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SPECIFICATIONS FOR LABOR AND MATERIALS

FOR

EDISON ELEMENTARY SCHOOL 2019 ADDITION

FOR

MACOMB CUSD #185

323 W. WASHINGTON STREET

MACOMB, IL 61455



**VOLUME ONE – CONTRACT TERMS – ARCHTECTURAL
FIRE PROTECTION - PLUMBING**

PROJECT NUMBER: 2275 0217

ISSUE DATE: March 4, 2019

PRE-BID: Wednesday March 20, 2019 at 3:15 p.m.
Edison Elementary School, 521 S. Pearl St., Macomb, Il 61455

BID DATE: Wednesday April 10, 2019 at 2:00 p.m.
Macomb CUSD #185, District Office
323 W. Washington Street
Macomb, IL 61455



DIVISION 00 – BIDDING & CONTRACT REQUIREMENTS

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PROJECT: EDISON ELEMENTARY SCHOOL 2019 ADDITION

FOR: Macomb CUSD #185
323 W. Washington Street
Macomb, IL 61455

SUPERINTENDENT OF SCHOOLS: Dr. Mark Twomey

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A/E PROJECT NO: 2275 0217

ISSUE DATE: March 4, 2019

Specifications are divided into two books for convenience:
Volume 1 - Division 0 Procurement through Division 22 Plumbing
Volume 2 - Division 23 through end of specification Division 32

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 END 00 0110

DIVISION 00 – PROCUREMENT REQUIREMENTS
Section 00 1116 – Invitation for Bids

Sealed proposals will be received by: Macomb CUSD #185

For Project: Edison Elementary School 2019 Additiion

Proposals to be submitted prior to **2:00 p.m.**, prevailing time, April 10, 2019.

Submit to: Macomb CUSD #185
323 W. Washington Street
Macomb, IL 61455

Pre-Bid Meeting: Wednesday, March 20, 2019 – 3:15 p.m., Edison Elementary School, 521 S. Pearl Street, Macomb, IL 61455

Proposals shall be delivered to the Macomb CUSD #185 District Office prior to the time of opening. Proposals shall be clearly identified on the outside of the envelope as "Sealed Proposal" and list the project title as shown above. Immediately following the stated time, proposals will be opened and publicly read.

Terms of the proposal:

- Bid Security is required, 5% Bid Bond payable to Macomb CUSD #185.
- Owner protective bonds are required in the amount of 100% of the Contract value.
- Illinois Prevailing Wage Act P.A. 86-799 and Illinois Certified payroll reporting P.A. 094-0515 apply to this contract.
- Revised Statutes of the Illinois Criminal Code, apply, including the School code.
- No faxed proposals or proposal modifications can be considered.

The Board of Education has the right to reject or accept any or all parts of all bids submitted and to waive any or all irregularities in the bidding and to accept the lowest responsible bid in compliance with the past experience requirements listed in the bid documents.

Plans and specifications prepared by the Architect, Middleton Associates Incorporated, 1702 W. College Avenue, Suite E, Normal, Illinois 61761-2793, Phone 309/452-1271, FAX 309/454-8049. Plans and specifications may be reviewed without deposit at the office of the Architect or Macomb CUSD #185 District Office.

Bid Documents are available on line at www.middletonassociates.net paper copies may be purchased directly from The Copy Shop in Bloomington or with a \$100 refundable deposit one set from the architect, phone 309/827-5466. Addendums or amendments to the bid documents will be available online, or electronically upon request.

END 00 1116

DIVISION 00 – PROCUREMENT REQUIREMENTS
Section 00 2113 – Instructions to Bidders

1. GENERAL

1.1. QUALIFICATION

- A. Competency and responsibility of the Bidder, and of their proposed subcontractors, may be considered in making awards. Determination of responsibility prior to award may include:
1. A detailed statement regarding the business, technical organization, crew availability and evidence of capability for the work that is contemplated.
 2. Evidence of successful experience of personnel and previously completed construction projects
 - a. Contractor and personnel, five years or more commercial construction experience, including recent projects of similar or greater value, similarity of types of work, technical content, and complexity
 - b. Evidence that recent projects as described above have been scheduled and delivered on time, aggressively pursued to conclusion without delay.
 - c. Experience does not include frivolous claims for additional costs, or work requiring abnormal or extensive corrections.
 - d. Evidence that equipment was properly installed and started and functioned without abnormal warranty calls for installation related problems.
 - e. Evidence that the contractor coordinated with the Owner, scheduled work in a progressive manner to allow Owner reasonable access to get facilities ready for occupancy in a timely manner.
 - f. Evidence that phased projects have been completed without loss of services between phases.
 3. Information pertaining to the financial resources of the contractor to pursue the work may be considered prior to making the award:
 - a. Evidence of financial resources to cover retainage, meet payrolls, contract for and acquire or pre-pay materials. Resources and Contractor net worth available to this project less than 35% of the contract award may be grounds to disqualify the bid.
 - b. Evidence of unpaid bills, unresolved liens, outstanding claims by the Department of labor for wage, benefits or workman compensation violations or failure to provide accurate payroll information.

2. EXAMINATION OF DOCUMENTS, SITE AND WORK INCLUDED

- A. LOCATION OF THE PROJECT: Edison Elementary School, 521 S. Pearl Street, Macomb, IL 61455.

B. PRE-BID MEETINGS

1. **Pre-Bid Meeting is scheduled for 3:15 p.m. Wednesday, March 20, 2019, Edison Elementary School.**
2. Building may be available for inspection after 3:15 p.m. weekdays. Coordinate prior to day of visit if staff is available to open the building.
 - a. Call ahead to schedule. Randy Smith (309) 837-0560
 - b. Times other than the pre-bid meeting may or may not be able to be scheduled. Dependent on availability of school personnel.

C. EXAMINATION OF SITE AND CONTRACT DOCUMENTS

1. Bidder shall carefully examine bidding documents and inspect the site to obtain first-hand knowledge of existing conditions.
2. Access may not be available on short notice.
3. Do not ask for directions or interpretations of the work during these visits unless in combination with a pre-bid meeting, you may discuss the work but if any clarifications or questions become evident these must be handled through the A/E and no change to the project requirements will result from verbal clarifications of the work during a visit.
4. Each Bidder, by submitting his bid, represents that he has examined the bidding documents, inspected the site and premises, compared task requirements and time constraints to installation conditions and that he understands the obligations of the bidding documents. By providing a proposal he is certifying that he has familiarized himself with the local conditions under which the work is to be performed. Bidders will not be given extra payment or contract time for conditions that could have been determined by on site examination.

D. INTERPRETATION OF DOCUMENTS

1. Anyone having a doubt concerning the meaning of the Contract Documents, or any other questions, may submit a request for interpretation from the Architect/Engineer. All pre-bid interpretation shall be requested not later than FIVE (5) DAYS prior to the bid due date. Response, other than minor clarification, will be in the form of Addenda and will be mailed to each Bidder.
2. It shall be the Architect/Engineer's responsibility to clarify conflicts in requirements as may be reported to the Architect/Engineer. After bid due date, the Architect/Engineer shall determine the course to be followed for said clarification with no cost change to the Owner.

E. ADDENDA

1. Addenda may be issued before the bid opening date to clarify or modify the Contract Documents. Addenda are posted at www.middletonassociates.net

2. Addenda will be issued electronically. Email address is required to receive addenda.
3. If you have not registered your interest in the bid with the Architect, and do not receive or seek out the addendums then failure to recognize any Addendum may disqualify the bid.
4. Said addenda shall become a part of the Contract documents and supersede any conflicting specifications and/or clarify intent of same.

F. INTENT, ERRORS AND OMISSIONS

1. Any known conflict between requirements of various portions of the Contract Documents shall be reported to the Architect/Engineer prior bid due date and shall fall under the authority of Interpretation of Documents.
2. The Drawings are descriptive and directive in concept and are not intended to exhaust all detail situations required to complete the work. The procedures detailed shall establish the general character of solutions needed for typical, non-typical, and peculiar situations at the job site.
3. It is the intent of the documents that specified work and equipment be installed in a proper and finished manner, fully operational, at a minimum of generally accepted standards for good quality commercial construction. All necessary materials, labor, controls, accessories, brackets, fasteners, sealants, etc., to properly install and complete the work shall be provided unless specifically noted otherwise.
4. Each Contractor and Subcontractor shall coordinate and cooperate with the other Contractors to provide proper installation. Verify dimensions, services, installation conditions, obstacles to the work and modifications necessary to complete the work and coordinate the fit, finish and scheduling of the work.

G. DOCUMENT INTENT, PROJECT COMPLETION, FITTING AND FINISHING FULLY FUNCTIONAL, USER READY

1. It is the intent that all items of work included in the project are to be completely finished and all necessary associated components and accessories for proper completion and operation are to be included in the work.
2. Drawings are schematic in nature; every single element needed is not necessarily labeled, dimensioned or positioned. Unless specifically exempted, the Contractor shall provide as follows:
3. Good quality fit, finish and workmanship at a level of competency and quality equal to or exceeding commercial construction in the area.
 - a. Sealants, caulks, flashings, transitions, closures and components to assure infiltration and weather tight result and finished appearance inside and out.
 - b. Sealants, flashings, closures at building connections.

- c. Upper and lower flashings, in new construction and whenever possible, to shed water outward.
- 4. All components and assemblies to assure proper installation and performance of manufactured equipment, per manufacturer's or industry association standards as a minimum.
 - a. Mechanical equipment, plumbing, piping, ventilation, valves back checks, connections etc.
 - 1) Functional
 - 2) Operating under control
 - 3) Code compliant
 - 4) Commensurate with nominal building controls and operation
 - 5) Unless specifically noted to be different
 - b. Mechanical and electrical coordination, coordination of installation locations, hidden where possible, routed through the construction in the most expedient but concealed manner:
 - 1) Minor relocation of piping, equipment, installations shall be provided without cost change within 10' either way or reasonable pathways of similar distance.
 - c. All other equipment, kitchen, doors, hardware, windows and any other operable equipment.
 - d. Service access, filters, repairs always allow for reasonable repair and maintenance access.
- 5. Electrical circuits
 - a. In cases where the drawings or schedules for equipment indicate equipment power requirements, MCA, RLA, always verify with the final submittal on the equipment prior to rough in and pulling the wire.
 - b. If a larger capacity circuit is required at an additional cost for breaker or larger wire always report same to the A/E for direction before pulling the wire.
 - c. If there is no change in cost proceed with the work and report same to the A/E and note on the as built drawings.
- 6. Proper protection of dissimilar materials or components for bond problems, galvanic action, movement, moisture, and/or chemical reaction.
- 7. New finished appearance for all new work and work abutting existing where applicable.
- 8. Code compliance:
 - a. All equipment and installations.

- b. Electrical NEC, circuit protection, grounding, disconnecting means, GFI, and installation practices
 - c. Water, back checks, vacuum breakers, back flow preventers, service valves, hammer arrestors, expansion tanks.
9. Construction assembly details, setting forth special requirements, keyed to a specific section, detail or I.D. number, shall be considered applicable to similar assemblies throughout the contracted work unless specifically designated otherwise.

2.2. DRAWINGS & SPECIFICATIONS

A. OBTAINING INFORMATION

1. Drawings and Specifications may be obtained from the Architect, Middleton Associates Incorporated, 1702 W. College Ave., Suite E, Normal, IL 61761-2793, Telephone 309/452-1271, Fax 309/454-8049.
2. No deposit required for one set. Contractor may purchase additional documents directly from The Copy Shop in Bloomington.
3. To obtain documents provide the A/E all contact information as well as an email address for delivery of addendums and bidding information during the bid period.
4. Method of document distribution is at the option of the Owner and the Architect whether it is paper, or digital.
5. Replacement value \$60.00 for paper.

B. RETURNING DOCUMENTS

1. All documents remain the property of the Architect and shall be promptly returned after the bidding. The low bidder may keep documents and sub bidders may retain same until awards have been made.
2. Failure to return documents within 20 days after bidding will result in loss of deposit or compensation will be required for the replacement cost in the event there was not a plan deposit.

2.3. ALTERNATES

- A. The Bidder shall submit a proposal for every alternate listed in the Contract Documents. Failure to provide alternate prices may disqualify the bid.
- B. See Section 00 2413, Scope of Bids, for a description of Alternates.

2.4. BID SECURITY

- A. The Bidder shall furnish bid security, along with his proposal:
 1. Form of security to be bid bond or certified check payable to the Owner.

2. Amount 5% of the base bid proposal
 3. Said security shall serve as a guarantee that the Contractor will enter into the Contract with the Owner as per his bid and the contract terms should the job be awarded to him.
- B. Should said Contractor refuse or fail to enter into a Contract with Owner per his bid for the work included in these Contract Documents within fifteen days following notification of award and/or receipt of a contract for signature, said bid security shall become collectible, in full, by the Owner in payment for damages.
1. Failure to enter into an agreement shall mean failure to return or submit:
 - a. A signed agreement.
 - b. Owner's protective bond(s) for Labor, materials and performance.
 - c. Approved subcontractor/supplier lists.
 - d. Certificates of insurance within stated time period.
 - e. Evidence that this contractor intends to pursue this contract in a timely and deliberate manner, including ordering of materials and committing or arranging for necessary manpower to accomplish the work.

2.5. WITHDRAWAL OF BIDS

- A. Bids may be withdrawn by an authorized person prior to the bid due date and time, after which time no bids may be withdrawn for a period of forty-five (45) days unless a Bidder has been released by the Owner's action.
- B. Authorized person shall mean an Owner or Officer of the Contractor offering the proposal or other evidence of authority.

2.6. PROPOSAL (BID) FORMS

- A. Each bidder shall submit his proposal, on proposal form provided.
1. Submitted bid forms may be copied
 2. All applicable blank spaces on forms shall be filled out fully.
 3. Numbers shall be stated in writing where noted and in figures.
 4. Signatures shall be live in longhand by person authorized to sign bids as Owner or corporate officer or shall include Power of Attorney to sign the bid.
 5. No facsimile proposals or modifications can be considered per Illinois School Code on public school projects.
- B. Completed forms shall be without delineation, clarification, alteration or modification.
1. Correction of contractor inserted is acceptable if clearly identified and initialed by the signatory to the bid. Irregularities of such

- corrections may be grounds to disqualify the bid.
2. Offers to clarify or modify may be made on voluntary alternates and substitution forms if provided in the bid package, but in no case should the base bid or requested alternate bids offered be based on anything but the document requirements.
- C. Voluntary alternates or offers for substitutions may be attached on forms provided or on the bidder's letterhead. These will be considered at the Owners option. Additional information may be requested prior to consideration.

2.7. AWARD OF REJECTION OF BIDS

- A. Although it is the intention of the Owner to accept the lowest qualified bid the Owner specifically reserves the right to waive all formalities and/or informalities, to reject any and all bids and/or accept the bid that, in the Owner's judgment is the lowest responsible bid.
- B. Contractor will note all alternates that are applicable, or as may become applicable by addendum, should be bid. Failure to bid an alternate may be grounds to disqualify the proposal, at the Owners discretion.
- C. Should the time for award exceed the time stated for the proposal's expiration period, the Owner reserves the right to continue to negotiate with bidders in the line of award succession as a prior option rather than re-bid.

2.8. RETURN OF BID SECURITY

- A. After bids have been read along with alternates as applicable and a successful Bidder has been approved by Owner, a Letter of Intent will be sent to the successful bidder and bid security may be returned to the unsuccessful bidders except the deposits of the two (2) most advantageous bidders will be retained until Owner/Contractor agreements have been consummated.
- B. Following the signing of the Contracts and receipt of bonds, remaining bid security will be returned. If the successful Bidder fails to accept the Contract and submit acceptable bonds, same will be grounds for forfeiture of his bid security.

2.9. OWNER'S PROTECTIVE BONDS: A 100% of value Labor and Material Payment Bond and Performance Bond including all alternates accepted is required in the Contract and shall be included in the Contractor's Proposal

- A. Periodic Change Orders that may occur to the Contract shall be included in each respective bond.
- B. Bonds shall cover the entire Contract without regard to the Contractor's assignment of work of Subcontractors or Suppliers.
 1. Inclusive of all awarded Alternates.

2.10. AWARD AND LETTER OF INTENT

- A. The Owner will make an award based on the selection of the lowest cost responsible bidder. After the award, and the issuance of a Letter of Intent, the contract timeline is as follows:
 - 1. Return signed agreement (10) days
 - 2. Sub Contractor, Supplier list, including any entity to be assigned a significant or skilled trade part of the work, provide list, addresses and contact information, (7) days. Provide references upon request.
 - 3. Labor and Materials Payment, and Performance bond(s), ten (10) days
 - 4. Insurance, ten (10) days
 - 5. Master Cost Breakdown (CSV), ten (10) days
 - 6. Proposed Schedule and time line, Pre Construction meeting
- B. Failure or refusal to provide the preceding Contract information in a timely manner may be cause for cancellation of the award or termination of the agreement if signed and the Owner will be entitled to compensation under the terms of the bid security for failure to execute contract terms in good faith.

2.11. LIST OF SUBCONTRACTORS AND SUPPLIERS

- A. Within seven (7) business days after notification of intent to award, and prior to the Contract being signed, the Contractor shall submit to the Architect/Engineer, a list of proposed subcontractors and major equipment suppliers and other persons or organizations to be assigned part(s) of the contract.
- B. This list is subject to the review and approval of the Owner. Basis for this review may include supporting evidence the proposed Subcontractor or Supplier has experience and adequate resources to accomplish the assigned responsibilities on time and in compliance with the requirements.
 - 1. The Owner reserves the right to request justifiable changes in the list.
 - 2. The changes requested are intended to be made at no additional cost to the Owner.
 - 3. If it is not possible to make requested changes at no additional cost, the Owner reserves the right to terminate the award and negotiate with the next successive bidder based on his original proposal.

2.12. MATERIALS SPECIFIED AND QUALITY OF WORK

- A. Materials shall be as specified or approved equal.
 - 1. Approved equal" and "or equal" shall mean that the Contractor shall be required to receive the approval (via the Architect) on any substitute materials.
 - 2. Requests for substitution approval shall be submitted to the Architect/Engineer, seven (7) days prior to the bid due date.

3. Prior to considering substitutions, the Owner and/or the Architect/Engineer may require submission of samples, descriptive, technical and catalog data and lab reports of tests for verification of equivalency.
4. If approved and selected, all adaptations to fit and accommodate the substitute or equal equipment including coordinating other trades is the responsibility of the Contractor requesting the change.

2.13. PROGRESS PAYMENTS

- A. Will be made not more frequently than monthly, per the Owners payment schedule.

2.14. PROJECT ACCESS: The Contractor shall be aware that the Town/City, Township, County or State has authority over various approach roads for site access and the Contractor is responsible to:

- A. Observe load limits and arrange for any exceptions to load restrictions that may be required for this project.
- B. Make arrangements for road cleanup, barricades and surface patches and repairs shall comply with applicable regulations and be subject to the governing authority approval.

2.15. EQUAL OPPORTUNITY EMPLOYMENT: The following clause is applicable unless this Contract is exempt under the rules and regulations of the Secretary of Labor of the State of Illinois.

- A. During the Performance of this Contract, the Contractor agrees as follows:
 1. The Contractor will not discriminate against any employee or applicant for employment because of race, color, religion, sex, age or national origin. The Contractor will take affirmative action to ensure that all applicants are considered and that employees are treated, during employment, without regard to their race, color, religion, sex, age or national origin."

2.16. ILLINOIS STEEL PROCUREMENT ACT

- A. During the performance of this contract, the contractor agrees to:
 1. Comply with the 30 ILCS 565
 2. Steel products used or supplied in the performance of that contract or any subcontract thereto shall be manufactured or produced in the United States.
 3. All requirements of and/or exemptions allowed in this regulation apply without exception.
 4. The Owner and A/E cannot interpret the legal requirements as applicable to this contract.
 5. Any additional cost incurred by the Owner for a violation of this provision shall be reimbursed by the Contractor.

6. If the regulation cannot be complied with due to product or inadvertent specification requirement, notify the A/E promptly for direction.

2.17. ILLINOIS DEPARTMENT OF LABOR AND LABOR RELATED REQUIREMENTS

- A. IDLR regulations apply to all work on site without exception.
- B. Publicly funded projects or projects managed by Public Bodies require the following:
 1. PREVAILING WAGE 820 ILCS 130/4: The Contractor shall pay and shall require his subcontractors to pay the prevailing hourly wages as is determined by the Illinois Department of Labor pursuant to the Illinois Prevailing Wage (820 ILCS 130/1 et. seq.) included at the end of this section.
 2. CERTIFIED PAYROLL REPORTS: Will be required with each successive pay application for payroll periods preceding the application date.
 3. SUBSTANCE ABUSE PREVENTION ON PUBLIC WORKS 820 ILCS 265: All Contractors must be prepared to certify upon request that they have complied with the Illinois Substance Abuse Act, including a written program that meets or exceeds the requirements of this act for the prevention of substance abuse among its employees.

2.18. SALES TAX

- A. Materials supplied to a public school district are exempt from state sales taxes. The Contractor shall determine the extent of exemption and shall comply with the regulations established by the Illinois Department of Revenue.
 1. Macomb CUSD 185 Sales Tax Exemption #E9995-1223-07.

2.19. TOBACCO AND ALCOHOL FOR CONSUMPTION PRODUCTS

- A. Smoking, chewing, tobacco use; shall not be permitted anywhere on public school property by State Statute.
- B. Alcoholic beverages, controlled substances, unauthorized prescription medication are not allowed on school property.
 1. Working under the influence of any of the above and/or a legal prescription that causes impairment is not allowed.
- C. Violators may be removed from the job sites subject to conditional return privileges in the future.

2.20. SEXUAL HARASSMENT POLICY

- A. The Owner will not tolerate sexual harassment in any form. Sexual

harassment is defined, for the purpose of this policy, as "unsolicited, deliberate or repeated sexually derogatory statements, gestures or physical or implied physical contact that cause discomfort or humiliation. Sexual harassment may involve pressure from a person of either sex against a person of the opposite sex or same sex . . ."

1. Should evidence that a Contractor, or a Contractor's employee, has harassed staff, student or other individuals, that employee shall be removed from the job site permanently or until such time that the circumstances have been determined to have been resolved satisfactorily.

2.21. BACKGROUND INVESTIGATION AND SEX OFFENDERS ON SCHOOL GROUNDS

A. Illinois Criminal Background checks may be applicable to this Contract. per 105 ILCS 5/10-21.9 and 105 ILCS 5/14-7.02.

1. According to current interpretation a background check is only required of Contract personnel or persons working in direct contact with students.
2. This standard in no way reduces or eliminates restriction in the law for certain convictions and proximity to school grounds.

B. The Contractor shall:

1. Maintain a list available to the Owner of all the employees who will be or are anticipated will be employed on site. This list shall be updated when new persons not originally listed will be working on site. This list shall also include names of personnel employed by subcontractors.
2. Persons temporarily on site such as truck drivers or employees making deliveries do not need to be listed, but the Owner reserves the right to request a background check if deemed in their interest.
3. Copies of employee lists shall be promptly provided to the Owner upon request and employees on site shall agree to submit to a background check if requested.
4. Persons failing such check or refusing shall be removed from working on this site.

C. The Contractor shall not knowingly employ on school grounds any person who has not signed or will not sign an authorization for a criminal background check.

D. The Owner reserves the right to run fingerprint background checks on any or all employees on site, randomly or specifically, and the cost of this check will be borne by the Owner. Upon request, provide information, which will not be shared, as needed to complete checks. This may include SSN, home addresses, fingerprint, address, etc. and any alias or former names used.

- E. The Contractor shall assume the responsibility to notify all on site employees or potential employees of this provision, and of the consequences of this provision.

2.22. BUILDING PERMITS

- A. This project is exempt from local permit fees associated with the construction. Any such fees assessed are reimbursable.
 - 1. This Contractor shall fully cooperate with the local authorities and shall apply for and obtain all required permits and comply with local regulations and requirements. Only the fee is exempt.
 - 2. Provide necessary permit related information to local city authorities.

2.23. CONTRACT DOCUMENTS CHECK LIST

- A. Proposal
 - 1. Proposal Form properly filled out and signed, (live signatures)
 - 2. Bid Bond/Bid Security for 5% of base bid amount (live signatures)
 - 3. Low bidders exempt, return of documents within fifteen (15) working days after bid due date
- B. Letter of Intent
 - 1. Supplier - Subcontractors List, (10 days after Award)
 - 2. Employee list and criminal background affidavit, (prior to start on site.)
 - 3. Proposal & Contract Form prepared by the Architect, (signed and returned 10 days after receipt).
 - 4. Labor and Material Payment Bond, two copies (10 days after award)
 - 5. Performance Bond, two copies (10 days after Award)
 - 6. Insurance Certificates, liability and hold harmless, three copies (10 days after award)
 - 7. CSV - Master Cost Breakdown (Preconstruction meeting)
 - 8. Bar Graph/Progress Schedule, copies as required (Preconstruction meeting)
- C. Periodically as needed
 - 1. Update employee list and criminal background affidavit as needed.
- D. Periodic Application for Payment
 - 1. Submit per the monthly scheduling, to be determined
 - 2. Application and Certificate for Payment, 3 copies (AIA G702A)
 - 3. Contractor's Affidavit, 2 copies (AIA G706)
 - 4. Breakdown Estimate, 3 copies
 - 5. Partial Waivers of Lien, 2 copies

- a. Partial Waiver of Lien from Subcontractors/Suppliers for previous payment, 2 copies.
 - b. Updated Progress Schedule, submit with each pay request
6. Certified Payroll for all trades employed on site.
- E. Substantial Completion
1. Notification work is ready for inspection.
 2. List of deficiencies or incomplete work.
- F. Final Application for Payment:
1. Letter to Architect that deficiency work is complete
 2. Final Lien Waiver from the Contractor, 2 copies
 3. Final Lien Waivers from Subcontractors/Suppliers, 2 copies
 4. Final Affidavit showing \$0.00 due to Subcontractors and \$0.00 due to Suppliers, 2 copies
 5. Final Payment Approval Letter from Bonding Co., 2 copies
 6. Certification of all guarantees, warranties and service contracts, O & M Manual
 7. Final Application & Certificate for Payment, 3 copies (AIA G702A)
 8. Additional certifications as may be requested, 2 copies
 9. Operating manuals & instructions, 3 copies-indexed and bound
 10. Figure Bonus / Penalty and Liquidated Damages if applicable.
- G. IDL Prevailing wages following pages.

END 00 2113

DIVISION 00 – PROCUREMENT REQUIREMENTS
Section 00 2213 – Supplementary Instructions

1. GENERAL

1.1. DESCRIPTION OF DRAWINGS AND LAYOUT

- A. Drawing data is intended to be reasonably accurate, however, strict accuracy in detail is not guaranteed.
1. Drawings, particularly Mechanical and Electrical drawings are schematic in nature.
 2. The Contractor must verify all of the actual conditions, measurements, dimensions, rough-in requirements; fitting of piping, conduit, wiring, and duct work and coordination necessary for each item, system or piece of equipment in the Contract Documents.
 3. Verification is the Contractor's responsibility and shall be completed prior to the fabrication or installation processes.
 4. Coordination of all elements of the work must be allowed for with cooperation between the trades particularly for conflicts of limited flexibility of installation. The general priority unless fixed conditions conflict is as follows: structure, placement of equipment, service access, mechanical piping, plumbing piping, and electrical piping. Trade priority in the preceding list does not supersede field cooperation to collectively and most expediently install the work.
 5. All corrections necessary to provide properly installed, finished and operable system, in accordance with the intent of the Documents, shall be made at no additional cost.
- B. All measurements and conditions must be verified by actual observation at the site.
1. The Contractor shall be responsible for all of his work fitting into place in a satisfactory and workmanlike manner in every aspect and detail subject to the approval of the Architect. The Contractor shall provide layout work and verification measurement at his own cost.
 2. The Contractor shall perform all layout work pursuant to site, building, grades and levels, and furnish such engineering services as he may require executing the intent of the work included.
- C. Before starting his work, the Contractor shall examine all Contract Area Drawings and Specifications and if discrepancies or conflicts are apparent or occur during the progress of the work:
1. Work first with the conflicting trades or installations to fit and coordinate the work.
 2. If there appear to be no practical or agreeable way to coordinate the fitting of the work report same to the Architect as a Request for Instruction, RFI, and obtain direction or interpretation to proceed.
- D. The Drawings are instructive and diagrammatic and shall be followed as closely as actual construction will permit. All changes from Drawings necessary to complete the work shall be done at no added cost charge to

the Owner above the amount shown on the Owner/Contractor Agreement.

1.2. OVERLOADING OF EXISTING FACILITIES

- A. Care shall be taken that completed structures are not overloaded during Contractor operations. It shall not be the Owner's, or Architect/Engineer's responsibility to observe and check construction processes and temporary loading conditions that may temporarily occur in the pursuit of the completed installations.
 - 1. Structural design, unless noted otherwise, is designed to accommodate design loads, per code, after completion.
 - 2. Bracing and shoring for loading or stability prior to the installation of lateral support elements and diaphragm assemblies is the responsibility of the Contractor.
 - 3. All structural damage done by overloading the system shall be repaired by the Contractor or Subcontractor overloading the system.

- B. Streets, drives and sidewalks shall be protected from damage for overloading, cracking, impact loads, adjacent excavation or operations related to the new construction.
 - 1. Repair or replace any damaged sections as agreed to by the A/E and Owner.
 - 2. While the intent is not to take advantage of this to repair already damaged surfaces, additional damage to an already cracked surface will trigger repairs to be made. If the surface is substantially damaged, failed or settled notify the A/E and Owner prior to operations that you cannot be responsible for additional failure on the particular location.
 - 3. Photo records of before conditions are recommended. Provide copy of same to A/E and Owner upon request.

1.3. MEANS AND METHODS

- A. The Architect/Engineer and Owner shall have no authority over the means, methods and procedures of the work and shall make no determination pursuant thereto nor render opinions concerning same.
 - 1. The Architect's Field Representative does not have authority to render opinions on structural questions.
 - 2. If questions arise submit a Request for Information, RFI, for direction.

- B. The Architect/Engineer and Owner and representatives of same shall have no authority over methods employed or safety conditions related to:
 - 1. Erection loads and as they relate to the Contractor's interest and shall provide no observation of same.
 - 2. Upon request the Architect can provide the design loads employed for the final installation.

3. The contractor shall designate an employee of the contractor as the person in charge of and responsible for directing the work and safety procedures on site.

1.4. PROTECTION OF WORK AND BUILDING

- A. The Contractor shall protect all work and stored materials from injury or loss caused by or resulting from operations under this Contract, including but not limited to:
 1. Physical damage
 - a. Poor stacking practices
 - b. Abuse damage due to adjacent operations or exposures
 - c. Weather related damage
 2. Failure to have reasonably secured stored and in progress work.

1.5. MOVING OF MATERIAL

- A. Contractor materials which are temporarily located or stored shall be relocated as needed to allow access by the Contractor, other Contractors and the Owner's personnel in and around the construction area.
 1. Prior to storing materials coordinate the operations to avoid conflicts.
 2. Such moving of any material shall be at no additional cost to the Owner.
- B. At no time shall tools, materials or workmen block an exit unless same has been coordinated with other trades on site and reasonable alternative options are maintained.

1.6. SHORING, BRACING, AND BARRICADES

- A. The Contractor shall provide, construct and finally remove all temporary shoring, bracing, underpinning, scaffolding, needling, barricades, etc. as required by local restrictions and as necessary for to protect persons and property from damage or injury.
 1. The Contractor shall determine the need for these items.
 2. The Contractor shall be responsible for the performance or failure of performance of same and shall repair damages caused by failure or absence of same.
- B. Specific temporary shoring supports, etc., may be noted in the Documents, such as for new openings or certain renovations in existing work.
 1. All such needed shoring is always not noted but the responsibility of the Contractor or Sub Contractor making the opening or installing the new work as needed
 2. Notation on the drawings is an observation that existing support conditions are being impacted by the work and shall be attended to

- by the Contractor as needed by conditions discovered.
3. In all cases, observe actual conditions of the work, same may be different than the anticipated conditions and may require shoring bracing and barricades.

1.7. MATERIALS, WORKMANSHIP, AND LABOR

- A. All installed materials and equipment shall be new and shall be installed and completed in a first class, workmanlike manner.
- B. The Architect reserves the right to direct the removal and the replacement of any item which, in his opinion, does not present a proper, orderly or reasonably neat installation. Such removal and replacement shall be done promptly when directed by the Architect or the Owner. All installations will be subject to the Architect's and Owner's inspections, tests, and approval at all times from commencement of the work to Final Acceptance of the completed Contract.
- C. Work needing correction or replacement that is not corrected with reasonable promptness shall be subject to written notice thereof by the Architect. The Contractor by virtue of having tendered his bid for the work, agrees that progress payments by the Owner may be held (no payment made) until said faults have been corrected.

1.8. ALIGNMENT BALANCING

- A. The Contractor shall be responsible for supervision of the installation of equipment.
 1. Level, adjust, balance and align new equipment and reinstalled or relocated equipment.
 2. Provide all alignment per manufacturer set up recommendations, align and balance pumps, belts and pulleys and adjust equipment to work properly.

1.9. CLEANING

- A. Work areas shall be maintained reasonably clear of accumulated debris, cartons and unused equipment to allow orderly pursuit of the Work.
- B. All surfaces shall be cleaned of any paint, plaster, mortar, gook and other stains.
 1. Care shall be taken that no surface is scratched, marred or damaged by the cleaning process.
 2. Damaged, marred or scratched surfaces of any type shall be repaired to new or original condition or replaced if necessary to provide a final installation acceptable to the Architect.
- C. Final Cleaning - All areas new and renovated areas:
 1. Clean and dusted.

2. Floors cleaned ready for occupancy.
3. Marks and scuffs repaired.

1.10. OPENINGS IN CONSTRUCTION

- A. Openings required for construction work shall be provided by the Contractor, complete with all necessary reinforcing, lintels, trim, finishing, etc. as shall be needed to complete the Work including openings required for electrical and mechanical work.
 1. Openings to be provided for other trades must be laid out and noted by the trade needing same prior to construction of the surface through which the opening is needed.
 2. Untimely note of required openings shall be the responsibility of the Contractor or Subcontractor not requesting same.
 3. All sleeves, flanges and forms, etc., shall be furnished by the Contractor requiring the opening.
- B. Concrete slabs, joists, concrete floors, finished floors, walls and structural elements, and other structural items shall not be cut or disturbed, except as approved by the Architect IN WRITING.
- C. Pipes or elements passing through floors or partitions shall have sufficient clearance around pipes to prevent damage to the adjacent finish from expansion and contraction.

1.11. FIRE SEALS

- A. All penetrations of fire walls, smoke barriers and floors shall be properly fire sealed to prevent the passage of smoke and maintain the integrity of fire barriers.
 1. Such seals are the responsibility of the contractor for whom the penetration is provided.

1.12. SUPPORTS

- A. The Contractor shall provide all concrete, steel bases and anchorage except as herein specified otherwise: vibration absorbing foundation bases, hangers, platforms, anchor bolts, etc. for all equipment which he furnishes. These foundations or supports shall be as specified under their respective headings, as shown on the drawings and/or as recommended by manufacturers.
 1. Materials and installation requirements for curbs and pads shall be commensurate with the need.
 2. Concrete shall be 3500 psi minimum strength, air entrained 5% to 8% by volume. Install following commercial practices.
 3. Framed curbs or foundations shall be properly supported.

1.13. PROTECTION OF WORK

- A. The Contractor shall protect his work and adjacent existing work from injury by keeping all piping, ductwork, etc. capped, plugged, drained, or otherwise protected from injury including damage done by freezing and damage from building materials, cement and/or dirt, concrete traffic or exposure.

1.14. ELECTRICAL SERVICES TO EQUIPMENT

- A. Unless otherwise specified the Contractor shall furnish and install electrical feeders of proper size, and furnish, install and complete all power wiring and the control wiring for each motor, electrified signage and/or piece of equipment affected by the Contract.
 - 1. Although circuits may be called for on the drawings, ALWAYS verify the final equipment requirements before pulling wire in the event it needs to be increased in size.
 - 2. Contractors providing equipment shall verify the circuits and protection level and need for safety switches matches what they are providing.
- B. All electrical procedures shall comply with the National Electric Code, whether temporary or permanent.

1.15. SEALANTS

- A. Provide sealants in all locations where shown on the Drawings or called for in the Specifications and as necessary for infiltration tight and weather tight building envelope and finished visual appearance.
- B. Sealants shall be provided in locations as directed by the Architect, where equipment components or fixtures fit to surrounds, and when cracks between equipment and surrounds are undesirable or excessive. Provide sealants in all interior locations, as necessary to properly trim out.
- C. Sealants shall be installed and tooled in strict accordance with the Sealant Manufacturer's recommendations for joint preparation, using foam rope backer bars, etc. Sealant shall be installed by the respective Contractor providing the item requiring sealant installation.

1.16. PAINTING

- A. All exposed surfaces or equipment reworked and installations leaving damaged or unfinished surfaces shall be painted or have a corrosion resistant or factory applied finish.
 - 1. Unfinished non ferrous metals such as aluminum and stainless steel do not require painting.
 - 2. Field paint unfinished equipment and surfaces for corrosion protection and visual appearance, except where clearly stated to the contrary on the Drawings.

END 00 2213

1. BASE BID

1.1. DESCRIPTION

- A. The Base Bid is to provide the Owner with all materials equipment and labor to complete the specified contract work.
 - 1. All work is a single Contract, Edison Elementary School 2019 Addition, 521 S. Pearl Street, Macomb, IL 61455. The Base Bid proposal must be for the specified work as may be modified prior to the bid time and date by addendum.
 - a. Do not add any additional description of what is included or excluded from the bid on the proposal form, this may disqualify the bid.
 - b. Fully fill out the proposal/bid form, omissions and failure to sign will disqualify the bid. Minor irregularities in filling out the bid form may be considered by the Owner as inconsequential to the intended bid and may be declared as such and the bid be accepted.
 - 2. Voluntary Alternates or Substitutions may be offered on the Voluntary alternate and substitution form if provided or on the Contractor's letterhead if desired. Such options should not materially change the intent of the proposal. These may be considered or disregarded at the Owner's discretion without explanation.

1.2. UNIT PRICES

- A. None unless requested by addendum

1.3. ALLOWANCES

- A. **Include an allowance of \$35,000** for unexpected conditions. Excess to be refunded – assignment by agreed change order with the Owner.

1.4. ALTERNATE BIDS

- A. The alternates are to provide the Owner with options expanding or reducing the project scope and content and for comparative material or equipment prices for use in determining the final construction contract.
- B. Work included in alternates shall be commensurate with and in compliance with all the applicable and similar project specifications and conditions and shall include all necessary adjustments and additional labor and/or material as may become apparent to properly complete the alternate into the work. No additional charge will be considered after bidding for the purposes of making additional construction or adjustments in order to accomplish alternative work which has been included in the

Contract.

- C. Incidental Work: All necessary adjustment in the work shall be made to accommodate accepted alternates without cost change in and above the alternate cost.
- D. Alternates are always an add or deduct to the Base Bid proposal and requirements UNLESS a specific alternate is described as an alternate to another alternate

1.5. ALTERNATE BIDS

A. Alternate #1 – Flooring

- 1. All new areas specified in the finish schedule to receive VCT shall receive polished concrete in accordance with the specification for polished concrete section 03 3500
- 2. This does not include any existing areas in the existing building which require floor repairs or new floors.

B. Alternate #2A – Flooring

- 1. All new areas specified in the finish schedule to receive VCT in the specification shall receive Armstrong VCT with diamond 10 technology coating as specified in 09 6500 Resilient flooring.
- 2. This does not include any existing areas in the existing building which require floor repairs or new floors which shall be patched with match existing VCT.

C. Alternate #2B - Flooring

- 1. All new areas specified in the finish schedule to receive VCT in the specification shall receive Mohawk LVT luxury Vinyl Flooring in 18" x 36" material, as specified in 09 6500 Resilient flooring.
- 2. This does not include any existing areas in the existing building which require floor repairs or new floors which shall be patched with match existing VCT.

D. Alternate #3 – Power wash north side of the existing two story wing

- 1. See site plan Sheet C-1
- 2. Power wash using a mild detergent and medium pressure, Coordinate with the F=EFIS contractor on the job to determine proper cleaning procedures for EFIS materials. Do not damage surface with excess pressure or inappropriate angle of spray causing delamination
- 3. Repair anything delaminated or blown off if caused by the power washing process.

END 00 2413

DIVISION 00 – PROCUREMENT REQUIREMENTS
Section 00 3000 – Project Schedule & Terms

1. GENERAL

1.1. SCHEDULING

A. Master Schedule

1. The General Contractor as the Coordinating/Pacesetter Contractor shall maintain a Master Schedule.
2. Prior to preparation of the Master Schedule, all Subcontractors shall coordinate scheduling needs with the General Contractor.
3. Upon preparation of a detailed schedule, same shall be reviewed by the Architect and the Owner. Once accepted, it shall become the basis for determining the on time progress of the work.
 - a. Provide manpower, overtime, and equipment as needed to maintain the schedule. The Owner will not authorize additional payment for overtime or additional manpower needed to maintain, achieve, or make up time to meet the schedule.
 - b. The General Contractor shall notify the Architect and the Owner promptly of any deficiency in performance, which is unacceptably impacting the schedule or delaying progress.
 - c. The Subcontractor(s) shall immediately notify the General Contractor, in the event any trade area Contractor's progress is impeding their ability to maintain the schedule.
 - d. The General Contractor shall immediately provide notification of this report to the Architect and the Owner and shall include a plan of action to regain schedule.

B. Schedule

1. Contractors proposed schedule and timeline shall be delivered for review within seven (7) days or at the Pre-construction meeting.
 - a. Schedule will be subject to review and negotiated revision after Owner and Architect input are considered.
 - b. Schedule should be available for the Preconstruction meeting.
 - c. See also, scheduling shown on sheet C-1.0. It is the intent that work will proceed in the most expedient and least disruptive manner practical, including consideration of second shift hours for noisy or particularly disruptive activities.
 - d. It is further the goal that the front entrance and the existing office be encumbered for the least amount of time to reasonably complete the work. There will be acm floor removal to coordinate during the transition to remodel the existing space.

2. Submittals shall be delivered forty-five (45) days following award.
 - a. This schedule is adjustable shorter or longer depending on the size and content of the project
3. Upon receipt of review submittals, schedule material and equipment for delivery as needed
4. Confirm that manpower is available and Contractor has adequate capacity to complete the work on a timely basis.
 - a. Materials and equipment may be stored on site in trailers or in suitable insured warehouses in or near Macomb.
 - b. Materials and equipment delivered on site or suitably stored with proof of insurance may be submitted for payment, subject to inspection.
 - c. The Owner requests that equipment and materials to do the work be on site or readily available for delivery prior to the start of operations.
5. Schedule
 - a. Project is planned for execution over the 2019 through summer 2020 construction period with the schedule to be coordinated with the Owners schedule and in an orderly fashion.
 - 1) Classroom section of the project be completed July 23, 2020 for occupancy in the 2020 fall attendance cycle.
 - 2) Kitchen/cafeteria completion January 2020 occupancy.
 - 3) Contractor shall prepare a proposed schedule showing the planned substantial completion dates and the trade schedules.
 - b. Occupation of the kitchen and cafeteria must be coordinated to allow these facilities to continuously provide serving access to students and staff. There cannot be a down time between demolishing the old kitchen and occupying the new, nor can the cafeteria move prior to having the new cafeteria available.
 - c. It is intended all work to be complete and fully operational 30 days after receipt of substantial completion punch list.
 - d. See requirements for Manning the work described hereafter.
 - e. Work on the addition to begin promptly and as much as possible completed prior to winter

C. Manning the work

1. Contractors shall work overtime, Saturdays and/or double shifts if

work falls one (1) week behind prepared schedule or agreed to revision and shall continue to work Saturdays and double shifts, full crews or with additional crews until lost time is recovered.

2. Prepare a plan of action to recoup lost time for the A/E and Owner.

End 00 3000

PROJECT TITLE: Edison Elementary School 2019 Addition
DATE OF PROPOSAL: **Wednesday April 10, 2019, 2:00 p.m. prevailing local time**
LOCATION OF BID: SUPERINTENDENT'S OFFICE
MACOMB CUSD #185
323 W WASHINGTON STREET
MACOMB IL 61455

NAME OF FIRM _____

PROPOSAL FOR: All work/All trades - single contract

A/E PROJECT NO. 2275 0217

THE BID ACKNOWLEDGES THE FOLLOWING ADDENDA:
Failure to acknowledge may cause bid rejection

NO. 1 _____, NO. 2 _____, NO. 3 _____, NO. 4 _____, NO. 5 _____

EACH BID SHALL INCLUDE:

- A. THE BID FORMS AND CERTIFICATIONS COMPLETED AND SIGNED, (*this form may be copied.*)
- B. BID SECURITY (*standard industry forms may be employed*)
- C. BIDS SHALL INCLUDE \$35,000.00 ALLOWANCE – SEE 00 2413

BASE BID: Edison Elementary School 2019 Addition: THE BIDDER AGREES TO PERFORM ALL BASE BID WORK, PER SCHEDULE, INCLUSIVE OF ALL TRADES FOR THE SUM OF:

_____ **Dollars**
WRITTEN AMOUNT
\$ _____

ALTERNATES: A bid is not required for every alternate to be considered, however, failure to bid any alternate subsequently selected by the owner for award will disqualify the bid. Determination of the low bid for award consideration is by combination of the base bid plus selected alternates.

ALTERNATE NO. 1: Polished concrete floors

_____ **Add/Deduct \$** _____
WRITTEN AMOUNT

ALTERNATE No. 2A: Armstrong Diamond 10® finish VCT

_____ **Add \$** _____
WRITTEN AMOUNT

ALTERNATE No. 2B: Mohawk LVT flooring

_____ **Add \$** _____
WRITTEN AMOUNT

ALTERNATE No. 3: Power wash north elevation of two-story classroom wing.

_____ **Add \$** _____
WRITTEN AMOUNT

ALTERNATE _____
SPACE LEFT FOR ALTERNATE IF REQUESTED BY ADDENDUM

_____ **ADD\$** _____
WRITTEN AMOUNT

VOLUNTARY ALTERNATES OR SUBSTITUTIONS

Did you offer or include voluntary alternates or product substitution on form provided?

YES _____ **NO** _____

SEE PRODUCT SUBSTITUTION OR VOLUNTARY ALTERNATES FORM, ATTACH IF ANY ARE OFFERED. Voluntary alternates or substitutions may or may not be considered in making the award and are not required.

THE BIDDER AGREES TO:

1. Hold this bid open for thirty (30) calendar days after bid opening date.
2. Enter into and execute a contract with Macomb CUSD #185 if awarded this contract.
3. Comply with the contract and bidding documents with respect to bid security, all bonds, insurance, work requirements, schedule and Bonus / Penalty Clause
4. Comply with the Contract Documents with respect to scheduling as described in the documents, noted on drawings.

THE BIDDER MAKES THE FOLLOWING REPRESENTATIONS AND CERTIFICATIONS:

- A. A surety company has agreed to issue payment and performance bonds to fulfill the contracting requirements.
- B. The Bidder is not barred from contracting with any unit of state or local government as a result of violating the bid rigging or bid rotating provisions contained in 720 ILCS 5/33E.
- C. The Bidder is not barred from contracting with the State of Illinois as a result of a bribery conviction per 30 ILCS 505/10.2.
- D. All on site labor and wage compensation provided by this contractor or his subcontractors will comply with the Illinois Prevailing Wage Act (820 ILCS 130E).
- E. This proposal is made without any connection with any person making another bid for the same contract, that the bid is in all respects fair and without collusion or fraud, that no member of the Macomb School Board, other officer or any person in the employment of Macomb CUSD #185 is directly or indirectly interested in the bid or any portion of the profit there from, except as allowed by the Illinois Law or the Illinois School Code.
- F. I agree to provide a drug-free workplace as required by the Illinois Drug-free Workplace Act.
- H. I do hereby certify that I am either the bidder or duly authorized agent of the referenced bidder, and I am authorized to execute the certifications hereon.
- G. I certify that by submission of this proposal the bidder confirms that he is familiar with the site, existing conditions, the Bid Documents, requirements and the project schedule.

Contractor:

Firm Name: _____

Address: _____

Telephone: _____

FAX: _____

Email: _____

Date: _____

Authorized signature:

TITLE: _____

Seal for Corporations only

END 00 4000

00 4000 PROCUREMENT FORMS

Section 00 4010 - Voluntary Alternate and Substitution Form

The Bidder should include this form with the Bid Forms if a material or equipment option to that specified is offered at that time.

The Base Bid and Alternate Bids include only those products specified in the bidding documents. Following is a list of substitute products or assemblies which bidder proposes to furnish on this project, with the difference in price being added to or deducted from the Base Bid or Alternate Bids.

Bidder understands that acceptance of any proposed substitution is at Owner's option. Approval or rejection of any substitutions listed below will be subject to review after Contract award. Hold open for thirty-five (35) days from Bid Date.

SUBSTITUTIONS

MANUFACTURER'S NAME AND PRODUCT	ADD OR (DEDUCT)
_____	_____
_____	_____
_____	_____
_____	_____

VOLUNTARY ALTERNATE

DESCRIPTION	ADD OR (DEDUCT)
_____	_____
_____	_____
_____	_____
_____	_____

EVALUATION. Contract award will be made in accord with Instructions To Bidders. Only the lowest responsible bidder's Proposed Product Substitution Voluntary Alternates Form will be evaluated.

Attach with herewith or submit on day of bid a general description of the proposed option being offered.

Provide detailed information promptly upon request.

END 00 4010

DIVISION 00 – PROCUREMENT REQUIREMENTS
Section 00 4113 – Award & Contract Form

OWNER - CONTRACTOR AGREEMENT

Sample format to be customized to the project as awarded

Between:

The Owner: Macomb CUSD #185
 323 W. Washington Street
 Macomb, IL 61455

And the General Contractor: _____

For the Project:

**EDISON ELEMENTARY SCHOOL 2019 ADDITION
FOR MACOMB CUSD #185**

The Owner and Contractor agree to enter into a contract in accordance with the terms and conditions of the Documents (Plans & Specifications), A/E Project Number 2275 0217 and the Contractor's Bid Proposal dated _____, which become the Contract for completion of the project as follows:

Alternates awarded
Substantial Completion Date: July 23, 2020
Bonus penalty if applicable: none
Additional Terms & Conditions: None (or as applicable)
Addenda: #1____#2____#3____#4____(as applicable)

Contract Amount: (to be listed as appropriate)
Base Bid Proposal including \$35,000 allowance \$ _____
Alternate Bids as awarded to be listed \$ _____
Total Contract Award \$ _____

(Written) _____ Dollars

Date of Agreement: _____

Signatures:

Owner: Macomb CUSD #185

Contractor:

Contractor's Seal
(Corporation Only)

This Agreement must be signed and returned with the Contractor's Performance Labor and Materials Payment Bonds within fifteen (15) days of notice or the Contractor will be considered in default on acceptance of the award.

END 00 4113

DIVISION 00 – PROCUREMENT REQUIREMENTS
Section 00 7000 – General and Supplementary Conditions

1. GENERAL

1.1. GENERAL CONDITIONS

- A. The conditions outlined in this and following paragraphs are to supplement and complement the conditions found in the articles of the AIA Document A201, 2007 Edition.
 - 1. Included in these Specifications by reference is AIA Document A201 General Conditions.
- B. AIA Document A201, 2007 Edition, can be purchased directly on line from a variety of vendors including the AIA and are available in electronic format as well as printed.
 - 1. AIA A201 2007 version can be reviewed at the Architects office without charge.
- C. To the page one of the AIA A201 General Conditions Document:
 - 1. Project: Edison Elementary School 2019 Addition, 521 S. Pearl Street, Macomb, IL 61455.
 - 2. The Owner: Macomb CUSD #185, 323 W. Washington Street, Macomb, IL 61455.
 - 3. The Architect: Middleton Associates Incorporated, 1702 W. College Ave., Suite E, Normal, IL 61761
 - 4. The Engineer: CM Engineering, 2801 Woodard Dr., Suite 105, Columbia, MO 65202

1.2. SIGNING OF DOCUMENTS AND INSTRUMENTS OF THE CONTRACT

- A. All documents shall be signed by persons fully and duly authorized to so sign. Any documents signed by a person other than person prescribed by the Contractor's legal organization shall enclose with his signature the evidence of "Power of Attorney."

2. SUPPLEMENTARY GENERAL CONDITIONS

2.1. SUPPLEMENTS TO AIA DOCUMENT A201 (2007 EDITION) THE GENERAL CONDITIONS OF THE CONTRACT.

- A. The following sections represent modifications or additions to the AIA A201 -2007 Document.
- B. TO ARTICLE 1/GENERAL PROVISIONS
 - 1. Subparagraph 1.1.1 Contract Documents delete reference to Instructions for bidders and Addenda relating to bid requirements as not included in the Contract Documents.
 - 2. Add Subparagraph 1.1.1.1 The information provided to the bidder

in Division 0 of the documents, shall be included without deletion as part of the Contract Agreement.

C. TO ARTICLE 2/OWNER

1. Add Subparagraph 2.2.2.1 Easements off site required by the Contractor to execute the work, such as space for storage, access, scaffolding, lane enclosure, etc., shall be arranged for by the Contractor and included in the contract amount.

D. TO ARTICLE 3 CONTRACTOR

1. To Subparagraph 3.3.1, delete the last two (2) sentences listed under 3.3.1 in their entirety.
2. To Subparagraph 3.3.1 insert: If the Contractor determines that such means, methods, techniques, sequences or proceedings may not be safe, or may not be appropriate to the equipment and task as becomes apparent, then said Contractor shall have included in his proposal amount allowance to complete this work per a revised plan for which he can assume responsibility and shall notify the Owner and Architect before proceeding. In no case do the Owner and Architect take responsibility for directing Contractor Operations.
3. To Subparagraph 3.12
 - a. Add 3.12.6.1 Submittals unmarked will not be reviewed at the Architect's option. Said unmarked submittals may be returned to the Contractor for re-submittal and the time loss shall not extend the time of completion of the project.
 - b. Add 3.12.6.2 Submittals reviewed by the A/E and returned or held as a record copy presume the Contractor responsibilities in paragraph 3.12.6 have been included whether noted or not.

E. TO ARTICLE 5 SUBCONTRACTORS

1. To Subparagraph 5.2
 - a. Add 5.2.5 The assignment of work or a portion of the work by the Contractor to Subcontractor(s) is the election of the Contractor and in no way changes or reduces the Contractor's obligations under the Contract to properly complete the work and/or provide clear title to the work, including the work by said Subcontractor(s).

F. TO ARTICLE 7 CHANGES IN THE WORK

1. To Subparagraph 7.1.2
 - a. Add 7.1.2.1 The Contractor and/or his Subcontractor shall

not proceed with any work, directive or change for which he intends to claim extra cost without providing timely written notice to the Architect.

- b. Add 7.1.2.2 The Architect and Owner shall provide response to claims for additional cost within a reasonable time period upon receipt of notice or quote.
- c. Add 7.1.2.3 Work for which an agreement cannot be reached prior to implementation can proceed as time and material work with all parties to agree on what is additional work over that which should have been included to complete the work as originally intended.

2. To Subparagraph 7.2.2

- a. Add 7.2.2.1 Change Order quotes shall be based on an approved quote or estimate which shall be based on labor and material cost, actual or estimated as prior agreed upon, and:
- b. Add 7.2.2.2 Overhead and profit may be charged proportional to this category of work on the Contractor's CSV or not to exceed the greater of:
 - 1) Eighteen percent (18%) for the Contractor's own work forces
 - 2) Ten percent (10%) Subcontractor plus ten percent (10%) Contractor, for twenty percent (20%) total for work completed under a Subcontractor arrangement.
 - 3) These allowances shall include all off site and indirect costs, including insurance, project management, bonds and profit.

G. TO ARTICLE 9 PAYMENT AND COMPLETION

1. To Subparagraph 9.6.1

- a. Add 9.6.1.1 Wherein the Owner is governed by a public Board, payment requests must be received by the A/E 5 days prior to the established time for entering into agenda prior to the next regular Board Meeting. Payments will be made within twenty-five (25) days following Board approval. Failure to make agenda dates will result in a minimum one (1) month delay in payment.

H. TO ARTICLE 10 PROTECTION OF PERSONS AND PROPERTY

1. To Subparagraph 10.2.1

- a. Add 10.2.1.4 The Contractor shall be responsible to provide and maintain on site MSDS Sheets for all required materials to be brought on site.

- 1) These sheets shall be readily available upon request to the owner on remodeling renovation projects which are Owner occupied.
- 2) Comply with VOC regulations.
- 3) Comply with IEPA regulations.

2. To Subparagraph 10.2.3

- a. Add 10.2.3.1 Provide for the general safety of public and Owners employees, such safety provision shall be adjusted as appropriate to the age and volume of public anticipated in the project vicinity.
- b. Add 10.2.3.1 Provide for traffic safety as appropriate to the operations; cooperate with the governing authorities on road activities, lane closures, excavations, surface cleaning etc.

I. TO ARTICLE 11 INSURANCE & BONDS

1. To Subparagraph 11.1.2

- a. Add 11.1.2.1 Minimum Limits of Liability for preceding coverage are:
 - 1) Workers Compensation - Statutory Limit
 - 2) Applicable Federal (*such as Longshoreman's*) Statutory limits.
 - 3) Liability Insurance may be written as Comprehensive General Liability policy form or Commercial General Liability policy form with the following coverages:
 - a) Bodily Injury - \$1,000,000 each occurrence, \$2,000,000 aggregate
 - b) Property Damage - \$1,000,000 each occurrence, \$5,000,000 aggregate.
 - c) Property Damage – Broad Form - \$1,000,000 each occurrence, \$2,000,000 aggregate.
 - d) Personal injury (*with employment clause deleted*) \$1,000,000 aggregate.
 - e) Products and completed operations \$1,000,000 to be maintained one year following final completion.
 - f) Business Automobile Liability, (*including owned and non-owned and hired vehicles*)
 - g) Bodily Injury and Property damage \$1,000,000 each person, \$1,000,000 each occurrence.
 - 4) Umbrella Insurance may be employed to supplement primary insurance limits to meet required limits.

- 5) Contractor is responsible for any self insured limits not to exceed \$10,000 for any self insured hazards each occurrence
 - 6) In the event that a claim is filed or a settlement reached whether related to this project or not which compromises the aggregate limits of liability then the Owner and Architect shall be notified and arrangements shall be made to provide additional insurance as needed to keep aggregate limits in force for the remainder of the Contract.
2. To Subparagraph 11.1.4
 - a. Add 11.1.4.1 The Owner, Architect, and Consulting Engineers including their employees and representatives shall be included as Additional Insureds or Named Insureds on the insurance and shall be shown as such on the Certificate.
 3. To Article 11
 - a. Add 11.1.5 Contractor's insurance shall be maintained in force through basic warranty and guarantee periods, not less than one (1) year following Final Completion.
 4. To 11.3. Property Insurance
 - a. Add 11.3.1.1 The Owner's property and vandalism insurance has \$1,000 deductible. The Contractor shall insure and thus pay the costs not covered by the Owner's deductibles.
 - b. Add 11.3.1.2 The Owner's Builder's Risk will cover only normally included Owner risks, on site, Owner's interest only, excluding tools and property of the Contractor and improperly stored or unsecured materials or loss/damage resulting from contractors operations.
 5. To Paragraph 11.4.1 add the following Subparagraphs:
 - a. Add 11.4.1.1 The Contractor shall furnish Performance and Labor and Material Payment Bonds covering the faithful performance by the Contractor of the work specified in accordance with the plans and specifications and according to the time and terms and Conditions of the Contract, and also that the Contractor shall properly pay all debts incurred in the prosecution of the work, including those for labor and materials furnished and including labor obligations as interpreted by the Illinois Department of Labor and/or the courts.
 - b. Add 11.4.1.2 The cost of each bond shall be included in the Contract Sum plus any changes to the Contract Sum. The Contractor shall include in all bonds provisions as will

- guarantee faithful performance of the prevailing wage provisions of the Contract if applicable.
- c. Add 11.4.1.3 Bonds shall be written by surety, approved by Owner, with a minimum rating of B or better, Financial Class V, or higher, in A.M. Best's Insurance Guide, current edition. The company must also be licensed in the State of Illinois.
 - d. Add 11.4.1.4 The Contractor shall require the attorney-in-fact who executes the bonds on behalf of the surety to affix thereto a certified and current copy of power-of-attorney.
 - e. Add 11.4.1.5 The Contractor shall deliver the required bonds to the Owner not later than fifteen (15) days following the date the agreement is executed.

J. TO ARTICLE 12 UNCOVERING AND CORRECTION OF WORK

1. To Subparagraph 12.2.2.1 After Substantial Completion:

- a. Add 12.2.2.1.1 Latent Defects, for a period of 10 years after Substantial Completion, upon demand by the Owner, the Contractor shall promptly repair or replace, including associated work repairs and cleanup necessary, defective or non-conforming work resulting from or constituting latent defects, fraud, fraudulent concealment or gross negligence.
- b. Add 12.2.2.1.2 Seasonal equipment such as temperature controls and building systems subject to seasonal loads such as heating equipment and air conditioning, shall be warranted to perform as intended for two years. Exception would be equipment damaged by incorrect operation or maintenance procedures, specifically covered in training, but improperly implemented by the Owner.
- c. Add 12.2.2.1.3 Prompt Repair. Upon notice from the Owner or Architect of defects or nonconforming work, the Contractor shall promptly visit the site in the company of the Owner's representative to determine the extent of all defects or nonconforming work. The Contractor shall provide all labor, material and equipment to promptly repair or replace the defective or nonconforming work. The repair shall include all adjacent work not necessarily provided by the Contractor, but damaged as a result of correcting or remedying such defects or non-conforming work. If the Contractor does not promptly pursue correction, the Owner may repair or replace such work and charge the cost to the Contractor. Work which is repaired or replaced by the Contractor shall be inspected and shall be warranted by the Contractor in accordance with this Article.
- d. Add 12.2.2.1.4 The warranties set forth herein are in addition to all warranties or guarantees expressed or implied by operation of law, statute or ordinance.

1. To Subparagraph 12.2.2.3, Delete the word 'not'. Clarification; all materials and equipment are expected to perform satisfactorily for one year, items or equipment needing periodic attention during the

first year of use, shall continue to be serviced by the Contractor until such time that the material, item or equipment is deemed to be doing its intended purpose without repeated service.

2. To Subparagraph 12.2.5

- a. Add 12.2.5.1 Extended Warranties and Commercial Warranties. The Contractor shall deliver all commercial and extended warranties received from manufacturers to the A/E prior to Final Payment. Extended warranties and guarantees will be as described under the various trade work sections of these documents, and may be the responsibility of third parties to the contract such as dealers or manufacturer's from whom such extended coverage is specified or as advertised such as a commercial limited warranty of performance or service. Such extended warranties may or may not include labor unless specified, or in the case of commercially advertised warranties as offered by the party selling the product or equipment.
- b. 12.2.5.2 Prompt Repair. Upon notice from the Owner or Architect of such defects or nonconforming work, the Contractor shall promptly visit the site in the company of the Owner's representative to determine the extent of all defects or nonconforming work. The Contractor shall provide all labor, material and equipment to promptly repair or replace the defective or nonconforming work. The repair shall include all adjacent work not necessarily provided by the Contractor, but damaged as a result of such defects or nonconforming work or as a result of remedying them. If the Contractor does not promptly repair or replace defective or non-conforming work, the Owner may repair or replace such work and charge the cost thereof to the Contractor. Work which is repaired or replaced by the Contractor shall be inspected and shall be warranted by the Contractor in accordance with this Article. The warranties set forth herein are in addition to all warranties or guarantees expressed or implied by operation of law, statute or ordinance.

B. TO ARTICLE 13 MISCELLANEOUS PROVISIONS

1. To Subparagraph 13.1

- a. Add 13.1.1 Location of the project is Illinois.
- b. Add 13.1.2 The Contractor shall, to the best of his knowledge and capability, perform all work encompassed by the documents, in compliance with the Environmental Barriers Act (Ill. Rev. Stat. 1985, ch. 111-1/2, pars. 3711 et seq. as amended), the Illinois Accessibility Code, 71 Illinois Administrative Code 400; The Uniform Federal Accessibilities Standards (UFAS); Section 504 of the Rehabilitation Act of 1973, and the Americans with Disabilities Act of 1990 (effective January 26, 1992) known

as ADA requirements. This obligation shall apply to the contractual work described as the project and the conduct of work processes initiated to accomplish the work.

- c. Add 13.1.3 All parties to this Contract are subject to the rules and regulations of the Illinois Department of Human Rights and the statutory requirements thereof, including the requirement that every party to a public contract shall have adopted written sexual harassment policies (PA 87-1257).
- d. Add 13.1.4 It shall be mandatory that the Contractor will not discriminate against any employee or applicant for employment because of race, color, religion, sex, national origin or ancestry, age, marital status, physical or mental disabilities.
- e. Add 13.1.5 Illinois Department of Labor requirements. It shall be mandatory upon the Contractor to whom the Contract is awarded and upon any Subcontractors thereof to be in compliance with applicable wage and reporting regulations. This project is a Prevailing Wage Public Works contract.

2. To Subparagraph 13.3.

- a. Add 13.3.1 Notice served by facsimile (fax) to facsimile number used during bidding and construction shall be official written notice.
- b. Add 13.3.2 Notice served by electronic means (email) to the electronic address used during bidding and construction shall be official written notice.
- c. Add 13.3.3 The Bidder shall notify the Architect and/or the Owner at anytime of changes in the facsimile or electronic contact addresses that will reach the contractor. Failure to so notify is the Contractors responsibility.

C. TO ARTICLE 15 CLAIMS AND DISPUTES

1. To Subparagraph 15.3.1 Delete the word 'SHALL' and Insert the word 'MAY'.

- a. Add 15.3.1.1 Mediation may be employed to resolve disputes if agreed to by both parties to the Contract.

2. To Subparagraph 15.4.1 Delete the word Shall and insert the word 'MAY'.

- a. Add 15.4.1.1 Arbitration may be employed to resolve disputes if agreed to by both parties to the Contract.

End 00 7000

1. GENERAL

1.1. REQUIREMENTS INCLUDE

A. Work covered by Contract Documents

1. The Contract includes all phases of the construction work pursuant to the Edison Elementary School 2019 as set forth in these Specifications and the accompanying Drawings.
2. All work, single Contract.
 - a. All labor and materials necessary to complete and finish properly and all systems operable unless specifically noted as by owner.
 - b. General Construction Work (GC) Prime
 - c. Plumbing, (PC) Subcontractor
 - d. Mechanical (MC) Subcontractor
 - e. Electrical Work (EC) Subcontractor
 - f. Interior and Exterior Work, site work, paving grading utilities
 - g. Equipment as specified in the Documents

1.2. PRODUCTS FURNISHED BY OTHERS: All products, components, spaces, and equipment furnished by the Owner are currently in place and are to be relocated, disconnected and reconnected as set forth in these Documents (Specifications and Drawings) and/or required to accomplish these Documents. All added components shall be new and furnished by the Contractor.

A. Contractor's Incidental Duties

1. Designate specific delivery date for each product in approved construction schedule.
2. Promptly inspect delivered products, report damaged or defective items.
3. Handle at site, including unloading, uncrating, and storage.
4. Protect from exposure to elements, from damage.
5. Repair or replace items damaged as result of Contractor's operations.
6. Install, connect and finish products in assembly function ready including incidental related work.

1.3. WORK SEQUENCE

- A. The Owner will occupy the adjacent school facilities at varied occupation levels (full occupation during school year minimal occupation summer) during construction.
- B. Coordinate the work schedule with the Owner and building administrator.

1.4. SCHEDULE

A. Project Schedule

1. Complete for occupancy on or before July 23, 2020
2. Final Completion: **fifteen (15) days after Punch List.**

B. Work not completed prior to student occupancy to be completed:

1. Second shift
2. Weekends
3. Arrange schedule with Owner that will not disturb the learning environment.

1.5. CONTRACTOR USE OF PREMISES

A. Confine operations at site to areas permitted by:

1. Law
2. Contract
3. The Owner's Representative, per 1.3.B. above.

B. Do not unreasonably encumber site with materials or equipment. Do not block the Owner's pedestrian traffic patterns except as prior arranged with the Owner's approval.

C. Do not load structure, or components thereof, with weight that will endanger or damage structure.

D. Assume full responsibility for protection and safekeeping of products stored on premises.

E. Move and relocate as necessary all stored products or equipment that interferes with operations of the Owner.

F. Obtain and pay for use of additional off site storage or work area needed for operations.

G. Limited use of site for work and storage

1. Use public access ONLY, now in service. Parking ONLY as prearranged with the Owner.
2. All vehicular on site activity shall have been prearranged and approved by the Owner.

H. Cooperate with the Owner's use of the premises and other Contractors providing work on site under separate Contracts with the Owner.

1.6. CONTINUOUS OCCUPANCY BY OWNER

A. Owner will occupy areas for purposes of conducting educational athletic and physical education and general maintenance during construction.

- B. Contractors shall provide
 - 1. Access by Owner's personnel and pupils when applicable.
 - 2. Operation of Mechanical and Electrical systems with a minimum of down time.
 - 3. Operation of exhaust systems with a minimum of down time.
 - 4. Adequate security of the premises in which work is in progress.

- C. Upon (after) the work being completed and accepted by Owner, the Owner shall provide:
 - 1. Custodial services
 - 2. Security
 - 3. General custodial maintenance

1.7. ASBESTOS

- A. ACM inspection reports are available at the site. The contractor shall perform his own examination of the buildings of concern on the project prior to bidding and be responsible for the determination of the existence or nonexistence of suspect asbestos in a state that is likely to be interrupted or become hazardous to the health of the Contractor, his employees, his subcontractors and their employees.

- B. Known ACM on site none that should impact the work**
 - 1. Ceilings, no ACM**
 - 2. Plaster no ACM**
 - 3. Always ask if there is any question, concern or risk.**

- C. The Contractor may deem it advisable to contact the Office of Superintendent of Schools and request access to the Asbestos Management Survey applicable to the building pursuant to Section 855.30 (including updated amendments thereto) of AN ACT KNOWN AS THE ASBESTOS ABATEMENT ACT: P.A. 83-1325, approved and eff. Sept. 5, 1984, amended by P.A. 84-0951, approved and eff. Sept. 20, 1985, and amended by P.A. 84-1096, approved eff. Dec. 9, 1985, amended by P.A. 84-1245, approved and eff. July 29, 1986, amended by P.A. 84-1346, and approved and eff. Sept. 10, 1986, inclusive of such amendments and regulations applicable since 1986.
 - 1. Upon determination prior to bidding, or after bidding discovery by the Contractor that an asbestos hazardous condition does exist in the path of execution of the work of his Contract, he shall so notify the Owner IN WRITING.
 - 2. Pursuant to Item 1.6.B.1 above, the Owner (Macomb CUSD #185, Macomb, IL) may implement the following action:
 - a. Eliminating that portion of the work by revision and change order to these documents.
 - b. Institute removal or acceptance encapsulation.

3. Wherein concealed asbestos is discovered or suspected, the Contractor shall notify the Owner of the existence of said apparent asbestos which may require analysis for hazardous determination. This notification shall be IN WRITING at no cost to the Owner. Should analysis indicate that hazardous substance does prevail the procedure shall be set forth under Item 1.6.B.2. above.
 - a. NOTE: DELAY IN THE CONTRACTOR'S WORK DUE TO SUCH CONCEALED DISCOVERY AND/OR OWNER RESPONSE THERETO SHALL NOT BE GROUNDS FOR CLAIM FOR EXTRA EXPENSE BY THE CONTRACTOR CHARGEABLE TO THE OWNER AS AN EXTRA TO THE CONTRACT AMOUNT.

1.8. COORDINATION AND COOPERATION

- A. It is the intent and purpose of the Owner to cooperate with the Contractor to the extent feasible under existing applicable laws and regulations and the Owner and the Contractor alike shall not construe this portion of the documents, that is, Section Paragraph 1.6.A, and B to the disadvantage of the other.
- B. Should the bidding Contractor not understand the foregoing, he shall notify the Architect/Engineer for clarification prior to bidding in accordance with Section 00040, Paragraph 1.3, 1.4, and 1.15.
- C. This Contractor shall cooperate with other Contractors and their Subcontractors working on site duly employed by the Owner to perform service related and unrelated to work outlined by these Documents.
- D. The Owner has the right to employ other contractors or his own forces to be working on site in concurrence with this Contractor's work. Coordinate and cooperate to the extent reasonable under the contract so all parties can collectively accomplish the work scheduled.

1.9. FITTING AND FINISHING THE WORK

- A. Contractor shall verify all field conditions, dimensions, elevations that relate to the work and properly accommodate these in the work as appropriate to the intended result within the Contract amount.
 1. In place construction, obstacles and site conditions and elements which can be seen and reasonably inferred.
 2. New construction, obstacles and conditions that can be seen or are to occur in the completion of the work.
 3. Allow to fit structural elements and all equipment as occur or will occur during the implementation of the Contract.
 4. Make adjustments as needed to fit and properly complete the work. This includes coordination of work by all trades.
- B. Contractor and his Subcontractors shall coordinate, accommodate, adjust and fit as appropriate all work to achieve the intended finished intent to

normal commercial industry standards.

1. Provide finishing elements, trim, sealants, scribes, receivers and accessories necessary and normal to the installations proposed and as recommended by manufacturers for proper use of products.
2. All construction (all trades) to be weather and infiltration tight. Include appropriate weather seals, infiltration barriers, sealants, non-corrosive flashings and sealants to properly complete the intent of the project.
3. Provide all necessary work to complete all installations, equipment and parts of the work to be complete and properly operable, under control for motorized equipment, in a finished appearance and condition, unless specifically noted otherwise.
 - a. Conceal piping and conduit to the extent possible
 - b. Run piping and conduit and supports parallel and/or perpendicular to main structural elements when possible.
 - c. Avoid creating trip hazards or low headroom hazards when possible
 - d. Always allow for service access.
4. Always comply with the Illinois Energy Code
 - a. Infiltration tight
 - b. Watertight
 - c. Insulation and continuous insulation, types and assembly U or R values as well as component ratings.
 - d. Air barriers continuous to the extent possible at assembly junctures, windows to walls, walls to roof assembly, walls floor to floor.

END 01 1000

DIVISION 1 – GENERAL REQUIREMENTS
Section 01 2500 – Substitutions & Product Options

1. GENERAL

1.1. SPECIFIED PRODUCTS

- A. All bids shall be based on providing products exactly as specified or equal as prior approved.
- B. Products specified only by reference or performance standards, shall be met or exceeded by the standards of any manufacturer's material and subject to the Architect/Engineer's approval.
- C. Products specified by naming several products or manufacturers shall be selected from any product and manufacturer named.

1.2. SUBSTITUTIONS, BIDDER/CONTRACTOR OPTIONS

- A. PRIOR TO BID OPENING - The Architect/Engineer will consider requests to amend the bidding documents to add products not specified, provided such requests are received in adequate time prior to bid opening date.
 - 1. Requests received after ten (10) days before bid due date will not be considered.
 - 2. If a request is approved, the Architect/Engineer will endeavor to issue an appropriate addendum not less than seven (7) calendar days prior to bid opening date.
 - 3. Ten (10) days is based on the start bid date, and will not be extended by bid extension unless same is extended more than ten (10) days.
- B. WITH BID - Substitutions will not be considered with the bids.
- C. AFTER AWARD OF CONTRACT - No substitutions will be considered after Notice of Award, except under one or more of the following conditions:
 - 1. Substitution is required for compliance with final interpretations of code requirements or insurance regulations.
 - 2. Unavailability of specified products, through no fault of the Contractor.
 - 3. Subsequent information discloses inability of specified product to perform properly or to fit in designated space.
 - 4. Manufacturer/fabricator refusal to certify or guarantee performance of specified product as required. This does not alter the requirement.
 - 5. When a substitution would be substantially to the Owner's best interest.

1.3. SUBSTITUTION REQUIREMENTS

- A. Submit four (4) copies of each request for substitution. Include in each request for substitution:

1. Complete data substantiating compliance of proposed substitution with Contract Documents.
2. For products:
 - a. Product identification, including Manufacturer's name and address.
 - b. Manufacturer's literature.
 - 1) Product description.
 - 2) Performance and test data.
 - 3) Reference standards.
 - c. Samples, if applicable.
 - d. Name and address of similar projects on which product was used and date of installation.
3. For construction methods substitution:
 - a. Detailed description of proposed methods.
4. Itemized comparison of proposed substitution with product or method specified, including accurate and true cost data on proposed substitution in comparison with product or methods specified.
5. Data relating to changes in construction schedule.
6. Identify:
 - a. List other contracts affected, if applicable.
 - b. List changes or coordination required.

B. In making requests for substitution, bidder/contractor represents:

1. He has personally investigated proposed product or method and determined that it is equal or superior in all respects to that specified.
2. He will provide the same guarantee for substitutions as for product or method specified.
3. He will coordinate installation of accepted substitutions into work, making all such changes as may be required for work to be complete in all respects.
4. He will provide complete cost data including all related costs under his contract (and other Prime Contract's, as applicable) whose work may also be affected by the substitution in product or method.
5. He will assume full responsibility for all additional costs and expenses to the Owner, Architect/Engineer (and other contractors employed on the same project, as applicable).
6. The Contractor agrees that it is the Contractor's sole responsibility to stand any costs that may be attributable to an allowed substitution that may surface as construction proceeds toward finalization.

C. Substitution will not be considered if:

1. It is indicated or implied on shop drawings or product data submittals without formal request submitted in accordance with Paragraph 1.4 above.
2. Acceptance will require substantial revision of Contract Documents.

END 01 2500

DIVISION 01 – ADMINISTRATIVE REQUIREMENTS
Section 01 3000 – Project Management

1. GENERAL

1.1. MANAGEMENT OF THE CONTRACT

A. The contractor shall provide necessary project support to manage necessary support documentation in an accurate and timely fashion.

1. Following award, ten (10) calendar days, submit two (2) copies:

- a. Signed contracts
- b. Insurance
- c. Bonds, Labor and Material payment and Performance or approved Owner protective bond.
- d. Subcontractor/supplier List – provide promptly prior to signing the of contract
- e. Contractor Schedule of Values, labor and materials and by trade and task breakdown.

2. Pre-Construction meeting:

- a. Provide proposed schedules
- b. Project access for remodel/renovation projects
- c. Project security plans, fences, storage facilities, public access control.
- d. Proposed schedule
- e. Contact information
- f. Identify Project management team, Superintendent of the work
- g. Provide minutes of the Pre-Construction meeting including list of attendees and copies of schedules, notices RFIs as applicable to the meeting

3. Periodic Progress meetings

- a. Schedule to be agreed to, not less than bi weekly nor more frequently than weekly during periods of active progress.
- b. Provide representation by subcontractors whose work is currently or projected to soon be active.
- c. Provide updates on recently completed progress since previous meeting and work planned for the immediate future.
- d. Provide Revised schedules or notice of major changes to projected schedules
- e. Provide minutes of the Progress meeting including list of attendees and copies of schedules, notices RFIs as applicable to the meeting

4. Prior to start of the work on site:

- a. NOI permit from IEPA as applicable on projects excavating

over 1 acre or more or as limited by local authorities if smaller excavation area is designated by local code.

- 1) Contractor to provide necessary erosion control plan as needed for the permitting process.
- b. Background check information as applicable to this project.
- c. Permits as applicable
 - 1) Regulatory permit fees as applicable to this project charged by authorities having oversight.
 - 2) IEPA payable by the contractor
 - 3) ROE application and any fees by the Owner
 - 4) City of Macomb, any fees charged will be negotiated by the District and is charged reimbursable.
- d. Have in place the safety plan and assigned safety person on the site. Safety is the responsibility of the contractor, and is not monitored or directed by the Owner or the A/E except in apparent emergency situations where the Owner or the A/E might assist in determination of safety accommodations as identified by the contractor.
- e. Have in place the fences and barricades to control public or non-contractor access to the site.

1.2. SUPERINTENDENT OF WORK

- A. The Contract shall designate a person who shall be General Superintendent of on site construction work encompassed by the Contract Documents.
 1. Said designated superintendent shall have prior served as project superintendent of construction of similar nature and size. Qualifications shall be subject to the Owner's and Architect's review.
 2. Superintendent shall remain superintendent for the duration of the project unless said person shall become disabled, no longer employed by the Contractor. The Contractor shall provide notice to the Architect and the Architect and Owner shall approve the personnel change.
 3. Owner can request superintendent replacement for cause at any time.

1.3. AWARD AND LETTER OF INTENT

- A. The Owner will make an award based on the selection of the lowest cost responsible bidder that has demonstrated past experience and evidence of adequate resources to accomplish the work. After the award, and the issuance of a Letter of Intent, the contract timeline is as follows:

1. Return signed agreement seven (7) days
 2. Sub Contractor, Supplier, or any entity to be assigned a part of the work, provide list, addresses and contact information. Seven (7) days. Provide references upon request. Seven (7) days:
 3. Labor and Materials, Payment, and Performance bonds, 15 days
 4. Insurance, 15 days
 5. Master Cost Breakdown (CSV), 15 days
 6. Proposed Schedule and time line, 15 days
- B. Failure or refusal to provide the preceding Contract information in a timely manner may be cause for cancellation of the award or termination of the agreement if signed and the Owner will be entitled to compensation under the terms of the bid security for failure to execute contract terms in good faith.

1.4. MATERIALS SPECIFIED AND QUALITY OF WORK

- A. Materials shall be as specified or approved equal.
- B. "Approved equal" and "or equal" shall mean that the Contractor shall be required to receive the Owner's approval (via the Architect) on any substitute materials seven (7) days prior to the bid due date.
- C. Requests for substitution approval shall be submitted to the Architect/Engineer.
1. Prior to considering substitutions, the Owner and/or the Architect/Engineer may require submission of samples, descriptive, technical and catalog data and lab reports of tests for verification of equivalency.
 2. Said submittals shall be presented to Architect/ Engineer.

1.5. PROGRESS PAYMENTS

- A. All payments by the Board of Education require Board approval.
1. Payment requests must be submitted prior to the first Monday of the month for consideration and entry into the agenda.
 2. Untimely submission of payment request will result in a one (1) month delay for consideration.
 3. The Contractor will be notified of the regular Board meeting schedule upon request.
 4. Payment will be made within twenty (20) days following board approval, or a notice of board concerns will be provided.
- B. In accordance with the terms of the Contract periodic partial progress payments may be made monthly to the Contractor for: 90% of the value of the labor, materials, and/or equipment incorporated in the construction.
1. Payment will be for completed progress materials only.
 2. Materials properly stored and protected on site may be billed
 3. Payment for Materials off site may be considered if properly

warehoused, dedicated to this project and insured, submit all information and same will be reviewed and may be approved or denied for payment.

4. Progress pay requests shall indicate amounts completed of all items listed from the master breakdown.
 5. 10% of each request will be retained by Owner until work has been satisfactorily completed.
 6. Submit lien waivers for preceding payments made.
 7. Submit lien waivers from subcontractors and suppliers.
 8. Submit notarized Contractor's affidavits with each pay request showing that total owed on Contract by Owner (after subject request has been paid to Contractor) is more than the amount to become due the Contractor for material, subcontractors and labor.
- C. All the applications for payment shall be made in three (3) copies with all copies bearing live seals and signatures, notarized and complete and accurately filled in.
1. Applications for payment shall be submitted to Architect/Engineer on AIA G-702A Forms or other standard formats containing similar information.
- D. Public Projects require: One (1) copy of Contractor's Certified Prevailing wage payroll with Pay Request or on monthly schedule coordinated with payroll dates, in accord with Illinois Dept. of Labor requirements. Include Payroll for the major Subcontractors and upon request any minor or intermittent on-site Subcontractor.
1. Certified payrolls are not required for personal making deliveries of materials, Officers and management team making inspections but not doing physical work on site. The extent of compliance is as established by the IDL and state law and exception to or compliance with is the responsibility of the contractor.
 2. Submit beginning with the first application for payment for all workers employed on site
 3. Submit for each successive month or pay periods as applicable.
- 1.6. FINAL PAYMENT: The final application for payment shall not be made until all work and deficiency (punch list) items have been satisfactorily completed and approved by the Architect/Engineer for documents compliance.
- 1.7. EMPLOYEE-STUDENT RELATIONSHIPS
- A. Except in an emergency situation involving safety, there is to be no intermingling of the Contractors' employees and the school faculty, staff and students violating this requirement shall be removed from employment at this site. Contractor employees experiencing problems with students or faculty shall report same to their project superintendent, who shall promptly report the problem to an authorized representative of the Owner and the Architect/Engineer.
1. Avoid profanity and inappropriate subject matter in conversation as

students and staff may be within audible range and walls or ceiling spaces may allow sound transmission.

2. Verbal or physical action interpreted as sexual or sexually suggestive in nature or as sexual harassment will be grounds for removal of the employee from the site. Further legal action remains the option of the persons affected.
3. In all aspects of this provision, the Contractor's employees as adults have the greater responsibility and should not respond to inappropriate student behavior.

- B. Authorized agents of the Owner include the District Superintendent, District Building and Grounds Supervisor, the District Financial Services Director and the Architect/Engineer. The School Principal is authorized to discuss concerns regarding operations on site, but is not authorized to order changes in the work.

End 01 3000

1. GENERAL

1.1. DESCRIPTION

- A. Prior to commencing the work, the Contractor shall provide submittals on all materials and equipment proposed for the work.

1.2. Shop Drawings, Submittals, and Submittal Brochures

- A. Submit four (4) copies minimum unless noted otherwise in a particular section.
 - 1. Electronic PDF submittals are preferred.
 - 2. Preferred direct email of submittals not a submittal service with log in and electronic tracking of comments.
 - 3. Electronic submittals **shall be edited to be relative to this specific project**. For example, do not submit an electronic file of a manufacturer's 25 page catalog with applicable selections circled or marked with in the body of the submittal. Select the applicable pages and submit only those.
- B. Architect, engineer and/or Owner will retain up to three (3) copies.
- C. Contractor will receive remaining copies for his use.
- D. Shop drawings and material schedules shall be accompanied by catalog cuts or literature providing all data, description, function, and capacity of item or component submitted.
- E. Catalogs and fliers with multiple component descriptions shall be clearly and precisely marked as to submittal item. The Architect/Engineer's office will provide no sorting to assure the submittals match with documents requirements.

1.3. Samples

- A. When samples are requested submit One set minimum.
 - 1. Color and pattern related materials submit actual chip kits or sample rings or samples to allow accurate discernment, printed or electronic pdf is generally not adequate.
 - 2. Upon request, provide an oversize, 12" x 12" or nominal cross section of actual color or pattern being considered to confirm a selection being made from a small color kit.
- B. All samples will be retained unless otherwise noted in the documents or requested by the vendor. Samples for return may be held until the material is installed on site.

1.4. Project record information

- A. The Contractor shall, within seven (7) days of Notice of Award, submit to the Architect the following:
 - 1. Name of person under Contractor employment at the job site in charge of the work and safety.
 - 2. Provide a contact list including emergency contact information for all relative parties to the work, including the superintendent, the project manager, major subcontractors, and major vendors.

1.5. Project Record Documents

- A. Operating and Maintenance Manuals.
 - 1. Submit three (3) bound, indexed copies minimum.
 - a. Or optional one (1) copy bound and a PDF electronic copy
 - 2. These manuals shall include:
 - a. Shop Drawings and Submittals,
 - b. All Equipment Brochures, Operating Manuals, Operating Instructions.
 - c. Names, addresses, and telephone numbers for warranty work. This information may appear in the various trade areas but should also be clearly organized on a single document at the beginning of the O&M information.
 - d. all bound into a good quality binder or loose-leaf notebook, clearly labeled.
 - e. pdf properly indexed
 - f. THE SHOP DRAWINGS RETAINED BY THE OWNER AND A/E ARE NOT AVAILABLE FOR PREPARING THESE MANUALS. If additional copies are required for this, the Contractor shall make allowance and copy additional sets.
 - g. Include warranty information and warranty contact information.
- B. Record drawings: Maintain as work proceeds record drawings marked to show any variances in installations, particularly underground and concealed services.

1.6. AS-BUILT DRAWINGS

- A. The Contractor shall provide the Architect/Engineer's Office with one marked set of drawings showing changes from the original drawings. Marked As-Built Drawings shall be submitted upon progress having Substantial Completion progress.
 - 1. Preferably markings should be in red, clearly legible and easily

- understood.
2. Clearly and boldly label the set As Built or Record Drawings.

1.7. IDENTIFICATION OF SUBMITTALS

- A. The Contractor shall clearly mark each submittal of the Shop Drawings, Catalog Cuts, Pamphlet, or Specification Sheet for identification and record, for example:
 1. DATE: As submitted
 2. BUILDING: Project Name
 3. LOCATION: City
 4. TYPE OF EQUIPMENT: (Example – AHU 1)
 5. SUBMITTED BY: Contractor's Name and contact information for questions.
- B. Data shall also indicate model number selected for furnishing and indicate capacities or conditions or operation.
 1. Catalog data of general advertising nature, without specific outline or rating for equipment, will be rejected.
 2. Marked product manufacturer's catalogs and engineering data shall accompany the submittal.

1.8. REVIEW OF SUBMITTALS

- A. Submittals will be reviewed by the Architect and/or the Owner and will be checked for Contract compliance and the basic fabrication methods.
 1. Submittals are reviewed as a convenience to the contractors and do not change the contract requirements unless specifically noted.
- B. The Contractor must verify all the dimensions, field conditions, field clearances, and rough-in requirements with adaptations as necessary.
 1. The A/E review may ask questions or make observations about dimensions and quantities, but actual conditions supersede.
- C. Submittals are to be reviewed and corrected first by the Contractor. If submittals contain obvious oversights or conditions that make it apparent they have not been checked, they will be returned for re-submittal.
- D. Architect/Engineer review of a submittal shall not relieve the Contractor of contract compliance unless any variance is specifically brought to the attention of the Architect and/or Owner IN A LETTER FORM attached to the submittal data and subsequently responded to by the Architect/Engineer IN WRITING.
- E. An omission on the shop drawings or a review oversight by the Architect/Engineer shall not be construed as the calling of specific attention thereto.

- F. It is not the responsibility of the Architect Engineer to request submittals, failure to submit presumes contract compliance is understood.
- G. It is not the responsibility of the Architect Engineer to provide rapid review turnaround on a delayed submittal to maintain schedule. The Contractor shall make submittals in a timely manner generally allowing at least ten (10) days for review.
 - 1. If timely response to submittals is not forthcoming from the A/E please notify the A/E to be sure that the submittal has been received. Particularly with electronic submittals there can be delivery issues.

END 01 3300

1. GENERAL

1.1. REQUIREMENTS INCLUDE

A. Contractor:

1. Coordinate work of all crafts including that of subcontractors and his crafts as applicable.
2. Schedule elements of remodeling and renovation work to expedite completion.
3. Schedule noisy or hazardous work to avoid problems with the Owner's day-to-day building functions and general maintenance operations.
4. In addition to required incidental demolition specified in various sections, and that shown on Drawings, cut, move or remove existing construction to provide access or to allow remodeling and new work to proceed. Include:
 - a. Removal of temporarily or permanent Electrical and Plumbing devices, circuits and piping plus the reinstallation of same as required to continue service.
 - b. Removal of unsuitable or extraneous materials and non-functioning components not marked for salvage, such as abandoned furnishings and equipment, and debris such as rotted wood, rusted metals, abandoned electrical and mechanical components, and deteriorated concrete.
 - c. Cleaning of surfaces. Remove surface finishes to install new work and finishes.
5. Patch, repair and refinish existing items to remain, to the specified condition for each material, with a neat transition to adjacent new construction.
6. Move room furnishings to allow access to specified floor, wall and ceiling work. Relocate same in place at the completion of specified rehab work.
7. Cooperate with the Owner and schedule ahead pursuant to rehab work at locations involving preparatory work by Owner - see 1.1.B. of this section.

B. Owner:

1. Remove, store and replace books and files to allow Contractor access to floors, walls and ceiling, room by room, on schedule determined by the Contractor.

2. Cooperate with the Contractor to provide reasonable access to areas as required for the work.

1.2. RELATED REQUIREMENTS

A. Specified elsewhere:

1. DIVISION 0 - PROCUREMENT REQUIREMENTS
2. DIVISION 1 - ADMINISTRATIVE REQUIREMENTS

1.3. SEQUENCE AND SCHEDULES: Schedule work in sequences within times coordinated with the Owner.

1.4. ALTERATIONS, CUTTING AND PROTECTION

- A. Assign moving, removal, cutting and patching work to crafts qualified to perform the work in a manner to cause least damage to each type of work, and provide means of restoring surfaces to appearance of new work.
- B. Perform cutting and removal work to minimize removals, and in a manner to avoid damage to adjacent work.
 1. Cut finish surfaces such as masonry, tile, plaster or metals by methods to terminate surfaces in a straight line at a natural point of division.
- C. Perform cutting and patching in accordance with the general and supplementary General Conditions.
- D. Protect from damage existing finishes, equipment and adjacent work which is scheduled to remain.
 1. Protect existing and new work from weather and temperature extremes.
 2. Provide weather protection, waterproofing, heat and humidity control to prevent damage to remaining existing work and to new work.

2. PRODUCTS

2.1. SALVAGED MATERIALS

A. The Contractor shall:

1. Remove all existing reusable components such as hardware, (hinges closers, locks, panic sets, door stops, kick plates and latch sets) and deliver same to the Owner at a location to be determined by the Owner.

2.2. MATERIALS FOR PATCHING, EXTENDING AND MATCHING

- A. Ensure that work is complete:
 - 1. Provide same materials or types of construction as that in existing structure, to patch, extend or match existing work.
 - a. Contract Documents may not define products or standards of workmanship present in existing construction.
 - b. Consult the Drawing Details and/or consult the Architect/Engineer.
 - 2. Presence of a product, finish or type of construction requires that patching, extending or matching be performed to make work complete and consistent to identical or better quality standards.

3. EXECUTION

3.1. REMOVE EXISTING CONSTRUCTION

- A. Consult the drawings for removals and replacements as set forth.

3.2. PERFORMANCE

- A. Patch and extend existing work using skilled craftsmen capable of matching existing quality of workmanship.
- B. For patched or extended work, provide quality equal to that specified for new work.

3.3. ADJUSTMENTS

- A. Where existing construction and components are removed, patch floors, walls, doors, trim, and ceilings with finish materials to match existing as closely as possible.

3.4. DAMAGED SURFACES RESULTING FROM CONTRACTOR WORK

- A. Patch and replace all portions of the existing finished surfaces found to be damaged, lifted, discolored or showing other imperfections, with matching material.
 - 1. Provide adequate support prior to patching the finish.
 - 2. Refinish patched portions of painted or coated surfaces in a manner to produce uniform color and texture over entire surface.
 - 3. When existing surface cannot be matched, refinish entire surface to nearest intersections.

3.5. TRANSITION FROM EXISTING TO NEW WORK

- A. When new work abuts or finishes flush with existing work, make a smooth transition. Patched work shall match existing adjacent work in texture and

appearance as closely as possible.

1. When finished surfaces are cut in such a way that a smooth transition with new work is not possible, terminate existing surface in a neat manner along a straight line at a natural line of division, and provide trim appropriate to finished surface.
2. Refinished surfaces must be weather tight as appropriate to the exposure

3.6. CLEANING

- A. Perform construction cleaning as specified in Section 01 7800.
 1. Clean Owner occupied areas, where work prevails, daily.
 2. Clean all spillage, overspray and heavy dust collections in Owner's occupied areas immediately.
- B. At completion of work of each craft, clean area and make surfaces ready for work of successive crafts.
- C. At completion of alterations work in each area, provide final cleaning for occupancy and return space to a condition suitable for use of Owner.

END 01 3516

1. GENERAL

1.1. GENERAL TERMS USED IN THE CONTRACT

- A. OWNER: Macomb CUSD #185
323 W. Washington Street
Macomb, IL 61455
Telephone: 309/837-0560 Fax: 309/836-2133
- B. CONTRACTOR: A person, firm or corporation with whom a Contract or Agreement is made by the Owner.
- C. GENERAL CONTRACTOR: The General Contractor furnishes all of the work in the documents. Pursuant to these Documents the Designating Contractor, General Contractor and Prime Contractor shall be one and the same.
1. Abbreviations employed on the drawings include:
- a. GC General Prime Contractor
 - b. PC Plumbing subcontractor
 - c. MC Mechanical subcontractor
 - d. HC, HVAC, or VC is referring to subcontractors involved in the installation of heating ventilating and/or air-conditioning systems.
 - e. EC electrical subcontractor
 - f. TC Temperature Control subcontractor
- D. ARCHITECT OR A/E: Middleton Associates, Incorporated, 1702 W. College Ave., Suite E, Normal, IL 61761 - Telephone 309/452-1271, Fax 309/454-8049, e-mail: russ@middletonassociates.net
- E. ENGINEER: BRIC Partnership LLC Engineering, 427 E. Monroe Street, Suite 300, Springfield IL 62701. Phone 217/679-0827 e-mail fmaras@BricPartnership.com
- F. DOCUMENTS: The Drawings, Specifications and Contract as apply to all areas of the work.
- G. WORK: All obligations undertaken by the Contractor, pursuant to the Contract Documents.
1. Work includes, but is not limited to, the furnishing of all of the materials, labor, equipment, supplies, plant, tools, scaffolding, transportation, unloading, superintendence, insurance, bonds, taxes and all other services, facilities, required demolition (major and minor as applicable) and expenses necessary for the full performance and completion of requirements of the Contract Documents.

2. Work also means that which is produced, built, or constructed, pursuant to the Contract Documents.
 3. Work includes all labor and materials to properly install and make functional.
- H. PROVIDE: Furnish and install (including materials, accessories and labor) ready for the Owner's use. Comply with manufacturer's installation requirements as minimum standard, Drawings and Specifications where installation requirements exceed manufacturer's recommendations.
- I. EQUAL, APPROVED EQUAL: Alternative products meeting or exceeding the base specification product or process and approved by the Architect/Engineer IN WRITING as suitable for this application. If not accepted prior to bidding, acceptance is discretionary.
- J. SUBSTANTIALLY COMPLETE: When work progress has arrived at the point where the Owner may have full use of the installation for the purpose for which the same was installed, all components installed, equipment operating under control and minimum code compliance achieved, then, the work may be declared substantially complete if so requested by the Contractor and specifically approved by the Owner.
- K. PUNCH LIST/DEFICIENCY LIST: Those items, components, installation inclusive of labor and materials (in place) which, in the opinion of the Architect/Engineer or the Owner do not conform to the intent of the Contract Documents and/or adequately satisfy the purpose and intent of the Owner.
- L. DESIGNATED WORK: Wherein the documents designate that one contractor shall provide specified material and labor for another trade area contractor, the cost of the work and material shall be included in the bid of the contractor that is designated to provide the material and labor.
- M. AND/OR: Wherein employed in the documents shall be either and both, singularly and together, as applicable to the intent of the Project Documents.
- N. CONCEALED: Concealed building components, services, and obstacles subject to Change Orders, shall be limited to those components, services, obstacles, etc., not designated or known to exist, not typical to the type of construction observed and not available for inspection without destructive action. Opening of access panels, looking above accessible ceiling systems or inside chase walls is not considered concealed items.
- 1.2. In general, definitions of words employed in the Contract Documents shall be as defined in "Webster's New World Dictionary" the latest edition. The Architect shall be the interpreter in the case of multiple meanings. Exceptions to this shall include longstanding meanings in the construction industry but have not been so defined in Webster's Dictionary. Determination shall be in accordance with these Specifications.

DIVISION 1 - GENERAL REQUIREMENTS
Section 01 5000 - Temporary Facilities & Controls

1. GENERAL

1.1. WORK INCLUDES

- A. Contractor shall provide and maintain specified temporary utilities.
- B. Contractor may extend electrical and water services from Owner's existing sources.
 - 1. Tap on and extension of services shall be implemented and paid for by the Contractor requiring utility.
 - a. Tap on arrangements must be coordinated with the Owner and shall not compromise the Owners operations or equipment.
 - 2. Return tap on surrounds to original or contracted configuration and circumstances at close of job by the Contractor.
 - 3. Extension shall not compromise Owner's operations.
- C. Contractor shall furnish (included in his Base Bid):
 - 1. The cost of all utilities required by him which:
 - a. Are in excess of existing available at the building and are necessary for the completion of his work.
 - b. Exceed the capacity of existing or permanent systems and are necessary for the completion of his work.
 - c. Required prior to permanent enclosure.
 - 2. Extension cords, extension lights and lamps from approved temporary power centers to his work.
 - 3. Ventilation for his storage spaces containing volatile or hazardous materials.
 - 4. Security for materials and equipment.
 - 5. Heating as needed to protect construction form freezing or frost damage.
- D. Furnished by Owner
 - 1. Authorization of existing facilities for temporary use.
 - a. Electrical power service, extended from the existing building service, MDP or temporary service from the power company paid for by the contractor.
 - b. Water service extended from existing outlets by the Contractor
 - 2. Owner will pay all costs of power and water consumables used for

construction purposes for utilities properly extended.

3. The Contractor requiring Owner-furnished services, shall provide and pay for extension or modification of services to perform the work and for restoration of services and Owner equipment at completion of the work.

E. Water Service:

1. For construction purposes:
 - a. The Contractor shall provide and maintain temporary water service connection throughout construction period.
 - b. The Contractor shall supply adequate water hoses from hose bibs to the point of his operations.
2. For temporary fire protection and cleaning.
3. Maintain adequate volume of water for all purposes.
4. The Contractor provides drinking water for his own forces.
5. Water source: On or off site.

1.2. COST OF INSTALLATION, OPERATION, MAINTENANCE & CONSUMABLES

A. Installation, operation and maintenance:

1. The Contractor requiring service extensions shall pay all costs of installation, operation, maintenance, restoration and equipment warranty extension of temporary utilities for designated time periods.
2. The Contractor shall not overload the system.

B. Consumables:

1. Contractor pay all costs of consumables for temporary utilities, as designated:
 - a. Heating Fuel via Temporary Heating Units: Contractor requiring same.
 - b. Heating
 - c. Electrical Energy Contractor except as properly extended.
 - d. Lamps: Contractor requiring same.
 - e. Water: Owner as properly extended.
 - f. Toilets and Supplies: Contractor.

1.3. MONITORING OF TEMPORARY UTILITIES

A. The Contractor extending or providing a temporary utility extension shall be responsible for all damage to his work or to the existing facility caused by a defect in temporary utilities or utility extensions.

1. Enforce compliance with specified codes and standards.
2. Enforce safe practices.

3. Prevent abuse of services and utilities.
 4. Prevent damage to finishes.
- B. Upon completion of work, or when directed by Architect/Engineer, restore existing systems to original condition.

2. PRODUCTS (Not applicable)

3. EXECUTION

3.1. ALL TEMPORARY UTILITIES AND EXTENSIONS

- A. Comply with DIVISION 15 and DIVISION 16 Specifications and Federal and State regulations.
- B. Install work in a neat and orderly manner.
- C. Be made structurally, mechanically and electrically sound throughout.
- D. Be maintained to give safe, continuous service, and to provide safe working conditions.
- E. Be modified and extended as work progresses.

3.2. INSTALLATION

A. Electrical:

1. May install the conduit for the permanent power from the MDP to the north end and use that for temporary power service
 - a. Provide a rain tight power center for the construction site
 - b. If this option is employed, MAKE SURE to coordinate with the Fire Protection contractor for piping location coordination.
 - c. Owners power may be used to the extent the privilege is not abused or the usage and or equipment start loads does not impact the owners operations in any way.
 - d. An example of abuse of power service would be use of Owner power for electrical resistance heating.
 - e. Abuse or negative impact on the Owners power service by surges or other power behavior will require the contractor to address the issue or set up an independent temporary service AT THE CONTRACTORS EXPENSE.
2. Protect branch circuits or extension wiring on floor or on ground from damage.
3. Provide ground fault outlets
4. Wiring for temporary heating and ventilating equipment:
 - a. Wire all safety devices specified for operation or equipment.
 - b. Verify proper operation of all safety devices.

3.3. REMOVAL & REINSTALLATION

- A. At the conclusion of the work, completely remove temporary materials and equipment.
- B. Repair all damage caused by installation. Restore to original condition or better.

END 01 5000

1. GENERAL

1.1. WORK INCLUDES

A. Completed Deficiency List

B. Final Cleaning

1. Clean all finished areas ready for occupancy, dust, remove debris, mop or vacuum as appropriate, seal and wax if specified. Concrete sealers free of scuffs and scratches
2. Unoccupied areas, above ceilings, tunnels, chases, Mechanical areas, roof, etc, free of debris reasonably cleaned up of construction scraps, tools boxes.
3. Equipment cleaned and ready for occupied use, new filters, and spare filters stored in location directed.
4. Site and exterior cleaned up, no debris, equipment, tools removed.
 - a. Sidewalks clean
 - b. Earthwork finish graded, seeded if specified
 - c. Drainage ways open

C. Project Record Drawings

1. Contact list of Installing Contractor and/or Subcontractors.

D. Guarantees, Warranties and Bonds

1. Contact list for warranty claims.

E. Submittal

1. Care and maintenance instructions for all finishes and operable equipment
2. All materials shall be submitted in multiple copies in an orderly and labeled fashion.
3. Generic documents not filled in, dated, and job specific are not acceptable.

1.2. EVIDENCE OF COMPLETION OF THE CONTRACT

A. Equipment and Building

1. All equipment operational as intended, under control, installed per Manufacturer's recommendations.
2. All construction completed, finished and in new condition.
3. All deficiencies addressed to the satisfaction of the A/E and Owner.
 - a. Return Punch List with each completed item initialed by the Contractor representative who has inspected the corrective work.

1.3. COORDINATE FINAL CODE INSPECTIONS

- A. Work with governing authorities for occupancy inspection.
 - 1. Municipality
 - 2. Regional Superintendent of Schools (school project).
 - 3. IDPH for plumbing and any other IDPH permitted work.
 - 4. A/E for called inspection when applicable.
 - 5. Fire Marshall, local / state / compliance certifications for:
 - a. Elevator, if applicable
 - b. Sprinklers, if applicable.
 - c. Fire alarm, if applicable.
 - d. Walk-through
 - e. Boilers
 - f. As requested by authorities

1.4. WARRANTIES

- A. Extended warranties beyond the one (1) year 100% labor and material overall warranty shall be provided showing:
 - 1. Terms and dates
 - 2. Contact information
 - 3. Installing Contractor
 - 4. Exact system / material as applicable.
- B. Extended warranties
 - 1. As listed in various Specification Sections.
 - 2. As advertised by Manufacturers.
 - 3. As required for:
 - a. Hardware – five (5) years
 - b. Refrigeration equipment – five (5) years.
 - c. Wet rotor circulator pumps – three (3) years
 - d. Roofing – twenty (20) years
 - e. Insulated glass – ten (10) years
 - f. Carpet – Contractor: two (2) years; Manufacturer: fifteen (15) years
 - g. HDPE Toilet Compartments – fifteen (15) years HDPE material; five (5) years hardware material
 - h. Visual Display Surfaces – Manufacturer – five (5) years
 - i. Lockers – five (5) year minimum (or Manufacturer's advertised if extended)
 - 4. Items requiring chronic repair during the warranty period shall have an extended 12-month warranty until repairs are not needed over a 12-month period.

1.5. PROJECT RECORD DOCUMENTS

A. Submit Project Record Documents to reasonably provide information on:

1. Hidden utilities
2. Products used.
3. Any hidden from view structural or mechanical or electrical variations from plans.
4. Notation of alternates where same impacted the Base Bid Drawings.

B. Provide listing:

1. Contractor / Subcontractor / Vendor list with:
 - a. Product or service.
 - b. Contact information.

1.6. FINAL PAY APPLICATION

- A. Final Lien Waivers – Major Subcontracts and direct Suppliers.
- B. Final Affidavit showing \$0.00 due to all vendors.
- C. Letter from Bond holder approving closeout payment.
- D. Final paperwork on allowances, adds or deductions agreed upon by Change Order.
- E. Final acceptance as applicable.

END 01 78 00

1. GENERAL

1.1. BASE BID

A. Contractor:

1. Remove and dispose of existing in required to make way for additions and rehab work set forth by the Drawings.
2. Provide and institute cautionary removal measures to allow continuing Owner occupancy/arrange schedule with building supervisor.
3. Remove and dispose of rubbish and debris resulting from demolition operations. Do not use Owner's refuse containers.
4. See Drawings for areas to be cleared of walls, floors, room finishes, furnishings, etc.
5. Remove and dispose of abandoned electrical components, conduits and circuitry in the course of executing the electrical work.
6. Disconnect, remove, extend electrical services as required.
7. Remove and reset existing components as shown on the drawings: Wherein not specifically shown on the drawings the details shown shall govern as typical solutions subject to the approval of the Architect.
8. Remove all debris from the construction site.

B. Inspection of existing surfaces:

1. Resulting existing surfaces following demolition shall be inspected for structural integrity and suitability for application of new work.
2. Repair and replace existing construction damaged by demolition and rework.
3. Notify the Architect of discovered previously concealed damage uncovered by demolition and removals for recommended action.
 - a. Concealed work
 - b. Discovered deterioration or deficiency condition

C. **See floor plan A-1.2 for temporary construction access to courtyard/cafe/terrace construction area.**

1. Secure courtyard doors so cannot be opened from the courtyard side into the building.
2. Construct temporary enclosure with temporary secured door.
 - a. Secured door shall have an exit device and be keyed with building keying. You may use the exit device from the wide door courtyard to inside.
 - b. Provide locking deadlock or other securing method to the existing corridor smoke screen to remain in place. Securing method shall be keyed to match the building and removed at the completion of the work.

- c. Maintain a construction fence at the through access and close at when work is not in progress.
- 3. At the end of the work, restore the access area to original.
 - a. Masonry and masonry back up.
 - b. Stud walls
 - c. Window
 - d. Remove temporary enclosure.
 - e. Flooring and base
 - f. Finishes
 - g. Drywall
 - h. Ceiling
 - i. Front yard and lawn
 - j. All conditions.

1.2. RELATED WORK

A. Specified elsewhere

- 1. All trades, all subcontracts, work as required to complete the contract and restore existing finishes to original condition.

1.3. SUBMITTALS

- A. Submit demolition and removal procedures and schedule in accord with 01 3300
- B. Maintain environmental security of the building envelope at all times.

1.4. EXISTING CONDITIONS

- A. Conduct all demolition work in such a manner to minimize interference with Owner operations and inconvenience with adjacent building areas regarding Owner, pedestrian and vehicular traffic. Maintain protected access and egress at all times.
- B. Provide, erect, and maintain temporary barriers and security devices in accord with Division 0 and 1

2. PRODUCTS

2.1. MATERIALS

- A. Products and materials for minor demolition work are limited to removal, repair and replacement of existing work damaged by demolition operations.
- B. All work damaged during operations shall be repaired or replaced with new materials of the same quality as the existing materials and installation when they were new.

3. EXECUTION

3.1. PREPARATION

- A. Erect and maintain weatherproof and security closures for exterior openings in accord with Division 0 and 1 and as needed to protect the work.
- B. Protect existing items not indicated to be demolished.

3.2. PERFORMANCE OF THE WORK

- A. Demolish and remove in an orderly and careful manner. Protect existing supporting structural members, traffic areas and project access.
- B. Immediately remove demolished and waste materials from site.
- C. Remove materials to be reinstalled or retained in manner to prevent damage. Store, deliver, relocate and protect in accord with Sections 01 3516. See this Section, Paragraph 2.1 "PRODUCTS".
- D. Remove and promptly dispose of contaminate, vermin infested, rotted or dangerous materials encountered.
- E. Do not burn or bury materials on site.
- F. Remove demolished materials from site daily, as work progresses. Upon completion of work, leave areas in clean condition.
- G. Do not remove materials by open gravity drop. All materials above ground level to be disposed of shall be handled via closed chutes with materials water sprayed to prevent dust.

END 02 4116

1. GENERAL

1.1. REQUIREMENTS INCLUDE

A. Base Bid

1. No identified ACM materials are anticipated to be encountered in this project.
 - a. Limited floor tile in the existing facility has ACM adhesive.
 - b. Do not disturb floor tile in areas where it has not already been removed or is not noted on the drawings to do work that will affect flooring.
 - c. The facility has had a preconstruction ACM inspection, suspect materials sampled and tested.
 - d. Materials found to contain ACM are scheduled to be removed prior to the anticipated start of work in the limited areas impacted.
2. If suspect materials are encountered STOP work in areas impacted by suspect materials pending verification of ACM content and direction to proceed
3. Provide notice to the A/E if suspect materials are encountered.

1.2. RELATED WORK

A. Specified elsewhere:

1. Replacement roofing systems
2. Means and Methods, AIA A201 General conditions and Supplementary General Conditions.

1.3. REGULATORY REQUIREMENTS:

A. Federal and state Requirements:

1. NESHAP - National Emissions Standards for Hazardous Air Pollutants.
 - a. Notifications
 - b. Disposal
2. OSHA - Occupational Safety and Health Administration, 200 Constitution Avenue, Washington, DC 20210.
 - a. Exposure Limits
 - b. Respiratory and Personal Protective Equipment.
3. IDPH – Illinois Department of Public Health

- a. Administrative Code: Part 855 Asbestos abatement for public and private schools and commercial and public buildings in Illinois

1.4. EXISTING CONDITIONS

- A. All facilities and adjacent facilities are occupied and shall remain so during operations.
- B. See ACM Bulk Sample Test Report included herein as a part of this section and hereby incorporated by reference. See Drawings for corresponding test sample locations.

1.5. QUALITY CONTROL

- A. Not in this contract if required: Air Monitoring shall be provided, if required, per IEPA.
 - 1. Air monitoring will be conducted by an independent air sampling professional (ASP) employed by the Contractor to ensure that no employee is exposed to an airborne concentration of asbestos in excess of the OSHA limits of 0.2 f/cc (8-hour time weighted average permissible exposure limit (PEL) or 1.0 f/cc (30 minute Excursion Limit (EL).
 - 2. The A/E will determine if the ventilation system must remain in operation during the removal, otherwise the same shall be shut down. If the system must remain in operation, two air samples shall be taken within the ventilated area. If any of the air samples taken indicate an airborne asbestos fiber level above 0.1 f/cc and the initial background levels, the contractor shall stop work, clean the area by wet wiping. The ASP shall then retest the area taking a minimum of two air samples. After all samples fall below 0.1 f/cc, work may resume.
 - 3. If the initial air monitoring reveals that employee exposure is below the action level and excursion limit, sampling will be discontinued. Power equipment shall not be used in the removal of non-friable asbestos containing materials.
 - 4. Send a copy of monitoring reports to the Architect for submission to the Owner.

1.6. SUBMITTALS

- A. Contractor shall complete contractor's information in Sections II, VII, IX, XII, XIII, XVII, and XVIII of the Notification of Demolition and Renovation Form included in Article 3.4. Ensure notification is postmarked or hand delivered to IEPA and USEPA at least ten working days prior to the start of demolition of ACM at the following address: Douglas P. Scott, Illinois EPA, Division of Air Pollution, P.O. Box 19276, Springfield, IL 62794-9276, 217/785-1743.
- B. Submit a copy of the EPA notification form to the Architect.

2. PRODUCTS (Not applicable)

3. EXECUTION **no ACM in this contract base bid pricing**

3.1. PREPARATION

- A. Shut down ventilation system and project rooftop ventilation system intakes and exhausts by covering and taped secure with one layer of 6-mil poly and plywood.
- B. Protect existing items not indicated to be demolished.
- C. Restricted Area
 - 1. Establish a restricted area in all work areas where non-friable ACM is to be removed. Post and limit access to the restricted area to authorized persons.
 - 2. Allow no eating, drinking, smoking, tobacco or gum chewing, or application of cosmetics.

3.2. EXECUTION PROCEDURES

- A. Remove all designated material in a careful manner. Protect existing construction and finishes scheduled to remain.
- B. Cooperate with the Owner appointed environmental services (ASP) for conducting air sampling.
 - 1. Costs incurred for air sampling shall be paid directly by the Owner.
- C. Cease work or change work methods when advised that air quality samples exceed OSHA limits.
- D. Dispose of all debris daily, and in an approved manner; do not burn or bury materials on site.
- E. Upon completion of work, leave area in clean condition. See Section 02 4116.

3.3. NON-FRIABLE ASBESTOS REMOVAL

- A. Regulated Area:
 - 1. Establish a regulated area in all work areas where non-friable ACM materials are to be removed. The regulated areas shall be posted in a manner that minimizes the number of persons within the area. Access to the regulated areas shall be limited to authorized persons.
 - 2. Ensure that employees shall not eat, drink, smoke, chew tobacco or gum, or apply cosmetics in the regulated areas.

- B. The use of powered tools, or high speed abrasive saws shall not be employed in the removal of ACM unless approved by the A/E and if approved must be equipped with engineering controls and HEPA devices that eliminate dust.
- C. Air Monitoring
1. Air monitoring will be conducted to ensure that no employee is exposed to an airborne concentration of asbestos in excess of 0.1f/cc permissible exposure limit (PEL) or in excess of 1.0f/cc Excursion Limit (EL) as averaged over a sampling period of 30 minutes.
 2. The air monitoring will be performed by an independent air-sampling professional (ASP) employed by the A/E.
 - a. A minimum of three background samples will be taken prior to the starting of the work; one on the roof, one on the ground, and one inside the building.
 - b. Determinations of employee's exposure will be made from breathing zone air samples that are a representative of both the 30-minute short-term exposures (Excursion Limit) and the eight hour Time Weighted Average (TWA) of each employee.
 - 1) Representative 8-hour TWA employee exposure will be determined on the basis of one or more samples representing full shift exposure for employees in each work area.
 - 2) Representative 30-minute short-term employee exposure will be determined on the basis of one or more samples representing 30-minute exposures associated with operations that are most likely to provide exposures above the excursion limit for employees in each work area.
 - c. In addition to the breathing zone air samples, at least one sample each will be taken in the following areas:
 - 1) Work area.
 - 2) Ventilation units will be shut down during removal. The A/E shall determine if the ventilation system must remain in operation during the removal. If so, they shall be extended, and two samples within the ventilated area shall be taken.
 - a) If any of the interior air tests taken above indicate an air-borne asbestos fiber level above 0.01f/cc and are above the initial background levels, the ASP shall have the contractor clean the area by wet wiping, and retest the area for final clearance taking a minimum of two air samples. Once all tests

fall below 0.01f/cc, the area may be reoccupied.

- D. If the air monitoring reveals that employee exposure is below the action level and excursion limits, sampling will be discontinued. Air sampling will be resumed any time the method of removal changes or power equipment is used in the removal process. Any time the PEL or the excursion limit is exceeded the contractor shall change the removal methods to lower the exposure, and post the site with the following information: DANGER. ASBESTOS, CANCER AND LUNG DISEASE HAZARD; AUTHORIZED PERSONNEL ONLY; RESPIRATORS AND PROTECTIVE CLOTHING ARE REQUIRED IN THIS AREA.
- E. Respirators
 - 1. Upon request of the worker, the Contractor shall provide the worker with a respirator and protective clothing.
 - 2. Whenever respirators are used, provide evidence of worker training, respirator fit testing, medical surveillance programs.
- F. Removal
 - 1. Keep materials damp using water during removal, and thoroughly wet prior to disposal. Handle materials to minimize breaking. Enclosed chutes may be used for lowering thoroughly wetted roofing materials to ground level.
 - 2. Bulk asbestos reinforced roofing materials, thoroughly wetted, may be transported to an EPA approved landfill in an enclosed truck or dumpster. All other ACM shall be bagged or sealed in two layers of 6 mil poly and transported to the landfill in an enclosed truck or dumpster per IDOT Rules and Regulations.
- G. Sampling Reports.
 - 1. Are available upon request or included in the on-site records.
 - 2. In the areas encompassed by the project, only the floors and the caulking have been identified.
 - 3. Floors will be removed under the 10 day notice regulation by infrared and cleaned up in coordination with the beginning of the existing office remodeling.

END 02 8200

1. GENERAL

1.1. WORK INCLUDED

A. Base Bid

1. No work

B. Alternate #3 Bid

1. Provide two (2) cast iron tree inset grates.

1.2. RELATED WORK

A. Specified elsewhere

1. DIVISION 01 - General Requirements

2. DIVISION 03 - Concrete

1.3. QUALITY ASSURANCE

A. Materials shall be installed by persons experienced in the installation of this type of material. All work shall be level and properly aligned.

B. Installation shall comply with manufacturer's recommendations.

1.4. SUBMITTALS

A. Submit the following in accordance with 01 3300.

1. Manufacturer's Literature: Material description and installation and maintenance instructions.

2. PRODUCTS

2.1. MATERIALS AND INSTALLATION

A. **Tree grate.**

1. Neenah R-8742-A, Adirondack Collection Tree Grate, cast iron. Modular two piece, 60" x 60 , 18" diameter expandable tree opening, nominal 410 pounds per set.

2. Perimeter set in 1 ½" cast dap out for edge support, verify grate edge thickness for flush surface.

3. Or equal submitted for consideration at least 8 days before bidding.

END 03 1500

1. GENERAL

1.1. DESCRIPTION

- A. General Contractor shall furnish all of the labor and materials necessary to complete all concrete work of every description called for in the Documents, including forming, finishing, placement, preparatory work, reinforcing, stripping, rubbing, curing and sealing.
- B. Construction joints, score joints and slab panels shall be selected to optimize concrete strength and performance and minimize shrinkage, cracking or other undesirable performance characteristics.

1.2. QUALITY ASSURANCE

- A. All materials and mixes shall comply with applicable ASTM Specifications. All requirements of the American Concrete Institute Building Code Requirements for Reinforced Concrete (ACI 318-71); as applicable to the forming, placement and handling of concrete materials shall be followed.
- B. Admixtures shall be employed in accordance with Manufacturer recommendations. The compatibility of admixtures to achieve proper results shall be verified by the Ready-Mix Supplier. **NO INCOMPATIBLE ADMIXTURES SHALL BE EMPLOYED.** The Architect/Engineer shall approve any alternative mix design proposed.

C. TOLERANCES

- 1. Footings: True to top grade, 3/8" high to 1" low; true to width - 0" and + 6"; true to bottom grade 0" high, 4" low.
- 2. Slabs: True to grade and plane, F 50, maximum variance 1/8" in 4' 1/4" in 10', 3.8" overall; slope uniformly to drains over areas identified on the Drawings; no ponding of water shall occur at any location on slabs, unless so specified.
 - a. Flatness ff 50 overall
 - b. Flatness ff 40 local
- 3. All Other Work: Not exposed to view, 1/2"; exposed to view work 1/16" in 2' and 1/4" overall.
- 4. Steel Placement: All work 3/8" plus or minus from specified position.
 - a. Never closer than 3" to unformed earth exposure.
 - b. Never closer than 2" to formed face earth exposure
 - c. 1" to exposed face exposure unless noted otherwise.

1.3. SUBMITTALS

- A. Identify the Concrete Supplier.

- B. Submit a description of the mix to be employed, identifying the quantities and types of all materials and admixture to be employed in the mix.
- C. Submit reinforcing steel shop drawings for all prefabricated steel work.

1.4. TESTING

- A. The Contractor shall be responsible for securing and paying for all testing as requested by the inspector at the job. Tests may be requested on the average of every fifty (50) cubic yards of work and on each day of pouring, whichever is the greater frequency.
 - 1. Testing clarification: Testing of concrete is to be included in the Contractor's Contract. Air entrainment testing will rarely be requested and will only be applied to concrete subject to freeze-thaw cycles such as sidewalks or curbs. Typically, concrete suppliers have access to an air meter and we will accept the results provided by on site personnel who know how to use such a device. All concrete testing can be done by on site personnel with break results being provided by an engineering lab. The Contractor should keep at the site a slump cone and cylinder molds.
- B. Test data shall be sent directly from the Testing Laboratory to the Architect and shall include the following information:
 - Project Name
 - Date of pour
 - Location of job
 - Job conditions, temperature, weather, etc.
 - Type of failure
 - Strength at failure
 - Slump results (if requested by the inspector)
 - Air entrainment (if requested by the inspector)
- C. At any time pouring is contemplated the Contractor shall have available, at the job, standard concrete testing cylinders. The Contractor, when requested to test, shall make three (3) at twenty-eight (28) days and one (1) in reserve to allow for verification in the event unsatisfactory results occurred at the twenty-eight (28) day test.
- D. The Contractor or his Supplier shall have available a slump cone and an air meter which can be brought to the job, if such a request is made by the inspector.

2. PRODUCTS

2.1. MATERIALS

- A. Cement - to comply with ASTM C-150, Type I Portland Cement.
- B. READY MIX - to comply with ASTM C-94.

- C. AGGREGATES - to comply with ASTM C-33, maximum size aggregate to pass 1-1/2" ring for footings, 1" ring for other work.
 - 1. No slag
 - 2. No fly ash
 - 3. No chert
 - 4. No coal
- D. WATER REDUCING ADMIXTURE - without chloride ions to comply with ASTM C-494, Type A. Use Type D retarding at temperatures exceeding 90 degrees F.
- E. AIR ENTRAINMENT ADMIXTURE - to comply with ASTM C-260,
 - 1. To be employed in concrete subject to moisture and freezing
 - 2. Exterior concrete slabs and paving
 - 3. Foundation walls above grade, adjacent to paving
- F. ANTI-SPALLING COMPOUND - to be combination product, minimum 50% linseed oil, meeting ASTM D-260 and maximum 50% mineral spirits or approved VOC carrier, meeting ASTM D 235.
- G. WATER - shall be clean, potable water, free of dissolved salts or detrimental substances at a minimum temperature 50 degrees F.
- H. BONDING agent- for rubbing and repairs shall be "Daraweld-C", "Elmer's Pro Bond", or "FlexCon" latex bonding agent.
- I. REINFORCING STEEL - to comply with ASTM A615, Grade 60 deformed bars.
 - 1. Epoxy coated reinforcing where noted
 - a. Exterior work or high moisture exposure structural work.
- J. WELDED WIRE FABRIC - to comply with ASTM A185, Grade 60 minimum.
- K. EXPANSION JOINT MATERIAL - minimum ASTM A185, Grade 60.
 - 1. Two (2) part/top 1/2" removable to allow S-4 sealant installation where appropriate on exterior pavements and sidewalks.
- L. JOINT FILLERS - asphalt impregnated, 1/4" interior, 1/2" for exterior and as noted on Drawings and in Specifications.
 - 1. See sealant specification for joint sealants over fillers.
- M. VAPOR BARRIER - shall be 10-mil (.010") polyethylene or vinyl film, Visqueen, WR Meadows, or equal.
- N. CURING COMPOUND - to comply with ASTM C-309 and to be compatible with finish treatments, adhesive and floor coverings.

O. FLOOR SEALER, acrylic or polymer base sealer such as Sherwin Williams 4401, apply minimum 2 coats or as needed for uniform shine

P. ANTIFREEZE ADMIXTURES WILL NOT BE ALLOWED.

Q. CONCRETE - shall be designed to conform to the following in-place minimum standards:

Seven (7) day strength	2500 psi.
Twenty-eight (28) day strength foundations	3500 psi.
Twenty-eight (28) day strength, other work	3750 psi
Cement content foundations - minimum/cu. yd 5 bag..	470 lb bags
Cement content other work – minimum/cu yd 5.5 bag..	517 lb
Air content by volume, all work	5% to 8%

Concrete shall contain water reducing admixture and air entrainment admixture, as recommended by additive manufacturers.

R. FIBER REINFORCING

1. Manufactured by Fibermesh, Inc., or equal, 4019 Industry Dr., Chattanooga, TN 37416 or equivalent by ASTM standards.

a. Fibermesh Macro 650 or equal polyolefin fiber

2. When noted on the drawings or specifically called out in these specifications.

a. Employ in all flat slabs, floors, paving, topping slabs. Use in all unreinforced slabs. If rebar mat or WWF is installed fiber is not required.

b. Material shall be incorporated in the mix at 3.0 lbs. per cu. yd. concrete.

3. EXECUTION

3.1. ENVIRONMENT AND JOB CONDITIONS

A. Concrete shall not be poured at an air temperature below 40 degrees F. or above 100 degrees F.

B. The concrete, as specified, shall not be poured at temperatures below 40 degrees F. and shall be provided a means of maintaining not less than 70 degrees F. for five (5) days or 50 degrees F. for seven (7) days.

C. NO USE OF CHLORIDES OR ANTIFREEZE WILL BE ALLOWED.

D. When WRITTEN APPROVAL is issued, pouring of concrete at below 40 degrees F. may be allowed.

E. When so approved, and when outside temperatures are between 25 degrees F. and 40 degrees F., Type III cement shall be used or an

additional one (1) sack per cubic yard of cement shall be used and placed materials shall be maintained at 60 degrees F. for three (3) days or 45 degrees F. for four (4) days and concrete shall have a temperature of 70 degrees F. to 80 degrees F. at the time of placement. Additional requirements may apply, depending upon the applicable circumstances.

- F. NO CONCRETE SHALL BE PLACED OVER A FROSTED BASE, ON FROSTED FORMS, OR WITH FROSTED REINFORCING, ALL SURFACES SHALL BE ABOVE FREEZING IN TEMPERATURE.
- G. All concrete shall be protected from direct sun, direct wind and adverse weather for two (2) days after placement, regardless of air temperature.

3.2. FORMING

- A. Construct forms accurately to the shapes; and dimensions set forth and adequately brace, secure and tie forms to maintain line and level during pouring operation. Form bracing shall be of a type to allow adjustment thereof.
- B. Any failure of the forms to properly maintain position or properly perform in any manner shall be the responsibility of the Contractor.
- C. Forms shall be designed and installed in a manner which will not be injurious to the concrete when removed. Forms shall remain in place until the concrete is hardened, two (2) days minimum.
- D. Bank forming is allowed for footings only.

3.3. REINFORCING

- A. Size and locate reinforcement as called for in the Documents and accurately position and secure reinforcement to prevent shifting during pouring. Reinforcing steel shall be continuous around corners and through points of thickness variation.
 - 1. Epoxy coated nose bars, exterior stairs if applicable.
- B. All reinforcing steel shall be kept covered and protected from deterioration at all times. Reinforcing steel shall be free of rust, scales, pints, form oil or bond reducing surface condition prior to pouring.
- C. Bars larger than #4 shall be shop fabricated to shape. Field heating for bending is not permitted.
- D. All splices shall be 36-bar diameters minimum. Welded wire fabric shall be lapped one (1) wire spacing (two (2) parallel cross wires).
- E. All steel shall be positioned to provide concrete clear cover as noted for the following conditions:

Earth, banked formed such as footings..... 3"

Earth, formed	.....	2"
Exterior weathering	.....	1-1/2"
Interior	.....	1"
Interior, fire rated	.....	1-1/2"
Slab steel (<i>includes wire mesh</i>)	.....	3/4"

- F. Form oils employed shall be non-staining and shall not leave a residue that will be detrimental to sealants, mastics or finished which may be applied to the surface.
- G. All elevated slabs on steel deck to be macro fiber reinforced.
- H. All other slabs, sidewalls, paving, to be macro fiber reinforced 3.0 lb. / cu. yd. unless detailed otherwise.

3.4. FOOTINGS

- A. All of the footing trenches shall be clean cut and full in measurement. Fill or backfill under footings shall not be permitted on the job. All footings shall rest on solid undisturbed earth unless specifically set forth otherwise.
- B. No loose materials (dirt knocked in during excavation or forming), debris of any type, muck or water shall be present within the footing trench at the time of concrete pour.
- C. All concrete shall be thoroughly mixed to achieve a uniform consistency of cement, fine aggregate and coarse aggregate without lumps or segregation at the point of placement. The water content shall be controlled by the Supplier to assure a workable mix at the point of placement.

3.5. PLACEMENT AND HANDLING

- A. Concrete shall be deposited in place in a manner to minimize segregation of aggregates. It shall be accurately deposited in the forms in a manner which will not allow significant horizontal flow of the concrete.
- B. Forms shall be uniformly filled the full length of the pour in approximately 3' lifts maximum.
- C. All concrete, except slabs, shall be compacted by means of a vibrator (slabs optional). The vibrator shall not be used to convey the concrete. Where a vibrator is employed in a vertical pour, it shall be used in a manner which does not disturb previous lifts and cause injury thereto.
- D. All of the interior slabs on grade shall be poured on 6 mil polyethylene vapor barrier. Lap joints and tape, or roll joints and staple.
- E. Concrete shall be placed in a continuous operation until the pour is completed. Construction joints not called for on the Drawings shall be approved by the Architect.

3.6. CONSTRUCTION JOINTS, EXPANSION, CONTRACTION, BOND BREAKERS

- A. Provide expansion joints, bond breakers and thermal breaks as detailed on the drawings.
- B. Exterior slabs shall have 1/2" asphalt impregnated expansion joints along all building walls, curbs and at approximately twenty-foot (20') center to center.
 - 1. Material shall be two (2) piece with top removable to provide for sealant S-4.
 - a. See Section 07 6200.
 - b. See Drawings for special locations.
- C. Exterior sidewalks shall have uniformly spaced score joints not to exceed 5'-0" o.c.
- D. Where practical, slab pours shall be made in approximately square sections. In no case, should the proportion of length to width on a slab pour exceed 3 to 1 without a joint.
 - 1. "Green" cut scores will be allowed on large pours.
 - 2. Joints and cut scores shall be planned to be unobtrusive, extend off inside corners.
 - 3. Fill joints after 90 days prior to floor installation. Select filler appropriate to floor cover.
 - 4. Coordinate with floor finishes.
- E. All construction joints in walls subject to weathering or earth shall have 1/2" X 1" reglet, provided with Styrofoam rope and be sealed with appropriate sealant.
- F. Joints shall occur where detailed or where approved by the Architect. Do not provide construction joints at locations other than those detailed, unless approved. Additional reinforcing may be required at non-detailed construction joints and shall be installed as directed at no additional charge to the Owner.

3.7. SLABS

- A. True to grade, full thickness.
 - 1. Checked any time prior to completion: slabs shall be within assigned level, F 50 1/8" in 4', 1/4" in 10', 3/8" max. across entire floor.
 - 2. Ponding of water shall be limited to small areas, in compliance with above and not over 1/4" ponded depth.
 - 3. Floor drains shall always be below slab perimeter unless calls out otherwise.
 - a. Sump around drain, approximately 1/8" per foot in 4' X 4'

- area.
 - b. Slope toward drains full rooms or marked areas 1/16" per foot.
 - c. Sump at open site drains 1/4" to 3/8" per foot 2' X 2' area.
 - 4. Floors sloped to drains should not pond water.
 - a. Grind if necessary to achieve drainage.
 - 5. Level areas beyond drains should not be lower than rim surrounding the sloped floor area. In some cases shaping the sump creates an artificial rim effect; this shall be avoided.
 - B. Depress slabs as appropriate for level transition at epoxy, wood, terrazzo floors, quarry tile as occurs.
 - C. Reinforcing
 - 1. Slabs
 - a. Macro fiber
 - 2. Exterior slabs
 - Macro fiber
 - 3. Walls, foundations, structural members as noted on details
 - D. Joints in slabs
 - a. Construction joints smooth dowels 3/8ths x 16" at 12" mid point of slab, interior, exterior, all locations
 - b. Green cut joints in an approved layout approximately 20' spacing, but adjusted to natural slab breaks.

3.8. FINISHING

- A. Concrete footings and foundation footings shall be given float finish unless specifically set forth otherwise on the Drawings or herein these Specifications.
- B. All slabs, stairs and horizontal surfaces shall be troweled to a very dense, hard, smooth surface.
- C. Walls at occupiable spaces, crawl spaces, tunnels, subject to backfill shall have voids filled, ties removed, lattice removed and be suitable to coating with dampproofing.
- D. The walls above grade, not subject to view, utility and mechanical areas, shall have forms removed, voids filled, and ties removed.
 - 1. Polish walls above grade with limestone block using 50-50 cement

and sand plus 2.1.H. bonding admixture.

- E. Walls in basement areas subject to view shall be filled, shall have ties removed and shall receive a medium rubbed surface of 50/50 sand to cement plus 2.1.H. bonding admixture.
- F. Trowel in abrasive, non-slip grit on stair treads and landing surfaces.
- G. Sidewalks shall be steel troweled and light broom finished.
- H. NO MISTING OR ADDITION OF WATER TO THE SURFACE FOR FINISHING OPERATIONS WILL BE PERMITTED. All concrete shall be poured at a workable slump and at a rate that will allow proper finishing with the manpower provided.

3.9. CURING

- A. All work shall be properly cured.
- B. All slabs shall receive a coat of Curing-Sealing Compound immediately following finishing. Sealer applied as curing does not count as seal coat to be applied at conclusion of job.
- C. Keep all freshly poured concrete protected for a period of seven (7) days with forms in place or mist frequently to prevent drying out. Maintain at 50 degrees F. during this period.
- D. Avoid loading or causing impact loading on new concrete for seven (7) days.
- E. Apply anti-spalling compound on all new exterior concrete slabs in October of the year of Owner occupancy. Apply no sooner than twenty-one (21) days following placement on all exterior slabs placed later than October when Owner occupancy is scheduled during that winter or spring season.

3.10. SEALING FLOORS

- A. All floors shall receive the following cure and seal treatment.
 - 1. All concrete
 - a. Cure and seal at time of pour ASTM C309
 - 2. Sealed floors
 - a. Thoroughly clean up of spots, stains and repair of abrasions
 - b. Muriatic acid wash
 - c. Two (2) coats (to uniform sheen) or of a clear urethane type floor sealer suitable for wet locations
 - d. Strictly follow the product Manufacturer's recommendations. For multi coat system to bring floor to uniform maintainable sheen.

END 03 3000

1. GENERAL

1.1 WORK INCLUDED

- A. Polished concrete as noted in the finish schedule on the drawings
 - 1. Base Bid – none
 - 2. Alternate #1 as noted on finish schedule in lieu of VCT floor tile
 - 3. System shall include standard color selection dye system

1.2 RELATED SECTIONS

- A. Section 03 30 00 - Cast-in-Place Concrete.
- B. Section 03 4113 – Precast Hollow Core

1.3 REFERENCES

- A. ASTM C 309 - Standard Specification for Liquid Membrane-Forming Compounds for Curing Concrete.
- B. ASTM C 779 - Standard Test Method for Abrasion Resistance.
- C. National Floor Safety Institute (NFSI): NFSI Test Method 101-A - Standard for Evaluating High-Traction Flooring Materials.

1.4 SYSTEM DESCRIPTION

- A. Performance Requirements: Provide polished flooring that has been designed, manufactured and installed to achieve the following:
 - 1. Abrasion Resistance: ASTM C779, Method A, high resistance, no more than 0.008 inch (0.20 mm) wear in 30 minutes.
 - 2. Reflectivity: Increase of 35% as determined by standard gloss meter.
 - 3. Waterproof Properties: Rilem Test Method 11.4, 70% or greater reduction in absorption.
 - 4. High Traction Rating: NFSI 101-A, ANSI B-101.1 2009 non-slip properties.
- B. Design Requirements:
 - 1. Flatness Overall F50, local F40
 - 2. Hard-Steel Troweled (3 passes) Concrete: No burnishing marks. Finish to ACI 302.1R, Class 5 floor.

C. Curing Options:

1. Membrane forming curing compounds (ASTM C309, Type 1, Class B, all resin, dissipating cure). 1) Acrylic curing and sealing compounds not recommended.
2. Sheet membrane (ASTM C171); polyethylene film not recommended.
3. Damp Curing: Seven day cure.

1.5 SUBMITTALS

A. Submit under provisions of Section 01 3300 - Administrative Requirements.

1. Typical layout including dimensions and floor grinding schedule.
2. Plan view of floor and joint pattern layout.
3. Areas to receive colored surface treatment.
4. Hardener, sealer, densifier.
5. Submit product data, including manufacturer's SPEC-DATA product sheet, for specified products.
- 6.. Material Safety Data Sheets (MSDS) on job site.
7. Letter of certification from the National Floor Safety Institute confirming the system has been tested and passed phase Two Level of certification when tested by Method 101-A. ANSI B-101.1 2009 non-slip properties.
8. Current contractor's certificate signed by manufacturer declaring Contractor as an approved installer of polishing system.
 - a. five (5) years experience.
9. Manufacturer's Instructions: Manufacturer's installation instructions.
10. WARRANTY: Submit warranty documents specified.
11. Operation and Maintenance Data: Submit operation and maintenance data for installed products.
 - a. Manufacturer's instructions on maintenance renewal of applied treatments.
12. Protocols and product specifications for joint filing, crack repair and/or surface repair.

1.6 QUALITY ASSURANCE

A. Installer Qualifications:

1. Installer with a minimum of 5 years' experience in performing work of this section who has specialized in installation of work similar to that required for this project.

B. Manufacturer Qualifications:

1. Manufacturer capable of providing field service representation during construction and approving application method.
2. Manufacturer shall have a minimum 5 years of experience in manufacturing components similar to or exceeding requirements of project.

C. Mock-Ups:

1. Mock-Up Size: Nominal 100 sf sample panel at jobsite at location to those which will exist during actual placement, such as custodial area.
2. Mock-up will be used to judge workmanship, concrete substrate preparation, operation of equipment, material application, color selection and shine.
3. Allow time for inspection of mock-up before proceeding with work.
4. When accepted, mock-up will demonstrate minimum standard of quality required for this work.
5. Approved mock-up may remain as part of finished work.

F. Finish.

1. Level 2 - Salt/Pepper Finish: Expose the fine aggregate such as sand and small aggregate with the concrete. The depth of grind will depend greatly on the placement and finishing procedures. Generally, this level of cut can be achieved within 1/16" of the surface.
2. Sheen Level B: Sheen (glossy) as determined by a gloss reading of 60+.
3. Protect floor during subsequent construction work and repair finishes damaged by subsequent construction operations

G. Coordination

1. Coordinate with the General Contractor to verify project requirements, manufacturer's installation instructions and manufacturer's warranty requirements. Including:
 - a. Environmental requirements.
 - b. Scheduling and phasing of work.
 - c. Coordinating with other work and personnel. Remind all trades that they are working on a surface that is to become a finished surface.
 - d. Surface preparation.
 - e. Repair of defects and defective work prior to installation.
 - f. Notice of materials placed on or in process or completed surface may cause staining or etching, such as cutting oil, chemicals or abrasion.
 - f. Cleaning.

1.7 PROJECT AMBIENT CONDITIONS

- A. Installation Location: Comply with manufacturer's written recommendations.

1.8 WARRANTY

- A. Manufacturer's Warranty: Submit, for Owner's acceptance, manufacturer's standard warranty document executed by authorized company official. Manufacturer's warranty is in addition to, and does not limit, other rights Owner may have under Contract Documents.

2. PRODUCTS

2.1 MANUFACTURERS

- A. Acceptable Manufacturer: L&M Construction Chemicals, which is located at: 1 LATICRETE Park N.; Bethany, CT 06524-3423; Toll Free Tel: 800-362-3331; Tel: 402-453-6600; Email: request info (info@lmcc.com); Web: www.laticrete.com/lmcc
- B. W R Meadows Induroshine
- C. Or equal providing 60+ gloss surface

2.2 POLISHED CONCRETE

- A. Products/Systems:
 - 1. Hardener, Sealer, Densifier: Proprietary, water based, odorless liquid, VOC compliant, environmentally safe chemical hardening solution leaving no surface film.
 - 2. Verify that waste materials can be disposed of locally.
 - 3. Joint Filler: Semi-rigid, 2-component, self-leveling, 100% solids, rapid curing, polyurea control joint and crack filler with Shore A 80 or higher hardness.
 - a. Such as: L & M Construction Chemicals, Inc., Joint Tite 750.
 - 4. Oil Repellent Sealer: Ready to use, silane, siloxane and fluoropolymers blended water based solution sealer, quick drying, low-odor, oil and water repellent, VOC compliant and compatible with chemically hardened floors.
 - a. Acceptable Material: L & M Construction Chemicals, Inc., Petrotex.
 - 5. Concrete Dyes: Fast-drying dye, packaged in premeasured units ready for mixing with water or VOC exempt solvent; formulated for application to polished cementitious surfaces.
 - a. Provide standard color range for use on this project.

6. Stain Guard Sealer: finish with, VOC compliant, topical sealer consisting of low molecular emulsified cross-linking, coupling polymers that effectively protect concrete and other natural stone floor surfaces from the damaging effects of staining, defacing and deterioration due to contaminant penetration.
 - a. Such as: L& M Construction Chemicals, Inc. Permaguard SPS.

3. EXECUTION

3.1 EXAMINATION

- A. Verify that concrete substrate conditions, which have been previously installed under other sections or contracts, are acceptable for product installation in accordance with manufacturer's instructions prior to installation of concrete finishing materials.
- B. Do not begin installation until substrates have been properly prepared according to system manufacturer standards.

3.2 INSTALLATION

- A. Floor Surface Polishing and Treatment:
 1. Provide polished concrete floor treatment in entirety of slab indicated by drawings. Provide consistent finish in all contiguous areas.
 2. Apply floor finish prior to installation of fixtures and accessories.
 3. Diamond polish concrete floor surfaces with power disc machine recommended by floor finish manufacturer. Sequence with coarse to fine grit. Installer to determine the optimum starting grit in order to achieve the specified aggregate exposure.
 4. All concrete surfaces shall be as uniform in appearance as possible.

3.3 ADJUSTMENTS

- A. Re-polish those areas not meeting specified gloss levels per mock-up.
- B. Fill joints flush to surface prior to the start of polishing operations.

3.4 FINAL CLEANING

- A. Upon completion, remove surplus and excess materials, rubbish, tools and equipment.

3.5 PROTECTION

- A. Protect installed product from damage during construction in accordance with manufacturer's recommendations.

END 03 3500

1. GENERAL

1.1. WORK INCLUDES

- A. Hollow Core Planks for floor and roof decking.
 - 1. The engineering of the product for loads specified.
 - a. Saddles and reinforced sections for special conditions
 - b. Custom width for field fit.
 - c. Coordinate with the Architect and General Contractor if cambers exceeding 1" are anticipated for adjustment of bearing heights.
 - d. All hollow core bearing ends, provide push in core plugs to allow grouting or concrete pour into void at walls
 - 1) Insert prior to erection where the end may become inaccessible.
 - 2. The transportation, hauling, handling and setting of materials.
 - 3. Coordination with the Masonry Sub contractor for anchorage and setting
- B. On site storage of materials shall be limited to the materials immediately required to maintain construction progress.
 - 1. Such storage, wherein applicable, shall be arranged by the Contractor: Whereas it is far more efficient to lift materials from transportation vehicles directly into planned and designed position.
 - 2. It is preferred the hollow core plank be set from truck to position.
- C. Coordinate framework, anchor bars and details not supplied by the Product Manufacturer.
- D. Provide openings and fitting around construction components and mechanical work.
 - 1. Provide headers and saddles of adequate structural capacity equal to the gross load requirements.
 - 2. Holes may be drilled on site and trimmed by chisel from the underside after the topside opening has been removed.
 - 3. Provide all concrete topping - in place, preceding masonry wall work to be placed thereupon.
- E. Provide on site grouting of edges and/or perimeter edges, ends, etc.
 - 1. Provide end plugs along the corridor walls such that they can be grouted with the side joints. See details.

1.2. RELATED REQUIREMENTS

A. Specified elsewhere

1. Division 1 - Administrative Requirements
2. Section 03 3000 - Concrete
3. Section 04 2000 - Unit Masonry
4. Section 05 1200 - Structural Steel

1.3. QUALITY ASSURANCE

A. Acceptable manufacturers of hollow core slabs

1. Material Service Corp., 300 W. Washington St., Chicago, IL 60606.
2. Mid South Precast, Pleasant View Tennessee Main:(615) 746-6606
Fax:(615) 746-6607
3. Spancrete, Crystal Lake IL 815 215 8230
4. County Materials Corporation, Salem, Illinois, (618) 548-1190,
Fax (618) 548-1294, info@countymaterials.com
5. Licensees of the Flexicore Co., Dayton, OH
6. Or equal of similar detail and construction

B. Design basis

1. American Concrete Institute "Building Code Requirements for Reinforced Concrete (ACI 318077) and PCI Design Handbook, Second Edition.
2. It is anticipated hollow core planks will be minimum of 20" and maximum of 48" in width

C. Manufacturing and Testing

1. Shall be performed in accord with Precast Concrete Institute's "Manual for Quality Control for Plants and Production of Precast Prestressed Concrete Products (P.I. MNL-116)."

1.4. SUBMITTALS

A. Shop Drawings containing and incorporating:

1. Openings and special reinforcements hangers and saddles.
2. Setting plan
3. Reinforcement
4. Slab designations
5. Connection details
6. Design loads

1.5. PRODUCT DELIVERY, STORAGE & HANDLING

- ### A. Shall be in accord with the Product Manufacturer's recommendations and procedures.

2. PRODUCTS

2.1. MATERIALS

A. Concrete

1. Portland Cement: ASTM C150
2. Aggregates
 - a. Normal weight: ASTM C33
 - b. Lightweight: ASTM C330
3. Admixtures: Do not use admixture containing calcium chloride.
4. Minimum compressive strength:
 - a. At transfer of prestress: 3500 psi
 - b. At twenty-eight (28) days: 5000 psi.

B. REINFORCEMENT

1. Pre-stressing steel: Uncoated seven-wire, stress-relieved strand in accord with ASTM A-416, grade 250k or 270k
2. Bars, deformed-billet steel, ASTM A-615, grade 40 or 60.

C. Structural Steel Plates and Shapes: ASTM A 36.

D. Welded Studs: In accord with AWS D1.1.

E. Bearing Strips

1. Tempered hardboard, Masonite, or equal, or,
2. High density plastic, Korolath, or equal.

F. Grout

1. One (1) part Portland Cement to three (3) parts sand and water.
 - a. Sufficient for placement and hydration.
 - b. Sufficient for fill and interlocking slabs

G. Caulking

1. Non-shrinking, non-staining, thermo-plastic putty, Architectural Gun Grade, Federal Specification TT-C-598, Type 1.

2.2. MANUFACTURE

A. Voids

1. Round or elliptical voids running lengthwise, formed by:

- a. Deflatable tubing.
- b. Extrusion

B. Strand Placement

1. The Product Manufacturer shall be responsible to determine which strand placement should be used based on loading requirements and fire-resistance.

C. Length

1. Furnish in whole inch increments.
2. 4" bearing unless detailed otherwise.

D. UL Label

1. Fire classification not required

2.3. PRODUCT DESIGN REQUIREMENTS

A. Where hollow core is to bear on masonry

1. Bearing shall be nominal four inches (4")
2. Provide reinforcing bar tie as detailed
3. Provide bearing pad such as 1/4" Masonite or as recommended by the manufacturer.

B. Where Hollow core bears on steel beams or embedded bearing plates such as poured walls

1. Provide embedded weld plates in precast ends.
2. Field weld precast to support.

C. Where hollow core is adjacent and parallel to CMU or concrete side walls provide #3 anchor bar turned up or down into the wall and extended out into the composite slab.

1. Or as detailed to tie wall to structure.

D. Verify installation conditions for:

1. Cantilevers
2. Openings
3. Saddle conditions transferring loads to adjacent panels.
4. See Drawings for special sections and bearing situations.

E. Product shall be designed to accept superimposed loads

1. Load chart is included on the structural layout drawings.
 - a. Loads vary over the general floor area; the description below is general application consideration.

2. Roof
 - a. Snow 30 psf
 - b. Collateral dead loads of 25 psf
 - c. No topping slab of 158 pounds per square foot, including live load, concrete topping, ceilings, lighting, incidental mechanical work and partitions.
 3. Floors
 - a. Composite 3" nominal slab less camber
 - b. Live loads classrooms 40 psf corridors 80 psf
 - c. Deadloads collateral 30 psf includes allowance for future steel stud partitions
 - d. Light Weight CMU walls as detailed approximately 500 plf applied over a contributing area of 2 hollow core panels.
 4. Bearing Ends – floors
 - a. Will support second floor walls
 - b. Plug and grout as necessary to support/transfer loads of 3000 pounds per lineal foot (*25 pounds per square inch gross area of the bearing surface transfers thru the slab*).
- F. Camber estimated workable: .028" per lineal foot of span.
- G. Precast sections shall be in accord with Drawing Details and requirements.
1. Topping shall be nominal 3" concrete at bearing ends.
 2. Topping shall be poured and subject to seven (7) days curing prior to construction of walls noted above.

3. EXECUTION

3.1. ERECTION

- A. Set bearing strips where required.
- B. Set slabs level and square keeping units tight and at right angles to bearing walls.
- C. Cooperate with other trades in permitting insertion of anchors, hangers, electrical outlets, etc.
- D. For areas where slab voids are to be used as electrical raceways or mechanical ducts, provide a taped butt joint at end of slabs, making sure the voids are aligned.

3.2. GROUTING

A. Between slab edges

1. Completely fill grout key by squeegee or other method to assure full interlock.
2. Neatly remove any grout that may seep through planks underside before it hardens.
3. If underside will be exposed to view clean smears and rake as need to allow caulking

B. At slab ends (*where shown on Drawings*)

1. Provide suitable end cap or dam in voids as required.

C. Clean up any grout that gets on otherwise finished surfaces such as walls and floors.

D. CAULKING

1. Is required where ever the underside is exposed to occupied view except for
 - a. Mechanical spaces
 - b. Storage rooms
 - c. Utility spaces such as janitor closets.
2. Apply uniformly, and tool using no more than required to fill the joints.
 - a. Caulking to be paintable type
 - b. Be cautious to avoid smears where the slabs will not be painted and select a gray to match concrete.

3.3. CLEANING

- #### A. Neatly and fully finish and remove all surplus materials and rubbish attributed to this work.

END 03 4113

1. GENERAL

1.1. WORK INCLUDES

- A. All masonry work of every description or the project.
 - 1. Concrete units, CMU, split face
 - a. Light weight
 - b. Double score in finished areas
 - c. **Except Bond beams at bearing conditions shall be standard weight CMU**
 - 2. Reinforced nominal bond beams and vertical reinforcing and grouting at 4' spacings or as detailed.
 - 3. Bearing wall construction
 - 1) Bearing surfaces for hollow core precast
 - 2) Bearing surfaces for long lintels
 - 3) Bearing for Beams where occur.
 - 4. Infiltration coating on exterior walls
 - a. Coordinate with EIFS subcontract, see specification 07 2400 for coating by EIFS contractor.
- B. See drawings for extent of work
 - 1. Sizes and dimensions
 - 2. Details of installation
- C. Coordination
 - 1. Provide openings requested by various trades prior to laying walls.
 - 2. Install sleeves or lintels.
- D. Provide openings in existing masonry for ducts.

1.2. RELATED REQUIREMENTS

- A. Specified elsewhere
 - 1. 03 3000 – Concrete
 - 2. 03 4113 – Hollow Core Precast Concrete
 - 3. 04 7200 – Architectural Cast Stone
 - 4. 05 3100 – Metal Decking
 - 5. 05 5000 – Metal Fabrication
 - 6. 07 2113 – Insulation
 - 7. 07 2400 – EIFS

1.3. QUALITY ASSURANCE

- A. Qualifications of installing contractor
 - 1. Five (5) years experience on similar size or larger, commercial prevailing wage work.
 - 2. Experienced and trained masons.
- B. Code Compliance
 - 1. 2015 International Building Code (IBC)
 - 2. ACI 530-92 / ASCE 5-92
 - 3. ACI 530.1-92 / ASCE 6-92
- C. Mock-up panel
 - 1. Lay up a 4' X 4' mock-up exterior wall to demonstrate reinforcing, insulation, jointing, color, workmanship unless exempted by the Architect.
- D. Aged materials, we request CMU materials be aged minimum 30 days prior to installation on the job to allow for normalization and initial shrinkage.

1.4. SUBMITTALS

- A. Mortar – each type, data sheet
- B. Grout – each type, data sheet
- C. Concrete masonry units – samples at job site
- D. Flashings – sample of each type.
- E. Reinforcing – data sheets

1.5. DELIVERY AND HANDLING

- A. Deliver and handle carefully.
 - 1. Protected from abuse, chipping, fire or other detrimental handling conditions.
- B. Store materials in a manner to prevent damage.
 - 1. Protect from excess moisture exposure.
 - 2. Keep clean; do not employ muddy units.
 - 3. Protect from excess handling, chippage or unit edge damage.
 - 4. Mortar cement and lime to be kept dry prior to use.

1.6. JOB CONDITIONS

A. Cleanliness

1. Do not lay units that will have loss of bond due to dirt, water, foreign substance frost, below freezing material temperature.
2. Surfaces to receive masonry shall be clean and provide suitable bond.

B. Protection

1. In place masonry shall be protected from water accumulation in cores.
2. Fresh masonry shall be protected from joint erosion or inadequate cure due to rain, heat, wind or abuse.

2. PRODUCTS

2.1. FACE BRICK none specified on this project

2.2. STONE none specified on this project

2.3. SPLIT FACE CMU none specified on this project

2.4. GLAZED STRUCTURAL TILE none specified on this project

2.5. ARCHITECTURAL CAST STONE see 04 7200

2.6. COMMON BRICK, BEARING BRICK, MASONRY BEARINGS

A. Common brick and concrete brick shall be sound and of uniform size. Brick shall be employed in all locations shown on Drawings or called for in these Specifications. Where not exposed to view, common brick or sound face brick which does not conform to chippage for dimensional requirements may be employed in locations calling for common brick, if this brick conforms to the following requirements.

1. Bricks employed shall be full units, except where cut to fit. Joints shall be of a consistent nature not exceeding 1/2" in thickness nor less than 1/4" for head and bed joints.
2. Brick may be Type FBA, Grade NW except that Grade SW shall be employed, if exposed to weather in any manner, meeting ASTM C62 or C216 requirements for performance and strength. An average of five (5) bricks shall be 3000 psi minimum. Brick shall be solid concrete brick where exposed to view in block walls.

a. See Drawing Notes requiring specific beams and columns bearing.

B. Masonry bearing: Always provide solid bearing for all steel structural members bearing on or embedded into masonry construction.

1. As detailed.
2. If not detailed, brick bearing or grout core filled 8" X 8" up to 8' span.
3. Over 8' span, grout filled hollow or solid masonry, 12" X 12" minimum, but not less than 1" X 1" per foot of span (i.e., 12' span 12" X 12" / 20' span 20" X 20").
4. Embed bolts or studs into grout.

2.7. INFILTRATION BARRIER see EIFS 07 2400

2.8. CONCRETE BLOCK

A. All block used shall be:

1. Standard weight aggregate below grade.
2. Lightweight aggregate to be used above grade – all walls.
3. Double 'V' score required in all areas exposed to view,
 - a. Except mechanical, custodial and utility areas may be standard block.
 - b. Wall patching existing walls standard block.

B. All units shall be sound, straight, free of cracks and voids and shall have reasonably clean, full edges. Block shall be 7-5/8" in height and laid one (1) course equals eight inches (8"). The running dimension shall be 15-5/8" laid to equal sixteen inches (16"). Dimensional variance shall not exceed three percent (3%) between like units.

C. Average compression strength of five (5) units at the time of delivery onto the job site shall be based on an 8 X 8 X 16 unit gross area compressive test. The Contractor shall furnish said test record upon the Architect/Engineer's request. The block shall conform to ASTM-C90T. Type P-1, except block exposed to weather shall be Type U-1; moisture content shall not exceed three percent (3%).

1. Standard weight aggregate, hollow CMU units, average of three tests 2000 psi gross area (3750 psi net).
2. Hollow lightweight CMU units 1700 psi gross area (3200 psi net)
 - a. Note: This job above grade is Light Weight CMU.
 - b. **Except Bond beams at bearing conditions shall be standard weight CMU.**

D. Chippage and honeycombing in block shall be repaired to be indistinguishable in all exposed locations. Repairs may be made after the first coat of wall finish where a multiple coat system is employed. Replace unsatisfactory units.

2.9. MORTAR

A. All prepared mortar shall conform to ASTM C270, Portland Cement/lime mortar.

1. Concrete block, foundations, walls above grade, brick bearings, Type S, 1800 psi at twenty-eight (28) days.
 2. Core fill lintel bearing, etc., Type S or grout (preferred) may use up to 3/8" aggregate limited by flowability in large voids.
- B. Prepared masonry cement may be employed, such as "Brixment" as manufactured by Louisville Cement Company, Lone Star, Lehigh, or approved equal, in proportions of one (1) part masonry cement to not more than three (3) parts damp loose sand. Sand shall have a fineness modulus of 1.96.
1. Type 'S', all CMU and brick work except exterior veneers.
 2. Type 'N' exterior veneer work.
- C. All mortar shall include a water-reducing plasticizer
1. Such as Master Craft 750HS as manufactured by Master Builders or approved similar product, in strict accordance with the Manufacturer's directions.
 2. The goal is to improve workability with less water in the mix.
- D. The mortar shall be installed within 2-1/2 hours of adding moisture to the mix. Mortar 2-1/2 hours old shall be discarded and replaced with new.
- E. USE OF CEMENT ACCELERATOR OR ANTIFREEZE WILL NOT BE ALLOWED without negotiated provision for accommodation as agreed upon with the Architect.

2.10. GROUT

- A. Where called for, grout to be per ACI 530-92.
1. Minimum 2000 psi.
 2. Aggregate size per ACI 530.1.
 3. Consolidate into place.
 4. Bond beam
 5. Vertical Core fill
- B. Non-shrink where called for at steel bearings.
1. Non-metallic cement based, ASTM C-827.
 2. Exterior rated.
 3. Protect from freezing.
- C. Limited locations such as lintel bearings, may be mortar, grout or concrete as available.

2.11. MASONRY REINFORCEMENT

- A. Exterior wall reinforcement double wythe, hot dip galvanized eye and pintle ladder style, 16" eye spacing 9-gauge by 9-gauge cross ties and 9-gauge

eyes with adjustable seismic clip interlock and #9 gauge veneer joint reinforcing snapped into seismic clips.

1. Dur-o-wal, D/A 3700ES, adjustable seismic tie and clip
 2. Hohmann and Bernard, LOX-ALL, adjustable seismic tie and clip
 3. Masonry Reinforcing Corp., Wire Bond Series 800 with seismic tie and clip
 4. Or equal
 5. See Plans for wall thickness and conditions.
- B. CMU wall reinforcement - single wythe, hot dip galvanized ladder style, 9-gauge X 9-gauge.
1. See Plans for wall thickness.
 2. Lap minimum 8"
 3. Lap around corners minimum 8"
- C. Interior wall reinforcing - single wythe, mill galvanized, or hot dipped galvanized ladder style, 9-gauge X 9-gauge.
1. See Plans for wall thickness.
- D. Bond beams and vertical reinforcement shall be clean Grade 60 deformed reinforcing steel. Lap splices 18".
1. Exterior walls use epoxy coated
 2. Interior walls use clean steel
 3. #3 or #4 bar size or as detailed
 4. May use H and B "Spyra Lox" in lieu of rebar laps in masonry.
 5. See plans for bar size and quantity.
- E. Control joints
1. CMU, 3/8" X 24" oiled smooth bars, (1) 4" and 6" walls, (2) 8" and 10" walls, (3) 12" and 16" walls
 2. Unbonded intersections, 1/2" square, hot dip galvanized, 3" x 8" x 16 gauge mesh wall ties, 2" X 8" or as appropriate, alternate courses.
 3. Masonry veneers, 1/2" square, hot dip galvanized, 16 gauge mesh wall ties, or 6" lapped #9 wire, one side
 4. As detailed.
- F. Ties
1. To embedded steel, weld on wire ties and Vee slip anchors
 2. To intersecting walls, foundation support to wall support, galvanized 3" x 8" x 16 gauge galvanized fabric ties.
 3. Appropriate ties for other conditions, all unbounded intersections veneers or other conditions to be tied.

2.12. FLASHING

- A. Through wall flashings or termite shield shall be two multiple piece flexible

long life adhesive type such as:

1. Hohmann and Bernard H&B Mighty Flash
2. W R Grace Perma Flash

B. Splicing cement

1. Shall be modified asphalt cement for metal flashing for all horizontal laps. Not required for joints lapped shingle fashion
2. Not required for adhering flexible types.

C. Drip flashings, 26 or 28 gauge stainless steel for **ALL** unprotected exterior wall openings, full length of lintel. *Unprotected means no overhang above within 2' vertically*

1. Such as Mason Pro type 304 stainless steel
2. Bottom edge hemmed on 28 gauge
3. Required at louvers, windows, doors, penetrations, ledge angles, lintels of any type.
4. No exception unless directed IN WRITING.
5. Seal laps.
6. Provide end dams at discontinuous applications such as doors and windows.
7. Exception: at brick sill condition at least 8" below finish floor on a concrete foundation, flexible flashing may be used with weep ropes.,

D. At through wall louvers provide:

1. Full wall width sill flashing. Coordinate with Mechanical Contractor. Flashing shall be 30 gauge stainless steel or as detailed. Provide 1/2" turned up back edge and jamb edges and seal corner where possible.
2. Drip flashings above louver. Coordinate with louver style.

2.13. MOISTURE REPELLENT: SEE 07 2400

2.14. INFILTRATION BARRIOR, See 07 2400 and EIFS specification for barrier by EIFS applicator.

2.15. WEEP ROPES: $\frac{5}{16}$ " ~ $\frac{3}{8}$ " cotton rope x 12" – 16" long

2.16. STONE ANCHORS

A. Stone Anchors and Cast stone Anchors to be stainless steel appropriate to the application and substrate such as:

1. H&B 366 x 12 gauge
2. H&B 367 x 12 gauge
3. H&B 435 x 12 gauge
4. H&B 433 x 12 gauge

- B. Coordinate the best anchor method with the stone/cast stone supplier and with the Architect for long term service.
 - 1. See also details on drawings for further instruction.

3. EXECUTION

3.1. WORK INCLUDED

- A. All masonry work and materials and associated work to complete the project and work indicated on the drawings.
- B. General Contractor shall furnish all labor and materials and complete all masonry work, of every nature, called for on the accompanying drawings, as need to complete the work and specified herein these Specifications.

C. OPENINGS

- 1. The Contractor shall leave or cut all of the openings in masonry construction required for work by the other Contractors and/or Subcontractors.
- 2. Provide and install lintels of proper size over all openings needed.
- 3. Where said lintel sizes are not established by schedule on the Drawings or herein these Specifications, sizes shall be determined in conference with the Architect.
- 4. Install sleeves in the walls as provided by the various Contractors and Subcontractors at locations as directed.
- 5. Provide openings in walls as coordinated with other contractor/sub contractors in a timely fashion prior to construction of the work and when noted on the drawings.

D. INSTALLATION OF MASONRY

- 1. This Contractor shall make all repairs needed at masonry openings, etc., after other Contractors and Subcontractors have completed their work.
- 2. All masonry work shall be laid straight, plumb and true, and in a workmanlike manner, employing full head joints and continuous bed joints.
- 3. All masonry walls are to be carried up to the exact heights that are properly leveled for sills, joists, beams, floors, etc. All masonry shall be properly protected from damaging weather. The Contractor shall be completely responsible, and shall replace, at his own expense, all masonry which, in the Architect's opinion, has been damaged by adverse weather conditions.
- 4. Where masonry work is called for to be laid up immediately over structural steel, a header course shall be laid directly over the steel.
- 5. All masonry units shall be sound and reasonably straight as judged by the Architect, in keeping with specific use to which the units are put. Unit sizes shall be standard for the material and shall comply with the coursing set forth on the Drawings.

6. All joints shall be struck evenly and regularly and in a manner and style as shall be determined in conference with the Architect.
 - a. All put-log holes shall be determined in conference with the Architect.
 - b. All put-log holes shall be carefully filled and struck.
 - c. All head bed joints shall be cut clean at their intersections.
7. Wherein the Drawings show masonry fill-in at the abandoned openings, the same shall comply with these documents, with each face finished to match the existing adjacent wall finish.

E. MASONRY BEARINGS:

1. All steel or concrete beams, lintels, headers, columns, precast concrete require solid bearing.
 - a. Embeds when called out in schedules or detailed.
 - b. Core filled and re-bar walls as noted on plans or details
 - c. Brick or grouted bearings
 - 1) As detailed
 - 2) Joists and beams
 - a) If not detailed not less than 8" x 8" or 1" x 1" per foot of span, i.e. 15' span 15" x 15", 20' span 20" x 20", (*whichever is greater*)
 - b) Bearings are intended to be approximately 450 psi bearing load and spread the load out to 60 psi on the gross area.
 - d. Set joist bearing plates, embed studs.
 - e. Set Beam bearing plates and anchor bolts as coordinated with the steel work.

F. WEATHER-TIGHT

1. Where sealants or flashings are to be employed, joints shall be raked to proper dimensions. Sealants employed shall be as per sealant specifications.
 - a. Fit masonry to dissimilar construction to provide weather and infiltration tight construction.
 - b. Caulk seal or flash and seal all such joints.
2. Install flashings at all exterior openings.
 - a. Flexible flash from CMU and lap over Stainless steel drip flashing applied over lintel
 - 1) Full length of lintel unless noted otherwise and uniform in appearance end to end.

- 2) Sealed laps not less than 4"
 - 3) End dams
- b. Drip flashing to extend length of lintel (uniform each end)
 - c. Weeps at all exterior flashing at 24" spacing (uniform space and not more than 16" from ends).
- 1) Cotton rope type lap horizontal and then 4" to 6" vertical behind veneer

G. INFILTRATION TIGHT

1. Coordinate with other trades to accommodate compressible infiltration barriers and sealants.
2. All exterior masonry work to be complete and properly jointed to provide barrier to wind through assembly.

3.2. INSTALLATION

A. BONDING

1. All masonry work shall be bonded unless specifically indicated otherwise on the accompanying Drawings or herein these Specifications.
2. All piers shall be bonded each course, insofar as this is practical. All walls and piers intersecting structural walls shall be bonded with structural wall every other course.
3. Where bonding is not practical, approved galvanized metal ties shall be used and the ties shall be set approximately one (1) per 1¾ square feet of wall surface.
4. All block work shall be laid in common bond.
5. Bond intersecting corners of foundation supported walls.
6. Rake and caulk and tie intersecting walls slab supported with foundation supported.

B. JOINTS, BACKPLASTERING AND PARGING

1. All joints shall be struck evenly and regularly and in a manner and style as shall be determined in conference with the Architect. All put-log holes shall be carefully filled and struck. Head and bed joints shall be cut clean at their intersections.
2. All head and bed joints in all masonry work shall be full joints and SHALL BE CROSS WEBBED when possible.
3. Tool all joints with V groove or round groove toll as directed.

C. COLD WEATHER CONSTRUCTION

1. Strictly comply with ACI 530-99/ASCE 5-99/TMS 402-99.
2. Implement the following requirements when the ambient temperature falls below 40 deg. F. or the temperature of masonry units is below 40 deg. F.

3. Do not lay masonry units having a temperature below 25 deg. F. Remove visible ice on masonry units before the unit is laid in the masonry.
4. Heat mortar sand or mixing water to produce mortar temperatures between 60 deg. F. and 120 deg. F. at the time of mixing. Maintain mortar above freezing until used in masonry.
5. When the ambient temperature is between 25 deg. F. and 20 deg. F., use heat sources on both sides of the masonry under construction and install windbreaks when wind velocity is in excess of 15 mph.
6. When ambient temperature is below 20 deg. F., provide an enclosure for the masonry under construction and use heat sources to maintain temperatures above 32 deg. F. within the enclosure.
7. When mean daily temperature is between 40 deg. F. and 32 deg. F., protect completed masonry from rain or snow by covering with a weather-resistive membrane for 24 hours after construction.
8. When mean daily temperature is between 32 deg. F. and 25 deg. F., completely cover completed masonry with a weather-resistive membrane for 24 hours after construction.
9. When mean daily temperature is between 25 deg. F. and 20 deg. F., completely cover completed masonry with insulating blankets or equal protection for 48 hours after construction.
10. When mean daily temperature is below 20 deg. F., maintain masonry temperature above 32 deg. F. for 24 hours after construction by enclosure with supplementary heat, by electric heating blankets, by infrared heat lamps, or by other acceptable methods.
11. Do not lay glass unit masonry during cold weather construction periods.

D. HOT WEATHER CONSTRUCTION

1. Strictly comply with ACI 530-99/ASCE 5-99/TMS 402-99.
2. Protect from wind when air temperature exceeds 90 deg. F.

E. RAIN / FLOWING WATER

1. Protect newly laid masonry from exposure to rain or running water.
2. Consult A/E prior to surface repair of eroded joints in an unexpected exposure.

F. FLASHINGS AND WEEPS

1. Provide flashings and weeps at all exterior veneer condition with solid bearing surface, open below, and at building sill line near grade.
 - a. Above all roof lines, coordinate with roof flashing System
 - b. Above all openings provide stainless steel drip flashing with turned up rear edge

- 1) Seal laps
 - 2) End dams where discontinuous
 - 3) Always provide weeps
 - 4) Lap over turned up edge with flexible flashing system installed into the cmu back up at least 8" up or secured and sealed to sheathing system at least 12" above flashing line.
 - 5) At concrete, steel, such as ledge angle or grade line
 - a) At grade line or lower edge of brick veneer the stainless steel flashing is not required in the flashing course is at least 8" below the interior lowest finish floor, then only the flexible flashing is required.
- c. Weep @ 24" U.N.O.
- 1) Not less than 4" from ends of flashing such as at lintels
 - 2) Weep ropes to lay horizontal in bed joint at least 4" then rise up at least 4" against the back up surface.
- d. Weep ropes, $\frac{3}{8}$ " cotton, to lay at least 12" horizontally then up 6" in space behind face veneer.
- e. Seal all flashing splices. Splices approximately 4" minimum
- f. Provide stainless steel drip flashing at all openings.
- 1) End dam all ends of flashings inside veneer.
 - 2) Flexible flashing laps over and out on the horizontal not less than 3".
 - 3) Flexible flashing only required at sill condition window or opening such as louver or penetration which also include a non ferrous flashing system for weathering.
 - 4) Place to face of wall.
- g. In all cases, the flexible flashing concealed in the wall shall lap up (*in front or behind the cavity insulation*) into the next CMU joint not less than 6" above the horizontal plane of the flashing.
- 1) Lay into the CMU joint approximately 2"

G. REINFORCING

1. Horizontal joint reinforcing

- a. Reinforcing shall be placed in bed joints continuous at 16" spacings, measured vertically, beginning a maximum of 16" above footing. Extra reinforcing in the first bed joint immediately above and below openings shall be continuous for a distance of 4'-0" beyond each jamb of the opening.

- b. Lap reinforcement sufficiently at splices, 8" minimum, to ensure continuity; corners shall be cut and bent.
- c. Reinforcing shall not pass through vertical masonry control joints, except where required for structural reasons as noted on the Drawings.
- d. Reinforcing shall be proper size for all thicknesses.
- e. See Drawings for Bond Beams.
- f. Pintle and tie veneer reinforcing loops, min. one (1) per two (2) sq. ft.
 - 1) Seismic clips and wire in brick joints.

H. Stone Anchors

- 1. Contractors preferred type may be submitted for consideration.
- 2. Follow the stone/cast stone supplier recommendation as minimum requirement
- 3. Details may have more inclusive requirements.

I. CLEANING DOWN FINISHED MASONRY: All block work shall be cleaning of mortar drippings, joints finished down, and the entire surface stoned or brushed as required and chips repaired.

J. Windbreak and wall to wall anchorage

- 1. Wherein the Drawings indicate new exterior masonry wall abutting existing masonry walls, provide the following system:
 - a. 4" X 4" X 1/4" windbreak steel angle full height of intersection walls/leg bolt to (E) wall - 3/8" dia. X 4" at approximately 2'-8" spacing.
 - b. Provide corrugated anchors/wall to wall at 8" spacing/each wythe.
 - c. Provide foam rope and sealant bead struck smooth/full height at exposed wall intersections.
- 2. Wherein the Drawings indicate interior new masonry walls abutting existing masonry walls,
 - a. Provide 1/4" drilled shear pins spaced max. 16" vertically per wythe/two (2) ties per wythe where masonry wythe exceeds 6".
 - b. Where new walls abut existing masonry walls exposed to view/rake the joint and provide paintable sealant bead struck smooth.

END 04 2000

1. GENERAL

1.1. SECTION INCLUDES – ARCHITECTURAL CAST STONE

- A. Scope - All labor, materials and equipment to provide the Cast Stone shown on architectural drawings and as described in this specification.
 - 1. Manufacturer shall comply with all material set forth in this specification.
 - 2. Installing contractor shall unload, store, furnish all anchors, set, patch, the Cast Stone as required.
 - 3. Match existing panels provided in 2005/2006 from Edwards Cast Stone Company, Dubuque, IA.
 - a. Color
 - b. Texture
 - c. Nominal joint spacing

1.2. RELATED SECTIONS

- A. 04 2000 – Unit Masonry

1.3. DEFINITIONS

- A. Cast Stone - a refined architectural concrete building unit manufactured to simulate natural cut stone, used in unit masonry applications.
 - 1. Dry Cast Concrete Products – manufactured from zero slump concrete.
 - a. Vibrant Dry Tamp (VDT) casting method: Vibratory ramming of earth moist, zero- slump concrete against a rigid mold until it is densely compacted.
 - b. Machine casting method: manufactured from earth moist, zero-slump concrete compacted by machinery using vibration and pressure against a mold until it becomes densely consolidated.
 - 2. Wet Cast Concrete Products – manufactured from measurable slump concrete.
 - a. Wet casting method: manufactured from measurable slump concrete and vibrated into a mold until it becomes densely consolidated.

1.4. SUBMITTAL PROCEDURES

- A. Provide submittal drawing in PDF format.

- B. Samples: Submit (2) 6" x 6" samples of the Cast Stone that represent the specific finish and color proposed to be furnished for the project.
- C. Test results: Submit manufacturers test results of Cast Stone previously made by the manufacturer in the last 90 days, for the following:
 - 1. Compressive Strength
 - 2. Absorption
 - 3. Air Content (wet cast)
- D. Shop Drawings: Prepare Project-specific information, drawn accurately to scale including,
 - 1. Layout sheets
 - a. Key plans
 - b. Floor plans (as appropriate)
 - c. Elevations (as appropriate)
 - d. Arrangement of joints (optional for standard or semi-custom installations)
 - e. Annotation of stone types (piece marks) and their locations
 - 2. Detail sheets
 - a. Piece profiles
 - b. Cross-sections
 - c. Reinforcement
 - d. Exposed faces
 - e. Anchoring methods
 - f. Anchors

1.5. QUALITY ASSURANCE

- A. Manufacturer Qualifications:
 - 1. Recommended Manufacturer and requirements defined by:

Edwards Cast Stone Company
777 Edwards Rd.
Dubuque, IA 52003
Tel: (563) 556-0535
 - 2. Manufacturer must be an active member (in good standings) of the Cast Stone Institute®
 - 3. Manufacturer shall have minimum of (10) years of experience manufacturing Cast Stone.
 - 4. All products must contain Portland cement.

2. PRODUCTS

2.1. ARCHITECTURAL CAST STONE

- A. Comply with ASTM C 1364
- B. Physical properties: Provide the following:
 - 1. Compressive Strength - ASTM C 1194: 6,500 psi (45 Map) minimum for products at 28 days.
 - 2. Absorption - ASTM C 1195: 6% maximum by the cold water method, or 10% maximum by the boiling method for products at 28 days.
 - 3. Air Content – ASTM C173 or C 231, for wet cast product shall be 4-8% for units exposed to freeze-thaw environments. Air entrainment is not required for VDT products.
 - 4. Freeze-thaw – ASTM C 1364: The CPWL shall be less than 5% after 300 cycles of freezing and thawing.
 - 5. Linear Shrinkage – ASTM C 426: Shrinkage shall not exceed 0.065%.

2.2. RAW MATERIALS

- A. Portland cement – Type I or Type III, white and/or grey, ASTM C 150.
- B. Coarse aggregates - Granite, quartz or limestone, ASTM C 33, except for gradation, and are optional for the VDT casting method.
- C. Fine aggregates - Manufactured or natural sands, ASTM C 33, except for gradation.
- D. Colors - Inorganic iron oxide pigments, ASTM C 979 except that carbon black pigments shall not be used.
- E. Admixtures - Comply with the following:
 - 1. ASTM C 260 for air-entraining admixtures.
 - 2. ASTM C 494/C 495M Types A - G for water reducing, retarding, accelerating and high range admixtures.
 - 3. Other admixtures: integral water repellents and other chemicals, for which no ASTM Standard exists, shall be previously established as suitable for use in concrete by proven field performance or through laboratory testing.
 - 4. ASTM C 618 mineral admixtures of dark and variable colors shall not be used in surfaces intended to be exposed to view.
 - 5. ASTM C 989 granulated blast furnace slag may be used to improve physical properties. Tests are required to verify these features.
- F. Water – Potable

- G. Reinforcing bars:
1. ASTM A 615/A 615M. Grade 40 or 60 steel galvanized or epoxy coated.
 2. Welded Wire Fabric: ASTM A 185 where applicable for wet cast units, epoxy or galvanized coated.
- H. All anchors, dowels and other anchoring devices and shims shall be standard building stone anchors commercially available stainless steel Type 302 or 304.

2.3. COLOR AND FINISH

- A. Match existing panels on building.
- B. All surfaces intended to be exposed to view shall have a fine-grained texture similar to natural stone, with no air voids in excess of 1/32 in. (0.8 mm) and the density of such voids shall be less than 3 occurrences per any 1 in.2 (25 mm²) and not obvious under direct daylight illumination at a 5 ft (1.5m) distance.
- C. All exposed edges to be hand tooled to ensure a consistent quality edge.
- D. All Cast Stone shall be hand sanded and acid washed.
- E. Minor chipping resulting from shipment and delivery shall not be grounds for rejection. Minor chips shall not be obvious under direct daylight illumination from an 8-ft distance.
- F. The occurrence of crazing or efflorescence shall not constitute a cause for rejection unless it cannot be cleaned off or is reoccurring problem.

2.4. REINFORCING

- A. Reinforce the units as required by the drawings and for safe handling and structural stress.
- B. Minimum reinforcing shall be nominal 0.25 percent of the cross section area.
- C. Reinforcement shall be noncorrosive where faces exposed to weather are covered with less than 1.5 in. (38 mm) of concrete material. All reinforcement shall have minimum coverage of twice the diameter of the bars, or 3/4" minimum, whichever is greater and be carefully controlled position during casting.
- D. Welded wire fabric reinforcing shall not be used in dry cast products.

2.5. CURING

- A. Cure units in a warm curing chamber approximately 100°F (37.8°C) at 95 percent relative humidity for approximately 12 hours, or cure in a 95 percent moist environment at a minimum 70°F (21.1°C) for 16 hours after casting. Additional yard curing at 95 percent relative humidity shall be 350 degree-days (i.e. 7 days @ 50°F (10°C) or 5 days @ 70°F (21°C)) prior to shipping. Form cured units shall be protected from moisture evaporation with curing blankets or curing compounds after casting.

2.6. MANUFACTURING TOLERANCES

- A. Cross section dimensions shall not deviate by more than $\pm 1/8$ in. (3 mm) from approved dimensions.
- B. Length of units shall not deviate by more than length/ 360 or $\pm 1/8$ in. (3 mm), whichever is greater, not to exceed $\pm 1/4$ in. (6 mm).
 - 1. Maximum length of any unit shall not exceed 12 times the average thickness of such unit unless otherwise agreed by the manufacturer.
- C. Warp, bow or twist of units shall not exceed length/ 360 or $\pm 1/8$ in. (3 mm), whichever is greater.
- D. Location of dowel holes, anchor slots, flashing grooves, false joints and similar features – On formed sides of unit, 1/8 in. (3 mm), on unformed sides of unit, 3/8 in. (9 mm) maximum deviation.

2.7. PRODUCTION QUALITY CONTROL

- A. Testing.
 - 1. Test compressive strength and absorption from specimens selected at random from plant production.
 - 2. Samples shall be taken and tested from every 500 (14 m³) cubic feet of product produced, minimum one test this project.
 - 3. Perform tests in accordance ASTM C 1194 and C 1195.
 - 4. New and existing mix designs shall be tested for strength, absorption and Freeze Thaw compliance prior to producing units.

2.8. DELIVERY, STORAGE AND HANDLING

- A. Piece Marks
 - 1. Clearly label each piece with project name, piece weight and corresponding identifier from shop drawings.
- B. Packaging
 - 1. Protect them from staining or damage during shipping and storage

2. Provide pallet label consisting of job name, piece identifier and total pallet weight.
3. Provide detailed shipping information consisting of each item per pallet per truck.

3. DELIVERY, STORAGE AND HANDLING

3.1. EXAMINATION

- A. Installing contractor shall check Cast Stone materials for fit and finish prior to installation. Do not set unacceptable units.

3.2. SETTING TOLERANCES

- A. Set stones 1/8 in. (3 mm) or less, within the plane of adjacent units.
- B. Joints, plus - 1/16 in. (1.5 mm), minus - 1/8 in. (3 mm).

3.3. JOINTING

A. Joint size:

1. At stone/brick joints 3/8 in. (9.5 cm).
2. At stone/stone joints in vertical position 1/4 in. (6 mm) (3/8 in. (9.5 mm) optional).
3. Stone/stone joints exposed on top 3/8 in. (9.5 mm).

B. Joint materials:

1. Mortar, Type N, ASTM C 270.
2. Use a full bed of mortar at all bed joints.
3. Flush vertical joints full with mortar.
4. Leave all joints with exposed tops or under relieving angles open for sealant.
5. Leave head joints in copings and projecting components open for sealant.

C. Location of joints:

1. As shown on shop drawings.
2. At control and expansion joints unless otherwise shown.

3.4. SETTING

- A. Drench units with clean water prior to setting.
- B. Fill dowel holes and anchor slots completely with mortar or non-shrink grout.
- C. Set units in full bed of mortar, unless otherwise detailed.

- D. Rake mortar joints 3/4 in. (18 mm) in. for pointing.
- E. Remove excess mortar from unit faces immediately after setting.
- F. Tuck point unit joints to a slight concave profile.

3.5. JOINT PROTECTION

- A. Comply with requirements of Section 07 9200.
- B. Prime ends of units, insert properly sized backing rod and install sealant.

3.6. REPAIR AND CLEANING

- A. Repair chips with touchup materials furnished by manufacturer.
- B. Saturate units to be cleaned prior to applying an approved masonry cleaner.
- C. Consult with manufacturer for appropriate cleaners

3.7. INSPECTION AND ACCEPTANCE

- A. Do not field apply water repellent until repair, cleaning, inspection and acceptance is completed.

END 04 7200

1. GENERAL

1.1. DESCRIPTION

- A. Provide structural steel as shown on the Drawings and specified herein, including but not necessarily limited to:
1. All steel normally falling under definition of structural steel as set forth in latest edition of AISC Code of Standard Practice, Section 2.
 2. All steel items reasonably implied but not specifically mentioned on the Drawings or specified herein to render work secure and complete. This includes all connections and erection accessories.
 3. All structural steel (beams, lintels, bearing plates, etc.) exposed to the building exterior envelope - atmosphere shall be galvanized (see 2.1.F.) and finish coated/09 90 00) after shop welding.

1.2. RELATED WORK

- A. Specified elsewhere:
1. DIVISION 00 – PROCUREMENT REQUIREMENTS
 2. DIVISION 01 – ADMINISTRATIVE REQUIREMENTS
 3. 03 3000 – Concrete
 4. 03 4113 Hollow Core Precast
 5. 04 2000 – Unit Masonry
 6. 05 5500 – Metal Fabrications

1.3. QUALITY ASSURANCE

- A. Manual of AISC, Fourteenth Edition – Allowable Stress Design (ASD)
1. ASIC "Code of Standard Practice for Steel Buildings and Bridges"
 2. AISC "Specifications for the Design, Fabrication and Erection of Structural Steel of Buildings" including Supplement No. 3
- B. ASTM A6-72 "General Requirements for Delivery of Rolled Steel Plates, Shapes and Bars for Structural Use"
- C. AWS - "Standard Code of Arc and Gas Welding in Building Construction"
- D. "Specifications for Assembly of Structural Joints Using High Strength Steel Bolts" as approved by the Research Council on Riveted and Bolted Structural Joints of the Engineering Foundation
- E. Prime coat, whether factory or field applied, shall have nicks and skins touched up, wherein the primer coat is the final coat or the primer coat is base for the pursuing coatings.
- F. Structural welding shall be completed by certified welders in shop or field.

1. Non structural critical welds such as back to back lintels, accessories welded to structure, masonry accessories such as wire ties, may be welded by a competent welder subject to inspection for uniform penetration and good appearance.
- G. PROOF TESTING SERVICES Testing shall be applicable only whereupon the Architect/Engineer has rejected the Contractor's work and so notified the Contractor thereof.
- H. The Contractor may employ, at his own expense, a Testing Laboratory (or laboratories) selected by the Architect/Engineer to perform all tests and submit reports of all tests specified.
- I. The Testing Laboratory shall be responsible for conducting and interpreting the tests and shall state in each report whether or not the test results conform to the Contract Documents.
- J. The Owner may employ an independent inspector.

1.4. SUBMITTALS

- A. Submit shop drawings with complete fabrication and erection details and schedules in accord with Section 01 7800, Project Closeout.
 1. Shop drawings shall have been thoroughly checked by the Fabricator before being submitted to the Architect/Engineer for review. Review is a precautionary measure only and shall not relieve the Fabricator of full responsibility of correctness of all materials, sizes, dimensions and details.
 2. In case structural sections or details indicated on Drawings cannot be readily obtained, substitution of sections or details of equal strength which conform to the requirements of design may be made only if approved.
 3. Fabrication shall not proceed until shop drawings have been reviewed. Fabrication, assembly and erection shall conform to reviewed and approved shop drawings.

2. PRODUCTS

2.1. MATERIALS

- A. Structural Steel: ASTM A 36-70a.
- B. Welding Electrodes: AWS Specifications, Designation A233 (E-60 or E-70)
- C. High Strength Bolts: ASTM A325-71a – beam to beam / beam to column
 1. Always provide washers.
 2. Beveled washers where needed.

- D. Standard Bolts: ASTM A 307-76b – anchor bolts
- E. Rivet Steel: ASTM A 502-76
- F. Galvanizing: ASTM A 123 two (2) oz. per square foot for all steel embedded in exterior walls supporting the exterior wythe (brick).
- G. Priming: All steel shall be given one (1) shop coat (two coats for members, embedded in exterior walls) of Red Oxide Alkyd primer, lead free.

2.2. FABRICATION

- A. Material shall be properly marked and match-marked where field assembly so requires. The sequence of shipments shall be such as to expedite and minimize the field handling of material.
- B. Beams and girders shall be cambered as required for loading conditions.
- C. Built up sections assembly by welding shall be free of warpage and all axes shall have true alignment.
- D. Welding
 - 1. Welds not specified otherwise shall be continuous fillet welds, using not less than the minimum fillet as specified by AWS.
 - 2. 1/16" less than thinnest material up to 1/4" weld, then as specified.
 - 3. Structural welding shall be completed by certified welders in shop or field.
 - 4. Non structural critical welds such as back to back lintels, accessories welded to structure, masonry accessories such as wire ties, may be welded by a competent welder subject to inspection for uniform appearance and penetration.
- E. Take field measurements as required to verify and supplement dimensions shown on the Drawings.
- F. Provide anchor bolts and embedded plates for anchoring structural steel to the supporting concrete and masonry. Furnish, as soon as possible, detailed plans showing exact locations of all bolts to be built into concrete or masonry. Furnish templates as required.
- G. Connections:
 - 1. Field connections shall be bolted, unless otherwise noted on the Drawings. Field welded connections shall be used only where they are specifically shown on the Drawings or with A/E's approval.
 - a. Beams bearing on column cap plates may employ slotted holes for easy field fit.
 - b. Beam to beam or beam web connections are bearing type connection. Properly tighten turn of nut or torque wrench.

2. Shop connections may be riveted, welded or bolted with high strength bolts at Contractor's option. All shear connections shall be welded or bolted with high strength bolts.
3. If high strength bolts are used, they shall be installed in strict compliance with AISC Specifications and ASTM A325 requirements for installation of A325 bolts.
4. All structural critical field and shop welds shall be by certified welder only. The Certificates should be available for inspection by the Architect/Engineer.
5. All connections not specifically shown shall fully develop critical load for member being connected.
6. Bolts, where used, shall have cut washers under nuts and no threads allowed to bear on parts being connected.
7. Bearing ends of columns shall be milled or sawed for true bearing on base plates. Rough bearing ends shall not be used.

H. Masonry to steel tie

1. All columns adjacent to or embedded into unit masonry shall have adjustable anchors at alternate block courses, 16" spacing up contact side(s) of steel.
2. All beams with masonry above shall have not less than 3" x 3/8" studs at 24" unless specifically detailed otherwise.
3. See Drawings for specific exceptions and designations.

2.3. CLEANING - SHOP PAINTING

- A. All steel furnished shall be cleaned of rust, mill scale, dirt and foreign matter before applications to shop coat of paint.
- B. Paint structural steel with one (1) coat of red oxide VOC compliant primer suitable for field painting with acrylic systems or DTM paint.
 1. Apply additional coats as needed on surfaces skinned, nicked, burnt or peeled after assembly and erection.
 2. Steel embedded in exterior masonry wall such lintels and beams shall be hot dip galvanized
- C. All steel under this heading, unless specifically noted otherwise shall be given one (1) smooth, shop coat of 2 mil dry film thickness.
- D. Hand clean and solvent-clean all unpainted and damaged shop coat areas and touch up with a compatible shop coat primer.

- 2.4. GALVANIZING - all lintels embedded in and supporting exterior face brick shall be hot dip galvanized. Only the portion effecting brick work is required to be galvanized.

3. EXECUTION

3.1. INSTALLATION

- A. Material stored at the job site shall not exceed design loads on structures so the members will not be distorted or otherwise damaged and all materials shall be protected against corrosion or deterioration.
- B. Confer with other contractors and procure necessary templates and other information required to establish number, size and location of holes or other details necessary for attachment of blocking, windows, purlins.
- C. Burning shall not be used to form holes, enlarging of holes or matching of unfair holes. No member shall be altered in field unless approved IN WRITING by the Architect/Engineer.
- D. Throughout all phases of erection and construction temporary bracing shall be introduced wherever necessary to take care of all loads to which structure may be subjected including equipment and operation of same. Wherever piles of material, erection equipment, or other loads are carried during erection, proper provisions shall be made to safely support these abnormal loads.
- E. All members shall be cut neat, square and should be erected true and flush without twists and open joints. Light drifting to draw holds together may be used. Reference should be made to codes and specifications listed in this Section under Quality Assurance which governs all phases of fabrication, details, erection and workmanship. Responsibility for all errors of fabrication and for proper fitting of various members shall be assumed by the Contractor.
- F. Column bases shall be set on steel shims. Grouting of column bases shall be with a non-shrink, non-metallic grout.
- G. All steel exposed to view shall be free of surface imperfections and ground off to true surfaces. Exposed welds shall be ground smooth.
- H. Provide steel lintels at all locations of mechanical work passage through walls.
 - 1. Locate in conjunction with mechanical installers.

3.2. CONSTRUCTION BRACING

- A. A/E design and detailing is for finished product only. Erection rigging, bracing and handling practices are the Contractor's responsibility.
 - 1. A/E neither directs nor schedules installation.
 - 2. A/E inspects only for installation conditions related to finished product.
- B. Provide all necessary additional bracing, clips, anchors and reinforcement as needed.
 - 1. Remove after erection when exposed to view or when design load shifts will result.

3.3. ANCHORAGE

- A. All structural steel shall be mechanically anchored.
 - 1. As detailed.
 - 2. Similar to detailed work for items not specifically detailed.
- B. Masonry lintels may be an exception.
 - 1. Loose set except where noted.
 - 2. Weld back to back lintel angles 2" weld at 12" spacing top to bottom.
- C. Fully embed steel in masonry unless detailed otherwise directed by A/E in field.

3.4. PROOF INSPECTIONS

- A. Welded connections shall be inspected by the Architect/Engineer in accordance with the following:
 - 1. All welds will be visually inspected for minimum size, length and for defects.
- B. Bolted connections will be inspected in accordance with the following:
 - 1. High strength bolted connections shall be checked and approved by the "inspecting wrench" method outlined in the "Specifications for Assembly of Structural Joints Using High Strength Steel Bolts" hereinbefore specified.
 - 2. Proof test as requested by the Architect.

END 05 1200

1. GENERAL

1.1. DESCRIPTION

- A. Steel joists as shown on the Drawings and specified herein, including accessories.
- B. Related work specified elsewhere:
 - 1. DIVISION 01 - PROCUREMENT REQUIREMENTS
 - 2. 05 1200 - Structural Steel

1.2. QUALITY ASSURANCE

- A. Steel joists shall be standard prefabricated units of a member manufacturer of the Steel Joist Institute. In lieu of the foregoing, nonmember manufacturers shall submit certification that the joists to be furnished conform to the Steel Joist Institute's Standard specification and load tables.
- B. Steel joists manufactured of light gauge cold formed steel are acceptable for installations requiring field welds to the top chord member only when the Contractor submits certification that the type and method of field welding will satisfy all structural requirements, including diaphragm shear requirements, for floor and roof assemblies.
- C. The design, fabrication and erection of steel joists shall be in accord with the "Standard Specifications and Load Tables for Open Web Steel Joists/Longspan Steel Joists" of the Steel Joist Institute, (SJI), latest edition, except as otherwise shown on the Drawings or specified herein.
- D. Welding shall comply with American Welding Society "Structural Welding Code: AWS D1.1. Rev. 1/73".

1.3. SUBMITTALS

- A. Submit the following in accord with Section 01 3300:
 - 1. Manufacturer's Literature: Specifications and design data
 - 2. Shop Drawings: Show joist layout, details of bearings, anchorage, bracing, bridging, etc.
 - 3. Design Calculations: Submit calculations stamped by a licensed professional engineer who certifies that the joists have been designed in accord with AISC-SJI standard specifications.
 - a. This submittal is waived if fabricator is SJI member.

1.4. PRODUCT DELIVERY, STORAGE AND HANDLING

- A. Deliver, handle and store joists as recommended by AISC and SJI specifications.

- B. Exercise care at all times to avoid damage through rough handling during hauling, unloading, storing and erecting. Joists shall not be dropped or overstressed or stored in a bowed condition.
- C. Replace materials that have been damaged or are otherwise unsuitable. When ascertained, immediately remove such material from job site.

2. PRODUCTS

2.1. MATERIALS

- A. Structural Steel:
 - 1. Structural ASTM A36/A36M
 - 2. High Strength Low Alloy ASTM A242/A242M
 - 3. High Strength Carbon Manganese ASTM A529/A529M
 - 4. Hot Rolled Sheet and Strip ASTM A570/A570M
 - 5. High Strength Columbian- vanadium ASTM A572/A572M
 - 6. High Strength ASTM A588/A588M
 - 7. Hot and cold rolled Sheet and strip steel ASTM A606
 - 8. Hot and cold rolled Sheet and strip steel ASTM A607, grade 50
 - 9. Cold rolled Sheet steel ASTM A611, Grade D
 - 10. Comply with Illinois Steel Procurement Act
 - 11. Manufacturer to select steel type appropriate to his design application.
- B. Welding Electrodes: AWS Specifications E60 or E70
- C. Accessories: Provide all applicable accessories necessary to complete the installation, such as but not limited to side and end wall anchors, headers, horizontal or diagonal bridging, extended ends full bottom chord extensions, joist bearing plates, anchor bolts, and government anchors.
- D. Shop Paint: Rust inhibitive paint complying with Steel Joist Institute Specifications of latest adoption.

2.2. FABRICATION

- A. Fabricate joists in accord with AISC-SJI Standard Specifications and load tables for span indicated.
 - 1. Note: On this project, special extended ends are required.
 - 2. Extended ends are noted using SJI designation
- B. Top chords shall be designed as continuous members subject to direct axial and bending stresses, in accord with the Standard Specifications.
 - 1. See Drawings for extended top chords requirements.
- C. Steel joists shall be of type shown.

D. Bearing and end anchorage

1. Minimum bearing for joists shall be not less than SJI standard, 2-1/2" on steel and min. 4" on masonry. Longer bearing may be required by details and notation on structural drawings.
 - a. This project is typically 3" minimum on steel
 - b. 5" on masonry by design
 - c. See schedule on the drawing for clarifications
2. Provide required bearing plates at masonry bearings per Steel Joist Institute Standards.
 - a. Size plates for 250 psi bearing onto masonry.
 - b. 6" x 6" x 1/4" minimum.
 - c. All plates minimum to have two (2) 3/8" X 4" studs embedded in masonry or concrete.
3. Bearing condition
 - a. This project typically has 1/8th joist slope
 - b. Provide end bearing per SJI
 - c. If required provide shim, beveled shim or tapered end shoe only as required by SJI standards
 - d. 2" x 1/8" welds each side of joist to bearing plate or steel
4. Up lift
 - a. See drawings, all roof joists designed for uplift approximately 80 plf all roof joists unless noted in schedule
 - b. Weld to structural steel as noted
 - c. At masonry bearing provide tie downs as detailed.
 - 1) Tie downs not required for joists fully embedded into a masonry wall
5. Applied Loads
 - a. Top chords loads as noted on the joist schedule or per SJI design standard uniformly applied
 - b. Bottom chord loads for ceilings, lighting and duct work should be assumed to be up to 40 plf equivalent.
 - c. Heavier loads if encountered shall be field located at joist panel points and verified with the A/E and may be required to be supported from top chord.
6. Camber
 - a. Camber in accordance with SJI institute standards is recommended but not required.
 - b. Recommended camber is L/2000

- E. Size, type, and spacing of bridging shall be in accord with Steel Joist Institute recommendations, unless otherwise shown.
 - 1. All roof joists designed for uplift, provide additional uplift bridging.
 - 2. When bridging is interrupted by duct work or other conflicts, add diagonal bridging bottom chord to adjacent joist.
 - 3. Bridging where possible is intended to connect through panel point connections at top and bottom chords and not be applied to the top or bottom surface of the chords.
 - 4. For further conflict issues, coordinate with the A/E
- F. All joints of steel joists shall be made by arc-welding. Connections at ends of members shall be proportioned to develop actual design stress but not less than fifty percent (50%) of the allowable design strength of the members.
- G. Ceiling extensions for joist ends shall be furnished where suspended ceilings occur below joists.
- H. Thoroughly clean joists and accessories and apply a shop coat of prime paint to a minimum dry film thickness of 1.50 mils.
 - 1. Primer type shall allow painting finish coats without further primer preparation, dry fog or other VOC approved finishes typical to construction.

3. EXECUTION

3.1. INSTALLATION

- A. Field welded and bolted connections shall be in accord with AISC-SJI standard specifications for type of joist used.
- B. Where joists are supported on steel members they shall be connected by welding, unless otherwise shown.
- C. As soon as joists are erected they shall be permanently fastened in place and all bridging completely installed before the application of loads. Bridging shall be continuous, and anchored to end walls or beams.
 - 1. Where substantial construction is not provided, open side condition occurs or adjacent construction is not completed, provide diagonal bridging in addition to horizontal bridging at the last full joist space.
 - 2. Where work of other trades (such as ductwork) interferes with bridging, add diagonal bridging in addition to straight bridging in joist spaces on each side of conflict to allow deletion of top or bottom bridging in one (1) joist space.
- D. After erection of joists, touch up all welds and surfaces where shop paint has been abraded or improperly applied with same paint used for shop coat.

- E. Cleaning, all joists shall present a clean appearance.
 - 1. Power wash if dirt or mud has collected
 - 2. Power wash or wipe clean for finish coats of paint as may be specified in exposed areas for proper paint bond.

3.2. ERECTION BRACING

- A. A/E design and detailing is for finished product only. Erection rigging, bracing and handling practices, means and methods, are the Contractor's responsibility.
 - 1. A/E neither directs nor schedules installation.
 - 2. A/E inspects only for finished product with deck installed.
- B. Provide all necessary additional bracing, clips, anchors and reinforcement as needed.
 - 1. Remove after erection when exposed to view or when design load shifts will result.

3.3. DESIGN APPLICATION

- A. All roof joists are designed for uplift loading due to wind.
 - 1. Provide appropriate private bearing end bottom chord bridging.
 - 2. Provide tie downs.

3.4. WELDING

- A. Bearing ends to be welded a min. of 2" X 3/16" fillet both edges at steel and/or bearing plates.
 - 1. For joists over 35' span, add 1" weld per 10' of span.
- B. Tie downs, tab over joist and 1" weld along each edge.

END 05 2100

1. GENERAL

1.1. BASE BID WORK INCLUDES

- A. Roof deck
- B. Stair landing decking

1.2. ALTERNATE BID WORK INCLUDES

- A. None.

1.3. UNIT COST WORK INCLUDES

- A. None

2. PRODUCTS

2.1. MATERIALS -

A. Metal Decking - Roof

- 1. 20 gauge galvanized decking, Type B.

B. Metal Decking - Elevator shaft, - Roof

- 1. 16 gauge galvanized decking, Type B.

C. Metal Decking stair landings.

- 1. 20 gauge galvanized type 1.5 VL or VLI composite galvanized decking

D. Reinforcing Flat Metal

- 1. 16 gauge galvanized x minimum 16" wide, as required for change in direction or deck transitions, ridge, valley or similar conditions.
 - a. Fasteners # self tap screws pattern as conditions warrant.
 - b. Areas subject to reinforcement are to be laid out in conference on site with the A/E representative

E. Trim and closure pieces

- 1. Provide 16 gauge or as detailed deck perimeter closures
- 2. At all roof perimeters, J edge closure
- 3. All points of discontinuity
- 4. Roof edges to wall closure pieces to be installed following insulation work to seal deck connection.

F. Foam Seal Strips

1. Provide upper and lower deck profile self adhesive foam infiltration seals at all deck ends along perimeter walls.
2. Top and under side as appropriate to resist infiltration or compromised insulation value.

3. EXECUTION

3.1. INSTALLATION

A. Openings in structural decking.

1. Openings greater than 16" should be reinforced
2. Openings greater than 23" should receive structural frame
 - a. Consult with A/E if frame is not called for or opening was not anticipated.
 - b. Provide foam seals where appropriate.

B. Reinforcing flat metal

1. The intent is none or minimum locations.
2. Where deck changes direction, or is warped and misaligned
3. Where deck requires cutting top of deck to fit or bend to slope change.
4. Any odd closures which become necessary such as over cut openings, wall closures, etc.

C. Provide anchorage to structure.

1. Roof and composite decking
 - a. $\frac{3}{4}$ " puddle welding as recommended for I-90 anchorage to supporting structural system.
 - b. 3900 pound average uplift test resistance per weld, 5,000 pound average shear.
 - 1) washers for decking less than 22 gauge
 - c. Mechanical fastener systems tested to not less than 3000 pull out/pull over and 3000 shear ultimate average test may be employed
 - 1) Washers for decking less than 22 gauge
 - 2) Or pull over test compliance.
 - d. Subject to approval Power actuated drive fasteners with tested pull out/pull over for selected deck and structure may be employed.

- e. Mid span lap screws at spans exceeding 34"
 - 1) Not less than (2) # 10 self drill or equivalent mid span.
 - 2) Two (2) #10 at third points decking spanning more than 60" (4) screws total.
- 2. Anchorage is directly to primary structural unless detailed otherwise.
 - a. Unless noted otherwise on the drawings
 - 1) 36/5 pattern field,
 - 2) 36/7 perimeter 6'.
 - 3) Additional for roofs: 36/7 pattern field of triangular area within 20' of outside corners of the structure each roof level
 - b. Anchorage screws approved mechanical screws, power actuated or 3/4" puddle welds.
 - 1) Provide test data on any mechanical fastening system
 - 2) Puddle welds by certified welder and inspected for integrity
 - c. Elevator decking, approved mechanical anchoring or 3/4" puddle welds to perimeter steel embed.
 - 1) 36/7 (every flute ends) and 12" centers along sides
 - 2) At third points side laps use double #10 screws.
- D. Insulate flutes underside to walls as needed for sound and/or infiltration protection.
 - 1. Roof decking: Foam seals exterior perimeter or infiltration risk
 - 2. Mineral wool stuffed interior at fire walls or for sound, room to room, room to corridor, room to rest room.
 - 3. Fire seal at fire walls (determined by rated openings into space).
 - 4. All walls extended to deck above, unless noted as through ceiling only, see roof structure plan
 - 5. At deck ends over and under blocking or insulation install profile match seal strips as infiltration barrier.
- E. Fill flutes at fire walls and fire separations with mineral wool insulation. Mortar or fire seal.

END 05 3100

1. GENERAL

1.1. WORK INCLUDES

A. Base Bid:

1. General Contractor shall provide:

- a. Non-loadbearing metal stud wall framing, with anchorage and bracing.
- b. Metal ceiling framing at interior/exterior soffits and pipe covers, with anchorage and bridging.
- c. Roll formed steel shaped sections, 14-gauge thickness and lighter for load bearing and non-load-bearing framing with floor and ceiling track, bracing, furring, bridging, for assembly generally using mechanical fastenings.
- d. Metal framing for the entrance overhangs, soffits and closure assemblies.
- e. As detailed.
- f. Provide fiberglass batt sound deadening in all metal stud partitions in occupied areas.

B. Alternate Bid

1. No alternate work for light gauge framing unless issued in addendum
 - a.

1.1. RELATED WORK

A. Specified elsewhere:

1. 07 2400 - EIFS System
2. 09 2116 - Gypsum Wallboard

1.2. SYSTEM DESCRIPTION

A. Performance Requirements

1. ANSI, North American Specification for the Design of Cold-Formed Steel Structural Members, 2007, with Addendums; American Iron and Steel Institute.
2. AISA Cold-Formed Steel Design Manual, 2017 Edition, American Iron and Steel Institute.

1.3. QUALITY ASSURANCE

A. Qualifications of Erector:

1. Minimum of three (3) years successful experience on comparable cold-formed metal framing projects.
 2. Welders qualified in accordance with AWS D.1.
- B. Regulatory Requirements: Erect cold-formed metal framing to meet requirements of IBC 2006.

1.4. REFERENCES

- A. ASTM A446, Grade D, minimum yield 50,000 psi - Structural Steel.
- B. AWS D1.1 - Structural Welding Code.
- C. SDI Standard #1 - Steel Deck Institute.
- D. ASTM A446-76 - Steel Sheet, Zinc-coated (galvanized) by hot dip process, physical structural quality.
- E. ASTM A90-69 - Weight of Coating on Zinc-coated galvanized iron or steel articles.

1.5. DELIVERY, STORAGE & HANDLING

- A. Deliver products to site in accord with Standard Documents for Construction.
- B. Store products on site in accord with Standard Documents for Construction.

2. PRODUCTS

2.1. ACCEPTABLE MANUFACTURERS

- A. Clark Cincinnati-Inc., Cincinnati, OH 45246 513/874-9631, 800/543-7140
- B. Dale Industries Inc., Dearborn, MI 48128 313/846-9400, 800/882-7883
- C. Unimast Inc., Franklin Park, IL 60131 708/451-1410, 800/323-0746
- D. Dietrich Industries Inc., Pittsburgh, PA 15219 412/281-2805, 800/873-2443
- E. Or equal
- F. Steel Stud Manufacturer's Association Members without prior approval.

2.2. MATERIALS

- A. Steel Framing
 1. Studs, Formed galvanized sheet steel, typical:

- a. See Details or Plan Notes for appropriate selection.
 - b. Gauge means standard sheet metal industry gauge NOT metal stud manufacturer "equivalent strength" gauge achieved by extra bends and forming strength design.
 - 1) 16 gauge = 54 mils
 - 2) 18 gauge = 43 mils
 - 3) 20 gauge = 33 mils
 - 4) 22 gauge = 27 mils
 - 5) 25 gauge = 18 mils
 - c. Unless noted otherwise stud and framing selections are minimum:
 - 1) 250S162-33 (2½" X 1-5/8" X 20-gauge
 - 2) 362S162-33 (3½" X 1-5/8" X 20-gauge
 - 3) 400S162-33 (4" X 1-5/8" X 20-gauge
 - d. Other sizes and gauges may be detailed but never less than 33 mil (20-gauge) unless specifically noted otherwise.
 - e. Clips and accessories as associated.
 - 1) Similar gauge to assembled studs and framing or
 - 2) Commercial industry standard such as spazzer bars and detail clips.
2. Studs, Interior Wall: typical 362S162-33, depth to provide total wall thickness shown in conjunction with finish surfaces or cladding indicated.
 - a. Other sizes may be noted on the Plans and Details.
 3. Track: Formed galvanized steel; channel shaped; same width as studs, for tight fit; same gauge as associated stud wall solid web.
 - a. Some Details may note deep track such as the top plate or headers.
 - b. Such as Alternate #1
 - c. Sill track deep track x 18 gauge
 4. Furring (hat) channel – 24-gauge X ¾" or size as appropriate to allow space for electrical boxes at furred cmu walls.

B. Accessories

1. Bracing, Furring, Bridging: Formed galvanized sheet steel; channel and strip shaped as indicated or as appropriate to conditions.
2. Plates, Gussets, Clips: Galvanized formed steel, thickness determined for conditions encountered as detailed, use manufacturer's standard shapes when available.

C. Fastenings

1. Self-drilling, self-tapping screws, bolts, nuts and washers: hot-dipped galvanized: ASTM A90-69.
2. Anchorage Devices: Power driven or powder actuated, drilled expansion bolts; screws with sleeves or tapcons.
3. Welding: AWS D1.1.

D. Finishes

1. Galvanizing: ASTM A90-69, 1.25 oz./sq. ft.
2. Primer: Zinc chromate touch-up for galvanized surfaces.

2.3. FABRICATION

- A. Form members to manufacturer's standard shapes meeting design criteria.
- B. Cut right angle connections of framing components to fit squarely against abutting members. There shall be no gaps in structural walls.
- C. Connect members together by self-drilling #8 pan head screws--four (4) screws per connection in structural walls.
- D. Galva-Prime non-galvanized steel to 1.5 mil minimum dry film thickness.
- E. Field fabrication of complex parts.
 1. Box beams – make up (2) track (2) c studs 20 gauge unless noted otherwise.

3. EXECUTION

3.1. ERECTION

- A. Align floor and ceiling tracks, locating to wall layout. Secure in place with screws or welding at maximum 16 inches o.c.
 1. Sixteen inches (16") o.c. maximum structural/non-structural
 2. #8 into wood floors
 3. ¼" or larger tapcons with washer into concrete substrates.
 4. Provide deflection allowance below supported horizontal building framing in ceiling or head track for non-load bearing framing
 - a. Deep track Deep track, stuff with mineral wool at fire walls, and voids above track stuffed also with mineral wool at fire walls.
- B. Place studs at sixteen inches (16") o.c. and not more than two inches (2") from abutting walls and at each side of openings. Connect studs to tracks using clips and ties, screws, or welding, in accordance with manufacturer's recommendations. Check manufacturer's recommendations for structural stud for mezzanine and follow.

- C. Construct corners using minimum three (3) studs. Double studs at door, window and sidelight jambs. Install intermediate studs above and below openings to match wall stud spacing.
- D. See drawings for track and box beams at bearing walls Build up as noted or out of the same materials as the wall framing as a minimum if not specified.
- E. Assembly,
 - 1. Non bearing may be assembled with #8 tek screws
 - 2. Bearing walls #10 tek screws or welded, deep track two screws per side of track to stud or box beam to stud.
 - 3. Or bearing walls may be welded per industry standards.
- F. Spazzer bar all walls 5' maximum on non-bearing and 4' maximum bearing walls
- G. Provide deflection allowance below supported horizontal building framing in ceiling or head track for non-load bearing framing.
 - 1. Deep track, stuff with mineral wool at fire walls, and voids above track stuffed also with mineral wool at fire walls.
- H. Attach cross studs or furring channels to studs for attachment of fixtures behind lavatory basins, toilet and bathroom accessories, grab bars and other items anchored to partitions or walls.
- I. Install additional framing between studs for attachment of:
 - 1. Electrical boxes and other mechanical and electrical items
 - 2. Door bumper stops
 - 3. Hardware
 - 4. Wall supported equipment and accessories
- J. Erect load bearing studs one piece full length. Splicing and wire tying of framing components is not permitted. Join members forming trusses by welding.
- K. Erect load bearing studs, brace, and reinforce to develop full strength to meet design requirements.
 - 1. Always provide track above or below box beams.
- L. Set floor or ceiling joists parallel and level, with end bearing, lateral bracing, and bridging in accordance with manufacturer's recommendations.
- M. Extend stud framing to ceiling only. Attach ceiling channel to ceiling framing securely.

- N. Make provision for erection stresses. Provide temporary alignment and bracing. Touch-up field welds and scratched or damaged galvanizing.
- O. Ensure framing provides true and flat surfaces, ready to receive gypsum board finish.

END 05 4000

1. GENERAL

1.1. WORK INCLUDES

A. Base Bid

1. Contractor shall provide incidental metal work required and shown on the Drawings.
2. A schedule of miscellaneous metal work is included on the drawings but may not have every incidental sub-structural or detail metal work delineated in the schedule
3. Contractor shall:
 - a. Consult the drawing for incidental, ornamental and safety fabricated metal work.
 - 1) Railings
 - 2) Lintels
 - 3) Steel Accessories
 - a) Joist tie downs
 - b) Roof deck perimeter weld down angles
 - 4) Roof opening supports
 - a) Curbs
 - b) Drains
 - c) Mechanical
 - 5) Roof ladder
 - 6) Elevator pit ladder
 - b. Take field measurements and submit Shop Drawings.
 - c. Hangers.
 - d. Drain line supports.
 - e. Fabricate railing.
 - f. Mechanical equipment supports.

1.2. RELATED WORK

A. Specified elsewhere

1. 03 3000 - Concrete
2. 04 2000 - Unit Masonry
3. 06 1000 - Rough Carpentry
4. 06 2000 - Finish Carpentry
5. 07 6200 - Sheet Metal Flashing & Trim
6. 07 9200 - Sealants & Caulks
7. 09 9000 - Painting
8. DIVISION 23 - MECHANICAL

9. DIVISION 26 - ELECTRICAL

1.3. REFERENCES

- A. ASTM A36-77a - Structural Steel
- B. ASTM A53-80 - Hot-Dipped, Zinc-coated, Welded and Seamless Steel Pipe
- C. ASTM A307-80 - Low-Carbon Steel Externally and Internally Threaded Fasteners
- D. ASTM A325-80a - High Strength Bolts for Structural Steel Joints
- E. ASTM A386-78 - Zinc-Coating (Hot-Dip) on Assembled Steel Products
- F. ASTM A123-A - 2 oz. Hot Dipped Galvanizing
- G. AWS D1.1 - Structural Welding Code
- H. Paint - See Section 09 9000

1.4. QUALITY ASSURANCE. Regulatory Requirements: Illinois Steel Products Procurement Act, as amended (Illinois Revised Statutes, ch. 48, par. 1801 et. seq.).

1.5. SUBMITTALS

- A. Submit Shop Drawings in accordance with 01 3300.
 - 1. Indicate profiles, sizes, connection attachments, reinforcing, anchorage, size and type of fasteners, and accessories.
 - 2. Include erection drawings, elevations, details as applicable.
 - 3. Indicate welded connections using standard AWS welding symbols. Indicate net weld lengths.
 - 4. Prepare structural Shop Drawings under seal of a professional structural engineer registered in the State of Illinois.

1.6. DELIVERY, STORAGE AND HANDLING

- A. Deliver and store products to site in accordance with 00 2213/1.14.

2. PRODUCTS

2.1. MATERIALS

- A. Steel Sections: ASTM A36-77a.
- B. Steel Tubing: ASTM A53, Grade B.
- C. Bolts, Nuts, and Washers: ASTM A36-77a minimum.

- D. Welding Materials: AWS D1.1; use correct type for materials being welded.
- E. Primer: Red for shop application and field touch-up. See Section 09 9000.

2.2. FABRICATION

- A. Verify dimensions on site prior to shop fabrication.
- B. Fabricate items with joints tightly fitted and secured.
- C. Fit and shop assemble in largest practical sections for delivery to site.
- D. Grind exposed welds flush and smooth with adjacent finished surface finished surface. Ease exposed edges to a 1/8" uniform radius.
- E. Exposed Mechanical Fastenings: Flush countersink screws or bolts, unobtrusively located, consistent with design of structure, except where specifically noted otherwise.
- F. Make exposed joints butt tight, flush and hairline.
- G. Supply all components for anchorage of metal fabrications. Fabricate anchorage and related components of same material and finish as metal fabrication, except where specifically noted otherwise.
- H. Hot dip galvanized metal fabrication where indicated on the Drawings.
 - 1. Railing components.

2.3. PRIMING PROTECTIVE COATINGS

- A. Clean surfaces of rust, scale, grease, and foreign matter prior to finishing.
- B. Clean all ferrous metal in accordance with applicable requirements of SSPC-SP1 (Solvent Cleaning) followed by cleaning with applicable requirements of SSPC-SP2 (Hand Tool Cleaning).
- C. Apply specified primer to all ferrous metal surfaces by brush or spray to a dry film thickness of 2 mils. (100% cover)
- D. Paint with bituminous coating dissimilar metals which are or will be in contact with on another. Coating shall not extend onto surfaces which will be exposed.
- E. Primer paint applied on ferrous materials shall be in accordance with Section 09 9000.

3. EXECUTION

3.1. PREPARATION

- A. Obtain Architect/Engineer's WRITTEN APPROVAL prior to site cutting or making adjustments not scheduled.
- B. Clean and strip site primed steel items to bare metal where site welding is scheduled.
- C. Make provision for erection loads with temporary bracing. Keep work in alignment.

3.2. INSTALLATION

- A. Install items plumb and level, accurately fitted, free from distortion or defects.
 - 1. In case of stair railing - parallel to stair noses.
- B. Perform field welding in accordance with AWS D1.1.
- C. After installation, touch-up, field welds, scratched or damaged surfaces with primer. Primer shall be same material as shop primer.

3.3. MISCELLANEOUS FRAMES AND SUPPORTS

- A. Provide miscellaneous metal angles, plates and assemblies shown on Drawings with anchors, bolts and accessories required, including but not necessarily limited to the following:
 - 1. Steel lintels at all openings/typical per opening shown on the Drawings.
 - 2. Shelf angles
 - 3. Clip angles
 - 4. Seat angles
 - 5. Sub-structural members per Detail Drawings
 - 6. Pipe hangers

3.4. MISCELLANEOUS SPECIALTIES

- A. Provide miscellaneous assemblies shown on the Drawings, with anchors and accessories required, including but not limited to:
 - 1. Schedules on Sheet S-1.4
 - a. Miscellaneous steel
 - b. Lintels
 - c. Although the schedules on sheet S-1.4 endeavor to list steel components used in the project, details may include other items not specifically scheduled.
 - d. Stairs and railings Sheets S-1.3, and A-3.7
 - 2. Joists scheduled on sheet S-1.4
 - 3. See details and structural plans for miscellaneous steel used throughout the work

END 05 5500

DIVISION 06 – WOOD PLASTICS AND COMPOSITES
Section 06 1000 – Rough Carpentry

1. GENERAL

1.1. REQUIREMENTS INCLUDE

- A. The Contractor shall provide rough carpentry (white wood) as shown on the Drawings, specified herein, and as needed to complete the work.
 - 1. Treated lumber is not specified or required unless required by application, code or ground contact. If treated is employed, fasteners must be rated for exterior treated use or be stainless steel.
 - 2. Framing, blocking, furring and miscellaneous carpentry.

1.2. RELATED WORK

- A. Specified elsewhere
 - 1. Means and methods, AIA A201 General Conditions and Supplementary General Conditions.

1.3. PRODUCT DELIVERY, STORAGE AND HANDLING

- A. Immediately upon delivery to site, place materials in area protected from weather.
- B. Store materials a minimum of 6 in. (150 mm) above ground on framework or blocking and cover with protective waterproof covering, providing adequate air circulation or ventilation.
 - 1. Do not install wet materials
- C. Seasoned materials shall not be stored in wet or damp areas.

2. PRODUCTS

2.1. MATERIALS

- A. Lumber
 - 1. Dimensions
 - a. Specified lumber dimensions are nominal: verify actual field conditions and field verify dimensions and provide materials required to accomplish the intent of the details shown.
 - 1) Rip or adjust sizes as needed to accomplish detail results.
 - b. Lumber dimensions conform to industry standards

established by the American Lumber Standards Committee and the rule writing agencies.

2. Moisture content: Nineteen percent (19%) maximum at time of permanent close in of building or structure, for lumber 2" or less nominal thickness.
 3. Surfacing: surface four sides (S4S), unless otherwise shown, or specified.
 4. General framing lumber: Nominal 2" (51 mm) to 4" (102 mm) thick X 2" (51 mm) to 12" (306 mm) wide/deep:
 - a. Any commercial softwood species, stud/standard grade unless otherwise noted or specified.
 - b. Free of unruly warp or wind, bark, splits or major defects affecting the strength or stability of the board or ability to maintain line and level.
 5. Structural Framing lumber: Nominal 2" (51 mm) to 4" (102 mm) thick X 2" (51 mm) to 12" (306 mm) wide/deep:
 - a. Yellow Pine, Douglas Fir, Hemlock or other approved species, grade stamped.
 - b. Not less than Construction grade for bearing stud walls and plates, unless noted otherwise.
 - c. Not less than #1 and better for horizontal framing, unless noted otherwise
 - d. Not less than Select Structural for horizontal free span framing where span to nominal depth ratio exceeds:
 - 1) Roof joists – 25/Roof Beams – 15
 - 2) Ceiling rafters - 20
 - 3) Floor joists – 18/Floor Beams – 12
 - 4) LVL and Glue Lam type products may be considered if appearance is not an issue.
 6. Boards: 1 in. (25 mm) to 2 in. (51 mm) thick; any commercial softwood species, unless otherwise shown or specified. Furring and grounds shall be minimum No. 1 Common Grade.
- B. Heavy timber structure, nominal 4" x 6" or larger primary members.
1. May be Glue Lam, Micro Lam or similar manufactured timber product
 - a. Sized on drawings
 - b. Bending $F_b = 2400$ or greater min.
 - c. Elasticity $E = 1.8 \times 10^6$ min.
 - d. Compression parallel $F_c = 750$ min.
 - e. Shear $F_v = 275$ min.
 - f. Waterproof glue

2. May be Structural graded #2 or better, fir larch or southern yellow pine.
 - a. Kiln dried,
 - b. Straight
 - c. Free of parallel to grain splits and major checks.
 - d. Graded not less than 1500 psi in bending.

- C. Plywood: CDX exposure rated and clearly stamped on material, thicknesses and listed on Drawings.
 1. 5 ply minimum.

- D. Rough Hardware:
 1. Any hardware used in treated lumber or plywood shall be stainless steel or finish rated for treated lumber exterior use.
 2. Any fasteners used in exposed to weather applications shall be stainless steel, or other corrosion finished appropriate for the application, zinc plated is not a weathering corrosion finish.
 3. Drawings may detail framing plates, and accessories:
 - a. TECO, Simpson, Phoenix or similar, galvanized minimum.
 - b. Details may use catalog numbers for one of the above, to establish shape, gage and load applications, but similar shapes by all may be used.
 4. Bolts: FS FF-B-575C
 5. Nuts: FS FF-N-836C
 6. Expansion Shields: FS FF-B-561C (limited use, see Drawings)
 7. Lag Screws and Bolts: FS FF-B-561C
 8. Toggle Bolts: FS FF-B-588C
 9. Wood Screws: FS FF-S-111C
 10. Nails and Staples: FS FF-N-105B
 11. FABCO/H-3, or equal, Stainless Steel Top Seal Fasteners
 12. Top Seals/H-3 Stainless Steel, Carbon Steel and Cadmium plated as applicable with Weath-R-Seal washers
 13. Tuff Tites #305 Stainless Steel and Cadmium plated as applicable.
 14. Top Seal/H-3 stainless steel, cadmium plated and carbon steel (as applicable) structural screws.
 15. RED HEAD, Fastenal, Hilti or approved equal, structural rated stud anchors
 - a. Wedge type, double wedge when noted
 - b. Epoxy
 - c. Drive in type

- E. Heavy timber connectors
 1. TECO, Simpson, Phoenix or similar, galvanized minimum.
 2. Details may use catalog numbers for one of the above, to establish

shape, gage and load applications, but similar shapes by all may be used.

3. See drawings for selections using Simpson catalog
 - a. Miter intersection HSULC 412
 - b. Perpendicular HUCTF 412
 - c. Tie down HTS 30"
 - d. All 16 gauge or heavier

2.2. QUALITY ASSURANCE

A. Grading Rules:

1. Lumber grading rules and wood species shall conform with Voluntary Product Standard PS 20-75.
2. Grading rules of the following associations shall also apply to materials produced under their supervision:
 - a. Northeastern Lumber Manufacturer's Association, Inc. (NELMA).
 - b. Southern Pine Inspection Bureau (SPIB).
 - c. West Coast Lumber Inspection Bureau (WCLIB).
 - d. Western Wood Products Association (WWPA).
 - e. Redwood Inspection Service (RIS).
3. Plywood shall conform to the following:
 - a. Softwood Plywood - Construction and Industrial: Product Standard PS 1-74.
 - b. Hardwood Plywood: Product Standard PS 51-71.

B. Identify all lumber and plywood by official grade marks.

1. Lumber: Grade stamp to contain symbol of grading agency, mill number or name, grade of lumber, species or species grouping or combination designation, rules under which graded, where applicable, and condition of seasoning at time of manufacture.
 - a. S-GRN: Unseasoned.
 - b. S-Dry: Maximum nineteen percent (19%) moisture content.
 - c. MC-15 or KD: Maximum fifteen percent (15%) moisture content.
 - d. Dense.
2. Softwood Plywood: Appropriate grade trademark of American Plywood Association.
 - a. Type, grade, class and identification index.
 - b. Inspection and testing agency mark.

C. Requirements of Regulatory Agencies:

1. Preservative Treated Lumber and Plywood: American Wood Preservers Bureau, Quality Mark.

3. EXECUTION

3.1. PREPARATION

- A. Examine receiving surfaces and verify that no rot or detrimental condition such as poor anchorage exists.
 1. Application or installation of materials constitutes acceptance of existing application conditions.
- B. Verify all dimensions of in place and subsequent construction.
 1. Adjust framing or additional framing as needed to accomplish the intent of the work and as needed to complete the work properly.
- C. See Drawing Details.

3.2. INSTALLATION

- A. Frame wood members to be close fit, set accurately to required lines and levels and secured rigidly in place in accordance with the Drawings.
 1. In continuous runs, stagger members of such as multiple member plates or curbs.
 2. Anchor all members typical to industry standards as a minimum.
 - a. As detailed
 - b. Sill plates not more than 48" anchor spacing, ½" bolts nor 12" from plate ends.
 - c. Roof edge curbs, not less than 60 pounds per lineal foot pull off resistance any direction.
 3. Cut and fit framing, blocking etc. to accommodate the other work, other trades and MEP work.
 4. Interlock plate and curbing corners.
- B. Framing Roof perimeter
 1. Provide dimensioned wood for all framing, blocking, furring, nailing strips built into, or adjacent to, exterior masonry walls, wood in contact with concrete and wood in conjunction with roofing.
 - a. Roof perimeter is intended to be infiltration tight, provide sealant, foam fill shields, and or insulation as need to accomplish this.

END 06 1000

1. GENERAL

1.1. WORK INCLUDES

- A. The Contractor shall provide finish carpentry as shown on the Drawings, required to execute the documents, and specified herein.
 - 1. Provide in accordance with requirements of Section 08200 Flush Wood doors.
 - 2. Verify all door sizes on the job.
 - 3. Install and reinstall hardware as indicated per drawing notes.
 - 4. Install new doors, frames, and hardware as noted on the Drawings, Sections 08 11 13, 08 14 00, and 08 71 00.
 - 5. Provide trim as required to complete the project.
 - 6. Provide 5/8" Type "X" gypsum wallboard and ceiling in all areas where single thickness material is designated.
 - 7. See Drawings for double twin layered separation wall between (E) and new addition.

1.2. RELATED WORK

- A. Specified elsewhere:
 - 1. DIVISION 0 - PROCUREMENT REQUIREMENTS
 - 2. DIVISION 1 - ADMINISTRATIVE REQUIREMENTS
 - 3. 06 1000 - Rough Carpentry
 - 4. 06 4116 - Laminate Clad Cabinets
 - 5. 08 1113 - Hollow Metal Work
 - 6. 08 1400 - Flush Wood Doors
 - 7. 09 2116 - Gypsum Wallboard
 - 8. 09 9000 - Painting

- 1.3. QUALITY ASSURANCE: All custom woodwork shall comply with the applicable requirements of the AWI Quality Standards established by the Architectural Woodwork Institute.

2. PRODUCTS

2.1. MATERIALS

- A. Softwood for Paint Finish: Ponderosa Pine, Sugar Pine, or Northern White Pine.
- B. Softwood Plywood: Product Standard PS 51-71.
- C. Solid Core Doors. See Section 08 1400.
- D. Hollow Metal Work. See Section 08 1113.

2.2. FABRICATION

- A. Exposed wood trim for natural finish shall be 3/4" clear select Birch or oak as is most compatible with surrounds. Poplar allowed for painted wood

trim.

- B. Install architectural trim plumb, level and in line; scribe to other finished work. Miter corner on casing trim. Provide blind fastenings and nailing to the extent feasible. Set all exposed nails with a nail set below the surface of the wood and fill all nail holes flush and color compatible.

3. EXECUTION

3.1. INSTALLATION - GENERAL

- A. Examine all surfaces to receive the parts of the work that are specified herein. Verify all dimensions of in-place and subsequent construction. Application or installation of materials constitutes acceptance of conditions.
- B. Install architectural woodwork plumb, level and in line; scribe and cope to other finished work. Miter corner on casing trim. Provide blind fastenings and nailing to the extent feasible. Set all exposed nails with a nail set below the surface of the wood and fill all nail holes flush and color compatible.
- C. Ease edges -- finish ready.
 - 1. 1/16" bevel on all exposed edges, trim, doors, etc.

3.2. INSTALLATION OF METAL FRAMES

- A. Set metal frames accurately in location, in perfect alignment, plumb, straight and true.
- B. Brace frames to prevent displacement. Extend frame anchorages below fill and finishes, except over membrane-waterproofed areas, or as shown otherwise.
- C. Anchor bottom of frames to floors with anchor bolts or with power fasteners. Coordinate the installation of built-in anchors for wall and partition construction, as required with other work.

3.3. INSTALLATION OF DOORS

- A. Apply hardware in accordance with the Hardware Manufacturer's instructions.
- B. Drill and tap for machine screws, as required. Do not use self-tapping sheet metal screws except as otherwise shown or specified.
- C. Adjust door installation to provide uniform clearance at head and jambs and to contact stops uniformly.
- D. Remove and replace doors which are found to be warped, bowed, or otherwise damaged and cannot be properly fitted in frames.

3.4. INSTALLATION OF FINISH HARDWARE

- A. Receive finish hardware as shown and called for on the drawings and/or sections of these Specifications. Store in a locked space to prevent loss.
- B. Apply finish hardware as recommended by the Hardware Manufacturer and as required. Fit lock and latch sets in their respective doors and remove before finishing of doors. Reinstall hardware after finishing of doors is

completed.

- C. Upon completion of finish hardware installation, adjust and lubricate hardware for proper operation.

3.5. REHAB INSTALLATIONS

- A. Match existing conditions where encountered.

END 06 2000

DIVISION 6 – WOOD PLASTICS COMPOSITES
Section 06 4116 – Plastic Laminate Clad Cabinets

1. GENERAL

1.1. DESCRIPTION

- A. Provide all laminate clad cabinetwork shown
 - 1. Base bid Classroom case work
 - a. Classrooms
 - b. Windows Solid Surface stools.
- B. Provide all accessory items needed to complete the cabinetwork including coat rods, coat hooks, locks, shelf brackets, drawer guides, handles, hinges, catches and general hardware.
 - 1. Raised back assemblies behind ranges.
 - 2. Counter tops to 1 ½" laminated:
 - 3. Provide 3" wire way grommets through top each side of each knee space.
 - 4. Coordinate with the Electric subcontractor to run power and communication work through the casework.
- C. Associated work
 - 1. Base bid Solid surface (Corian or similar) window sills
 - a. All new windows in new Additions.
 - b. All Alternate windows in existing areas.

1.2. RELATED WORK

- A. Specified elsewhere
 - 1. 06 1000 – Rough Carpentry

1.3. QUALITY STANDARDS

- A. All work is to be in compliance with Architectural Woodwork Institute (AWI) Quality Standards
 - 1. Custom Grade for assembly, fit, finish, performance, laminate selection and construction methods.

2. PRODUCTS

2.1. CASEWORK - LAMINATE CLAD

- A. AWI quality grade: custom grade.
- B. Construction: Details shall conform to design. Flush overlay or exposed

face frame.

- C. Casework doors to be 3/4" plywood, plastic laminated both sides and edged. Interiors may be liner material
- D. All shelves shall be laminated over 3/4" thick, 7 ply fir plywood

2.2. PLASTIC LAMINATE

- A. Exposed surfaces: to be high pressure Laminate, Formica, Nevamar, Wilson Art or approved equal submitted prior to bidding.
 - 1. Colors to be selected in each room.
 - 2. Tops will be acrylic solid surface.
- B. General Purpose 50 (.050") horizontal work surfaces and edges subject to high use, color and pattern to be selected.
- C. General Purpose 28 (.028") for vertical and medium use surfaces, color and pattern to be selected.
- D. Cabinet liner 20 (.020") for interior surfaces.
 - 1. Includes backs and shelves in open shelving condition.
 - 2. White, off white, gray or white on white patterned.
- E. Backer 20 (.020") for backs of doors and any surface not rigidly supported and anchored to resist warp, wind or curling.
- F. All surfaces not otherwise anchored against warping shall be backed whether in view or not.

2.3. CASEWORK HARDWARE

- A. All cabinet hardware shall be furnished and installed by the casework manufacturer. Hardware to be as follows:
 - 1. Drawer guides: manufacturer's standard roller guide.
 - 2. Shelf standards and brackets: type optional with manufacturer, adjustable as shown on drawings.
 - 3. Hinges: 2-1/2" .083 (3" on 1" or heavier doors). Chrome finish.
 - 4. Catches: Nylon roller type.
 - 5. Pulls: Epcoc MC427 or equal, 1/2" diameter aluminum X 3" long.
 - 6. Clothes poles: optional with manufacturer, chrome.
 - 7. Clothes hooks: Ives #572 or equal.
 - 8. Locks: Five (5) disc tumbler casework locks.

2.4. TOPS

- A. AWI Custom Grade: custom, laminate covered, four inch (4') backsplash and sidesplash at walls, solid surface material.

1. Shall be able to support 300 lbs. at any location, framed or backed as necessary.
2. Solid surface material
 - a. Corian
 - b. Wilson Art
 - c. Maganite
 - d. Formica
 - e. Or equal submit prior to bidding for approval.

2.5. SHELVES

- A. All shelves shall be 3/4" plywood.
- B. All shelves shall be designated for not more than length divided by 180 (48" = 1/4") deflection when solidly loaded with paper or books.
 1. Provide stiffeners when needed.
- C. Shelf and shelving brackets or clips shall be adequate to hold without failure four (4) times the actual load of the shelf fully loaded with books or papers.

2.6. CABINET BOX

- A. AWI Custom Grade, 3/4" plywood basic construction.
 1. Provide bracing and corner hardware as required for rigid sturdy construction.
 2. Backs against walls may be less than 3/4", select for service, backed or supported to not present a flimsy or unstable performance.
 3. Cabinets to be fully plastic laminate lined.
 4. Coordinate adjacent cabinets for alignment and fit.

2.7. DRAWERS

- A. Drawers by definition shall have **full height** sides and backs.
 1. Full height means drawer face height less 1/2" side clearance below horizontal box frame drawer fits into.
- B. Drawers to be backer laminate lined.
- C. Drawer guides
 1. BHMA A156.9 type B05091
 2. Full extension, side mount, zinc plated steel
 3. Heavy duty

2.8. WINDOW SILL/STOOL

- A. 3/8" or heavier solid surface (Corian or similar)
 - 1. Approximately 1" overhang to actual masonry face
 - 2. Rounded corners.
 - 3. Set with silicone adhesive-sealant

3. EXECUTION

3.1. INSTALLATION

- A. Cabinetwork shall be set level and square with surrounds. Provide filler strips and sealant as needed to finish installation.
- B. Provide mechanical counter anchors for counter top joints. Joint shall be tight and uniform. Install with sealant in joint before tightening and clean off immediately.
- C. Coordinate with mechanical and electrical trades for installation services.
- D. All tops shall be mechanically anchored to base cabinets.
- E. All cabinetwork shall be mechanically anchored to floors and walls.
- F. Apply resilient base to all cabinets with flooring work.

3.2. Shelving and coat hook and coat rod accessories

- A. See drawings sheet A-5.4 for shelving hardware and coat rack and coat hooks. Coordinate with hardware provider for who is providing and installing.

END 06 4116

DIVISION 7 - THERMAL & MOISTURE PROTECTION
Section 07 1113 - Foundation Waterproofing

1. GENERAL

1.1. DESCRIPTION

- A. All below grade walls with interior space on one (1) side, backfill on one (1) side.
 - 1. Liquid applied modified membrane.
 - 2. Top of Footing to top of poured wall at grade.
 - 3. Elevator Pit

1.2. RELATED WORK

- A. Specified elsewhere
 - 1. Specification 31 2200 - Earthwork and Backfill.
 - 2. Specification 03 3000- Concrete Work

1.3. SUBMITTALS

- A. Product Data, show select materials, surface preparation requirements, installation instructions.
- B. Samples

1.4. QUALITY ASSURANCE

- A. Manufacturer: Membrane system shall be manufactured and marketed by a firm with not less than ten (10) years experience in manufacturing similar products, not less than five (5) years experience for selected product.
- B. Installer: Minimum five (5) years experience installing similar system, approved by manufacturer.
- C. Pre-installation inspection, verify that all surfaces are clean, voids filled.
- D. Follow manufacturer's instructions for protection during backfilling operations.
- E. Manufacturer to inspect as needed for warranty.

1.5. PROJECT CONDITIONS

- A. Apply to **clean** dry surfaces.
- B. Apply at 50 degrees surface temperature or follow manufacturer requirements for colder conditions.
- C. Follow manufactures recommendation for concrete cure time.

1.6. WARRANTY

- A. Liquid applied membrane, two (2) years by applicator or manufacturer.
- B. Warranty to begin at Substantial Completion or first date beyond Substantial Completion that leaks are successfully addressed.

2. PRODUCTS

2.1. ACCEPTABLE PRODUCTS

- A. Liquid membrane system
 - 1. Karnak 192 One Kote, or Karnak 88R Rubberized.
 - 2. Henry 787
 - 3. Lucas 4700
 - 4. Or equal, nationally marketed urethane or polymer modified elastomeric asphaltic coating subject to approval prior to bidding.
 - 5. Primers and/or prep coatings as recommended by the manufacturer for best performance.

3. EXECUTION

3.1. APPLICATION- LIQUID MEMBRANE

- A. Inspect wall clean, filled and dry surface to receive coating.
 - 1. Power wash if necessary
 - 2. Prime as recommended by the product manufacturer
- B. Apply one (1) coat of membrane, spray or roller applied, over footing to top of concrete any location where floor is below grade.
 - 1. Inspect for full coverage.
- C. After full set, apply second coat of membrane, spray or roller applied.
 - 1. Inspect for full coverage.
- D. Backfill carefully such that membrane is not pulled down.

3.2. CLOSEOUT

- A. Clean up all surfaces and debris.
- B. Provide Warranty documentation.

END 07100

DIVISION 7 – THERMAL & MOISTURE PROTECTION
Section 07 2113 - Insulation

1. GENERAL

1.1. DESCRIPTION

- A. The Contractor shall provide insulation as shown on the Drawing and as specified herein:
1. Foundation Insulation
 2. Wall Insulation
 3. Roof Insulation
 4. Miscellaneous insulation for air tightness and sound

1.2. RELATED WORK

- A. Specified elsewhere:
1. 03 3000 – Concrete
 2. 06 1000 – Rough Carpentry
 3. 07 5323 – EPDM Elastomeric Membrane Roofing
 4. 07 2400 – EIFS Exterior insulation and finish system.

1.3. SUBMITTALS. Submit Manufacturer's Literature in accordance with 01 3300 (materials description and installation instruction for each type insulation).

1.4. PRODUCT DELIVERY, STORAGE AND HANDLING

- A. Handle and store in such a manner as to prevent damage. Store under cover and above ground. All damaged or otherwise unsuitable material, when so ascertained, shall be immediately removed from the job site.
- B. Store all materials supported by blocking runners 4" above bearing surface.
- C. Maintain stored insulation weather free. Provide and maintain repellent poly protection cover secured against blowing rain.
- D. Tie down and secure against wind damage.

1.5. WARRANTY

- A. Insulation system shall be included in the roofing membrane manufacturer's full system warranty paragraph for roof insulation.
1. See Section 07 5323 for warranty requirements.
- B. Other insulation applications, one (1) year.

2. PRODUCTS

2.1. MATERIALS - ROOF

- A. See also roof specification, insulation is part of the roof assembly.
1. Description
 - a. See roofing specifications and details for thickness and layers.
 - b. All roof insulation systems to be branded by membrane manufacturer for warranted assembly.
 2. Specification
 - a. Fiber reinforced facers, sheet size, 4' X 8' preferable
 - b. Federal specification HH-I-1972/1.
 - c. Factory Mutual Class 1 per FM 4450.
 - d. Condition R-value 5.88 minimum per ASTM C 518 Test Methods and PIMA Conditioning Procedure 101 or RICTIMA Bulletin 281-1.
 3. Compliance: insulation system must comply with roofing manufacturer's standards for uplift, delamination, warranty and general compatibility.
 - a. Comply with warranty requirements for full system warranty.
 - b. Coordinate material selections for full system warranty.
 - c. System aged R value 5.7 per inch
 - 1) Total system intent is R-25
- B. Tapered insulation, saddles and crickets - polyisocyanurate core - Use as necessary to accomplish drainage, see also Roof Plan for minimum required use.
1. Description
 - a. All roof insulation systems to be branded by membrane manufacturer for warranted assembly.
 - b. 1/2" minimum starter thickness for taper board.
 - c. Provide 0" to 1/2" taper wood fiber or other appropriate starters when needed.
 - d. Facer required.
 - e. Taper 1/8" per foot.
 - 1) Saddles and crickets may be 1/4" or more as appropriate to the condition and needed to provide drainage along the valley created.
 - f. Specifications, same as 07 2113/2.1.A.2. above.
 2. Compliance same as 07 2113/2/1.A.3. above

C. Fill insulation - polyisocyanurate core - required with tapered system.

1. Description

- a. Thickness as required, one-inch (1") minimum.
- b. Facer required.

2. Specifications

- a. Same as 07 2113/2.1.A.2. above.

3. Compliance

- a. Same as 07 2113/2.1.A.3. above.

D. Surface cap system.

1. Insulation systems shall have the surface capped/topped with a layer of not less than ½" high density HD board branded or approved for use with the roofing membrane system.

- a. All roof insulation systems to be branded by membrane manufacturer for warranted assembly.
- b. Poly-isocyanurate core faced high density foam systems of 100 psi or higher compressive strength.
- c. Contractor option, Dens Deck gypsum panel system branded or approved by the membrane manufacturer.

B. Taper wood fiber 0" to ½" starter

1. Provide at all transitions to wood blocking or lower surface condition or edges of ½" taper starter or HD board at locations such as roof drains.

C. Fasteners (for adhered areas required only)

1. Fasteners as required for guarantee, also for roofing system unballasted alternate mechanical anchorage.

- a. Provide rust resistant mechanical fasteners to achieve wind rating listed in roofing specification.

1) Base layer only

- b. Optional, FM approved adhesives that will achieve specified anchorage and that are compatible with the roofing membrane and maintenance system warranty requirements.

1.2. MATERIALS - MASONRY WALLS AND FOUNDATIONS

A. Constant thickness two inches (2") unless noted otherwise, extruded

polystyrene, closed cell.

1. Dow Styrofoam - blue
2. Foamular - pink
3. Amoco Amof foam - green
4. Approved equal

B. Provide mortar block screen at flashings and weeps.

1.3. MISCELLANEOUS INSULATION PRODUCTS

A. Fiberglass batt insulation, thickness, facers as detailed.

1. Owens-Corning
2. Johns-Manville
3. Celotex
4. Or equal, pre bid submittals for fiberglass products of equal performance to specified.

B. Mineral wool, sound and fire safing as detailed.

1. Johns-Manville
2. Or equal, pre bid submittal not required.

1.4. VAPOR BARRIORS - RETARDERS.

A. Above slabs, such as walls:

1. Six (6) mil polyethelyne film Visqueen or similar
2. Liquid applied as noted or contractor option
3. Manufacturers performance tested at 0.06 perm or less
4. Age tested for permanent performance.

2. EXECUTION

2.1. PREPARATION

- A. Examine all conditions for compliance with Product Manufacturer's requirements.
- B. Application or installation of materials constitutes an acceptance of the existing conditions.
- C. Verify all dimensions of in place and subsequent construction.

2.2. INSTALLATION - ROOF

A. Installation shall be:

1. First constant thickness insulation layer to metal decking, mechanically anchored in accord with I-90 standards as coordinated with selected roofing system.

2. All other layers and tapered if above the first layer to be foam adhered.
 - a. Foam to be roof membrane manufacturer's foam adhesion system, compatible with the installed roof membrane system.
 - b. Two (2) part low rise urethane foam adhesive system, select for temperature conditions at time of application.
 - c. Follow all instructions for I-90 rating, 90 mph blow off per IBC Code requirements.
- B. Install tapered and fill systems when needed
 1. May be bottom course below first mechanically attached constant thickness layer.
 2. Or, may be assembled between constant layer insulation boards
 3. Or above the constant thickness boards but below the cap system of HD ISO board or Dens Deck as selected.
- C. Inspect for proper installation:
 1. Tight side and edge.
 2. Offset joints in layered application.
 3. Do not use broken boards.
 4. Fill in chipped or damaged spots in insulation.
 5. Install 0" to 1/2" taper starters at all starter transition points to tapered or cover board.
- D. Protect properly to prevent crushing, delamination or abuse to insulation systems during subsequent operations.
- E. Taper systems shall be installed as true 1/8" taper systems, both ways from drains (i.e., do not taper one way and install cricket or saddle between drains). See plans for roof layout.

2.3. INSTALLATION - MASONRY AND FOUNDATION

- A. Install to assure snug tight fit. Repair or replace damaged materials.
 1. No seam voids or missing broken corners or edges.
- B. Coordinate with flashings where occur such that flashing through insulation space will not pocket moisture.
 1. Mortar blocks to be provided at flashings.
 2. Lintels and weep lines to allow water flow.

END 07 2113

1. GENERAL

1.1. WORK INCLUDES

A. Exterior Insulation and Finish systems related to window replacements

1. Base Bid:

- a. Exterior walls
- b. As detailed on the drawings

2. Alternate bid:

- a. See Alternate #3 to wash north wall of existing building.

2.2. SYSTEM DESCRIPTION

A. Provide the EIFS manufacturer's water proof air barrier on the CMU structural and exterior wall system

- 1. Compatible with the primer adhesive system to be employed
- 2. Coat all exterior surfaces and wrap into the window returns and up to the adjacent surfaces such as roof deck and adjacent walls
- 3. Seal the envelope infiltration tight

B. The EIFS will be Class PB with cavity wall for moisture drainage, secondary weather resistive barrier, adhesive, 2" grooved expanded polystyrene insulation board, internal vinyl tracks, vent system, starter strip, base coat, reinforcing mesh and final finish.

- 1. Full surface reinforcing mesh
- 2. Provide top and base flashings as needed to make water tight along the barrel roof flashing and to cover the lower roof counter flashing in a manner to allow for convenient roof maintenance and/or reroof.

C. Provide exterior insulation and finish system assemblies complying with the following requirements for system performances:

- 1. Bond Integrity: Free from bond failure within or between any components.
- 2. Weather tightness: Resistant to water penetration from exterior into assembly, through it or degradation of assembly components including substrate, joint sealers and supporting wall construction.
 - a. Air Leakage: Installation classified Type III air barrier.
 - b. System shall be provided with components, flashings and weeps to allow drainage of internal cavities.
- 3. System to be field assembled and finish system field applied.

4. The three-inch (3") insulation board shall be completely encapsulated by the substrate.
 5. The base sheathing where applicable such as soffits or stud walls shall be Densglass -gold or equal.
- D. Fire Performance Characteristics: Provide materials and construction which are identical to those whose fire performance characteristics as listed below have been determined by testing, per methods indicated, by UL or other testing and inspecting agency acceptable to authorities having jurisdiction.
1. Surface Burning Characteristics: Flame spread rating of 25 or less per ASTM E 84 for installed system.
- E. Mold and mildew resistant
1. All components of the system shall be tested to be resistant to mold and mildew growth

2.3. RELATED REQUIREMENTS

- A. Specified elsewhere
1. Division 00 – Procurement Requirements
 2. Division 01 – Administrative Requirements.
 3. Division 4 - Masonry
 4. 05 4000 – Cold Formed Metal Framing
 5. 07 9200 – Joint Sealants
 6. 09 2116 Gypsum Wallboard

2.4. QUALITY ASSURANCE

- A. Single Source Responsibility: To ensure consistent quality of appearance and performance, obtain materials for exterior insulation and finish systems from either a single manufacturer or from manufacturers approved by the system manufacturer as compatible with other system components.
1. All materials to be included in the manufacturers' warranty.
- B. Installer Qualifications: Engage an Installer/Applicator that is certified IN WRITING by system Manufacturer as qualified for installation of systems indicated.
1. Minimum five (5) years experience.

2.5. SUBMITTALS

- A. Product Data: Submit manufacturer's product data for each component of exterior insulation and finish system.
1. Submit promptly after award such that reviews and color selections can be made in a timely manner.
 2. Sealants

07 2400 – 2 EIFS System

- B. Submit Shop Drawing showing layout of exterior wall for each surface showing reveals, joints and details of the assembly.
 - 1. Walls, or window to window wall sections nominally similar do not all have to be detailed beyond what the installer will need.
 - 2. Nominally symmetrical walls only have to one side fully detailed plus any additional needed by the installer to execute.
- C. Relief design, provide shop drawings for relief layout

2.6. DELIVERY, STORAGE & HANDLING

- A. Deliver products in original, unopened packages with manufacturer's labels identifying products legible and intact.
- B. Store materials inside, under cover and in a manner to keep them dry, protected from the weather, direct sunlight, surface contamination, aging, corrosion, damaging temperature, damage from construction traffic and other causes.
- C. Stack insulation board flat, off the ground, and protected from the sun.

2.7. PROJECT CONDITIONS

- A. System will be installed on new steel stud structural system, with new light gauge cold formed steel framing.
- B. Protect contiguous work from moisture deterioration and soiling, which might result from application of exterior insulation and finish systems. Provide temporary covering and whatever other provisions may be necessary to prevent harmful spattering of exterior finish coatings on other work.
- C. Protect exterior insulation and finish system from effects of inclement weather during and until installation is completed, including flashing, joint sealers and other related work required to prevent infiltration of moisture behind system or deterioration of substrates over which system is applied.
- D. Do not install exterior insulation and finish system when ambient outdoor temperatures are 40 degrees F. (4 deg. C.) and below, during and for twenty-four (24) hours after, installation of wet materials.

2.8. SEQUENCING/SCHEDULING

- A. Sequence installation of exterior insulation and finish system with related work specified in other sections to ensure that wall assemblies, including flashing, trim and joint sealers, are protected against damage from effects of weather, aging, corrosion or other causes.

2.9. WARRANTY

- A. Provide Standard Product Manufacturer's Warranty for ten (10) years for moisture drainage and limited materials warranty.
 - 1. Dryvit Outsulation Plus MD System is the warranty basis.
 - 2. Warranties of other approved systems must have similar for more inclusive provisions.

3. PRODUCTS

3.1. ACCEPTABLE MANUFACTURERS

- A. Subject to compliance with requirements, provide products of one (1) of the following:
 - 1. Manufacturers of EIFS allowed based on availability of similar drainage type systems and extended warranties.
 - a. Dryvit Outsulation PLUS MD System
 - b. STO
 - c. Total wall
 - d. USG
 - e. Synergy

3.2. POLYMER-BASED PROTECTIVE COATING, EXTERNALLY REINFORCED SYSTEM

- A. Sheathing Board, Gold sheathing meeting ASTM C1177, Dens Glass or similar fiberglass scrim waterproof board
 - 1. 5/8" thick where detailed on stud walls or metal framed soffit
 - 2. Flame spread and smoke developed ASTM E84: 0 maximum
- B. EIFS flashing systems:
 - 1. Dryvit Aquaflash and recommended mesh, or equal from approved manufacturers.
- C. Air/Moisture Barrier
 - 1. Manufacturers recommended over the substrate condition
 - a. Fully encapsulate full backing surface including areas covered by other veneers as may be encountered.
- D. Adhesive
 - 1. 100% acrylic based.
 - 2. Base coat materials: System Manufacturer's standard, job-mixed formulation of Portland Cement complying with ASTM C150, Type I, white or natural color; and System Manufacturer's standard 100%

polymer-based adhesive designed for use indicated.

E. Insulation Board (OMD Board)

1. Three inch (3") molded expanded polystyrene and approved for EIFS drainage system installation.
 - a. Additional thickness where detailed for special conditions and as needed to complete the work or relief design.
 - b. Provide three-dimensional relief detail trim and reveals as detailed.
 - 1) Always shape in drip at underside of all returns
 - 2) Top side reveals shall always be shaped to drain not less than 1" in 3" and shall include extra mesh over the joint inside joint and top surface.
 - 3) Relief to have beveled edges typical
2. Molded Polystyrene Board Insulation: Rigid, cellular polystyrene thermal insulation formed by the expansion of polystyrene resin beads or granules in a closed mold to comply with ASTM C 578 for Type I; aged in block form prior to cutting and shipping by air drying for not less than six (6) weeks or by another method producing equivalent results; 2' X 4' thickness indicated, but not less than the minimum thickness allowed by System Manufacturer, complying with requirements of System Manufacturer for corner squareness and other dimensional tolerances.
 - a. $R = 3.85$ per inch
 - b. Tight fit, accurate cut, no voids

F. Reinforcing Mesh

1. Material employed shall be compatible with EIFS Manufacturer's drainage system installation.
 - a. Open weave glass fiber type.
2. Reinforcing Fabric: System Manufacturer's standard, balanced alkali-resistant, open weave glass fiber fabric made from multi-end strands with tensile strength of not less than 120 lbs. and 140 lbs. in warp and fill directions, respectively, per ASTM D1682; and complying with the following requirements for weight of fabric per square yard:
 - a. Weight of Standard Reinforcing Fabric: Not less than 4.3 oz.
 - b. Weight of Impact-Resistant Reinforcing Fabric: Not less than 20.5 oz.
 - c. Weight of Strip Reinforcing Fabric: Not less than 4.3 oz.

G. System to include drainage channel or space between the backing and the insulation system. This can be achieved by using ribbed building wrap or

using a grooved trowel to install the backstop.

H. Accessories: As needed to complete the MD system

1. Drainage track and drainage strip appropriate to the system.

I. Flashings: As needed at the top edge and the bottom edge to shed water properly. It is anticipated that the top should fit under the existing upper flashing, but the exact condition is not known, include allowance for flashing. At the bottom edge, a new flashing will be needed to lap over the roof counter flashing at least 4", with a hemmed drip edge.

1. Material to be bronze fluorocarbon finish 0.032" aluminum, sealed laps.

2. Exposed edges to be hemmed.

3. Always slope horizontal surface slightly to drain out. **Do not** allow water to pocket back into the back edge.

J. Finish

1. Shall be 100% pure acrylic finish with sandblast type finish.

a. Polymer/cement base coat

b. Reinforcing mesh

c. Additional base coats as needed to finish mesh, details and properly prep for finish coat.

d. Acrylic finish

2. Groove and relief design as shown on Drawing.

3. Color and finish using Dryvit Sand Pebble finish.

a. Multiple color and relief design, see drawings.

b. Will match existing color selections.

K. Water: Clean and potable.

3.3. MIXING

A. General: Comply with system manufacturer's requirements for combining and mixing materials. Do not introduce admixtures, water or other materials except as approved by system manufacturer. Mix materials in clean containers. Use materials within time period specified by system manufacturer or discard.

4. EXECUTION

4.1. INSPECTION

A. Installer shall examine the substrate and determine and/or provide that a factory condition exists to receive exterior insulation and finish system. Do not proceed with installation of system until unsatisfactory conditions have been corrected.

4.2. PREPARATION

- A. Substrate Preparation: Perform preparation and cleaning procedures in compliance with system manufacturer's requirements to obtain optimum bond between substrate and adhesive used to attach insulation.
 - 1. Apply surface-sealer over substrates where required by system manufacturer for improving adhesion.

4.3. INSTALLATION - GENERAL

- A. Comply with system manufacturer's current published instructions for installation of exterior insulation and finish system as applicable to each type of substrate indicated.
- B. Provide surface reinforcing fabric over full area of fascia and soffit.
 - 1. Reinforcing to be fully embedded and covered.
- C. Provide expansion control at approximately 20' spacing.
 - 1. Sonneborn NP-1, or similar, non-sag urethane sealant, color to blend.
 - 2. Use this material around all windows and door frames.\
 - 3. Uniform spacing
 - 4. Coordinate reasonably with relief design
- D. Anchorage of installation board.
 - 1. Glue and mechanical (with nylon oversize washer).
 - 2. Mechanical anchorage, one (1) per 6 sq. ft. (6 per 4' X 8' sheet minimum) and two (2) per piece minimum.
 - 3. Mechanical anchorage specified is redundant anchorage and does not replace adhesive.
- E. Provide decorative grooves as shown on plans.
- F. Flashings: As needed at the top edge and the bottom edge to shed water properly, It is anticipated that the top should fit under the existing upper flashing, but the exact condition is not know, include allowance for flashing. At the bottom edge, a new flashing will be needed to lap over the roof counter flashing at least 4", with a hemmed drip edge.

4.4. CLEANING AND PROTECTION

- A. Remove temporary covering and protection of other work. Promptly remove protective coatings from window and door frames, and any other surfaces outside areas indicated to receive protective coating.
- B. Provide final protection and maintain conditions, in a manner suitable to installer and system manufacturer, which insures exterior insulation and finish system being without damage or deterioration at time of substantial completion. If, despite these precautions, damage occurs, restore to a

condition indistinguishable in appearance from and equivalent in performance to, undamaged areas by replacing or repairing in compliance with system manufacturer's recommendations.

END 07 2400

DIVISION 7 - THERMAL & MOISTURE PROTECTION
Section 07 5323 – EPDM Elastomeric Membrane Roofing

1. GENERAL

1.1. WORK INCLUDES

- A. The Contractor shall provide single-ply synthetic rubber adhered roofing with flashing system(s) at Edison Elementary School new additions as shown on the Drawings and specified herein, and related work for roof tie ins and flashing of new equipment onto existing roofs.
 - 1. Warranty NDL manufacturer 25 year.
- B. Tie in to existing roof systems.
 - 1. Existing roof, Firestone 60 mil EPDM, 20 year warranty
 - a. FBPCO GB8673
 - b. Warranty RO 031946
 - c. 20 year 12/09 – 12/29
 - 2. All work on existing roofs shall comply with manufacturer's warranty repair requirements.
 - a. Use Firestone materials
 - b. Arrange for Firestone inspection if necessary to maintain warranty.
 - c. Tie in seam shall be warranted with new roof for the new materials and the existing roof for the existing installed materials.
- C. Provide new materials as needed and as shown on the detail drawing sheets.
 - 1. Compliance requirements
 - a) Upper roof classroom adhered – IBC 120 MPH wind rated
 - b) Cafeteria roof IBC 90 MPH rated
 - 2. Insulation system
 - a) Base insulation system, 2 layers 2" fiberglass scrim faced polyisocyanurate or combination that equals 4"
 - b) Tapered insulation, ½" starter thickness, 1/8" taper, fiberglass scrim faced polyisocyanurate
 - c) Cap board, 1 layer of ½" HD Isocyanate or ½" Densglass or manufacturers Densglass equivalent water proof board.
 - d) First layer may be mechanically or foam attached
 - e) Subsequent layers foam attach with offset joints
 - f) Limited crickets and saddles may be required to assure drainage.

- g) Roof is structural slope 0", flat, no slope, drainage to be accomplished with tapered insulation layout to drains
3. Roofing membrane
 - a) 60 Mill EPDM black or white
 4. Resilient flashings
 5. Metal cap flashings
 6. Gutters and downspouts
 7. Expansion and construction joints
 8. Counter flashing and termination bars
 9. Roof projection flashings
 10. Wood blocking addition extensions and reconstruction
 11. Raised curbs, vents, roof edges as detailed or as needed for warranty.
 12. Remove flash, replace and reset rooftop equipment or flashings as needed.
 13. Temporary cap curbs watertight as appropriate to progress.
 14. Support blocks and walkway pads
 15. **Double strip in all seams, three-inch (3") double adhesive seam tape (or manufacturer membrane edge tape system) and six-inch (6") surface lap strip.**
 16. Top quality butyl adhesives and accessories
 17. Manufacturer's two part urethane expanding adhesive
 - a. Select as appropriate for the installation conditions and temperature.

1.2. RELATED REQUIREMENTS

A. Specified elsewhere

1. DIVISION 00 - PROCUREMENT REQUIREMENTS
2. DIVISION 01 - ADMINISTRATIVE REQUIREMENTS
3. 06 1000 - Rough Carpentry
4. 07 2000 - Insulation
5. 07 6200 - Sheet Metal Flashing & Trim
6. 07 9200 - Sealants & Caulks

1.3. MECHANICAL WORK

A. Contractor shall coordinate with any mechanical work that penetrates or other wise sits on the rook system or above the roof system

1. Curbs
2. Rails
3. Platforms
4. Vents or piping.

1.4. DEFINITION ROOFING SYSTEM MANUFACTURER. Any of the manufacturers whose systems are specified under "Acceptable Systems" in this Section, and herein called "Manufacturer".

1.5. QUALITY ASSURANCE

A. Qualifications

1. Installers shall be experienced craftsmen, skilled in the installation of the specified products set forth in these and related documents.
2. Roofing Contractor shall:
 - a. Have a minimum of five (5) years experience as certified applicator for this or for like roofing systems specified in this document and shall be certified by the Product Manufacturer whose product is to be installed.
 - b. Be licensed by the State of Illinois in accord with the Illinois Roofing Industry Licensing Act, as *amended*. 25 ILCS 335.

B. Requirements of regulatory agencies

1. Permits: Contractor shall provide and pay for all applicable permits.
2. Tests or standards by independent agencies whose classifications and requirements have general acceptance as regulatory:
 - a. American Society for Testing and Materials (ASTM).
 - b. Factory Mutual Laboratories (FM).
 - c. National Fire Protection Association (NFPA).
 - d. Underwriter's Laboratories, Inc. (UL).

C. Source Quality Control - The Roofing System Manufacturers shall assume full responsibility for certifying that:

1. Prior to the start of work and material acquisition, the Contractor may be requested to submit a letter to certify that the manufacturer has reviewed the project and it is warrantable or project adjustments to make it warrantable are described.

D. Referenced catalogs: The catalogs, current as of date of bidding documents, of the manufacturers specified are incorporated herein by reference.

1.6. SUBMITTALS. Make all submittal in accordance with 01 33 00.

A. Shop drawings

1. Submit shop drawings of Roofing System Manufacturer for approval.

2. Submit only system manufacturer approved shop drawings to Architect/Engineer.
3. Minimum scale: 1" = 1'-0" for details, 1/8" per foot for taper layout.
4. Include in submittals:
 - a. Resilient flashing, cap and counter flashing details.
 - b. Gutters/scuppers/perimeter curb related sheet metal.
 - c. Fasteners.
 - d. Expansion and control joints.
 - e. Mechanical/electrical equipment curbs.
 - f. Copings.
 - g. Flashing of extended roof curbs.
 - h. Flashing of through roof pipes and columns.

B. Product data

1. Insulation
2. Joint seal or tape. (Self-adhering battens, etc.)
3. Manufacturer's specification and instruction manual for all components of roofing system.

C. Samples wherein same are applicable to the project

1. Constant thickness isocyanurate insulation: one (1) piece 4" x 4".
2. Sheet metal in conjunction with roofing: one (1) piece of each type, 4" X 4".
3. Sheet metal, one piece in selected finish. of break formed metal and clip design, gutters and trim pieces to depict planned edge work and surface drainage work
4. Membrane: one (1) pieces 4" x 4".
5. Fabricated metal flashing caps, miters and flashing lap systems and covers: one (1) assembled sample each configuration upon request if submittal drawings do not depict adequately.
6. Break formed metal and clip design, gutters and trim pieces to depict planned edge work and surface drainage metal work

1.7. PRODUCT DELIVERY, STORAGE AND HANDLING

- A. Deliver all materials in Manufacturer's original, unopened containers and rolls with all labels intact and legible.
- B. Deliver materials requiring fire resistance classification packaged with labels attached as required by labeling service.
- C. Deliver materials in sufficient time and quantity to allow continuity of work and compliance with approved construction schedule.
- D. Handle rolled goods in manner to prevent damages to edges or ends.
- E. Store all materials on clean raised platforms with weather protective covering when stored outdoors.

- F. Store rolled goods in accordance with Manufacturer's instructions.
- G. Provide continuous protection of materials against damage or deterioration.
- H. Remove damaged or defective materials from site.
- I. Comply with fire and safety regulations.
- J. Follow Manufacturer recommendations as minimum except where contract documents exceed Manufacturer recommendations. Where Contract Documents are in excess of the Manufacturer recommendations, the contract documents supersede.
- K. PROTECT INSTALLED ROOFING MATERIAL FROM TRAFFIC DAMAGE

1.8. JOB CONDITIONS

- A. Contractor to avoid concentrated material loads. DISTRIBUTE LOADS AND ALWAYS ACROSS JOISTS -- NEVER PARALLEL WITH FRAMING MEMBERS.
- B. Environmental requirements: Except as otherwise authorized by Architect/Engineer, follow Manufacturer's written request for variance:
 - 1. Apply roofing in dry weather.
 - 2. Apply roofing only when dry substrata and substructures prevail.
- C. PROTECTION
 - 1. AVOID HEAVY TRAFFIC ON COMPLETED WORK.
 - a. Protect finished roofing materials from subsequent damage
- D. Sequencing and scheduling prior to commencement of work.
 - 1. The Roofing Contractor's on site foreman shall assign and coordinate all operations of the Roofing Contractor, his Subcontractors and his Suppliers for the work in the Contract Documents.
 - 2. Coordinate with other trades

1.9. WARRANTY

- A. Contractor shall provide the following minimum warranties:
 - 1. Contractor: 2-Year Warranty
 - 2. Manufacturer: On the new roof system, provide a twenty-five (25) year comprehensive Manufacturer's No Dollar Limit, (NDL) Warranty

1.10. WARRANTED TIE-INS

- A. Existing roofs are warranted systems
 - 1. Existing Gym roof, Carlisle 60 mil EPDM, 20 year warranty
 - a. Serial #10083082
 - b. CMD #1108605
 - 2. Existing east wing (east of existing gym), Firestone 60 mil EPDM, 20 year warranty
 - a. Warranty #RO 059434
 - b. FBCO CF7120

2. PRODUCTS

2.1. MATERIALS. For the entire system, use materials either manufactured by or certified as compatible by one of the acceptable system manufacturers.

2.2. Roofing Membrane System

- A. Rubber Membrane 060-mil EPDM rubber system fully adhered.
 - 1. Carlisle Syn Tec Systems, Carlisle, PA
 - 2. Firestone Building Products, Co., Carmel, IN - Firestone Rubbergard
 - 3. Other manufacturers are not approved as we do not want to introduce another manufacturer product on this site.
- B. Resilient Flashing; 060 mil uncured formable EPDM shall be of same source by name as the membrane system.
 - 1. Additional materials and adhesives recommended by the manufacturer
- C. Adhesives
 - 1. Adhesives for adhering membrane shall be the manufacturer recommended contact type adhesive for the substrate condition.
 - 2. Seam adhesive shall be the membrane manufacturer's top grade butyl base type contact seam adhesive or manufacturer self vulcanizing seam tape.
 - 3. Insulation adhesives, to be two part expanding urethane adhesive in manufacturer labeled containers.
- D. Seam sealant and seam tape shall be manufacturer's recommended seam sealant or tape.
 - 1. Provide necessary seam work or seam primers as recommended.

- E. Anchor bars
 - 1. Manufacturer's recommended type as a minimum standard unless detailed otherwise.
 - 2. See drawings for heavier or stiffer bar anchors at detailed conditions.
 - 3. Conditions not detailed but similar to detailed conditions shall be handled with similar bar anchor materials.
 - 4. Finishing termination bars (where exposed to view) and as noted on the Drawings:
 - a. Metal Era, Inc. - Model CB-175 with .040" CF 175 Snap On Cover.
 - b. Carlisle - Design Accessories per drawing details with .040" Snap On Cover.
 - c. J.P. Stevens Accessories Elastomerics Corp. - High-Tuff with .040" Snap On Cover.
 - d. First and last anchor hole in any bar segment shall be 1" from ends.

- F. Walkway pads, Manufacturer's standard adhered rubber pads, see Plan for application and provide as required by the manufacturer warranty requirements at ladders, walkways, downspouts, roof top equipment service areas.
 - 1. Select dark color to enhance snow-melt.
 - 2. Provide puncture mat below and four inches (4") from blocks.
 - 3. Layout and space 1" to 2" apart

- G. Insulation - see 07 2113.

- H. Screws and mechanical anchors
 - 1. Insulation system anchors to be manufacturer's band label and/or approved anchors with oversize washers, self drilling
 - 2. Anchors for term bars manufacturer's approved non-rusting
 - 3. Screws and anchors for sheet metal systems to be stainless steel, seal head type
 - 4. Screws for general assembly to be stainless steel
 - 5. Pop rivets used where allowed by the A/E to be rust resistant or aluminum.
 - 6. Always follow good practice to protect different metals from galvanic action.

- I. Ballast - not required at this project.

3. EXECUTION

3.1. NIGHT CUT OFF (See 1.1. of this Section).

- A. Provide tie-off per EPDM Manufacturer's recommendations between

new/old roof or deck system each day, watertight and wind resistant.

1. Assume it will rain before work resumes.

B. Avoid situations where water can run under the newly installed assemblies in deck flutes.

3.2. **BLOCKING AND ANCHORAGE.** Where Drawings Sectional Details do not account for surface of the insulation and surface of the wood blocking lying in same plane and wherein same is a Manufacturer's requirement, the Contractor shall so provide by tapering wood blocking so the concealed base EPDM anchor shall be screwed into the wood blocking as detailed. This requirement applies to perimeters, curbs, parapets, equipment rails, saddles and crickets as shown on the drawings specifically or reasonably inferred by similarity, and as required for warranty.

3.3. INSPECTION

A. Verify that all work of other subcontractors that penetrates roof deck or requires men and equipment to traverse roof deck has been completed. Protect all reroof work from traffic damage. See Paragraph 1.7.C of this Section and Paragraph 3.3.A.3 of Section 07 6200.

B. Examine all surfaces for inadequate anchorage, foreign material, moisture, unevenness or other conditions that would prevent execution and quality of installation of specified roofing and flashing system and accessory items.

C. Do not issue a proceed order to a subcontractor or proceed with work until all defects are corrected to the satisfaction of and with the written approval of the roof system manufacturer.

3.4. **PREPARATION.** Thoroughly clean all surfaces against or into which work will be installed. Ensure that all surfaces are clean and dry before starting and during performance of work. Follow roofing system manufacturer's recommendations.

3.5. INSTALLATION

A. Install roofing and flashing system(s) and all accessory items in strict accordance with system Manufacturer's printed instructions current at date of bidding documents.

1. Except wherein the Documents designate in excess of Manufacturer's requirements; in such case proceed per Documents.

B. Contractor may employ membrane manufacturer's standard details in lieu of details shown on Drawings, **ONLY** upon confirmation IN WRITING to the A/E that the Manufacturer's system exceeds the quality, longevity and future ease of replacement of the system detailed on the Drawings, otherwise these specifications and accompanying drawing shall control

materials and installations.

- C. Double lap all field seams with second cross-lap. Provide additional material; tape/uncured and sealed. (i.e. strip in all seams after basic seam is completed).
 - 1. Use minimum six-inch (6") strip or four inch (3") EPDM bonding tape.
 - 2. Cross-lap to be included in warranty.
- D. **Seal head stainless steel screws** shall be secured in all pre-punched (or drilled) holes

3.6. EXISTING ROOFS

- A. Provide appropriate tie-in flashing where required.
 - 1. Comply with the original Manufacturer warranty requirements, actual tie in to be covered under this warranty.

3.7. FIELD QUALITY CONTROL

- A. Roofing System Manufacturer to provide on site observation, training, pull out testing and instruction as the Manufacturer deems necessary.
 - 1. Adjustments in the system design necessary to meet manufacturer's requirements for guarantee are subject to Architect's approval and shall be included at no additional charge.
- B. Carefully clean surfaces prior to applying adhesives.
- C. Proper fit and lay out membranes.
 - 1. Avoid wrinkles.
 - 2. Avoid bubbles.
 - 3. Install without stretching or applying under stress.
 - 4. Handle carefully to minimize patching.
 - 5. Keep seam adhesives in proper alignment to avoid seam sealant over adhesive.
 - 6. Carefully apply contact adhesive in a thin uniform manner.

3.8. ADJUST & CLEAN

- A. Carefully inspect all completed work. Correct all defects.
- B. Clean up spill, debris and remove surplus materials at the end of each day.
- C. Provide adequate protection of completed work until substantial completion. Prevent traffic, storage of materials or equipment on completed roofing. Finally, remove 3/4" thick X 4' wide plywood from

traffic lanes over complete membrane installation. See 1.7.C of this Section.

- D. Do not store materials or equipment on the completed roof.
- E. Finally clean up all rubbish, debris, surplus materials, tools and equipment and remove from the site.
- F. Provide manufacturer inspection and warranty paper work.

END 07 5323

DIVISION 7 – THERMAL & MOISTURE PROTECTION
Section 07 6200 – Sheet Metal Flashing & Trim

1. GENERAL

1.1. WORK INCLUDES

- A. Contractor shall provide metal flashing inclusive of trim, wall to roof guttering, downspouts, splash pans associated with the work as shown on the Drawings and specified herein.
1. Roof curb caps
 2. Roof edge details
 3. Roof to wall intersection detail, fascia trim
 4. Where appropriate, match existing appearance profiles, metal pre-finish, but not necessarily gauges or anchorage, follow proper practices for all new work.
 5. It is intended the fascia system be a manufactured system such as Metal Era Perma Tite 200 x12 ½” fascia system, 120 MPH rated, 20 year warranty.
 - a. Metal Era, 1600 Airport Road, Waukesha WI 53186, phone 800 558 2162, Fx 800 373 9156, Info@metalera.com
 - b. Or equal approved by the roof membrane manufacturer warranty.
- B. See roof plan for adding scupper and downspout for overflow secondary roof drainage on existing roof adjacent to new construction where no overflow is provided now.
1. Verify existing conditions fit and flash in place for finished installation in compliance with the existing membrane warranty
 2. May be Shop fabricated or Manufactured such as Metal Era.
 3. Downspout not less than 5” x 4” 0.050” prefinished aluminum
- C. Contractor shall provide and coordinate HVAC, Plumbing and Electrical work curb revision therefore and flashing thereof.

1.2. RELATED WORK

- A. Specified elsewhere
1. 06 1000 - Rough Carpentry
 2. 07 5323 - EPDM Elastomeric Membrane Roofing
 3. 07 9200 - Sealant & Caulks

1.3. QUALITY ASSURANCE

- A. All sheet metal trim and flashings to be shaped installed by experienced Sheet metal workers.

- B. Shall be installed in a manner to look attractive and always naturally shed water.
- C. Seal all splices and laps to make water resistant

1.4. REFERENCE STANDARDS

- A. ASTM B209-79, Alloy 3003-H-14: Aluminum
 - 1. H-24 temper where required for spring action. See details on the Drawings.
 - 2. See Drawings for thickness.
- B. ASTM A617-77, Type 304: Stainless Steel
 - 1. 2D finish, dull, cold-rolled, annealed.
 - 2. See Drawings for location, configuration and thickness.
- C. Galvanized steel ASTM A635/ A 65BM - hot dip process.
 - 1. Box annealed steel.
 - 2. Zinc coating 20½ oz. per sq. ft. of sheet metal.
 - 3. Top coating in accord with AAMA 621-96 Standards.
- D. Paint grip galvanized, ASTM A525, ASTM A361
 - 1. G-90, surface treated and cleaned for field shop finishing.
 - 2. See Drawings for gauge and fabrication.
- E. Factory Mutual, flashing and edge pull off 60 lb./ft.

1.5. SUBMITTALS. Make all submittals in accord with 01 3300. Submittals are not returnable.

- A. Product data:
 - 1. Manufacturer's Literature: Materials description and current printed installation instructions for manufactured items.
 - 2. Shop Drawings: Typical details of fabricated and formed configurations.
- B. Samples:
 - 1. Metals: One (1) 12" X 12" each type and gauge of material proposed.
 - a. Labeled proposed use.
 - b. List accessory item associated to installation.

2. Fabrication Samples:

- a. Provide one (1) assembled sample of splice covers, and caps, inside and outside mitered cap corners.
- b. Sample shall be completed, that is, soldered or welded as set forth in the Drawings.

1.6. DELIVERY, STORAGE & HANDLING

- A. Deliver products to site in accordance with Section 00 2213/1.4. Store all products in a manner to prevent damage, in a secure place, out of way of construction operations. Provide protection until ready for use.
- B. Handle in accord with manufacturer's recommendations.

1.7. SEQUENCING/SCHEDULING

- A. Cap flashing on masonry walls and parapets shall be installed as set forth or salvaged per and assigned on the Drawings.

1.8. WARRANTY. The Contractor shall warrant metal flashing and trim to be free of faults and defects for two (2) years.

2. PRODUCTS

2.1. MATERIALS

- A. Aluminum: Comply with reference standards.
- B. Manufactured fascia system
 - 1. Metal Era Perma Tite 200 120 MPH rated two piece system, or equal
 - 2. Face profile 12 ½" standard
 - 3. Material minimum 0.040" prefinished aluminum or heavier, with galvanized or heavy aluminum concealed anchor strips, if galvanized design so there is separation between different types of metal.
 - 4. Custom bottom closure clip
- C. Other Flashing and trim shall conform with the following:
 - 1. Min. 0.040" thick minimum aluminum, except specified thicknesses where designated on the Drawings or in these specification
 - a. Gutters 0.050"
 - b. Downspouts 0.050"
 - c. Cap flashings, covers miscellaneous 0.04"

2. Specified requirements of the manufacturer of the metal.
 3. Recommended practices contained in "Aluminum Construction," from the Aluminum Association, 750 Third Ave., New York, NY 10017, latest edition.
- D. Finish
1. Aluminum: Exposed to view flashing, gutters, downspouts, and trim Dark Bronze finish
 2. Aluminum concealed and in roof system flashing, gutter: Mill finish.
 3. Stainless Steel: Dull finish
- E. Screws, Bolts and Nuts:
1. Stainless steel with sealhead washers where exposed to weather.
- F. Washers
1. Same alloy as screw or bolt minimum .050" thick.
 2. Material same as adjacent screw head.
 3. All exposed washers shall be sealhead type: See Paragraph H, herefollowing.
- G. PVC or EPDM Insulator: 20-mil thickness in sheet, strip or tape form.
1. At all locations separating soft metal from steel.
- H. Sealant: single part urethane or silicone as deemed most workable for long life service in the conditions of application
1. Such as Sonnoborn NP-1 urethane or Dow Corning CCS or CWS construction silicones
 2. Always select following manufacturer's recommendation for application, use and exposure.
 3. Prepare or prime surfaces as is appropriate.
- I. Resilient Washers: Neoprene, minimum .062 in. thick. Must be factory
1. Adhered to washers.
- J. Gutters None proposed
- K. Downspouts None proposed.

3. EXECUTION

3.1. INSPECTION

- A. Thoroughly inspect all existing construction and the conditions under which the work will be performed. Report to the Architect/Engineer IN

WRITING all conditions that would adversely affect installation of the work.

- B. Start of work constitutes acceptance of the construction and conditions.

3.2. FABRICATION

- A. Verify dimensions at site prior to shop production fabrications.
- B. Form, fabricate and assemble all work in the shop to the extent feasible and, if necessary, mark to ensure proper installation at the project site. Disassemble only to the extent necessary for shipment. ASSEMBLY MARKS SHALL BE APPLIED TO BLIND SIDE.
- C. Use the proper thickness of metal, adequate stiffeners, supports and proven details of assembly so that the finished product will conform to the highest standards of the industry. All clips shown on the drawing are to be continuous.
- D. Fabricate items with the minimum number of joints, using concealed fasteners wherever possible. Lap or lock joints but so not rivet or otherwise restrict relative movement of sections. SEE DETAIL NOTES FOR EXPANSION PROVISIONS.
- E. Limit all segments to ten feet (10') in length. Allow for minimum ½" expansion per segment length, unless otherwise specified. Miter and braze or weld all internal or exterior corners and end caps. Where exposed to view, a watertight cap can be installed below the finish flashing to accomplish this.
- F. See the drawings flashing details and configuration. Running flashing and trim metal splices shall be separated ½" for expansion and covered with .040 X 5" wide cap flashing set in double bead of sealant. Anchor screws shall pass in the ½" no-contact expansion space. Lock splice caps in place securely.
- G. Should cap lengths require more screws than shown on the drawing to hold the splice cap close to the flashing, the same shall be furnished and installed by the Contractor in a uniform pattern throughout the job.

3.3. INSTALLATION

- A. Examine all surfaces to receive the metal flashing and trim.
 - 1. Verify all dimensions of existing and subsequent constructions.
 - 2. Installation of metal flashing and trim shall constitute acceptance of existing conditions.
 - 3. Coordinate work with work of HVAC, Plumbing and Electrical Subcontractors.
- B. Erect all the members plumb, level and in line securely anchored and

properly related to other parts of the work.

- C. Protect metal surfaces that are to be in contact with dissimilar metals.
- D. Coordinate flashing installation with work under Section 07 9200.
- E. All holes in sheet metal flashing anchored by screws exposed to temperature change and which is applied in segments in excess of 4'0" lengths shall be 1/16" diameter over size to accommodate expansion and contraction.
- F. All flashings shall be adequately secured to substantial construction to comply with Factory Mutual requirements for blow off, 60 lbs. per lineal foot.

3.4. MECHANICAL FASTENERS - ACCESSORIES

- A. Stainless Steel Screw Manufacturers:
 - 1. Dynamic Fastener Services, P.O. Box 231, 13902 Century Lane, Grandview, MO 64030.
 - 2. Guardian Fastener & Closure Systems, Telephone 800-633-GFCS.
 - 3. Fasteral Co., 2001 Theurer Blvd., Winona, MN 55987
 - 4. Fabco Fastening Systems, Townsend Div. of Textreon, Inc., West Newton, PA 15089.
 - 5. Olympic Fasteners, 153 Bowles Rd., Agawam, MA 01001
 - 6. All screws shall be of alloy that will field test zero magnetic attraction.
 - 7. All weather-exposed screws shall be sealhead or provided with seal head washers.
 - 8. Or similar.

3.5. ADJUST & CLEAN

- A. Upon completion of installations, carefully examine all work to confirm installation compliance and adequacy and correct all defective work.
- B. Clean up all rubbish, debris, surplus materials, packaging and tools and dispose of same off site in accordance with Federal, State and local regulations.

END 07 6200

DIVISION 07 – THERMAL & MOISTURE PROTECTION
Section 07 7233 – Roof Hatches

1. GENERAL

1.1. SUMMARY

A. Section includes:

1. Personnel Series roof hatches installed on or in roofing system indicated on Drawings and specified herein. Includes related hardware and attachments. Does not include mechanical or structural items.
2. Safety railing system.

B. Cafeteria Roof Hatch to be 36" x 36"

1.2. RELATED SECTIONS

A. Specified elsewhere:

1. Division 5 - Metal Fabrications
2. Division 7 - Roofing & Roof Accessories

1.3. SUBMITTALS

A. Shop Drawings: Indicate configuration and dimension of components, adjacent construction, required clearances and tolerances, and other affected Work.

1. Hatch Units: Show types, elevations, thickness of metals, and full size profiles.
2. Hardware: Show materials, finishes, locations of fasteners, types of fasteners, locations and types of operating hardware lock hasps, and details of installation.
3. General: Show connections of units and hardware to other Work. Include schedules showing location of each type and size of unit.
4. Show safety rail system.
5. Provide Operating & Maintenance Manuals at end of work.

B. Manufacturer's Installation Instructions: Indicate installation requirements and rough-in dimensions.

1.4. QUALITY ASSURANCE

A. Qualifications:

1. Manufacturer/Installer: Company specializing in manufacturing and installation of components specified in this Section with minimum of 5 years documented experience.

B. Regulatory Requirements:

1. OSHA Compliance: Provide hatch safety railing system as required by OSHA Standard 1910.23 and 1910.27 and as specified in Section.

1.5. DELIVERY, STORAGE, AND HANDLING

- A. Deliver materials to Project site ready use.
- B. Exercise proper care in handling of Work so as not to injure finished surfaces. Protect Work from damage after it is in place.
- C. Store materials under cover in a dry and clean location off the ground. Remove materials that are damaged or otherwise not suitable for installation from Project site and replace with acceptable materials at no additional cost to Owner.

1.6. WARRANTY

- A. Provide manufacturer's written 5-year warranty
- B. Warrant materials and workmanship against defects after completion and final acceptance of Work.

2. PRODUCTS

2.1. MANUFACTURER

- A. Babcock-Davis, 9300 73rd Avenue North, Brooklyn Park, MN 55428, Toll Free Hotline: 888.412.3726, Toll Free Fax: 888.312.3726, Direct Phone: 763-488-9247, E-Mail:
- B. Bilco, PO Box 1203, New Haven, CT 06505, Phone 203/934-6363, Fax 203/933-8478
- C. Williams Brothers Corp. of America, 1330 Progress Dr., Front Royal, VA 22630, Phone 540/636-4444, Fax 540/636-4445
- D. Dur-Red Products, 4900 Cecella St., Cudahay, CA 90201, Phone 323/771-9000, Fax 323/771-9009
- E. Or equal.

2.2. MANUFACTURED UNITS

- A. Personnel Series Aluminum Roof Hatches:
 1. Cover and liner: 11 gauge (0.090-inch) aluminum cover with 1 inch rigid fiberboard insulation and 18 gauge (0.040-inch) aluminum cover liner.
 - a. 36" x 36" hatch opening.

2. Curb: 11 gauge (0.090-inch) aluminum curb with 1 inch rigid fiberboard insulation.
3. Hinges: Zinc plated steel or Type 316 stainless steel tamper-proof hinge contained within hatch as part of counterweight spring assembly.
4. Latch: Zinc plated steel or Type 304 stainless steel slam latch with turn handle and inside padlock hasp.
5. Springs: Greased heavy-duty compression springs in telescoping tubes.
6. Hardware: Zinc plated steel or Type 316 stainless steel hold open arm(s) with vinyl grip handle that automatically locks door when opened. Furnish hatches with interior padlock hasp and EPDM draft seal.
7. Mounting Flanges

2.3. FINISHES

- A. Finish designations prefixed by AA comply with system established by Aluminum Association for designating aluminum finishes.
- B. Aluminum: Mill finish.

2.4. SAFETY RAILINGS

- A. Top rail, Mid rail and upright posts: Galvanized Steel Pipe, 1 ¼" ID, A53 Grade B pipe.
- B. Exit: Self Closing Gate; Galvanized Steel Pipe, 1 ¼" ID A53 Grade B pipe, U bolt with hinge attachment and galvanized mounting bolts and nut hardware.
- C. Fittings: Manufacturer's standard aluminum magnesium alloy, cast with set screw pipe mount
- D. Counterflash Mount: CRS, zinc plated mounting bracket with backer plate, pemmed nut for easy installation.
- E. Hardware: Bolts and Tooling: 3/8 inch by 2-1/2 inch, grade Z, zinc plated, wrench for assembly
- F. OSHA Compliance: Provide hatch safety railing system as required by OSHA Standard 1910.23 and 1910.27 and as specified
 1. Top Rail Height: 42 inches +/-3" above finished roof deck.
 2. Top-Mid Rail Spacing: 21" diameter maximum.
 3. Meets 200lb deflection load when mounted to roof hatch counterflash.
 4. Upright post maximum spacing of 8'.

3. EXECUTION

3.1. EXAMINATION

- A. Verification of Conditions: Examine areas and conditions under which Work is to be performed and identify conditions detrimental to proper or timely completion.
- B. Verify existing structural member location.
- C. Verify that deck, curbs, roof membrane, base flashing, and other items affecting Work of this Section are in place and positioned correctly.
- D. Verify tolerances and correct improper conditions.
- E. Do not proceed until unsatisfactory conditions have been corrected.

3.2. INSTALLATION

- A. Install roof accessory items and components per manufacturer's instructions.
- B. Coordinate installation of components of this Section with installation of roof deck, roof structure, roofing membrane, and base flashing.
- C. Coordinate installation of sealant and roofing cement with Work of this Section to ensure water tightness.
- D. Coordinate installation of flashing flanges into reglets, if applicable.
- E. Separate metal from incompatible metal or corrosive substrates, including wood, by coating concealed surfaces, at locations of contact, with bituminous coating or providing other permanent separation.
- F. Flange Seals: Unless otherwise indicated, set flanges of accessory units in a thick bed of roofing cement to form a seal.
- G. Flashing height:
- H. Construct wood curb, or order special height curb such that flashing height is 12" above the roof level.
- I. Always construct wood curb through insulation to support flanges at roof height.
- J. Curb to be anchored to steel structural support with ½" bolts, not less than two per side, and fasten flange as manufacturer recommends but not less than (4) #10 ring shank nails per side.

3.3. ADJUSTING

- A. Adjust movable parts for smooth operation.

- B. Operational Units: Test-operate units with operable components. Clean and lubricate joints and hardware. Adjust for proper operation.

3.4. CLEANING

- A. Clean exposed surfaces per manufacturer's written instructions. Touch up damaged metal coatings.

END 07 7233

DIVISION 7 – THERMAL & MOISTURE PROTECTION
Section 07 9100 – Infiltration Barriers

1. GENERAL

1.1. WORK INCLUDED

- A. Contractor shall provide infiltration barriers as shown on Drawings and specified herein, and as appropriate to protect against infiltration of air, uncontrolled humidity or water migration.
1. At all intersections of dissimilar materials or major components forming the exterior envelope.
 - a. Windows
 - b. Doors and framing
 - c. Glass to framing
 - d. Masonry to dissimilar enclosing systems /materials.
 - e. All joints forming the perimeter envelope.
 2. Wall to roof, and roof deck, including deck deformations / flutes
 3. Blocking to Masonry
 4. Perimeter envelope penetrations
- B. It is the project intent that the entire building envelope be infiltration and water tight
1. Exception is controlled HVAC intake or exhaust air systems.

1.2. RELATED WORK

- A. Specified elsewhere:
1. 04 2000 – Unit Masonry
 2. 04 7200 – Architectural Cast Stone
 3. 05 3100 – Metal Decking
 4. 06 1000 – Rough Carpentry
 5. 07 1916 – Moisture Repellent
 6. 07 2400 – EIFS
 7. 07 6200 – Sheet Metal Flashing & Trim
 8. 07 9200 – Sealants & Caulks
 9. 08 1113 – Hollow Metal Work

- 1.3. SUBMITTALS. Submit the Manufacturer's literature, materials description and installation instructions for each preformed filler or barrier filler in accordance with above.

1.4. WARRANTY

- A. Contractor shall be responsible to repair infiltration breaches in the exterior envelope for a period of two (2) years.
1. Provide or replace sealants

2. Provide sealants where compressible seals have been found to have voids or failures
3. Repairs seals in the event of excess shrinkage of materials.

2. PRODUCTS

2.1. MATERIALS

- A. Wood blocking to masonry, provide a compressible foam continuous seal, approximately 5½" wide.
- B. Metal Deck to wood blocking or CMU.
 1. Compressible foam seal as noted above where deck flutes are parallel to intersecting surface
 2. Compressible profile contoured self-adhering seal where deck is perpendicular to the intersection surface. Provide in flutes above and below surface.
- C. Masonry back up on exterior wall. See EIFS specification on this project for infiltration barrier by the EIFS applicator or coordinated with EIFS applicator compatible with EIFS installation adhesives.
- D. Materials used shall be used in the manner intended and be of long life expectancy makeup.
- E. Sealants as specified in the sealant section may be substituted for foam seal strips where same will accomplish the intended result.

END 07 9100

DIVISION 7 – THERMAL & MOISTURE PROTECTION
Section 07 9200 – Sealants & Caulks

1. GENERAL

1.1. WORK INCLUDED

- A. Contractor shall provide caulking and sealing of joints as shown on Drawings and specified herein, including backup fillers where required.

1.2. RELATED WORK

- A. Specified elsewhere:

1. 07 1916 – Moisture Repellent
2. 07 6200 - Sheet Metal Flashing & Trim
3. 08 1113 - Hollow Metal Work

- 1.3. SUBMITTALS. Submit the Manufacturer's literature, materials description and installation instructions for each compound and filler in accordance with 01340.

1.4. HANDLING & STORAGE

- A. When the Contractor chooses a product for a particular use for a sealant or caulk specified, that same product shall be used throughout the project for that specific assignment.

1.5. WARRANTY

- A. Sealant Manufacturer: Contractor shall certify per Section 01 7800, as applicable.
1. Material performance - twenty (20) years against shrinkage and hardening - implied and advertised.
 2. Loss of bond to substrate - five (5) years - Contractor or Manufacturer's Warranty.

2. PRODUCTS

2.1. MATERIALS

- A. Exterior for metal-to-metal, metal-to-glass and for glass-to-glass installations.
1. Sealants shall be one (1) part type - silicone
 2. Serviceable life expectancy shall be twenty (20) year minimum in Manufacturer's printed material for applications proposed.
 3. Approved products are as follows: (Select proper product from product family).
 - a. General Electric Silicone Series 1200.
 - b. Dow Chemical CCS/CWS Silicone Rubber Sealant.

- B. Exterior grade for masonry-to-masonry, metal-to-masonry, wood-to-masonry, and glass-to-masonry.
1. Material's serviceable life expectancy shall be twenty (20) year minimum in Manufacturer's printed material for the applications proposed – one (1) part urethane.
 2. Approved products are as follows:
 - a. Sonneborn NP-1
 - b. Silaflex 1A
 - c. Vulkem 116
 - d. Tremco Mono
 - e. Dow Corning CCS/CWS
 - f. Select a sealant type appropriately recommended by the manufacturer for the application and as preferred by the installation contract best experience.
- C. Interior grade caulk shall be one (1) part, paintable.
1. Chemical make-up shall permit 5% joint movement from 20 deg. F to 110 degrees F and shall be skinning type.
 2. Approved products are as follows:
 - a. DAP Latex Caulk
 - b. Pecora BC 158
 - c. Tremco Butyl Sealant
- D. On grade horizontal joints, exterior/interior grade sealant shall be one (1) part, self-leveling for concrete contraction/expansion joints.
1. Approved products are as follows:
 - a. Sonneborn Sonolastic S.L.1
 - b. Vulkem 45
 - c. Dow Chemical 880
 2. If slope will cause flow, use one (1) part urethane listed above.

2.2. JOINT FILLER / BACKER

- A. Joint Filler/Backer, closed-cell polyethylene approved products shall be as follows:
1. Ethafoam by Dow Chemical.
 2. Expand-O-Foam by Williams Products, Inc.
 3. Filler Foam FF-4 by Progress Unlimited, Inc.
 4. Safe-T-Grip Filler Gasket by Structural Specialties Corp.

- 2.3. JOINT CLEANER. Joint cleaner shall be that cleaner recommended by Sealant Manufacturer for specific joint surface and conditions.

- 2.4. JOINT PRIMER AND SEALER. Joint primer and sealer shall be those compounds recommended by Sealant Manufacturer for the specific joint surface and conditions.

3. EXECUTION

3.1. PREPARATION

- A. Examine all surfaces to receive the parts of the work specified herein. The application or installation of materials constitutes acceptance of the substrate.
- B. Clean surfaces and remove protective coatings that may fail in adhesion or interfere with bond of compound so surfaces are free of deleterious substances which might impair the work.
- C. Prime surfaces per the Sealant Manufacturer's instructions.
- D. Install bond breakers in locations and of type recommended by the Sealant Manufacturer to prevent bond or sealant to surfaces where such bond might impair the performance of the sealant.

3.2. INSTALLATION

- A. Install all materials in accordance with Manufacturer's printed instructions. Unless otherwise directed, conform as follows:
 - 1. Compounds shall not be installed at temperatures below 40 deg. F unless the Manufacturer specifically permits the application of his materials at a lower temperature.
 - 2. If job conditions require installation of compounds below the minimum installation temperatures recommended by the Manufacturer, consult the Manufacturer's Representative and establish the minimum provisions required to ensure the satisfactory work.
 - 3. Confine compounds to joint areas shown. Use masking tape to prevent staining of adjoining surfaces, spillage and/or migration of the compound out of joints. Tool surfaces to shape shown or, if none is shown, to a flush or slightly concave surface. Remove excess compound and clean adjoining surfaces as may be required to eliminate any indication of soiling or migration.
 - 4. In joints which are not subject to traffic, apply sealants to a minimum depth of 50% of the normal joint width but not less than 3/8" or more than 1/2" deep.
 - 5. Apply non-elastomeric compounds in exposed joints with the depth of compound not less than the joint width.
 - 6. Use appropriate sealants for all exterior joints and for the interior joints subject to movement, except traffic expansion and contraction joints and for all exterior and interior expansion traffic joints in concrete and tile work.
 - 7. Use paintable sealant for all interior joints at locations to be painted not subject to movement in excess of 5%.

8. Pouring sealants shall be poured over a bond breaker tape joint filler. The joint shall be masked off adequately to assure a clean, flush and finished installation.
 9. Sealants and caulks shall be a color selected to blend with adjacent material color.
- B. Installations shall be neatly executed, smooth and regular in appearance, no lumps or globs or smears onto adjacent surfaces. Tool when appropriate.

3.3. SEALANT COLOR SELECTION

- A. Sealant shall generally match surrounds for color.
1. Coordinate with Architect/Engineer regarding colors to insure approval.
 2. Once a Manufacturer's product has been established for a use, that same product shall be used throughout the project for the particular situation and background.

3.4. SEALANT APPLICATION

- A. For exterior/building envelope conditions: Select the proper sealant to provide resistance to air or water infiltration at all exterior envelope joints, connections of dissimilar materials:
1. Wall expansion joints
 2. Door & windows
 - a. Bed all thresholds in urethane sealant.
 3. Wall penetration
 4. Abutting dissimilar materials
 5. As needed to control infiltration
 - a. Water
 - b. Air
 - c. Vermin and insects
- B. Appearance conditions: Throughout the interior of the construction provide sealants as needed to visually finish all installations.
1. Wall expansion joints
 2. Construction joints
 3. Abutting dissimilar materials
 4. Wall, floor and ceiling penetrations
 5. Joints subject to water penetration
 6. Irregular joints
 7. Unintended gaps, cracks or openings such as at poorly executed electrical device cover plates

C. Kitchen, Restrooms, etc.

1. Use appropriate approved sealants as needed for compliance with regulations and good housekeeping practice.

END 07 9200

1. GENERAL

1.1. WORK INCLUDED

- A. The General Contractor shall provide hollow metal doors, frames, sidelights and vision panel frames as shown on the Drawings and specified herein.
 - 1. Contractor shall verify quantities.
 - 2. Contractor shall verify existing frame dimensions or existing masonry opening to install new material.
 - 3. Verify for square, clearances, 5/8" undercut.

1.2. RELATED WORK

- A. Specified elsewhere:
 - 1. DIVISION 00 - PROCUREMENT REQUIREMENTS
 - 2. DIVISION 01 - ADMINISTRATIVE REQUIREMENTS
- B. See Door Schedule shown on the Drawings.

1.3. SUBMITTALS

- A. Submit shop drawings in accord with 01 3300. Show type of door and frame for each opening, full scale sections of all typical members, dimensioned elevations, anchors, reinforcements, and other required components.

1.4. HANDLING AND STORAGE

- A. Handle and store doors and frames at the job site in such a manner as to prevent damage. Wrappings or coverings shall be removed upon arrival of doors at the job site.

2. PRODUCTS

2.1. MATERIALS

- A. Structural Steel Shapes: ASTM A36-70a.
- B. Sheet Steel: ASTM A 366-72, commercial quality, cold rolled, stretcher leveled.
- C. Galvanized Steel ASTM A 366-72 .5 oz/square foot per side.
- D. Primer: Phosphate treated, gray zinc chromate baked on inside and outside of all sections.

2.2. MANUFACTURERS

- A. Acceptable manufacturers of standard 16-gauge doors and frames:

1. Steelcraft - Cincinnati, Ohio
2. The Ceco Corporation - Chicago, Illinois
3. Mesker Door Co., Inc., Huntsville, AL
4. Fenestra Corporation - Erie, Pennsylvania
5. Curries Co., Mason City, IA
6. Amweld Building Products, Garrettsville, OH

2.3. FABRICATION

- A. Fabricate hollow metal doors and frames as shown on the Drawings and in accordance with best shop practices. Frames shall be welded rigid, neat in appearance, and free from defects. Field measurements shall be taken as required for coordination with adjoining work.
- B. Form exposed surfaces free from warp, wave and buckle, with all corners square, unless otherwise shown. Set each member in proper alignment and relationship to other members with all surfaces straight and in a true plane.
- C. Reinforce members and joints with steel plates, bars, rods or angles for rigidity and strength.
- D. Conceal all fastenings unless otherwise shown or specified.
- E. Provide combination type hollow metal door frames to be used as both door buck and trim, formed to profiles.
- F. Unless otherwise shown, fabricate all interior frames of 16 gauge steel primed steel. Exterior frames shall be 14 gauge galvanized and primed.
- G. All corners shall be welded and ground smooth exhibiting a neat smooth flush finish.
 1. Provide proper returns at all edges.
- H. Doors and frames shall be mortised and reinforced for hardware in accordance with the Hardware Manufacturer's instructions and templates. Reinforcing shall be drilled and tapped to receive hinges, locks, strikes, and closers. Cover boxes shall be provided for hardware cutouts. The hinge reinforcements shall be 7-gauge. Angle floor clips have two holes each for 3/8" anchor.
- I. Make provisions for installing rubber door mutes on interior door frames. Three (3) for single frames.
- J. Provide internal reinforcement for surface mounted hardware in frames to match locations shown or specified for doors.
- K. Furnish at least three (3) adjustable metal anchors in each jamb of shapes, sizes and spacing shown or required for anchorage into adjoining wall construction. Fabricate joint anchor of steel no lighter than gauge used for

the frame, unless otherwise shown.

- L. Floor anchor clips for each jamb shall be not less than 14-gauge steel with two anchor holes and welded to frame. Terminate bottom of frames at the indicated finished concrete floor level.
- M. Miter, fit, weld, and grind smooth corners of panel moldings for glass panels to form continuous frames around panels. Furnish removable moldings of minimum 18-gauge steel. Secure removable moldings with not less than No. 6 x 32 Phillips, oval-head countersunk machine screws at 12" o.c.
- N. Door shall be as follows:
 - 1. 1-3/4" thick.
 - 2. 16-gauge face sheets. **See door schedule for 14-gauge doors**
 - 3. 16-gauge edge channels.
 - 4. 1/8" beveled lock side.
 - 5. S.D.I. Type III extra heavy-duty seamless full flush.
 - 6. Foam filled core on exterior doors – honeycomb interior doors
 - 7. Cut out mortise and reinforce for hardware mounting.
 - 8. 7-gauge drilled and tapped hardware.
 - 9. 5/8" undercut all doors.
 - 10. Louvers to be heavy gauge sight tight style
- O. Frames shall be as follows: One (1) new metal frame.
 - 1. Standard 5 1/2" X 2" jambs, 2" or 4" head as appropriate.
 - 2. Stops 5/8" deep X 1-15/16"
 - 3. Loose stops for glazed frames shall be 1/2" thick X 1-1/4" wide - screw anchored to frames.
- P. Top and bottom edges all doors shall be closed with a continuous recessed channel not less than 16-gauge, extending full width of door and spot welded to both faces. Both vertical edges of doors shall be leveled 1/8" in 2".
- Q. Provide clearances for hollow metal doors of 3/32" at jambs and heads, 1/8" at meeting stiles for pairs of doors and 3/8" at bottom where no threshold is required. 3/8" to increase 1/4" where door swings over carpet. Where a threshold is shown, provide 1/8" in 2".
- R. In addition to other requirements for hollow metal doors and frames specified herein, comply with the label requirements of the National Fire Protection Association and applicable local codes. Fabricate doors and frames in accordance with the requirements of the NFPA Standard No. 30 and UL Standard for Safety No. 60 for the class of door opening shown or scheduled.
- S. Provide accessories for doors per the Drawings and per Section 08 7100.

2.4. SHOP PAINTING

- A. Thoroughly clean all metal surfaces of loose scale, shavings, filings, dirt and other deleterious materials by using wire brushes or other effective means. Remove grease and oil by solvent cleaning.
- B. Chemically treat all surfaces with phosphate compound to assure maximum paint adherence. Apply one coat of primer, baked on. Cover all surfaces without runs, smears or bare spots. THOROUGHLY PRIME JAMBS INSIDE AND OUTSIDE.
- C. Prime coat inside surfaces of frames.
- D. Prime coat inside surface of all removable stops, as well as the frame area covered by such stops.

3. EXECUTION

3.1. PREPARATION

- A. Examine job site conditions to receive the work. Installation shall confirm acceptance of job site conditions and preparation.
- B. Verify all dimensions of in place and subsequent construction.

3.2. INSTALLATION

- A. All items shall be set in their correct locations as shown on details and shall be level, square, plumb and at the proper elevations and in alignment with other work.
- B. All interior and exterior joints between glass, framing and mullion members shall be tightly sealed with elastomeric sealant in order to assure a vibration free and watertight installation.
- C. All materials shall be screwed in place using backing, masonry plugs or anchor straps as applicable.
- D. Where moldings are joined, they shall be accurately cut and fitted to result in a tightly closed joint.
- E. After erection, protect exposed portions of framing from damage by grinding and polishing machines, plaster, lime, acid, cement or other harmful compounds.
- F. All doors and frames to be primed and receive two (2) coats satin DTM latex paint. See Section 09 9000.

END 08 1113

DIVISION 8 – DOORS & WINDOWS

Section 08 1140 – Aluminum Doors & Storefront Framing

1. GENERAL

1.1. WORK INCLUDED

- A. General Contractor shall provide aluminum doors sidelights and framing systems as shown on the Drawings and specified herein.
- B. Base Bid:
 - 1. All hardware unless noted
 - 2. All sidelights, transoms, glazing and insulated panels as detailed
 - 3. All trim, filler and closure pieces to complete the work
 - 4. All weather-stripping, seals, thresholds and cushion felts
 - a. Completely weather tight installation, resistant to air infiltration and watertight where appropriate
 - 5. ADA Compliance
 - a. Hardware
 - b. Operational Features
 - 6. Demolition and disposal of existing as needed
 - 7. Clean up and prep of surrounds to properly receive new door and frame assembly.
 - a. Repair surrounds and touch up as needed following demolition work.
- C. All exterior assemblies to comply with Illinois/International energy code, IEC.
 - 1. Thermal break commercial assemblies as appropriate.
- D. Weather tight
 - 1. All framing and door systems are to be infiltration tight
 - a. No water penetration to the interior
 - b. No noticeable air penetration to the interior
 - c. Flash and weep to direct all moisture outside.
 - d. Provide all additional seals, door bottoms, drips and weather-strips needed to meet this requirement

1.2. RELATED WORK

- A. Specified elsewhere
 - 1. Division 0 and Division 1- Contract requirements
 - 2. Specification 08 7100 Hardware

1.3. QUALITY ASSURANCE. Glazing in aluminum doors and frames shall be performed under this section of the work. Door and frame schedule shown on the Drawings.

A. Comply with all laws, ordinances, rules, regulations and orders of Federal and State authorities having jurisdiction over this work.

1. IECC energy code

B. Reinforce the doors and frames to receive hardware components. In particular, reinforce the door and frame for closers and stops. Show reinforcing on the shop drawing per 01 3300 Submittal Procedures.

1.4. SUBMITTALS

A. Submit the following in accordance with Section 01 3300.

1. Manufacturer's Literature: Materials description and installation instructions for system used.

2. Shop Drawings: Complete layout of frame and door elevations, framing details, reinforcing peripheral conditions, and anchorage.

3. Complete description of hardware and parts list for future maintenance.

4. Samples: Pieces of metal with finish specified.

1.5. WARRANTY

A. Doors and framing – one (1) year labor and material

B. Insulated glazing – ten (10) year replacement for loss of seal, materials delivered to site.

C. Hardware

1. One (1) year installation

2. Five (5) years parts or manufacturing, or manufacturer's advertised extended warranty.

3. Closers, five (5) year minimum or advertised warranty if longer.

2. PRODUCTS

2.1. MANUFACTURERS. Use all one Manufacturer for the project, minimum primary wall thickness framing and door stiles and rails must be 0.125". Glazing beads not less than 0.055".

Listing here does NOT supersede this requirement.

A. Kawneer, PO Box 609, 751 International Dr., Franklin, Indiana 46131, phone 317/738-2600.

B. Special-Lite Inc., Decatur, Michigan 49045, phone 800/821-6531.

- C. Manko window Systems, Incorporated, Manhattan KS 66502, phone 800/642-1488, fax 800/576-2656
- D. Or approved equal submitted not less than 7 days prior to bidding.

2.2. FINISH

- A. Doors and frames – Dark Bronze anodized.
- B. FRP –
 - 1. Not less than 0.125" thick
 - 2. Fade resistant, color to be selected.
 - 3. Impact 20 ft-lb/inch ASTM D256
 - 4. Abrasion 0.03% ASTM D1242
 - 5. Hardness 54 ASTM D2583, Barcol Meter
 - 6. Flexural 25,000 psi ASTM D790
 - 7. Weather ability 0.2% ASTM D570
 - 8. Flame spread, exterior facer ≤ 200 , interior facer ≤ 25 , smoke developed ≤ 450 , ASTM E84-79a
 - 9. Chemical resistant to normal cleaning agents such as chlorine, sodium hypochlorite, acetic acid, hydrochloric acid in safe concentrations for cleaning.
 - 10. Dark Bronze to match aluminum
- C. Hardware to match door finish:
 - 1. Closers, dark bronze painted or cover
 - 2. Wall bumpers miscellaneous hardware
 - 3. Continuous hinge dark bronze

2.3. APPLICABLE DOOR TYPES

- A. See Schedule and Drawings for door types, glazing, FRP, size, vision lights, and specific information, etc.
 - 1. Coordinate door, stile, framing and reinforcement with selected hardware.
 - 2. Fully weather-stripped.
 - 3. Insulated panels, 1", 1/8" FRP both sides, color to be selected.
 - 4. Sidelights and/or transoms, insulated glazing or insulated FRP panels as noted.
 - 5. IECC compliant (Energy Code)
- B. Glazed doors
 - 1. 5" minimum styles and head rails
 - 2. 6½" minimum mid-rail
 - 3. 10" minimum bottom rail (ADA compliant)
 - 4. Minimum extrusion primary wall thickness 1/8", secondary, non-structural cross connectors or receivers 1/10" minimum

- C. Insulated panels for glazed style doors or frames.
 - 1. 1" total thickness, 1/8" FRP both sides, foam infill
 - 2. FRP color to match the framing system
- D. Flush face FRP doors
 - 1. 0.125" minimum FRP; flush face both sides, insulated core.
 - 2. Kawneer Flush Line
 - 3. Special-Lite SL-17
 - 4. Manko
 - 5. Or equal – subject to pre-bid approval.

2.4. FRAMING SYSTEMS

- A. Accessory trim pieces: Provide necessary closure pieces on extruded aluminum to properly finish jambs and head.
- B. Basic Framing Systems – nominal 6" X 2" X 1/8" primary wall thickness, thermal framing storefront system.
 - 1. Always inspect installation conditions. May request different profile if necessary to fit.
 - 2. Closure and trim pieces to finish installation. Necessary clips, stops and framing components to complete the framing system.
 - 3. Sealants and closure pieces.
 - 4. At existing installations typically provide 1" X 1" X 1/8" extruded anodized aluminum trim angles and other 1/8" shapes as needed to finish installation.
 - 5. Finish: Dark bronze anodized aluminum
- C. Exterior assemblies shall be IECC compliant, thermal break systems, heavy commercial type.

2.5. SEALANT

- A. Use long life rubberized sealant appropriate to surrounds:
 - 1. Urethane types such as Sonnoborn NP-1
 - 2. Silicone Types such as Dow 795, but select proper product for the specific condition encountered.

2.6. GLAZING

- A. All glazing to comply with Safety Glazing requirements, Federal and State.
- B. Exterior doors, laminated/tempered, float or plate glass.
 - 1. Nominal one inch (1") insulated glazing, or manufacturer standard
 - 2. Glazing to conform to IECC 2015.
 - 3. Outer layer 1/4" minimum dark gray, low 'E' inside surface, tempered.
 - 4. Space argon filled

5. Inner glass layer clear ¼" minimum laminated .060 interlayer.
6. 10 warranty against failure of the seal allowing clouding or moisture in the air space.

2.7. FRP (Fiber reinforced panels)

- A. FRP doors and insulated panels shall match color and texture.
 1. Face sheet to be 1/8" nominal or heavier, resistant to fade and dulling.
 2. Insulation to be approximately:
 - a. Panels ¾" minimum insulation (1" minimum overall panel) urethane foam, R-5/inch rating
 - b. Doors 1 ½" minimum insulation (1 ¾" over all door) less insulation in structural framing areas.
 3. Color to be selected, fade resistant.

2.8. HARDWARE

- A. ADA compliant hardware is intended.
- B. Exit Devices rim lock at single doors or pairs with mullions, vertical rod bolts at pairs without removable mullion, rated at labeled doors, extra heavy duty, removable core or core cylinder to match keying system used by Owner, may reverse existing cores or replace matching keying.
 1. Rim type exterior doors - surface with removable or fixed mullion.
 - a. See Schedule for selections.
 - b. Precision Apex 2300 wide style Series (district standard)
 - 1) Stainless steel trim
 - 2) Exterior sets, using Precision as the spec basis.
 - a) Trim No. 2000C - core, match building keying as directed
 - b) Blank, see drawings for blank exterior trim.
 - c) key dogging on all sets.
 - c. Strike, most appropriate heavy duty for application condition encountered.
 - d. Removable or fixed mullions, see drawings for fixed locations.
 - 1) Precision, match to hardware, heavy-duty steel.
 - 2) Key removal kit
 - e. Key operated dogging on interior side all push bars.

- f. Provide storm rated 3 point latching at doors as noted in schedule below, with hex key dogging.

C. Keying

1. Verify existing cores and keyway, may reuse or supply new, match building keying, master key or sub master.
 - a. All exterior doors are Corbin/Russwin keyway 77 (6) pin
 - b. Interior cores are Yale YF (6) pin
 - c. Always verify local conditions
 - d. Return old cores, locksets and exit devices to Owner unless directed otherwise.

D. Pulls

1. Manufacturers Standard ADA compliant
2. Match throughout work with pulls provided with exit devices

E. Flush bolts: Manufacturer's standard heavy-duty commercial.

A. Continuous geared hinges

1. Heavy duty, full mortise at new locations
 - 1) Roton
 - 2) Precision
 - 3) Hagar
 - 4) Pemko
 - 5) Select
 - 6) McKinney

F. Threshold - manufacturer recommended for application, ADA compliant, resistant to blowing rain.

G. Closer

1. Norton Unitrol Series 7700, LCN or Dorma equivalent.
2. Equivalent LCN, Dorma or Corbin/Russwin may be employed.
3. Thumb-turn selected hold-open where hold-open is specified
4. Cushion-stop holder bracket.

H. Sill drip/sweep exterior openings only

1. National Guard Products 101V
2. Pemko 3452
3. Reece 353
4. Or equal.
5. Note, verify installation conditions and revise selection of a threshold for water control and ADA compliance

- I. Doorstop wall, concealed fastener, dark bronze, select for anchorage condition.
 1. Hiawatha: R1326 ½ BL
 2. Ives: #401
 3. Glynn Johnson #WB50
 4. Rockwood 400/403

3. EXECUTION

3.1. INSTALLATION

- A. Examine all surfaces to receive parts of the work specified herein. Verify all dimensions of in-place and subsequent construction. Installation of frames constitutes acceptance of the existing conditions. Prime coat and enamel all exterior steel lintels prior to aluminum frame installations.
- B. All items shall be set as shown and shall be level, square, plumb, at proper elevations, and in alignment with other work.
- C. All joints between glass framing and mullion members shall be tightly sealed with elastomeric sealant in order to secure a watertight job. All materials shall be screwed in place using backing, masonry plugs or anchor straps as required.
 1. Plastic anchors or drive pins in masonry shall not be used, use tapcons, or expansion type metallic base anchors.
 2. Jamb and heads (for glazing frames or door frames) shall be anchored as follows:
 - a. 1/4" diameter cap screws at maximum 1'-4" o.c.
 - b. 5/16" diameter cap screws at maximum 2'-0" o.c.
 - c. 3/8" diameter cap screws at maximum 2'-0" o.c.
 - d. Minimum three (3) anchors per jamb segment.
 - e. First and last segment anchors shall not exceed 8" spacing from the end.
 - f. Anchor for 25 psf wind load, leeward/windward.
- D. Where moldings are joined, they shall be accurately cut and fitted to result in a tightly closed watertight joint.
- E. Doorsills and thresholds shall be set in a bed of exterior grade sealant, full length and full width, watertight. See 07 9200, sealants.
- F. Frames anchored to masonry shall be spaced shimmed, anchored and finished.
 1. Provide continuous Styrofoam rope backer. After backer insertion, depth of recess shall be equal to joint width.
 2. Provide exterior silicone or urethane sealant in color to match frame materials. Strike sealant to a smooth uniform fillet.

- a. Straight neat cut to surrounds
- G. Thresholds shall be anchored with stainless steel flat head threaded cap screws into metal expansion anchors, set into full bed of silicone or urethane sealant.
- H. Finished installation to be weather/watertight and not allow penetration of water unto floors or through seals to the interior.

SCHEDULE OF OPENINGS –

A-1 Cafeteria to Exterior, single, outswing, door 3'-0" x 7'-2" glazed door with dead lock and push pull, not an exit.

1. Dead lock, key both sides, commercial heavy duty, Corbin or Mark, Corbin Russwin interior keyway this door.
2. Provide pull to match the pull on the adjacent door with precision hardware.
3. Geared hinges
4. Threshold, ADA, set in sealant.
5. Closer, thumb turn or hex key adjustable hold open, approximately 135 degree mount on interior side of door on in swing doors.
6. Door sweep inside and rain drip exterior such as NGP 17DKB
7. Fully weather-strip perimeter and meeting stiles
8. Sidelights as detailed

A-2 Exterior to Cafeteria, single, inswing, door 3'-0" x 7'-2" glazed door with exit device, not an exit for cafeteria, is an exit for courtyard.

1. Rim type exit devices (panic) Precision Apex series
 - a. Hex wrench, manual key dogging, interior pull
 - b. LHR hand door style 2000C
2. Geared hinges
3. ADA Threshold
4. Door sweep inside and rain drip exterior such as NGP 17DKB
5. Closers, thumb turn or hex key adjustable hold open, approximately 85 Degree.
6. Fully weather-strip perimeter and meeting stiles.
7. Sidelights as detailed

A-3 Classroom wing Exit, pair 3'-0" x 7'-2" Flush FRP with 4 x 24" insulated glass lights, **STORM RATED** assembly (FEMA).

1. Rim type 3 point latching exit devices (panic) Precision Apex series
 - a. Manual key dogging, 2000C exterior trim on RHR door, LHR door flush no pull.
2. Geared hinges
3. Removable center mullion.
4. Threshold, ADA

5. Closers, thumb turn or hex key adjustable hold open, approximately 105 Degree.
6. Door sweeps
7. Head rain drips
8. Fully weather-strip perimeter and meeting stiles

A-4 Roof level, classroom wing second floor, 3'-0" x 5'-2" leaf, FRP. **STORM RATED**, FEMA, two point jamb latch see detail.

1. Dead Lock key both sides, exterior keying system.
2. Passage lockset, coordinated with building hardware for brand and style, or have supplied by hardware supplier.
3. Geared hinges
4. Fully weather strip
5. Overhead holder such as Glynn Johnson 70/79 series.
6. Threshold set in sealant on thru flashing cap on wall.
7. Full wall cap piece with hemmed edges under threshold set in sealant, make with space on exterior side to allow for future reroof and sealant, not a tight fit.
8. Door sweep
9. Rain drip at head, such as NGP 16 DKB

END 08 1140

1. GENERAL

1.1. WORK INCLUDED

- A. The General Contractor shall provide and install flush wood doors designated on the Drawings.
 - 1. Where existing hollow metal frames of doors may be reset, the same shall be adapted to accept the new hardware comparable to the stability and concealment level of a new frame installation.
 - a. Reset doors and jambs shall be subject to on site approval of the Architect prior to reinstallation.
 - b. Doors to be pre finished.
 - 2. Single source sub supplier for doors, frames and hardware.

1.2. RELATED WORK

- A. Specified elsewhere
 - 1. 06 2000 - Finish Carpentry
 - 2. 08 1113 - Hollow Metal Work
 - 3. 08 7100 - Door Hardware
 - 4. 09 9000 - Painting

- 1.3. QUALITY CONTROL: Except as otherwise specified herein, wood doors shall conform with publications Architectural Woodwork Institute (AWI) current standard and Window and Door Manufacturer's Association (WDMA) I.S 1A.

1.4. SUBMITTALS

- A. Submit the following in accordance with 01 3300.
 - 1. Manufacturer's Literature: Materials description and installation instructions for products and Certificate of Compliance with WDMA 1A.
 - 2. Shop Drawings: Show elevations, dimensions and construction details. Shop drawing shall be limited to door panel sizes determined on the site and verified by the Contractor prior to submittal of shop drawings.

1.5. PRODUCT DELIVERY, STORAGE AND HANDLING

- A. Door panels shall be individually packaged in a manner to provide end protection by the Door Manufacturer and shall not be delivered to the site until the building is readied and thoroughly dry.
 - 1. Building is enclosed.

- a. Final envelope "R" values have been achieved temporarily or permanently.
- 2. Building is environmentally controlled for seasonal weather which will not result in high humidity exposure.
- B. Doors shall be stored flat and spaced off floor and be properly supported.
- C. Doors shall not be removed from cartons until all building finish coatings and other interior finishing work has been completed.
- D. Damaged or otherwise unsuitable doors, when so ascertained, shall be promptly replaced.
- E. Door dimensions shall be determined from on site dimensions where existing frames exist or are reused. Where new jambs are to be installed the listed door size shall prevail.

1.6. SPECIAL WARRANTY

- A. The Contractor and Manufacturer shall warrant the wood doors to be free of faults and defects in accordance with the General Conditions, except that the warranty shall be for five (5) years.
- B. Warp in excess of that permitted by NWMA Industry Standard, or any defect which shall affect the operation of the door, shall be considered a defect under the provisions of the warranty. Door Manufacturer shall be responsible for door installation inspection and shall notify the A/E and Contractor that doors have been hung in accordance with Manufacturer recommendations.
- C. Warranty shall include finishing and hanging.

2. PRODUCTS

2.1. FABRICATIONS

- A. Door Type: Flush, hardwood veneered Premium Grade, AWI Quality Standards.
 - 1. Manufacturers:
 - a. Allegion Wood doors
 - b. VT Industries, Holstein IA
 - c. Algoma Hardwood, Inc, Algoma WI
 - d. Graham Wood door / Assa-Abloy
 - e. Approved equals and meeting WDMA standards for commercial wood doors.
 - 2. Minimum finished door thickness 1-3/4".

3. Cores:
 - a. Fire rated Georgia Pacific, or equal, homogeneous gypsum type mineral board with minimum density of 26 lbs. per cubic foot containing no asbestos.
 - b. All other locations, particle board core or equivalent.
4. Vertical edge stiles shall be minimum 1-3/8" deep of solid wood and adhere to door core.
5. Top and bottom rails shall be minimum 1-3/8", thick cut between stiles, same materials as stiles and adhered to the door core.
6. Construction shall provide 5 ply hot press waterproof glue assembly
 - a. Premium oak veneer, plain slice, book match, applied to HDF crossband
 - b. Type 1 water proof glue
 - c. Matching hardwood style edges
 - d. Bevel edges
 - a. 3/4" under cut unless otherwise specified
 - b. Laminated to the core and securely adhered thereto without deformation or unbounded areas.
2. Fire Ratings
 - a. See door schedule for 1 hour or 1-1/2 hour rated doors. "B" rated door shall bear a 1-1/2 hour rating.
 - b. Rated doors shall be provided with hardware blocking.
3. Adhesives shall be fungus and moisture resistant.
4. Face veneer grain shall run vertical and minimum finished thickness (after factory sanding) of 1/50" with matching grain on each leaf face.
5. Stops to be accurately fit to door and glass thickness, coordinate, no rough sharp or splinter edges.

2. EXECUTION

2.1. INSTALLATION

- A. Drawing Plan Sheets and door schedule sheet shall determine door and frame locations and hardware sets. See Section 08700 Hardware.
- B. Coordinate door design style, type, location, frames and hardware.

END 08 1400

1. GENERAL

1.1. WORK INCLUDES

A. Provide Access doors as noted on drawings

1. Serving the following rooms:

a. Boys restroom #8

- 1) two (2) 20" wide x 16" high
- 2) In ADA stall to right of toilet

a) Sill at 56" AFF3

- 3) above to right of urinal

a) sill at 72" AFF

b. Boys Restroom #13

- 1) One (1)20" wide x 16" high
- 2) In ADA stall to right of toilet
- 3) Sill at 56" AFF

c. Boys Restroom #11

- 1) two (2) 20" wide x 16" high
- 2) In ADA stall to right of toilet

a) Sill at 56" AFF3

- 3) above to right of urinal

b) Sill at 72" AFF

1.2. RELATED WORK

A. Specified elsewhere:

1. 04 2000 - Unit Masonry

B. Coordinate masonry opening provided by other trades.

C. Field coordinate counter to opening provided.

1.3. QUALITY ASSURANCE

A. Materials shall be installed by persons experienced in installation of this

type material.

1. Installation shall comply with manufacturer's recommendations, binding, warped, crooked or oil canning not acceptable.

1.4. SUBMITTALS

A. Submit the following:

1. Shop Drawings or Manufacturer's Literature to fully describe installation, details, assembly.
2. Operation and Maintenance materials.

2. PRODUCTS

2.1. MATERIALS

- A. 16 gauge stainless steel doors and frame
- B. Wall mount to CMU - concealed.
- C. Screw driver locking mechanism.

2.1. MANUFACTURERS

- A. Nystrom, 9300 73rd Avenue North, Minneapolis, MN 55428
PH. 1.800.547.2635
- B. Babcock Davis 9300 73rd Avenue North Brooklyn Park MN 55428, Phone
888 412 3726
- C. Acudor, info@acudor.com, 973 575 5120 or 800 722 0501
- D. Best Access doors available on line
- E. Or equal, Bilco, Durared

3. EXECUTION

3.1. INSTALLATION

- A. Installation shall follow instruction of manufacturer.

3.1. CLEANING

- A. All material to be left in clean condition. smooth operating, adjusted counterbalance for easy operation.

END 08 3313

DIVISION 8 – DOORS & WINDOWS
Section 08 3313 – Coiling Doors

1. GENERAL

1.1. WORK INCLUDES

A. Provide coiling door.

1. Opening C-1 - Kitchen to serving area 4'-8" wide x 8'-8" high clear masonry opening, one hour fire rated label:
 - a. B label
 - b. Sill at floor
 - c. Head opening at 8'-8"
 - d. Jamb mount with hood inside the opening.
 - e. Counter balance manual operation
 - f. Stainless steel rectangular hood and stainless steel guides
 - g. Locking bar on kitchen side

2. Opening C-2 - Dish Room to Cafeteria nominal
 - a. B Label
 - b. Sill at nominal 2'-10 ½"
 - c. Head at nominal 8'-0"
 - d. Provide stainless steel wrapped jambs, approximately 13" walls and fully wrapped stainless steel sill.
 - e. Coordinate jambs with item 5 kitchen equipment serving counter
 - f. Jamb mount with hood inside the opening.
 - g. Rectangular hood
 - h. Stainless steel hood and guides

3. Opening C-3 - Cafeteria to heat pump closet
 - a. No label required
 - b. Sill at floor
 - c. 12' wide x head opening at 11'-4"
 - d. Jamb mount condition, see also detail 6/sheet S-1.2.
 - e. Counter balance manual operation
 - f. Stainless steel rectangular hood and stainless steel guides
 - g. Provide cylinder locking with dead bolt, coordinate keying with hardware.

1.2. RELATED WORK

A. Specified elsewhere:

1. 04 2000 - Unit Masonry
2. 05 5500 - Metal Fabrication
3. 11 4000 - Food Service Equipment

B. Coordinate masonry opening provided by other trades.

C. Field coordinate counter to opening provided.

1.3. QUALITY ASSURANCE

A. Materials shall be installed by persons experienced in installation of this type material.

1. Installation shall comply with manufacturer's recommendations, binding, warped, crooked or oil canning not acceptable.

1.4. SUBMITTALS

A. Submit the following:

1. Shop Drawings or Manufacturer's Literature to fully describe installation, details, assembly.

2. Operation and Maintenance materials.

2. PRODUCTS

2.1. MATERIALS

A. All exposed finish materials are to be stainless steel.

1. Slats shall be interlock and lateral movement shall be prevented by end locks at jamb edge. Slats shall be flat style - 16 gauge stainless steel or as appropriate to fire rating.

2. Hood guides and sill shall be stainless steel.

3. Operation shall be by counterbalanced torsion spring. Slide Locks shall be provided for both jambs and shall be operable from serving side only. Provide pad lock holes

4. Welded construction on frame.

B. Hidden structural members may be galvanized steel.

C. Product shall be surface jamb mounted.

D. Fusible link/60 minute rated.

2.2. MANUFACTURERS

A. Raynor Doors, Dixon, IL (800) 472-9667/Series CSS.

B. Trac-Rite Door, Sun Prairie, WI (800) 448-8979/Counter Shutters.

C. Overhead Door, Dallas, TX (972) 233-6611.

D. Cornell Iron Works, Mountain Top, PA (800) 233-8366/300 Series.

E. Cookson Co., Phoenix, AZ (602) 272-4244/Counter Door

3. EXECUTION

3.1. INSTALLATION

- A. Installation shall follow instruction of manufacturer.
 - 1. Joints between stainless and stainless or stainless and other surfaces shall receive FDA approved silicone rubber sealants.
 - 2. Installed material to operate in smooth manner with locks, torsion springs, etc. properly adjusted.
 - 3. All joints to dissimilar material to be silicone sealant.

3.2. CLEANING

- A. All material to be left in clean condition. smooth operating, adjusted counterbalance for easy operation.

END 08 3313

DIVISION 8 – DOORS & WINDOWS
Section 08 3346 – Coiling Storm Shutter

1. GENERAL

1.1. WORK INCLUDES

- A. Provide coiling storm rated door.
 - 1. Two Story classroom wing all windows
 - a. Classrooms – six required
 - b. Corridors – two required
 - c. Stair tower - one required.
 - d. Verify on plans
 - 2. Rectangular style enclosure hood.
 - 3. Power operated with manual override.

1.2. RELATED WORK

- A. Specified elsewhere:
 - 1. 04 2000 - Unit Masonry
 - 2. 08 5113– Aluminum windows
 - 3. See also Schedule on drawings
- B. Coordinate masonry opening provided by other trades.
- C. Field coordinate to opening provided.

1.3. QUALITY ASSURANCE

- A. Materials shall be installed by persons experienced in installation of this type material.
 - 1. Installation shall comply with manufacturer's recommendations, binding, warped, crooked or oil canning not acceptable.

1.4. SUBMITTALS

- A. Submit the following:
 - 1. Shop Drawings or Manufacturer's Literature to fully describe installation, details, assembly.
 - 2. Operation and Maintenance materials.
 - 3. Certification of storm rated construction.

2. PRODUCTS

2.1. MATERIALS

- A. All exposed finish materials are to be stainless steel or powder coat to

selected color.

1. Slats shall be interlock and lateral movement shall be prevented by end locks at jamb edge.
2. Hood guides and sill to match.
3. Welded construction on frame.
4. Storm Rated
 - a. Wind pressure sustained 240 psf
 - b. Large missile impact ASTM E1886 for FEMA 361
 - c. Fire rating not required
 - d. Insulated not required
 - e. ICC 500 (2014) ICC 500/NSSA Standard for the construction of storm shelters
 - f. CCRR-1086 applicable to SafeSpace 500F & 500F-IS
5. Power operation, low voltage control.
6. Typical opening size is 8' wide plus jambs x 4' 8" plus 8" vertical
7. Reinforced masonry wall anchorage condition.

B. concealed structural members may be galvanized steel or powder coat.

C. Product shall be surface jamb mounted.

1. See sections on drawings for coil mount and power operator above ceiling or in soffit

2.2. MANUFACTURERS

A. McKeon SafeSpace 500 is design basis

1. info@mckeondoors.com
2. 800 266 9392 / 631 803 3000
3. Fax 631 803 3030
4. 44 Sawgrass Drive
5. Bellport, New York 11713

B. Or equal if they manufacture storm rated assemblies:

- C. Raynor Doors, Dixon, IL (800) 472-9667
- D. Trac-Rite Door, Sun Prairie, WI (800) 448-8979
- E. Overhead Door, Dallas, TX (972) 233-6611.
- F. Cornell Iron Works, Mountain Top, PA (800) 233-8366/300 Series.
- G. Cookson Co., Phoenix, AZ (602) 272-4244/Counter Door

3. EXECUTION

3.1. INSTALLATION

A. Installation shall follow instruction of manufacturer.

1. Installed material to operate in smooth manner with locks, torsion springs, etc. properly adjusted.
2. Power operation to be interlocked and tested for operation

3. All joints to dissimilar material to be caulked

3.2. CLEANING

A. All material to be left in clean condition. smooth operating, adjusted counterbalance for proper operation, gravity close with loss of power.

END 08 3346

1. GENERAL

1.1. WORK INCLUDED

- A. Furnish and install aluminum architectural thermal break windows complete with hardware and related components as shown on the drawings and specified in this section.
 - 1. Type: Fixed and project-out vents, with screens, heavy commercial (HC) aluminum.
 - 2. Comply with 2012 IEC / Climate Zone 5.

1.2. RELATED WORK

- A. Specified elsewhere:
 - 1. Division 1 – Administrative Requirements
 - 2. 12 2400 window shades

1.3. TESTING

- A. Test Units
 - 1. Air, water and structural test unit sizes and configuration shall conform to AAMA / WDMA / CSA 101 / I.S. 2 / A449 AW Performance grade AW 70.
 - 2. Thermal and infiltration test unit sizes shall be 4'-0" X 6'-0". Test unit shall consist of a single typical vent.
- B. Test Procedures and Performance
 - 1. Air Infiltration Test
 - a. With window sash and ventilators closed and locked, test unit in accord with ASTM E 283 at static air pressure difference of 6.24 psf.
 - b. Air infiltration shall not exceed .10 cfm per foot of perimeter crack length.
 - c. Comply also with 2012 IEC.
 - 2. Water Resistance Test
 - a. With window sash and ventilators closed and locked, test unit in accord with ASTM E331 at static air pressure difference of 12 psf.
 - b. There shall be no uncontrolled or accumulated water leakage to the interior.

3. Uniform Load Structural Test
 - a. With window sash and ventilators closed and locked, test unit in accord with ASTM E330 at a static air pressure difference of 70 psf positive pressure and 70 psf negative pressure.
 - b. At conclusion of test there shall be no glass breakage, permanent damage to fasteners, hardware parts, support arms or actuating mechanism, not any other damage which would cause the window to be inoperable.
4. Condensation Resistance Test (CRF)
 - a. With window sash and ventilators closed and locked, test unit in accord; with AAMA 1502.7.
 - b. Condensation Resistance Factor (CRF) shall be not less than 48 Frame / 76 Glass.
5. Thermal Transmittance Test (Conductive U-value)
 - a. With window sash and ventilators closed and locked, test unit in accord with AAMA 1503.1.
 - b. Conductive thermal transmittance (U-value) shall be not more than .38 BTU/hrs/sf/degrees F. fixed; 0.45 operable.

1.4. QUALITY ASSURANCE

- A. Provide test reports from AAMA accredited laboratories certifying the performance as specified in 1.3.
- B. Test reports shall be accompanied by the window manufacturer's letter of certification stating that the tested window meets or exceeds the referenced criteria for an appropriate ANSI/AAMA 101-88 window type.

1.5. SUBMITTALS

- A. Contractor shall submit Shop Drawings, finish samples, assembly samples, test reports and warranties.
 1. A small sample window assembly showing hardware and basic construction.
 2. Test reports documenting compliance with performance requirements.

1.6. DELIVERY, STORAGE AND HANDLING

- A. All materials shall be carefully handled upon receipt at the project site. Do not stack directly on floor, provide wood or cardboard shims, stack or store in a manner to avoid abrasion, warping or winding of the assembly. Keep covered.

- B. Replace materials damaged in storage or shipment with new materials.

1.7. WARRANTIES

- A. The responsible Contractor shall assume full responsibility and warrant for one (1) year after Substantial Completion, the satisfactory performance of the total window installation which includes that of the windows, hardware, glass (including insulated units), glazing, anchorage and setting system, sealing, flashing, etc. as it relates to air, water and structural adequacy as called for in the Specifications and approved Shop Drawings.
- B. Insulating glass units shall be guaranteed for ten (10) years minimum against failure of seal or clouding.
 - 1. Verify glazing condition and supply safety glass, heat strengthened glass, or tempered glass where needed for safety glazing cut and to comply with glass manufacturer's recommendations for stress, wind and solar/shade exposure.
- C. Any deficiencies due to such elements not meeting the specifications shall be corrected by the responsible contractor at his expense during the warranty period.

2. PRODUCTS

2.1. MATERIALS

- A. The intent is to match the profile of existing window systems on the north classroom wing of the building
- B. Aluminum window systems shall be a minimum 3" deep, by approximately 1½" face width system. Nominal 0.1" primary wall thickness thermal break window system for 1" glazing, weep to exterior, 6063-T5 alloy and temper, AAMA Performance Class: P-AW, Performance Grade: 70. All windows to be equipped with operable awning or hopper sash. All operable windows to be equipped with screens. Listing in this schedule does not supersede noted requirements or Performance ratings, jamb depth requirements or IEC compliance. Verify for each and adjust model selection if necessary.
 - 1. EFCO 325 Series
 - 2. Wausau 3250 T, Wausau Metals Corp., 1415 West St., PO Box 1746, Wausau, WI 54401, (715) 845-2161.
 - 3. Manko 3527 Series
 - 4. Kawneer 5500 Isoweb
 - 5. Winco 3350 Series
 - 6. Graham 6800/6800S
 - 7. Quaker E600
 - 8. Approved equal submitted prior to bidding for Architect review.
- C. Finish
 - 1. Dark Bronze anodized

D. Sill Starter

1. Wide style to allow window set back approximately 3" from face
2. Thermally broken

E. Hardware

1. Locking handles shall be cam type and manufactured from a white bronze alloy with a US25D brushed finish.
2. Operating Arms
 - a. Projected Vents: Anderberg Series 301 4-bar stainless steel arms or equal.
 - b. Pivots: Pivot mechanism shall be extruded aluminum housing with a stainless steel pin.

F. Weather-stripping shall be Schlegel Q-Lon or equal silicone non-hardening type.

G. Glass and glazing

1. Nominal one inch (1") insulated glazing
2. Glazing to conform to IEC 2012.
3. Outer layer ¼" minimum dark gray, low 'E' inside surface, tempered.
4. Space argon filled
5. Inner glass layer clear ¼" minimum laminated .060 interlayer.
6. 10 warranty against failure of the seal allowing clouding or moisture in the air space.

H. Insulating panels

1. Insulating panels shall be a one-inch (1") total thickness
2. Porcelain enamel, or Kynar 500 finish on 24 gauge galvanized steel on 1/8" hardboard backing
3. Poly isocyanurate urethane foam core or similar approved material
4. 20 year warranty fade and rust through.

I. Thermal Barrier

1. Barrier material shall be poured-in place two (2) part structural polyurethane. A non-structural thermal barrier is unacceptable.

J. Sealants, interior and exterior, shall be a one-part polyurethane color to be selected. Use rope where appropriate to conditions.

2.2. FABRICATION

A. General

1. Mechanical fasteners, welded components and hardware items shall not bridge thermal barriers. Thermal barriers shall align at all frame and sash corners.

2. Depth of frame and sash shall be less than three and one-quarter inches (3 $\frac{1}{4}$ ") actual.

B. Frame

1. Frame components shall be mortised and tendoned. Other means of mechanical fastening, i.e., screws shall not be permitted.
2. Frame/sash design shall include integral drip, self-flashing operation, or surface applied extruded rain drip over each operable sash section.
3. At each location, provide an extruded sill flashing full frame depth with turn up plus drip out over brick.

C. Sash

1. All sash extrusions shall be tubular.
2. Each corner shall be mitered, reinforced with an extruded aluminum corner key, hydraulically crimped, and "cold welded" with epoxy adhesive.
3. Each sash shall have two (2) rows of weather-stripping installed in dovetail grooves in the sash extrusion.

D. Screens

1. Screen frames shall be extruded aluminum – dark bronze finish.
2. Screen mounting holes in the window frame shall be factory drilled.
3. Screen mesh shall be stainless steel 18 X 14 mesh .011 wire diameter; available from McNichols Co., 1-800-237-3820 or equal.

E. Glazing

1. All shop glazed units shall be wet glazed with a silicone backbed compound (to be BE SCS-2511 or equal) and an extruded aluminum glazing bead with vinyl gasket.
2. All field glazed units shall be glazed with butyl tape, silicone cap seal (DC 795 or equal), extruded aluminum glazing bead, and a dense neoprene drive-in wedge.

- F. Sealants: One (1) part urethane or silicone appropriate for metal to masonry application.

1. Prime as recommended.
2. Joint shape and backer bars as recommended by sealant manufacturer.

3. EXECUTION

3.1. INSPECTION

A. Job Conditions

1. Verify dimensions clean tolerances, plumb and level. Provide a

solid anchoring surface in accord with Manufacturer's recommendation.

- B. Plumb and align window faces in a single plane for each wall plane and erect windows and materials square and true adequately anchored to maintain position permanently when subjected to normal thermal and building movement and specified window loads.
- C. Adjust windows for proper operation after installation.
 - 1. Check for open adequate weeps.
 - 2. Check for points that might allow water into framing or wall below window.
- D. Furnish and apply sealants with backer rope to provide a weathertight installation at all joints and intersections and at opening perimeters. Carefully follow sealant manufacturer's requirements and recommendations. Wipe off excess material and leave all exposed surfaces and joints clean and smooth.
 - 1. Use exterior grade, for inside and outside joints, color to match window system.
 - 2. Properly seal at sill and sill ends.
 - 3. Installation and window assembly to be infiltration tight.

3.2. ADJUSTING AND CLEANING

- A. After completion of window installation, windows shall be inspected, adjusted, put into working order and left clean, free of labels, dirt, etc. Protection from this point shall be responsibility of General Contractor.

3.3. WINDOW SCHEDULE

- A. Configuration, see window types on the Drawings, A6.0.
- B. Bid Package: This schedule shows the Bid Package application for various windows.
- C. Window Shades: This schedule shows applicable shade locations. Shades follow the same alternate pattern as window replacements.

END 08 5113

1. GENERAL

1.1. WORK INCLUDED

- A. General Contractor shall provide adequate and suitable hardware and accessories.
 - 1. At all existing doors as noted on the Drawings.
 - 2. At all new doors without exception.

1.2. RELATED WORK

- A. Specified in other Sections:
 - 1. DIVISION 01 – ADMINISTRATIVE REQUIREMENTS
 - 2. 08 1113 - Hollow Metal Work
 - 3. 08 1140 - Aluminum Doors & Frames

1.3. REFERENCES

- A. Codes
 - 1. ANSI A117.1 - Specifications for Making Buildings and Facilities Accessible to and Usable by Physically Handicapped People
 - 2. NFPA 80 - Fire Doors and Windows
 - 3. AWI - Architectural Woodwork Institute - Quality Standards
 - 4. NFPA 101 - Code for Safety to Life from Fire in Buildings and Structures
 - 5. NFPA 252 - Fire Tests of Door Assemblies.
 - 6. UL 10B - Fire Tests of Door Assemblies
 - 7. UL 305 - Panic exit hardware
 - 8. Illinois School Code 175/185/180
 - 9. IBC 2015 or current.

1.4. WARRANTY

- A. 100% Labor and Materials - one (1) year warranty to Owner under provisions of 01740. Warranty shall cover latch sets and door closures.
- B. Extended Warranty: Parts, replacement, rebuilding, shop labor - excludes field labor to install.
 - 1. Latch/locksets - five (5) years
 - 2. Exit devices - five (5) years
 - 3. Closers - five (5) years or as manufacturer advertised if longer
 - 4. Geared hinges - lifetime

2. PRODUCTS

2.1. ACCEPTABLE MANUFACTURERS

08 7100 - 1 Door Hardware

A. Hinges:

1. Interior Application:

- a. Heavy Weight, ANSI A8111, or ANSI A5111, 4-1/2" x 4-1/2" plated steel or brushed stainless steel,
 - 1) Hagar
 - 2) Lawrence
 - 3) Stanley
 - 4) AASA Abloy
 - 5) IR/Ingersoll Rand
- b. Please note, it is believed all the existing doors have 4½" x 4½" hinges, but the vendor/contractor shall verify that there are no odd doors requiring special hinges.
- c. Please note, general inspection found the existing hinges to be ANSI screw pattern, but this must be verified by the vendor/contractor for any special orders or field preparation which may be needed.

2. As noted applications and exterior

- a. Continuous geared hinges heavy duty full mortise at new locations, verify conditions for full, half or surface at existing locations. ANSI/BHMA A156-26-1996
 - 1) Roton
 - 2) Precision
 - 3) Hagar
 - 4) Pemko
 - 5) Select
 - 6) McKinney
 - 7) Stanley

B. Latchsets/Locksets: 2-3/4" backset

- 1. Mark Industries to match existing in the building.
- 2. Extra heavy-duty commercial grade, cylindrical ANSI A156.2, Series 4000, grade 1, vandal resistant lever (break away).
 - a. Specification basis is Mark 195 American
 - b. All keyed locks 6 pin Yale YF, to match existing keyway and keying system as directed by Owner.
 - 1) Key
 - 2) Master key
 - 3) Group key
 - 4) Grand master key
 - 5) As directed in Owner conference.

- C. Dead Locks
 - 1. Corbin/Russwin or Mark match existing keyway and keying system
 - a. See schedule for desired function
 - b. Grade 1 Extra Heavy Duty

- D. Exit Devices (Panic bars)
 - 1. Precision APEX 2100/200 reversible, district standard device.
 - 2. See schedule for
 - a. Generic description see schedule
 - 1) Surface Rim,
 - 2) Mortised Rim
 - 3) Concealed rod
 - 4) Surface rod
 - 5) Three (3) point FEMA storm style
 - b. Hex key dogging except where prohibited by label
 - c. Entrance side function
 - 1) 4900A lever sets
 - 2) 2000C for pull sets – always locked
 - 3) Blank flush, always latched
 - 4) See schedule for style and function
 - d. UL rated openings
 - e. Locking Function
 - f. Key dogging (bar lock down)

- E. Cylinders: All new hardware to be keyed to Owner's keying system to provide building keying coordinated with existing, master keying, match existing, grand master keying and individual keying as directed in conference with Owner prior to delivery.
 - 1. Verify with owner prior to ordering, keyway is Yale YF - 6 pin

- F. Closers:
 - 1. Normal closers – LCN 4040XP
 - a. Fully adjustable closing and backcheck and applicable accessories.
 - b. No hold open only where specifically noted in Schedule
 - c. Thumb or hex key (hand) turn operated hold-open arm all other locations.
 - d. Adjustable delay action at all closers.
 - e. 10 year warranty on leaking and cylinder failure
 - f. Norton equivalent heavy duty acceptable

- 1) Set bolt mounting
- 2) Provide cover
- 3) Parallel mount where practical

G. Door Stops (Use wall stops wherever possible):

1. Wall Stops (mounted to mate pull, handle or knob device):
 - a. Hiawatha: R1326 ½ BL
 - b. Ives: #401
 - c. Glynn Johnson: #WB50MX
 - d. Rockwood 400/403
2. Floor Stops (add spacers as applicable to door undercut)
 - a. Hiawatha: #1330A and #1330AE x AL.
 - b. Yale: #846RP and 847RP
 - c. Russwin: #207, #207 ½ and #209
 - d. Ives: #436 or #438.

H. Push-Pull:

1. Hiawatha Pull #535A 8", or equal, US32D or US26D. Mount pull in 3-1/2" x 16" x .1" thick push plates x US32D or US26D.
2. Redstone Pull #178A (1" x 2-1/2" x 10") x US32D or US26D. Mount pull in 3-1/2" x 16" x .1" thick push plate x US32D or US26D.
3. Hiawatha, or equal, push plates (kick plate stock) 10" x 24" x 18 gauge US32D.
4. Russwin Pull #481, 9-1/4" x US32D or US26D.

I. Kick Plates:

1. Plated finish to match hardware
2. 0.060" (16 gauge) plated steel, Brass, or Stainless steel as appropriate, plated after fabrication.
3. Bevel 3 sides,
4. B3S
5. Countersunk oval head screws at 8" maximum uniform spacing
6. Oval head matching philips head screws
7. Size, 2" less than door width x 8.

J. Impact plates:

1. Rigid vinyl 1.5 mm (0.060" thick, finished bevel edges
2. 1" less than door width x 36" verify hardware coping if needed.
3. Oval head screws at maximum 8" centers or less as recommended by the manufacturer
4. Inpro/IPC
 - a. S80 W18766 Apollo Drive • Muskego, Wisconsin 53150
USA inprocorp.com Nationwide 800.222.5556 / Fax 888.715.8407
 - b. Or equal

08 7100 - 4 Door Hardware

- K. Door Bolts (with matching top and bottom strike): See Hardware Schedule also.
 - 1. Ives SB360 or equal: Top and bottom, UL rated for inactive leaf.
 - a. Strike, most appropriate heavy duty for application condition encountered.
- L. Louvers:
 - 1. Standard application
 - a. Anemostat ADFL or equal
 - b. Sight tight
 - c. 18 gauge frame, 22 gauge minimum blades with hemmed edges
 - d. Prefinished powder coat.
 - 2. Fire doors
 - a. Anemostat FLDL or equal
 - b. 18 gauge frame 22 gauge minimum blades with hemmed edges
 - c. Fusible link
 - d. Carry the appropriate UL rating stamp
- M. Thresholds: select for conditions, ADA style typical 5" or greater with no slip grooves.
- N. Door Holder/stop, Glynn Johnson GJ70/79 Series, select for door width as needed or similar

2.2. FINISH

- A. Match existing, verify, US 26D / US32
 - 1. All Steel and brass Hardware plated US26D
 - 2. Anodize to match aluminum hardware, US28 BHMA 628
 - 3. Closers may be painted or plastic covers.
 - 4. Stainless steel hardware US32D BHMA 630

2.3. KEYING

- A. Door Locks: New cylinders keyed differently, keyed alike, master keyed, and grand master keyed. Match existing building keying and master keying as directed by Owner.
 - 1. Verify on site.
 - 2. Interior Yale YF (6) pin.
 - 3. Exterior Corbin/ Russwin 77 (6) pin

- B. All cylinders shall be keyed and master keyed compatible with the existing building hardware system. Supply keys in the following quantities:
 - 1. Four (4) sets of individual cylinder keys.
 - 4. Master keys existing.
 - 5. Four (4) grand master keys.

3. EXECUTION

3.1. EXAMINATION

- A. Always verify site conditions and dimensions.
- B. Verify that doors and frames are ready to receive work and dimensions are in accord with documents, shop drawings and manufacturer's instructions, as applicable.
- C. The Specifications and Drawings indicate hardware intent.
 - 1. Door hardware omitted from the Schedule shall be fitted with hardware in accord with a similar door installation at no additional cost to the Owner.

3.2. INSTALLATION

- A. Install hardware in accordance with manufacturer's instructions.
- B. Use templates provided by hardware item manufacturer.
- C. Mounting heights for hardware from finished floor to center line of hardware item, follow BMHA standards for all hardware mounting and mortises.
 - 1. Locksets: 40"
 - 2. Push/Pull: 40"
 - 3. Dead Locks: 40"
 - 4. Exit Devices: 40"

3.3. FIELD QUALITY CONTROL. Hardware Consultant shall inspect installation and certify that hardware and installation has been furnished and installed in accordance with manufacturer's instructions and as specified.

3.4. ADJUSTING

- A. Adjust work for proper fit and finish and alignments of the work
- B. Adjust hardware for smooth operation.
 - 1. No scraping or rubbing
 - 2. No warp
 - 3. Smooth closure of all doors, engaging upon closing but without slamming.

3.5. PROTECTION OF FINISHED WORK

- A. Protect finished work under provisions of Division 00 and 01

3.6. SCHEDULE OF HARDWARE

- A. Details of each opening to be verified on site by the hardware and frame supplier.
 - 1. In all cases the intent is fully functional opening with complete set of hardware, commensurate with the remainder of the work.
 - 2. Every new opening provided in the work that shows a door swing on the plans is intended to have a door, frame and hardware.
 - a. Locks or latches
 - b. Hinges
 - c. Kickplates normally occupant used doors
 - d. Wall bumpers anytime a wall can be hit by the swinging door or latchset
 - e. Closers or some door control, stop or holder
 - f. Always extra heavy duty commercial grade
 - g. Make allowance for such intent in the bidding or clarify by 5 days prior to bid date.
 - 3. Hollow metal frames are specified as 5 ½" typical throat, but may be adjusted more or less at the contractor's discretion to improve the installation detail or cover more existing unfinished existing construction to minimize trim work and repairs as may be needed to finish the work.
 - a. Walls less than 6" CMU may use narrow frames
 - b. Walls greater than 8" may use deeper frames particularly if a cut in opening existing wall and it will simplify repairs.
- B. See floor plan to determine handing of hardware and frames and sidelights.
- C. Security controlled hardware.

3.7. Schedule of hardware sets follows

Set A: Typical Classroom application

- 1. ANSI F110 Classroom Intruder, Mark LG318GJ
- 2. Three (3) hinges ANSI A8111/A5111
- 3. Closer, adjustable hold-open
- 4. Kickplate
- 5. Wall bumper stop

Set B: Pair, B Label

- 1. Exit device, concealed vertical rod, lever handle, lockable

08 7100 - 7 Door Hardware

2. Two (2) -Vertical rod to head only if labeled
 - a. RHR, trim, 4900A x 08
 - b. LHR no trim x 01
3. Six (6) hinges.ANSI A8111/A5111
4. Closer two (2) no hold open, magnetic holder by EC
5. Kick plates two (2)
6. If astragal is required for label then provide coordinator
 - a. no astragal is preferred.
7. Wall bumpers not required. Coordinate swing with magnetic holders by EC sub.

Set C: Pair B label, double egress, B label

1. Exit device, concealed vertical rods, flush, no entry trim
Vertical rod top and bottom with receivers properly installed.
 - a. Both doors RH with 01 or no trim
2. Six (6) hinges. ANSI A8111/A5111
3. Closer two (2) no hold open, magnetic holder by EC
4. Kick plates two (2)
5. If astragal is required for label then provide.
 - a. no astragal is preferred.
6. Wall bumpers Not required coordinate swing with magnetic holder by EC. Subcontractor.

Set D: Connecting room doors

1. Lockset ANSI F80
2. Three (3) hinges ANSI A8111/A5111
3. Closer with hold-open
4. Kick plate
5. Wall bumper verify mounting condition to protect door and casework

Set E: Restroom

1. Push – pull
2. Dead Lock, thumb turn interior, classroom function, unlocks but will not lock.
3. Three (3) hinges ANSI A8111/A5111
4. Kick plate
5. Louver, 18" wide x 16" high, mount above kick plate
6. Wall bumper
7. Closer with hold open

Set F: Kitchen B label

1. Lockset classroom intruder ANSI F110
2. Three (3) hinges ANSI A8111/A5111
3. Closer,
4. surface bump plates, 1/8" FRP or Rigid textured vinyl, 2" less than door width x 36 high, cope for lockset rose.
5. Coordinate with magnetic hold open by EC

Set G: Mechanical/custodial

1. Lockset, Storeroom ANSI F86
2. Three (3) hinges ANSI A8111/A5111
3. Closer with hold open
4. Kick plate
5. Wall stop where appropriate

Set H: Kitchen storeroom/office

1. Lockset F84
2. Three (3) hinges ANSI A8111/A5111
3. Closer, hold-open
4. Bump plate 2" less than door width x 36" cope for lockset rose.

Set I: mechanical closets

1. Dead lock, thumb turn inside
2. Half dummy trim, lever corridor side, blank inside
3. Three (3) ANSI A8111/A5111
4. Glynn Johnson GJ 70/79 Holder Stop set at 100 degrees

Set J: Restroom - normally staff only classroom addition

1. Lockset Storeroom ANSI F86.
2. Three (3) hinges ANSI A8111/A5111
3. Kick plate
4. Louver, 18" wide x 16" high, mount above kick plate
5. Wall bumper
6. Closer with hold open

END 08 7100

1. GENERAL

1.1. DESCRIPTION

A. Work Included:

1. Contractor shall provide mirrors, glass and interior glazing as shown on the Drawings and specified herein.
2. Glazing for manufactured items such as aluminum windows and doors included in the respective specification.
3. Coordinate glazing as required, some glazed items are manufactured with glazing factory installed such as windows.

1.2. RELATED WORK

A. Specified elsewhere

1. DIVISION 00 - BIDDING & CONTRACT REQUIREMENTS
2. DIVISION 01 - ADMINISTRATIVE REQUIREMENTS
3. 07 9200 - Sealants & Caulks
4. 08 5113 Aluminum Windows
5. 08 1140 - Aluminum Doors & Storefront Framing
6. 10 2800 – Toilet and Bath Accessories

1.3. QUALITY ASSURANCE

A. Glass shall conform to Federal Specifications DD-G-451-C.

B. Unless otherwise shown, conform to details and procedures of the "Glazing Manual" (Flat Glass Marketing Association).

C. All glazing materials shall comply with State and Federal recommendations and the Illinois School Building Code.

D. Glazing for code regulated locations shall meet code requirements

1. Fire rated openings, appropriate ceramic glass or glass rated for that purpose
2. Doors and adjacent to doors, comply with safety glazing act
3. All exterior glazing to include laminated glass in the assembly

E. Comply with glass manufacturer's recommendations for annealed, heat treated or tempered depending on exposure conditions, edge shading, sun, etc.

1. Always assume irregular sun/shade of exterior glass to be applicable

1.4. SUBMITTALS

- A. Submit the following Manufacturer's Literature, including materials description and installation instructions for glazing inserts and glazing sealants,
 - 1. Glass technical information
 - 2. Energy performance for exterior glazing

2. PRODUCTS

2.1. MATERIALS

- A. Float Glass: "Clear Float" (PPG Industries), "Parallel-O-Float" (Libby-Owens-Ford Company), or "Starlux Float" (ASG Industries, Inc.) thickness as shown on the drawings; tempered or laminated in doors and adjacent lights and where shown. Annealed heat strengthened or tempered as recommended by manufacturer solar/shade/thermal conditions.
 - 1. Laminated to have .060" inter layer
 - 2. Laminated glass to be used where allowed for improved interior security.
- B. Tempered Glass: Comply with requirements of Consumer Products Safety Commission Regulation for Safety Glazing Materials 16 CFR 1201 Catalog I & II and GTA Specification G4-3-16. Minimum thickness shall be 3/16".
 - 1. Use when noted
 - 2. Not intended to be used in doors or room to corridor glazing, those locations are all to be laminated unless noted tempered or fire lite.
- C. Fire Rated Glazing:
 - 1. Firelite Premium 5mm minimum, clear polished, or equal.
 - 2. Firelite plus 8 mm laminated at safety glazing location.
 - 3. The term Fire lite used on the drawings is intended to be generically applied for rated ceramic glazing systems, not restrictive to brand.
 - 4. Or Firelite NT 5 mm film surface to meet safety glazing requirements.
 - 5. As required for door rating and glazing size.
 - 6. Application
 - a. Fire Doors select as labeled, comply with safety glazing act
- D. Mirrors
 - 1. 1/4" laminated polished plate
 - 2. Silver/Copper Federal Specification DD-M-411 Class E Grade 1.
 - 3. Mirror frames to be stainless steel, welded corners, concealed fastening.

- a. Bobrick B-165 Series (with B-166 at sinks)
 - b. McKinney 160 Series (with 165 shelf at sinks)
 - c. Epco #136 (with 131 shelf at sinks)
 - d. Or equal
- E. Wire Glass: None intended on this project.
- F. Glazing Compound - Exterior Glazing - One Part Acrylic Compound: "Mono" (Tremco Manufacturing Company), "60+ Unacrylic" (Pecora Chemical Corporation) or DAP '1020' (DAP, Inc.).
- G. Glazing Compound - Interior Glazing - Oleoresinous, Nonoxidizing, Nonhardening, Soft Knife Consistency Channel Glazing Compound: "Tremglaze" (Tremco Manufacturing Co.), "M251" (Pecora Chemical Corporation), or "Flexiglaze '1231' Glazing Compound" (DAP, Inc.).
- H. Glazing Tape - Polyisobutylene/butyl: "Tremco 440 Tape" (Tremco Manufacturing Company), "G-66" or "BB-50" (Pecora Chemical Corporation) or "Butyl Rubber Tape" (DAP, Inc.).
- I. Setting Blocks: Neoprene Blocks, 70 to 90 Type A durometer hardness. Spacers: Neoprene blocks, 40 to 50 Type A durometer hardness, three inches (3") long, self-adhesive on one face only.
- J. Laminated glass to meet ASTM C 1036-85 and ANSI 297.1-1984 and Consumer Product Safety Commission 16 CFR 1201, 1/4" minimum 0.060" interlayer.
- 1. Use as noted throughout plans
 - 2. Classroom doors in sprinkler areas
 - 3. Corridor side lights and borrowed lights in sprinklered area.
 - 4. Obscure where noted on plans, Rest room doors etc.
- K. Insulated glass: Where called for shall be assembled of the required or noted glazing materials and thicknesses, ten (10) year manufacturer's guarantee against loss of seal and/or clouding.
- 1. Solar Grey / Low 'e' / argon filled
 - 2. Tempered outer pane
 - 3. Laminated 0.060" interlayer, inner pane.
 - 4. Always assume irregular shading pattern glazing due to seasonal sun incidence variation and possible future landscaping shadows.
- L. Glazing stops: Coordinate with glazing thickness, stops shall fully cover to face of door. Sand, no splintering.

3. EXECUTION

3.1. PREPARATION

- A. Examine all surfaces to receive the parts of the work specified herein. Verify all dimensions of in-place and subsequent construction. Application

or installation of materials shall constitute acceptance of the related construction.

3.2. INSTALLATION

- A. Employ only experienced glazers who have had previous experience with the materials and systems being applied. Use the tools and equipment recommended by the Glass Manufacturer.
- B. Measure all openings and cut glass accurately to fit each opening. Provide a minimum edge clearance and bite on the glass as specified by FGMA. Tempered glass and wire glass shall not be seamed, nipped or abraded at the job site.
- C. Maintain a minimum temperature of 40 degrees F during glazing unless the Manufacturer of glazing materials specifically agrees to application of his materials at lower temperatures.
- D. Clean glazing stops and rabbets to receive glazing materials of all obstructions and deleterious substances that might impair the work. Remove protective coatings that might fail in adhesion or interfere with bond of sealants. Comply with the Manufacturer's instructions for final wiping of surfaces immediately before application of primer and glazing compounds or tapes. Wipe metal surfaces with approved cleaning solvent.
- E. Prime surfaces to receive glazing compounds in accordance with the Manufacturer's recommendations, using recommended primers.
- F. Inspect each piece of glass immediately before installation. Do not install pieces with significant impact damage at edges, scratches, or abrasion of faces, or any other evidence of damage.
- G. Locate setting blocks at the quarter points of sill but no closer than 6" to corner of glass. Use blocks of proper size to support the glass in accordance with Manufacturer's recommendations.
- H. Provide spacers for all glass to separate glass from stops, except where continuous gaskets or tape are required. Locate spacers 36" o.c. maximum inside and out, with a minimum of two (2) spacers per edge of glass. Provide thickness equal to the sealant or compound thickness shown. Provide width, as required for minimum of 3/8" bite on glass, at all four edges.
- I. Set glass in a manner that produces greatest possible degree of uniformity in appearance. Face all glass, which has dissimilar faces, with matching faces in the same direction. Set all glass with bow (if any) to exterior.
- J. Glazing materials from different sources shall not be used in the same joint system unless the Manufacturer of each material has stated IN WRITING that his material is fully compatible with the other material.

- K. Use masking tape or other suitable protection to limit coverage of glazing materials to the surfaces intended for sealants.
- L. Butt or lap ends of sealant tape in accordance with Manufacturer's recommendations.
- M. Tool exposed surfaces of glazing materials to provide a slight wash away from the glass. Install exposed tapes and gaskets with a slight protrusion above stops in the final compressed condition.
- N. Clean excess sealant or compound from glass and framing members immediately after application, using solvents or cleaners recommended by Manufacturers.
- O. Provide glass as follows:
 - 1. All interior glazing, comply with Safety Glazing Act, except as noted on plans, 1/4" diamond pattern wire glass in fire doors.
 - 2. Fire rated interior glazing sidelights and borrowed lights greater than 100 square inches to be ninety (90) minute fire rated glass.
 - 3. Exterior doors, insulated gray glass; tempered/laminated or laminated/laminated.
 - 4. Doors & interior wind screens located just inside exterior doors only, laminated clear glass.

3.3. CURING, PROTECTION & CLEANING

- A. Cure sealants in accordance with the Manufacturer's instructions to attain maximum durability and adhesions to glass and framing as soon as possible.
- B. Protect glass from breakage immediately upon installation. Use streamers or ribbons suitably attached to framing and held free of the glass. Warning markings shall not be applied directly to the glass.
- C. Remove and replace glass which is broken, cracked, chipped or damaged in any way and from any source, including weather, vandalism and accidents during the construction period.
- D. Maintain glass in a reasonably clean condition during construction so that it will not become stained and will not contribute to deterioration of glazing materials.
- E. Wash and polish glass on both faces, not more than four days prior to date of substantial completion. Comply with instructions and recommendations of the Glass Manufacturer and Glazing Materials Manufacturer for cleaning in each case.

3.4. MIRROR SCHEDULE – See Section 10 2800.

END 08 8000

1. GENERAL

1.1. WORK INCLUDES

A. Base Bid:

1. All new gypsum wallboard and any accessories as needed to complete the work as shown on the drawings and specified herein.
 - a. Interior walls
 - b. Closures above ceilings
 - c. Fire separations as noted
 - d. 9'-4" x 7'-4" nominal size, verify:
 - 1) 1 Cafeteria. - north wall
2. Minor associated sound deadening work
 - a. Install sound deadening fiberglass insulation bats all metal stud and drywall walls in occupied areas full height of wall.

1.2. QUALITY ASSURANCE

- A. Gypsum wallboard construction shall comply with all laws, ordinances, rules, regulations and orders of public authorities having jurisdiction over this part of the work.
 1. Formaldehyde free.
- B. All materials shall be from a single manufacturer unless others are approved by the Architect/Engineer, to insure total unit responsibility. Installer shall be acceptable to the Manufacturer of the wallboard materials. All gypsum board installed shall be 5/8" fire rated (Type X), except 2-hr. rated separation wall shown on the Drawings, constructed of 1/2" fire rated (Type X).

1.3. PRODUCT DELIVERY, STORAGE & HANDLING

A. Acceptance at site:

1. All materials shall be delivered to the job in their original, unopened containers or bundles; stored in a place providing protection from damage and exposure to the elements.
2. Damaged or otherwise unsuitable material, when so ascertained, shall be immediately removed from the job site.

B. Protection prior to installation:

1. Since the Owner will be occupying the building, storage of materials will be difficult. Coordinate deliveries to match use.

2. Protection must be provided by General Contractor against moisture, impact, etc.

1.4. SUBMITTALS. Submit product data for review.

2. PRODUCTS

2.1. ACCEPTABLE MANUFACTURERS

A. Gypsum wallboard, joint compound, etc.

1. U.S. Gypsum
2. Gold Bond
3. Georgia Pacific
4. Celotex

B. Adhesive

1. Contech PL200
2. DAP 4000
3. Miracle Adhesives Corp. DSA-20
4. Ohio Sealants Inc., Formula 38

2.2. MATERIALS

A. Gypsum Drywall: All material to be 4' X 8' (or larger) X 5/8" thick UL rated.

1. Lower 4' all wall applications to be "Fiberbond" or abuse resistant, hard faced gypsum board.
2. See Plans for moisture resistant board, damp locations.
3. See Plans and Details for sheathing board – Dens Glas, or equal.
4. See Plans and Details and Materials for exterior moisture resistant soffit board.
5. DEFS System, Dens Glas, or equal.

B. Tape, Joint Compounds, Screws, Corner Edge Guards, etc.: Shall be manufactured by the manufacturer of the gypsum wall board or shall be manufactured to be compatible with all other system components.

1. Paint ready.

C. Joint compound for exterior applications or moisture sensitive areas to be curing type compound.

1. Durabond 60 or 90
2. Sudden Bond 60 or 90
3. Or equal

D. Trim items

1. Corner beads flush taping style, galvanized.
2. Expansion joints, flush taping style, galvanized or PVC.

3. Edge beads, taping style, galvanized, selected for condition.

2.3. ACCESSORY MATERIALS

- A. Screws: Type W and GWB; sized to suit thickness.
 1. Galvanized or coated for exterior or moist applications.
 2. Bugle head
 3. #6 or larger only
- B. Corner Reinforcements, Casing Beads and Metal Trim: fabricated from 26-gauge galvanized sheet steel with perforated flanges, designed to receive joint compound.
- C. Joint Treatment Materials: ASTM C475-64 (1975).
- D. Concrete nails: One-inch (1") long plus adhesive.

3. EXECUTION

- 3.1. PREPARATION. Insure that studs are aligned and adequately braced so that resulting installation will be smooth and straight. Attachment shall be by screws ONLY, with spacing of screws per manufacturer's recommendations or these specifications whichever is more demanding.

3.2. INSTALLATION

- A. Single or Double Layer Systems; Gypsum Panel Erection-Direct Attachment to metal studs and metal furring channels:
 1. Place panels horizontally at right angles to framing, offset joints.
 - a. Position all ends centered on vertical framing members.
 - b. Use maximum practical lengths to minimize end joints.
 - c. Fit ends and edges closely, but not forced together. Stagger end joints in successive courses.
 - d. Place end joints on opposite sides of partitions on different studs.
 - e. When necessary, cut ends, edges and cutouts within the field of the panel in a workmanlike manner.
 2. Screw fasteners in panel field first, work toward ends and edges.
 - a. Hold panel in place with firm contact and install screw fasteners at least 3/8" in from ends and edges.
 - b. Apply panels with power driven screws.
 - c. Attach gypsum panels to framing supports with 1-1/4" Type W screws at 8" o.c.
 3. Finish
 - a. Level 2 above ceilings

- b. Level 4 above 10'
 - c. Level 5 below 10' and for the wall screens to be constructed.
- B. Wall systems shall employ 5/8" thick, Type X gypsum board unless noted otherwise.
 - 1. Expansion joints neatly spaced at about 50" centers on long walls, select location for most efficient use.
 - 2. Add expansion joints at site or during warranty where drywall cracking is anticipated or occurs due to installation conditions, structural framing, etc.
- C. Accessories:
 - 1. Square edge corner beads shall be installed on all exterior corners and at dissimilar materials, attached with suitable fasteners spaced 9" o.c. on both sides up to 60" above floor and shall be in single lengths unless corner exceeds standard stock lengths. Dimple set allowed only above 60".
 - 2. Square edge metal trim shall be installed at all extruded edges and corners of wallboard, attached with suitable fasteners, spaced 9" o.c. and shall be in single full lengths unless application length exceeds standard stock lengths.
 - 3. Wallboard screws shall be applied with an electric driver. Screws shall be secured not less than 3/8" from ends and edges of wallboard for a uniform dimple not over 1/32" deep.
- D. Joint treatment compounds shall be mixed according to the Manufacturer's directions and applied as follows:
 - 1. All "V" grooves formed by abutting eased radial edges of wallboard shall be filled flush with plane of taper with pre-fill compound. Excess compound beyond the "V" groove shall be wiped clean leaving a flat joint for taping.
 - a. Reinforcing tape shall be applied immediately, centered over joint, seated into compound.
 - b. A skim coat shall follow immediately, but shall not function as a fill or second coat.
 - c. Tape shall be properly folded and embedded in all angles to provide a true angle.
 - d. Tape all corner and edge beads with tape fully embedded into compound.
 - 2. After taping compound has hardened, topping compound shall be applied, filling board taper flush with surface.
 - a. Fill coat shall cover tape and feather out slightly beyond taper.
 - b. On joints with no taper, fill coat shall cover tape and feather out at least 6" on either side of tape.
 - c. Sanding or wet wiping shall be done after material has hardened.

3. A finishing coat of taping compound shall be spread evenly over and extending slightly beyond fill coat on all joints and feathered to a smooth, uniform finish.
 - a. Over tapered edges, finished joint shall not protrude beyond plane or surface.
 - b. All taped angles shall receive a finish coat to cover tape and taping compound, and provide a true angle.
 - c. Sanding or wet wiping shall be done after final application of compound to provide a smooth surface, ready for decoration. Use wet wiping in all occupied areas.
4. Fastener depressions shall have at least two (2) coats of taping compound, leaving all depressions level with surface plane. Sand or wet wipe fastener depressions after each application hardens.
5. Taping compound shall be applied to all bead and trim and shall be feathered out from ground to plane of surface.
 - a. When hardened, this shall be followed by two (2) coats of taping compound applied separately and allowed to dry between coats.
 - b. Each coat shall extend slightly beyond previous coat.
6. Joints concealed from sight shall be fire taped - smoothing shall not be required.
7. Apply joint sealants as appropriate at edge beads to dissimilar materials and expansion beads.

E. Projector screens (PS)

1. Nominal 9'-4" wide x 7'-4" tall. Verify flat wall space available.
2. Typically bottom edge at adjacent window sill, but be verified on site in conference with the district technology director.
3. 5/8" drywall glued and nailed to cmu sand to extra smooth finish
4. Edge molding
5. Sealant to wall
6. Prime and finish with multiple coats as needed of screen paint such as **Sherwin-Williams Dry Erase Poly Urethane Extra White**.

3.3. FINISHING. All exposed gypsum board installation shall receive finish coating per finish schedule.

A. See Section 09 9000 - Finish Coatings.

3.4. CLEAN UP. Remove all sanding dust and any excess or spilled material from all surfaces.

END 09 2116

1 GENERAL

1.1. WORK INCLUDED

- A. General Contractor shall provide quarry tile floors and bases as shown on the Drawings and specified herein.
 - 1. Restrooms
 - 2. Kitchen and associated areas

1.2. RELATED WORK

- A. Specified in other sections:
 - 1. DIVISION 0 - BIDDING & CONTRACT REQUIREMENTS
 - 2. DIVISION 1 - ADMINISTRATIVE REQUIREMENTS
 - 3. 07 9200 - Sealants & Caulks

1.3. QUALITY ASSURANCE

- A. Material and installation shall comply with following:
 - 1. Tile Council of America Inc.:
 - a. Recommended Standard Specifications for Ceramic Tile, TCA 137.1-1976.
 - b. 1982 Handbook for Ceramic Tile Installation.
 - 2. American National Standards Institute Specifications for:
 - a. Glazed Wall Tile, Ceramic Mosaic Tile, Quarry Tile and Paver Tile installed with Portland Cement Mortar, A108.1-1976.
 - b. Dry-Set Portland Cement Mortar A118.1-1976.
 - c. Latex-Portland Cement Mortar, A118.4-1973(R-1976).
- B. Acceptable Manufacturers:
 - 1. American Olean Tile Co., Quarry Tile/Quarry Naturals
 - 2. Summitville Tiles Inc., all price groups I through IV.
 - 3. Metropolitan Ironrock, Quarry Basics, Quarry Hi-Lights.

1.4. SUBMITTALS

- A. Submit the following:
 - 1. Manufacturer's Literature: Material description and recommended installation instructions for epoxy and latex-Portland mortars and grouts.

2. Samples: Samples of tile through range of color, mounted on 12" x 12" backing with grouted joints sample of each trim shape. Selection will be base color (60% of floor) and limited accent colors (two (2) up to 40% of floor).
3. Samples of colored mortar for joints.

1.5. PRODUCT DELIVERY, STORAGE AND HANDLING

- A. Accept delivery of material only in an undamaged condition; store above ground and in a dry place within the building. Packaged material shall be in original containers with seals unbroken and labels intact until time of use. Wrapped or bundled material shall bear the name of the manufacturer and the product.
- B. All damaged or otherwise unsuitable material, when so ascertained, shall be immediately removed from the job site.

2. PRODUCTS

2.1. MATERIALS

- A. Floor Tile: Unglazed natural clay quarry tile, square edged.
 1. Size: 6" x 6" x ½", unless otherwise shown.
 2. Base: 6" x 5" x ½", coved, round top, top set.
 3. Color: As selected from manufacturer's standard colors.
 - a. Colors such a gray and beige are to be included.
 - b. Premium colors such as blue or green not included
- B. Base
 1. Provide matching 4" or 6" base with bullnose top edge.
- C. Water: Clean, free from deleterious substances.
- D. Setting Adhesive: Acrylic high strength, water resistant meeting ANSI A136.1 Type I and Type II. Bonsal B-4050, Hydroment 7001, Mapei or equal.
- E. Floor Grout: Colored, latex modified joint grout, to be selected with flexible grout additive, L & M, Bonsal B-733, Hydroment 428, Mapei or equal.
- F. Latex Liquid: Mapei Keraply, "Laticrete" (Laticrete International Inc.), "No. 4237" for mortar and "No. 3701" for grout; "TEC Crete" (HB Fuller Company) for mortar and "TEC Tile Bond" for grout; "L&M Surco-Crete" (L&M-Surco Mfg., Inc.) for mortar and "L&M Flexible Grout Additive" for grout.
- G. Joint water repellent: Seal grout joints with Mapei Ultracare or similar.

- H. Movement Joints: Select an appropriate urethane or silicone sealant color coordinated with grout
- 2.2. Strictly follow manufacturer's recommendations for adhesives and grouting including environmental recommendations and curing.

3. EXECUTION

3.1. PREPARATION

- A. Examine all surfaces to receive the parts of the Work specified herein. Verify all dimensions of in-place and subsequent construction. Application of materials constitutes acceptance of the substrate.
- B. Work shall not commence until grounds, anchors, plugs, hangers, bucks, etc., have been installed, and until adjoining work is satisfactorily protected.
- C. Containers in which tile and other materials are packed shall be kept dry until tiles and other materials are removed and every precaution taken to see that tiles are not stained before they are set in place. Maintain temperatures in rooms where tile is being set at a minimum of 40 degrees F.
- D. Layout tile in each area in such a manner as to minimize the cutting of tile.

3.2. INSTALLATION

A. CONDITIONS

- 1. Check floor for level, slope to drains and all surface conditions to verify suitability for applying quarry tile.
- 2. Thoroughly clean and etch slab.
- 3. Inspect for hairline shrinkage, cracking or suspect conditions which may affect tile installation and provide reinforcing tape or expansion joint as appropriate.
- 4. Do not grout tight to vertical surfaces, always allow for perimeter movement and sealant joint or slip space under base.

B. PATTERN OR BORDER

- 1. A/E will provide at time of color selection, a pattern layout, which might be border, repeating pattern or random pattern, or a combination of same.

C. ADHESIVES

- 1. Apply adhesives in strict accordance with manufacturer's recommendations.
- 2. Use notched trowel.
- 3. Follow set time and cure time instructions.

4. Carefully embed tile into adhesive maintaining uniform joints, alignment and level.
5. Stop tile approximately 1/8" from wall - no grout in joint, seal with sealant.
6. Keep traffic off until grouted.

D. BASE

1. Provide Quarry tile base at all Quarry tile floors.
2. Base to sit on top of Quarry tile so movement is not confined.

E. GROUTING

1. After tile is firmly set, fill joints with selected grout. Spread slurry of grout over the floor surfaces until joints are filled. Compress grout and strike flush with surface of tile. Before grout sets, fill all skips and gaps. Remove surface latence and excess grout. Face of all tile shall be left clean and free from grout or other stains.
 - a. Allow for expansion.
 1. Along walls, do not grout perimeter to walls, always leave movement space, and caulk to keep dirt out.
 2. At slab construction joints
 3. At identified slab cracks (cut tile if necessary or install mesh in grout base as determined best option).
 2. Cure grout per manufacturer's recommendations. Add dampness as needed ad or cover with polyethene sheeting to facilitate curing.
 3. Expansion joints including along edges shall be caulked with an approved urethane type sealant with bond breaker tape in bottom of joint.
 1. Select sealant color to match grout.
 2. Use exterior grade sealant, per 07900.

3.3. CLEANING

- A. Upon completion of tile work in each area, including work specified under other sections, clean all tile surfaces with warm water and high quality washing compound. Acid or acid cleaners shall not be used. Sponge and wash tile thoroughly, working diagonally across joints; polish with dry cloths.
- B. Immediately prior to acceptance by the Owner, wash tile surfaces again, and perform additional grouting that may be necessary.
- C. Spray tile with a liberal coat of Huls BSM 20 or similar, two coats in restrooms. See 07100 for suitable materials. This is not a sealer, this is a joint dampproof.

3.4. JOINT WATER REPELLANT

- A. Seal all joints after curing.

3.5. PROTECTION

- A. Tile floors shall be covered with nonstaining building paper or polyethylene sheeting until just prior to acceptance by the Owner. During construction, tiled areas used as walkways in addition to other covering shall be protected with boards or plywood.
- B. Replace any tile or joint materials damaged by construction related traffic.

3.6. MAINTENANCE MATERIALS

- A. Provide 5% (not to exceed 100 pieces) of each quarry tile or base selection used in the work for the Owner's maintenance use {i.e., 100 sq ft x .05 = 5 sq ft, provide twenty (20) 6" x 6" pieces or for 5,000 sq ft x .05 = 250 sq ft, provide one hundred (100) pieces}.
- B. Place Owner's maintenance materials neatly, as directed, delivered to job site.

END 09 3016

1. GENERAL

1.1. WORK INCLUDES

- A. Base Bid: Provide acoustical ceiling work as shown on the Drawings and specified herein.
 - 1. Install new grid and 2 X 4 panels as shown on Plans.
 - a. All areas new areas depicted on the reflected ceiling plan and coordinated with the electrical and mechanical contractors.
 - b. Existing areas as noted ceilings to be removed replaced.
 - c. Existing areas as impacted by the work, repair or replace as disturbed to quality commensurate with existing conditions or replace full area.
 - 2. It is intended the new ceilings will be:
 - a. 9'-0" throughout the new classroom areas and restrooms.
 - b. 10'-0" kitchen areas
 - c. 11'-4" cafeteria and entry way.
 - d. Inspect in field with the A/E and adjustment up to 4" lower may be considered if conflicts cannot be addressed with proper coordination of MEP rough-ins.
 - 3. Coordinate with
 - a. Soffits
 - b. Wall hung accessories
 - c. Existing conditions
 - d. Consult A/E for unusual or conflicting conditions.

1.2. QUALITY ASSURANCE

- A. All materials of any type, single source, (single run if possible).
- B. All materials certified upon request by an independent NVLAP accredited laboratory.
 - 1. Fire rated materials: Underwriters Laboratories, Inc. Design P-202 RC13-1 Hour except spring clips are not required.
 - 2. Humidity resistance, sag resistant, mold resistance.
 - 3. STC, SA and reflectance factors

1.3. SUBMITTALS

- A. Required:
 - 1. Manufacturer's Literature: Materials description and recommended

installation and maintenance instructions.

1.4. DELIVERY, STORAGE AND HANDLING

- A. Deliver materials to the project site in Manufacturer's unopened containers clearly indicating Manufacturer's name, brand, type, style, size, color, texture and other identifying information.
- B. Store materials in a dry location, off the ground and in a manner to prevent damage, deterioration, and intrusion of foreign matter. Replace materials, which have been damaged or are otherwise unsuitable promptly.

1.5. EXTRA MATERIALS (Attic stock)

- A. At conclusion of the work provide not less than:
 - 1. 2' X 4' tile 3% of quantity installed (not less than two unbroken cartons.)
 - 2. For turn over to Owner, not for punch list or other contractor use.

2. PRODUCTS

2.1. MATERIALS

- A. Acoustical Tile: Fissured surface, mineral fiber tile, fire code rated, 24" X 48" X 5/8", (limited 24" X 24 when noted on drawings), square edged, also meeting ASTM E-84 and ASTM E-119 of material certified to contain no asbestos.
 - 1. USG
 - 2. Conwed Corp.
 - 3. Celotex Corp. – Fine Fissured
 - 4. Armstrong
 - 5. Product requirements
 - a. 2' x 4' x 5/8" or 3/4" mineral fiber
 - b. Humidity rated non-sag 100 deg. F, 90% R.H.
 - c. Anti-microbial
 - d. Fine fissured, match existing building for non-directional style.
 - e. Sound Absorption: ASTM CA23-66, NRC .50-.60.
 - f. Sound Attenuation: AIMA, Test I-II, 35-39 range.
 - g. Light Reflectance: ASTM C 523-68, .70-.74. (LR-1).
 - h. Flame Spread smoke developed: class A
 - i. R thermal value = 1.36
 - j. Formaldehyde release comply with current commercial standards for schools, no detectable release.
 - 6. Special requirements in the Reading Center and renovated offices in existing building.
 - a. CAC of 40 or more.

B. Suspended Grillage

1. Hangers: Minimum 10-gauge, soft annealed, steel wire, galvanized.
 - a. #12 eyelet head screws into wood, light gauge steel or locations where tie wire cannot be wrapped.
 - b. Ramset hanger eyelet in areas with concrete decking
2. Provide support at 48" maximum spacing along main runners.
 - a. Provide necessary sub-framing where needed to achieve 48" support spacing under ducts, openings, etc.
 - b. Support grid or light fixture at all drop in fixtures per IBC requirements. Coordinate with Electrical contractor.

C. Kitchen and associated areas

1. Vinyl or mylar face water resistant gypsum board ceiling,
2. NSF/FDA approved for sanitary use.

D. Snap Grid System

1. Main Runners: 15/16" wide X 3/4" high, minimum 0.020" thick steel sheet formed runner with vertical leg at top and tee shape at bottom.
2. Cross tees: 15/16" wide X 3/4" high, minimum 0.020" thick steel sheet formed runner with vertical leg at top and tee shape at bottom.
3. Clips: Steel wire clips to hold main runner to carrying channels.
4. White face finish
 - a. Chicago Metallic
 - b. Conwed
 - c. Armstrong
 - d. Celotex
 - e. Or equal subject to approval
 - f. Match grid employed in the existing building if competitively priced and available.

- E. Metal Wall Moldings: Galvanized sheet steel, angles or channels, minimum 0.020" thick, match grid.

2.2. FORMED EDGE

A. Many areas of the project will require formed white metal transitions.

1. Pre-finished white 26-gauge galvanized sheet.
2. Hem edges.
3. Shape to condition.
4. Will occur in every room around ceiling cabinet ventilator, along all outside window walls, at interior aluminum windows and framing and a few miscellaneous other conditions, and at split ductless units in computer rooms.

- a. Best shape to be determined in conference with the Architect at each condition prior to installing grid

3. EXECUTION

3.1. PREPARATION

- A. Examine all surfaces and spaces to receive the work specified herein.
- B. Verify all dimensions of in-place and subsequent construction. Application or; installation of materials constitutes acceptance of the supporting construction.

3.2. INSTALLATION OF SUSPENSION SYSTEMS

- A. Install suspension system in accord with ASTM C636-76 and current AIMA recommended procedures.
 1. Grid system shall be clipped or mechanically secured at intersections
 - a. Loose fit grid not allowed.
 - b. Method of securing shall avoid exposed fasteners such as screws or rivets up through grid, clip or tie together above ceiling.
 - B. Unless otherwise shown or recommended closer by the system's manufacturer, install hangers to construction above a maximum four feet (4') o.c. in rows four feet (4') apart.
 1. All hangers shall hang in plumb position.
 - a. If hanger wires must be installed non plumb, then coordinated counterbalancing wire to make equivalent result.
 2. Supporting runners typically shall run perpendicular to the structural members.
- C. Extend wire hangers downward.
 1. At proper elevation wrap hangers around carrying channels and secure each hanger with at least three (3) turns.
 2. Hanger wires shall be vertical. Wires installed at a diagonal to reach a structural member shall be balanced with diagonal ties in the opposite direction to brace the grid against side loading.
- D. Coordinate spacing of hangers, carrying channels, runners and moldings with the location of electrical fixtures and other items occurring in or on the ceiling.

1. The ceiling lighting fixture locations shall determine the ceiling grid pattern, (see Drawings).
2. Provide hanger wires to structure for cross runners around light fixtures. Each fixture shall have a minimum of four (4) tie wires within sixteen inches (16") of each fixture corner.

3.3. INSTALLATION OF TILE

- A. Installation of acoustical materials shall be done under temperature and relative humidity conditions that will exist when the building is occupied. Building shall be closed in and operating on permanent equipment such that temperature and humidity will be maintained at a constant and normal level.
- B. Installation of grid must follow installation of ceiling closer panels (new pipe soffits) at new exterior wall.
- C. The entire installation shall be free of damage of any sort at the completion of the Contract. All system sections deflecting in excess of 1/240th of the span or length shall be replaced.
- D. At a time and following installation the building shall be kept at a constant temperature and DOOR TO EXTERIOR KEPT CLOSED, ventilating system functional, filters in place.

3.4. CLEANING AND PROTECTION

- A. Upon completion of the work remove all unused materials, debris, containers and equipment from the project site. Clean and repair floors, walls and other surfaces that have been stained, marred or otherwise damaged by work under this section.
- B. Protect acoustical ceilings during the construction period so that they will be without any indication or deterioration or damage at the time of acceptance by the Owner.

END 09 5123

1. GENERAL

1.1. WORK INCLUDED

A. Base Bid

1. Wooster or similar extruded Aluminum, non slip stair treads.

1.2. RELATED WORK

A. Specified elsewhere

1. DIVISION 01 - ADMINISTRATIVE REQUIREMENTS

1.3. QUALITY ASSURANCE

A. Materials shall be installed by persons experienced in the installation of this type of material. All work shall be first class. Tightly butt together materials without seepage through joints, without chips, cracks or blemishes of any type. Install securely with strongest available glue, verify nose is snug and secured to riser as recommended by the manufacturer.

1. Install sample tread for inspection prior to proceeding with the work. The inspection observations shall establish the minimum standard of workmanship for the job.
2. Joints shall be tight, no measurable/visible space between pieces and generally aligned within 1/64th" at tile intersections, edges and corners and splices.
3. Rubber treads to fit to stringer and risers
4. Extruded aluminum treads bevel back and side edges with accurately fit VCT filler to complete the installation

B. Installation shall comply with manufacturer's recommendations.

C. Flooring Subcontractor to fully inspect surfaces for level, cleanliness, suitability of surface to receive treads, fill or level if needed.

1.4. SUBMITTALS

A. Submit the following in accordance with 01 3300 Submittal Procedures.

1. Manufacturer's Literature: Material description and installation and maintenance instructions.
2. Samples: Full size tile through range of color.

1.5. COLOR SELECTIONS

1. Provide color samples.

1.6. OWNER'S MAINTENANCE MATERIAL

- A. Provide maintenance materials to the Owner.
 - 1. Provide two spare treads for future Owner maintenance use.

2. PRODUCTS

2.1. MATERIALS

- A. **Extruded Aluminum** non slip treads
 - 1. Wooster Stairmaster #511 SN sloped nose style 11" depth
 - a. Bevel back edge to 1/8".
 - b. Bevel ends, to 1/8" approximately 1 1/4" from stringer each side. Verify all run widths for consistent edge appearance.
 - c. Two tone abrasive grit, leading edge grooves to be safety contrasting color to remaining tread grooves.
 - d. Mechanical anchorage, into pan stair concrete fill, expansion anchors, flat head style, non corrosive. Provided by tread manufacturer.
 - e. Paint risers and exposed parts of tread as directed with DTM.
 - f. At landings, see finish schedule for proposed finish.

3. EXECUTION

3.1. PREPARATION

- A. Existing conditions
 - 1. Surfaces, always verify surface conditions in all locations for needed fillers or repair or deficiencies.
 - 2. Prepare all surfaces as appropriately to receive the new flooring.

3.2. INSTALLATION

- A. Fit, field measure stair treads for close fit to stringers, fit between 1/8" and 1/4" at ends to stringer Install sample tread for inspection prior to proceeding with the work.
- B. Paint the risers and exposed concrete surface prior to installing the treads
 - 1. Inspect surfaces prior to installation of treads. Do not apply to rough, dirty or unprepared surfaces.
 - 2. Apply adhesive uniformly on the back surface of the base with a notched trowel, single or double ribbon of adhesive not acceptable.

3.3. CLEANING

- 1. Leave project clean, ready for use, no glue on surfaces, scratches in paint caused by these operations shall be touched up.

END 09 6250

1. GENERAL

1.1. WORK INCLUDED

A. Base Bid

1. Provide in accord with Room Finish Plans.
2. Provide coped and mitered rubber base at stair treads and risers as apron.
3. General surface preparation that follows carpet removal, scrape/remove old adhesives, fill and level minor defects and all cracks.
 - a. Leveling skim coat and alkali barrier over full surface.
 - b. Crack preparation as recommended by the skim coat and/or resilient flooring manufacturer.

B. Alternate Bid 1 See polished concrete specification 03 3500

C. Alternate Bid 2A: See this specification for Armstrong Diamond 10® technology coated VCT

D. Alternate bid 2B: See this specification for Mohawk Premium Luxury tile 18" x 36"

1.2. RELATED WORK

A. Specified elsewhere

1. DIVISION 01 – ADMINISTRATIVE REQUIREMENTS
2. DIVISION 03 -- CONCRETE

1.3. QUALITY ASSURANCE

A. Materials shall be installed by persons experienced in the installation of this type of material. All work shall be first class. Tightly butt together materials without seepage through joints, without chips, cracks or blemishes of any type.

1. Install one (1) sample room for inspection prior to proceeding with the work. The inspection observations shall establish the minimum standard of workmanship for the job.
2. Tile and base joints shall be tight, no measurable/visible space between pieces and generally aligned within 1/64th" at tile intersections, edges and corners and splices.

B. All material installed in a single room shall be of the same manufacturing run to assure the color continuity.

C. Installation shall comply with manufacturer's recommendations.

- D. Flooring Subcontractor to fully inspect surfaces for level, cleanliness, suitability of surface to receive VCT.
 - 1. Skim coat all floors with self leveling floor preparation product.
 - 2. Do not proceed unless surface is ready and properly prepared.
 - 3. Do not tile over dust grit, raised paint spills or any other irregularities.
- E. Contractor shall perform moisture vapor test on floors on grade prior to starting work, at least two (2) locations.

1.4. SUBMITTALS

- A. Submit the following in accordance with 01 3300 Submittal Procedures.
 - 1. Manufacturer's Literature: Material description and installation and maintenance instructions.
 - 2. Samples: Full size tile through range of color.

1.5. COLOR SELECTIONS

- A. Floor Tile: Up to four (4) colors shall be allowed in the Base Bid work.
 - 1. Multiple colors per room.
 - a. No border
 - b. Random patterns 94% background color and 3% orange tiles and 3% black uniformly mixed into the primary floor. Always verify the color tiles to be selected, may be different accents than orange and black
 - 2. Corridors
 - a. Multiple colors
 - b. Nominal 12" border along perimeter and into door insets
 - c. Random patterns 94% background color and 3% orange tiles and 3% black uniformly mixed into the primary floor. Always verify the color tiles to be selected, may be different accents than orange and black
- B. Resilient Base: Up to two (2) resilient base colors may be allowed in the Base Bid.
 - 1. One (1) color per room, no pattern or border work

1.6. OWNER'S MAINTENANCE MATERIAL

- A. Provide maintenance materials to the Owner.
 - 1. Floor tile: Provide 2% of the floor area covered for each selection, but not less than twenty (20) full pieces.

2. Resilient base: Provide 2% of the lineal footage and pre-molded corners but not less than twenty (20) lineal feet and five (5) outside corners of each color.

2. PRODUCTS

2.1. MATERIALS

- A. Vinyl composition (asbestos-free) Tile: 1/8" thick, 12" X 12' marbleized; Solid color and standard colors for multi colored accent colored patterned installation. Patterns may include border tile color, and random or field color patterns in all rooms over 150 sq ft, corridors and classroom entries.
 1. Armstrong, Premium Excelon
 2. Mannington Progressions
 3. Mohawk premium Grade
- B. Alternate bid 2A
 1. Armstrong VCT with Diamond 10® technology reduced maintenance coating
 2. 12" x 12" tile.
 3. Patterns and colors consistent with the base bid flooring schemes.
- C. Alternate Bid 2B
 1. Mohawk Luxury vinyl tile LVT
 2. 18" x 36" tile.
 3. Patterns and colors consistent with the base bid flooring schemes.
- D. Adhesives:
 1. Adhesives shall be water and alkali resistant, complying with recommendations of resilient flooring manufacturer as applicable to substrate. Adhesive shall contain no asbestos.
 2. Manufacturer's recommended adhesive, not less than:
 - a. Rated to 8 lbs. moisture vapor and 11-pH.
 - b. Neutralize and/or seal floor as needed for the selected adhesive system such that combined installed result can accommodate 8 lbs. vapor.
 - c. Products such as Henry 420, 430, 622, or 640 High moisture adhesives appropriate to the installation conditions and approved by the flooring manufacturer for use with their product.
- E. Skim coat: Rapid set, skim coat material as appropriate for conditions encountered.
 1. Product Manufacturers
 - a. Ardex

- b. Mapei
 - c. DryTek
 - d. Select product suitable to discovered conditions.
 - 2. Quick set, fast dry, feather edge or up to 1/8" no shrink, latex or similar modified for adhesion.
 - 3. Installation to be level and without trowel marks, delimitation or surface defect.
 - 4. Material to provide good bonding surface and alkali protection for new adhesives.
- F. Rubber Base: 1/8" gauge, coved, preformed corners, four inches (4") high unless otherwise shown; color shall be selected from the full range of available standard colors.
- 1. Afco
 - 2. Johnsonite
 - 3. Roppe
 - 4. Or equal
- G. Vinyl Edge/transition Strips: 1½ " wide for tile
- 1. Afco
 - 2. Johnsonite
 - 3. Roppe
 - 4. Or equal
- H. Carpet edge strips where carpet intersections occur.
- 1. Afco JV #212 or JV #213 as appropriate
 - 2. Johnsonite EG-XX-G or EG-XX-H as appropriate
 - 3. Roppe #156 or #160 as appropriate
 - 4. Or equal

2. EXECUTION

3.1 PREPARATION

- A. No resilient flooring shall be installed until the Installer has ascertained that the chemical cleaning treatment on substrates do not interfere with the successful application of the flooring materials. If additional prior cleaning is deemed necessary, same shall be provided by this contractor before proceeding.
- B. Before installing resilient flooring, fill all cracks and holes and level depressions and skim coat with cement base surface preparation system.
 - 1. Check for flush fit at drain and cleanout rims, grind if necessary.

1.2. INSTALLATION

- A. Install sample room for inspection prior to proceeding with the work.

- B. Firmly adhere tile and resilient base to floor or walls and cabinet bases respectively.
 - 1. Inspect surfaces prior to installation of floors and base. Do not apply to rough, dirty or unprepared surfaces.
 - 2. Corners shall be pre-formed.
 - 3. Cope inside base corners. Scribe bases accurately to abutting surfaces.
 - 4. Apply adhesive uniformly on the back surface of the base with a notched trowel, single or double ribbon of adhesive not acceptable.
 - 5. Miter fit to stair treads, risers, and cope to nosing.
- C. Remove excessive adhesive in accord with the Flooring Manufacturer's instructions.

3.3 CLEANING & SEALING

- A. Not less than four (4) days after flooring installation clean the resilient flooring and base.
 - 1. Re-clean as needed prior to turn over to Owner.
 - 2. Strip seal and wax will be by Owner at a later time.

END 09 6500

1. GENERAL

1.1. DESCRIPTION

- A. Work Included: Contractor shall provide all painting, decorating and preservative coating work as set forth on the Drawings, in these Specifications and as necessary for the completion of any alternate(s) which may be introduced by Addendum and accepted. All new equipment and surfaces not receiving a specified finish shall be painted. See Drawings and drawing notes.
1. Include surface prep, prime and painting of ductwork, conduit and structure in areas with painted and exposed ceilings
 2. Painting of sprinkler piping and mains is optional but be consistent.
 3. Paint other pipping as encountered.
 4. Dry erase urethane paint on projection board north wall of cafeteria
- B. Work Not Included: Copper, bronze, chromium plate nickel, stainless steel, lead and bright non-corroding metal surfaces shall not be painted unless specifically noted.
- C. Color Selections:
1. New areas rooms walls anticipate base color and one accent wall color.
 2. Accent colors will vary throughout the building
 - a. Some accent colors require additional coats to cover
 - b. Please review Section 3 below – Workmanship for clarification of a coat of paint and resulting appearance.
 3. Door frames and metal work will be different color than wall work
 4. Match existing surrounds except for new doors, frames and trim.
 5. Limited areas, cafeteria include allowance for multi color on walls including straight line vertical or horizontal color cuts.
- D. Flame Spread - All paint finishes shall meet the following flame spread requirements:
1. Class a (1) on non-combustible surfaces.
 2. Shall not increase flame spread on other surfaces
- E. Special painting: stripe two patterns of squares or circles as determined by the owner, approximately 36" diameter in a patterns of 4 wide x 3 high, painted on north or east and west walls of the gym to be determined by the owner.

1. One inch (1") wide lines
2. Color to be selected
3. Height approximately 2' above floor. To 11' above the floor, final to be determined in conference with the owner.

F. Floor sealing, limited areas are sealed concrete floors. Specification and products are listed in section 03 3000 Concrete.

1.2. RELATED REQUIREMENTS

A. Specified elsewhere

1. DIVISION 00 - Procurement Requirements
2. DIVISION 01 - Administrative Requirements
3. DIVISION 03 - Concrete
4. DIVISION 04 - Masonry
5. DIVISION 06 – Wood, Plastics & Composites
6. DIVISION 07 - Thermal & Moisture Protection
7. DIVISION 08 - Doors & Windows
8. DIVISION 09 - Finishes

1.3. QUALITY ASSURANCE

- A. Supplier shall verify appropriateness of paint systems/surface preparation and modify as approved by Architect to properly achieve finished result.
- B. Materials shall be as specified and shall be delivered to the job in unopened, labeled containers.
- C. Applicators shall be skilled in the application system employed.
- D. Application: No thinning of materials will be allowed, except as specifically recommended by the Paint Manufacturer's written data to facilitate application.
- E. Special Requirements: The written instructions of the Paint Manufacturer shall be carefully adhered to for all surface preparation, priming, application techniques, environmental conditions and drying conditions.
- F. The surface temperature shall be 50 degrees F. minimum, dry, free of dust, dirt or any bond-breaking substance prior to the paint application.
- G. Protect all surrounding surfaces from paint and the painting operations. CLEAN UP ALL PAINT SPATTER OR OVERSPRAY.
- H. Factory-primed surfaces shall be properly prepared to receive field coatings. Repair chips and nicks in factory primer before proceeding.
- I. Provide all surface preparation, treatments, and all primers needed to comply with the Paint Manufacturer's recommendations. The Contractor shall seek the Paint Manufacturer recommendations and shall be responsible for compatibility of the specified coatings and receiving

surface preparation.

- J. Wherein these Specifications require successive coats of finishing materials, the A/E shall be notified of completion of each coating application prior to application of a successive coating. Failure to notify the Architect for on site observation of each coating prior to a successive coating application shall disallow acceptance of the successive coating.

1.4. SUBMITTALS

- A. Submittals only required on paint / systems employed on this project, see 3. EXECUTION, for this project.

2. PRODUCTS

2.1. DESCRIPTION

- A. It is the intent to use each Manufacturer's premium grade commercial finishes. Adjust selections accordingly. VOC compliance required.
- B. Ferrous metals
 - 1. Sherwin Williams base specification B66-600 series
 - a. One (1) coat Pro-Cryl Industrial primer, or DTM acrylic Primer
 - b. Two (2) coats DTM High Performance 100% acrylic.
 - c. Verify exterior rated system for exterior or wet location application conditions.
 - 2. Acceptable equivalent commercial paint subject to A/E concurrence that system is of similar chemical make-up and performance by:
 - a. PPG
 - b. Benjamin Moore
 - c. Valspar
 - d. Subsidiaries of the above manufacturers with commercial product line.
- C. Galvanized or Aluminum when specified to be painted.
 - 1. Clean surface as specified by the manufacturer.
 - 2. Select appropriate zinc chromate or zinc dust primer
 - 3. Finish as above for ferrous metals
 - 4. Underside of roof decks and structural systems may be dry fog system, and may be in any selected color including flat back or charcoal color.
- D. CMU / Concrete Block Filler:
 - 1. Sherwin Williams base specification B66-600 series

- a. One (1) coat Loxon filler - Primer
 - b. Two (2) coats DTM High Performance 100% acrylic, satin sheen.
 - c. Verify additional coats as may be need for uniform coverage on the substrate and base material
 - 2. Acceptable equivalent commercial paint subject to A/E concurrence that system is of similar chemical make-up and performance by:
 - a. PPG
 - b. Benjamin Moore
 - c. Valspar
 - d. Subsidiaries of the above manufacturers with commercial product line.
- E. Gyp Board / Drywall surfaces
- 1. Sherwin Williams base specification B66-600 series
 - a. One (1) coat Pro-Mar 200 Industrial primer
 - b. Two (2) coats DTM High Performance 100% acrylic.
 - c. Verify additional coats as may be need for uniform coverage on the substrate and base material
 - 2. Acceptable equivalent commercial paint subject to A/E concurrence that system is of similar chemical make-up and performance by:
 - a. PPG
 - b. Benjamin Moore
 - c. Valspar
 - d. Subsidiaries of the above manufacturers with commercial product line.
- F. Natural finished wood surfaces
- 1. Sanding Sealer for natural finishes - use Manufacturer's recommended sanding sealer or thin urethane varnish as appropriate.
 - 2. Oil Stains for natural finishes
 - 3. Varnish - Polyurethane satin or "hand rubbed" finish.
 - a. Sherwin Williams
 - b. PPG
 - c. Valspar
 - d. Benjamin Moore
 - e. Minwax
- G. Wall striping as noted in the General section of these specifications

1. Final layout to be determined.
- H. Special finish, cafeteria north wall screen and dry erase board, gypsum drywall, **Sherwin-Williams Dry Erase Poly Urethane Extra White**

3. EXECUTION

3.1. SURFACE CONDITIONS

- A. Inspect all surfaces for defects prior to starting finishing operations and notify the appropriate persons to make suitable repair and corrections. Be responsible for all rework of finish systems made necessary by application to improperly prepared surfaces.
- B. As painting operations proceed, inspect for chips, abrasions, pitch strikes, sap, knots, cracks and hot spots. All defects that are evident shall be repaired and repainted.
- C. Touch up marred or worn factory primers before painting. Wash down metal with mineral spirits or approved cleaner to assure bond.
- D. PROVIDE PRIMERS IN ALL LOCATIONS APPROPRIATE FOR MATERIAL BASE AND MATERIAL EXPOSURE.
- E. Protect all surrounding work from damage.
- F. Sand surfaces that are not smooth prior to applying succeeding coats.
- G. Primer paint applied on ferrous materials, specified in Section 05500, shall be in accordance with list above but superseded by the manufacturer's recommendation for surface preparation for finish coatings.
- H. Exterior gypsum shall be primed and two (2) coats 2.1.D.

3.2. WORKMANSHIP

- A. Quality workmanship is required. Only skilled mechanics shall be employed to ensure the very best workmanship. Materials to be applied by craftsmen shall be applied only by those familiar with the specific products involved.
- B. Each coat called for shall be applied to achieve 100% coverage of the surface and materials shall be applied as recommended by the Paint Manufacturer.
- C. One coat shall be considered to completely cover the material being finished such that the surface, including all voids and indentations such as in wood or concrete block, no longer retains the color of the surface material but only that of the finish applied. The cover achieved will be subject to the approval of the Architect/Engineer in all cases.

- D. For finishes similar in color to the material or for finishes with little or no pigments, such as varnish, the coats shall be of adequate thickness to meet the approved requirements assuming that the surface and finish were of complementary colors. The cover achieved will be subject to the approval of the Architect/Engineer in all cases.
- E. In the process of painting surfaces, caution shall be used to avoid discontinuity in the finish surface texture or appearance such as at lap joints, corners, etc.
- F. All materials shall be applied under 100 F.C. illumination. Materials shall be uniformly spread without runs or sags.
- G. All coating called for shall be applied in back of all fixtures, cabinets and tackboards before said items are secure in place.

3.3. STORAGE

- A. Flammable materials shall not be stored inside of the building, except single one-quart cans of each paint color may be kept in an approved location for touch up work at the end of the job.
- B. Flammable materials storage should be kept to a minimum of currently-in-use materials only. Overnight storage shall not be allowed in the building.

3.4. APPLICATION

- A. Application rates that are specified in these Specifications shall be considered as minimum rates but shall not supersede the coverage requirements specified herein or the recommendations of the Paint Manufacturer.
- B. It is the intent that all finish coating systems specified (excluding primer only) present a finished uniform appearance, free of lap marks, color variation, sheen variation and irregularities. Provide additional coats as needed to accomplish this finish intent.
- C. Application shall be per the following schedule except that, in no case, shall materials be applied over a base preparation not in accordance with the Paint Manufacturer's specifications. See Drawing Notes and Room Finish Schedule for finishing directions.
- D. See section 2 above of these specifications for products and applications Interior and Exterior Steel and Metal Work
- E. Interior Natural Wood Work and Custom Furnishings, Cabinetry and Millwork.
 - 1. Sand smooth and ease edges.
 - 2. Sanding sealer.
 - 3. Apply stain.

4. Steel wool and dust surfaces.
 5. Apply one (1) coat satin urethane varnish.
 6. Steel wool and dust.
 7. Apply second coat satin urethane varnish.
 8. Lightly steel wool with 5/0.
 9. Check for runs and apply third coat if needed for uniform sheen and coverage and steel wool.
- F. Additional finish systems shall be as described on the Drawings or elsewhere in the specifications.
- G. In general, all applications and product selections are to be consistent with good quality long life commercial finishing standards.

END 09 9000

1. GENERAL

1.1. DESCRIPTION

- A. Surfaced metal, marker boards, MB, tackboards, TB, tackable display strips, TS and accessories.
 - 1. See Sheet A-1.4 for schedule.
- B. Promethean Boards or Smart boards (PB)
 - 1. Located on drawings,
 - 2. See Schedule
- C. Display Screen Cafeteria wall
 - 1. 5/8" drywall glued and nailed to cmu sand to extra smooth finish
 - 2. Edge molding
 - 3. Sealant perimeter to wall
Prime and finish with multiple coats as needed of screen paint such as **Sherwin-Williams Dry Erase Poly Urethane Extra White.**

1.2. SUBMITTALS

- A. Submit under provisions of Section 01 3300:
 - 1. Shop Drawings: Indicate wall elevations, dimensions, joint locations and anchorage details. Field verify all conditions.
 - 2. Product Data: Provide data on chalkboards, tackboards, tackboard surface covering, and trim and accessories.
 - 3. Samples: Submit samples 4" X 4" in size illustrating materials and finish, color and texture of chalkboard and trim, tackboard and tackboard surfacing.
 - 4. Maintenance Data: Include data on regular cleaning and stain removal.

1.3. REGULATORY REQUIREMENTS

- A. Conform to flame/smoke rating of 25/25 maximum for vinyl fabric covered tackboards in accord with ASTM E84.

1.4. QUALIFICATIONS

- A. Manufacturer: Company specializing in manufacturing products specified in this section with minimum five (5) years' experience.

1.5. FIELD MEASUREMENT

- A. Verify field measurements.

1.6. WARRANTY

- A. Provide five (5) year manufacturer warranty on chalk and marker boards under provisions of Section 01 7800.
- B. Warranty: Includes chalkboard and surface from fading or discoloration not attributed to abuse, crazing, cracking, staining, or delamination.

2. PRODUCTS

2.1. VISUAL DISPLAY. All chalk, marker and tackboards will be selected from Manufacturer's full range of available colors. All tackboards will be one (1) color, all chalkboards will be one (1) color and all marker boards will be one (1) color throughout the work.

A. Marker Boards (MB)

- 1. Porcelain enamel on 24-gauge steel on not less than 3/8" particle board core with foil backing.
- 2. Trim to be extruded aluminum.
 - a. Chalk/Marker tray, triangular shape with snap-in ends.
 - b. Sides approximately one-inch (1") reveal.
 - c. Head rail one-inch (1") map rail with cork.
- 3. Manufacturers
 - a. Claridge Vitracite/LCS (Series 1)
 - b. Greensteel (AL Series)
 - c. Lemco (Type 5)
 - d. Tri-Adco, Phoenix, AZ (602) 271-0501
 - e. Newline

B. Tackboards (TB)

- 1. Vinyl on 1/8" cork on minimum 3/8" fiberboard.
 - a. Include structural backer such as press board or thicker fiber board as need for larger boards.
- 2. Trim to match chalk/markerboards less map rail end tray.
 - a. In some locations edge wrapped is specified in lieu of aluminum trimmed.
- 3. Manufacturers
 - a. Claridge #1380
 - b. Greensteel Type 7
 - c. Lemco #3358

- d. Tri-Adco, Phoenix, AZ (602) 271-0501
 - e. Newline
4. Tackboards mounted over lockers typically are edge wrap style
- a. See Plans and Schedule on Sheets-1.4.

C. Tackstrips (TS)

- 1. To be 2" style with end caps.
- 2. Manufacturers



- a. Claridge #74 Deluxe
- b. Greensteel Series 2000
- c. Lemco - Verify availability
- d. Tri-Adco, Phoenix, AZ (602) 271-0501
- e. Newline

D. Accessories

- 1. Flag holder - one (1) required per classroom.
- 2. Map clips - two (2) required per room.
- 3. Metal hooks - four (4) required per room.
- 4. Chalk/Marker trays shall be extruded aluminum with snap on trim to form triangular shape with snap in rounded end caps.

E. Projector screens (PS)

- 1. 14'-6" wide x 12' tall. Verify flat wall space available.
- 2. Typically bottom edge at 8' above floor, but be verified on site in conference with the district technology director.
- 3. 5/8" drywall glued and nailed to cmu sand to extra smooth finish
- 4. Edge molding
- 5. Sealant to wall
- 6. Prime and finish with multiple coats as needed of screen paint such as **Sherwin-Williams Dry Erase Poly Urethane Extra White.**

3. EXECUTION

3.1. EXAMINATION

- A. Verify site conditions, verify clearances and access and provide all boards in maximum length sections. Where split sections occur, they shall be of equal length for any specified run.

3.2. INSTALLATION

- A. Install chalkboards/marker boards and tackstrips in accordance with manufacturer's instructions, concealed fasteners.
- B. Secure units level and plumb.

- C. Carefully cut holes in chalkboards/marker boards and tackboards for thermostats, wall switches, and outlets, as occur.
- D. Ease all trim sharp edges and corners.
 - 1. Chalk trays shall have end caps with rounded corners.
 - 2. All edges of frames and trays shall be eased.
- E. Edge wrapped tack boards may be mounted with neatly positioned drive pins and adhesive.

3.3. CLEANING

- A. Clean chalkboard/marker board surfaces in accordance with manufacturer's instructions.
- B. Ease all trim sharp edges and corners.
 - 1. Chalkboard trays shall have 45 degree end cuts with resulting corners eased.

3.4. INSTALLATION

- A. Mounting height - display boards
 - 1. Unless noted, 36" above floor, **always verify with the Owner prior to install.**
 - 2. All lengths shown on the Drawings.
- B. Mounting height - marker boards
 - 1. Unless noted otherwise, 36 above floor, **always verify with the Owner prior to install.**
- C. Tack Strips
 - 1. Install 12" above lockers in corridors, 12" above Marker Boards and Tack boards in classrooms. **This is to be coordinated on site.**
 - 2. Accessory equipment for 2" tack strips include display hangers and flag holders. These are to be located as directed on site.
- D. Projection screen, cafeteria north wall, between windows, from sill to head, approximately

3.5. SCHEDULE

- A. See sheet A-1.4.
- B. Schedule Note: In some locations the lengths shown will be split by fire horn/strobes. Field verify conditions and locker spacing.

END 10 1100

1. GENERAL

1.1. WORK INCLUDED

- A. Aluminum letters, as shown on the Drawings and specified herein, for exterior building sign.
- B. Cast aluminum plaque.

1.1. SUBMITTALS

- A. Submit the following:
 - 1. Shop Drawings: Complete layout of lettering; fabrication and installation details
 - 2. Samples: One (1) sample letter may be installed in the finish work after approval
 - 3. Mounting template for Contractor.

2. PRODUCTS

2.1. MANUFACTURERS

- A. Ark Ramos Manufacturing Co., PO Box 26388, Oklahoma City, OK 73126, (800) 725-7266.
- B. Gemini Incorporated, 103 Mensing Way, Cannon Falls, MN 55009 (800) 538-8377, FAX 507/263-4887.
- C. Matthews Intl. Corp., 1315 W. Liberty Ave., Pittsburgh, PA 15226 (888) 838 8890, FAX: 412 571 5514.
- D. Metal Arts, 410 6th St. SE, PO Box 639, Mandan, ND 58554 (800) 237-8069, FAX: 701 663 0401

2.2. MATERIALS

- A. Letters – None scheduled
- B. Cast aluminum plaque black or brown leatherette background, approximately 32" X 24" showing
 - 1. Project Name,
 - 2. Board Members year, Board Officers, School Administrators
 - 3. Prime Contractors'
 - 4. Architect's name, Engineer's name,
 - 5. Sketch will be provided by A/E showing general layout. Fabricator to prepare an accurate Drawing from information provided.

a. Submit mock up drawing for owner review correct and resubmit as needed prior to casting

1. Concealed anchors into masonry.

C. Anchors

1. Non-corrosive.

3. EXECUTION

3.1. INSTALLATION - PLAQUE

A. Follow Manufacturer's instructions.

B. Final location to be determined in Entry Vestibule

END 10 1416

1. GENERAL

1.1. WORK INCLUDED

- A. General signage, see Schedule, this Section.

1.1. SUBMITTALS

- A. Shop Drawings: Show letter style and stroke for typical numbers and names in full size. Furnish a complete listing of all signs.
- B. Samples: Typical number and name screened on acrylic plastic in colors selected.

1.2. DELIVERY, STORAGE AND HANDLING

- A. Deliver, handle and store material at the job site as directed. Packaged material shall be in original containers with seals unbroken and labels intact until time of use. All damaged or otherwise unsuitable materials when so ascertained shall be immediately removed for the job site.

2. PRODUCTS

2.1. PLASTIC SIGNS

1. Standard would be Kroy Signature ADA tactile, raised letter or engraved letter, with raised braille. Kroy Sign Systems, 7575 E. Redfield Rd., Ste. 113, Scottsdale, AZ 85260, Midwest Regional Sales, 480-619-6080, beyer@kroysignsystems.com
2. Similar products are typically available at local sign shops, brand is not critical.

B. Plastic

1. 1/8" minimum thickness.
2. Multi color laminated
3. Colors to be selected.
4. Comply with ADA regulations for sign requirements.

A. Letter style to be Helvetica Medium, engraved to expose core color, one inch (1") high stroke.

1. Larger letters where noted.
2. Optional letters may be raised in contrasting color.

B. Type of Panels

1. Mount with double faced tape or adhesive as recommended by the manufacturer; message panels proportional size to message.

2. Install with double face adhesive strips **and** screws or small drive pins at masonry walls.

C. Braille - Comply with ADA.

1. All signs.

2.2. SIGN SCHEDULE

A. Rest Room signage, coordinate locations with A/E, approximately 8" x 8"

1. One "GIRLS" *cafeteria addition*: with international silhouette symbol plus accessible (wheelchair) symbol
2. One "BOYS" *cafeteria addition*: with international silhouette symbol plus accessible (wheelchair) symbol.
3. Two (2) *classroom addition* "WOMENS" with international silhouette symbol plus accessible (wheelchair) symbol
4. Two (2) "MENS" *classroom addition*: with international silhouette symbol plus accessible (wheelchair) symbol

B. Rooms: Show room number to be determined by Owner.

1. Nine (9) Include cut out panel that allows slip in card with teacher name and grade, approximately 8" x 8" with 3" x 8" slide in card panel.

- a. ROOM #109
- b. ROOM #110
- c. ROOM #111
- d. ROOM #128
- e. ROOM #129
- f. ROOM #130
- g. ROOM #206
- h. ROOM #207
- i. ROOM #208

2. 10" wide signs, x vertical as needed

- a. Two (2) "CAFETERIA
ROOM #131"
- c. One (1) "KITCHEN
ROOM #131B"
- d. One (1) "KITCHEN
ROOM #131C"
- d. One (1) "AUDITORIUM
ROOM # 12"

3. Nine (9) Mechanical room signs approximately 2 ½" x 5", these may mount on door frame head or door as directed by owner, these numbers are for maintenance use only not for public use. Braille not required.

- a. M3
- b. M4
- c. M8
- d. M9
- e. M10
- f. M11
- g. M12
- h. M13
- i. M14

- 4. One (1) "**Occupancy not to exceed 400**", Location: Cafeteria, size to be approximately 8 ½" x 11" in Health Life Safety code format

HLS format for occupancy signs but follow number requirement listed not the number shown on this sample:



3. EXECUTION

3.1. APPLICATION

- A. Examine all surfaces to receive the signs. Application or installation of signs constitutes acceptance of the existing conditions.
- B. Position each sign in its designated location.
 - 1. On wall adjacent to door latch jamb, top at 5'-0". Place immediately under side lights where they occur.
 - 2. Verify prior to mounting, some may need to be located at hinge jamb.
 - 3. Complete all finishes prior to mounting the signs.

C. Prepare surfaces and apply signs in accord with the manufacturer's recommendations.

1. Set with level.

3.2. When signs are thoroughly set, clean substrates of adhesive spots, temporary lines and centering, etc., prior to acceptance by Owner.

END 10 1423

1. GENERAL

1.1. WORK INCLUDED

A. General Contractor shall provide HDPE solid plastic toilet compartments, shower compartments and urinal screens floor mounted and head rail braced as shown on the Drawings and specified herein.

1. See requirements for additional head rail reinforcement.

B. Soap drip trays, see drawings sheet A-1.3 for detail

1. Eight (8) required

1.2. RELATED WORK

A. Specified elsewhere:

1. Division 00 – Procurement Requirements

2. Division 04 – 04 2000 Unit Masonry

3. Division 09 – Finishes

4. Division 22 – Plumbing

1.3. REFERENCES

A. ANSI A117.1 - Specifications for Making Buildings and Facilities Accessible to and Usable by Physically Handicapped People.

B. ASTM A167 - Stainless and Heat Resisting Chromium-Nickel Steel Plate, Sheet and Strip.

1.4. SUBMITTALS

A. Submit shop drawings and product data under provisions of 01 3300.

B. Indicate on shop drawings, partition plan and elevation views, dimensions, details of floor supports, and door swings. See Plan Drawings and Elevation Drawings, as applicable.

C. Provide product data on panel construction, hardware, and accessories.

D. Submit samples under provisions of Section 01 3300.

E. Submit two (2) samples 6" x 6" in size illustrating panel finish, color, and sheen.

1. Select from full range of colors and textures, including speckled.

2. Multiple colors may be selected for the work

F. Submit manufacturer's installation instructions per 01 3300.

1.5. MAINTENANCE MANUAL

- A. Submit information for insertion into the building maintenance manual showing all adjustments, parts and color descriptions and where replacement parts can be ordered, and complete care and cleaning instructions.

1.6. WARRANTY

- A. Provide extended manufacturer's warranty.
 - 1. One (1) year Labor & Materials
 - 2. Fifteen (15) years, HDPE material against corrosion, delamination
 - 3. Five (5) year extended hardware material against corrosion and failure.

2. PRODUCTS

2.1. APPROVED MANUFACTURERS

- A. General Partitions, Erie, PA (814) 833-1154
- B. Santana Solid Plastic Products, PO Box 2021, Scranton, PA 18501, (800) 368-5002 or (717) 343-7921
- C. Comtec Industries, 801 Corey St., Moosic PA 18507, (800) 445-5148 or (717) 348-0997, FAX: (800) 551-6993
- D. AMPCO Products, Sanger, TX (940) 958-7401
- E. Or approved equal.

2.2. MATERIALS

- A. Partitions: Heavy-duty solid core HDPE partition system with associated heavy duty hardware and brackets as noted below. Color to be selected by Owner.
- B. Head Rails:
 - 1. Standard extruded aluminum overhead rail.
 - 2. Provide additional reinforcement by 6" X 1" HDPE, secured through pilasters; mount on back side of pilaster near ceiling overhead rail.
 - a. At open ends return HDPE head rail to wall and secure.
- C. Screws, and Bolts Stainless Steel. Plastic/nylon wedge anchors are not acceptable.
- D. Hardware: Chrome plated nonferrous cast pivot hinges, gravity type, adjustable to door close positioning; nylon bearings, easy to operate lever slide door latch, door strike and keeper with rubber bumper, cast alloy

chrome plated coat hooks and bumpers.

1. Top, bottom and center pivot (3) each door.
2. Or 8" adjustable aluminum hinge top, bottom and center.
3. Or continuous geared hinge – concealed spring.

E. Mounting and intersecting brackets, (component to component and component to walls), full height, single-piece heavy duty extruded aluminum.

2.3. FABRICATION

A. Doors, Urinal and Side Panels: 1" thick x 60" high door & stalls, ADA accessible use where indicated on plans.

1. Typical stall doors 2'-2" wide, in-swing.
2. Accessible stall doors 3'-0" wide, out-swing where detailed.
3. Always consult plans.
4. Stall dimensions may be custom, see plans.

B. Pilasters: Of sizes required to suit cubicle width and spacing.

1. 1" thickness.

C. Pilaster Shoes: Formed ASTM A167 Type 304 stainless steel with No. 4 finish or HDPE solid plastic.

1. Anchor to pilaster on backsides with minimum two (2) stainless steel screws.

D. Latch/lock hardware to be ADA style with convenient lever handle, all stalls.

2.4. ACCESSORIES

A. Double roll heavy duty toilet paper holders.

B. Coat hook / bumper

C. HDPE shelf 1" X 10" X 18" mounted at 54" on rear wall, or as indicated on plans, use wall bracket to anchor. Locate in corner and back screw through adjacent partition.

D. ADA grab rails

1. Stainless steel, 42" on side, 36" across rear per ADA and Illinois Accessibility code. ADA stall only.

E. Lock hardware, heavy-duty, lever / operating ADA compliant or slide.

1. Rubber bumper on strike stop

3. EXECUTION

3.1. EXAMINATION

- A. Verify that site conditions are ready to receive work and that opening dimensions are as indicated on shop drawings and in compliance with instructions by the manufacturer.
- B. Verify correct spacing of plumbing fixtures.
- C. Verify correct location of built-in framing, anchorage, and bracing, where required.
- D. Beginning of installation means acceptance of existing substrate.

3.2. INSTALLATION

- A. Install partitions, secure, plumb, level, and in accordance with manufacturers' instructions.
- B. Wall receivers to be continuous as noted before and anchored rigidly to walls or intersecting panels.
- C. Attach panel and short shelf brackets securely to walls using mechanical anchor devices.
 - 1. Panel connection at wall and pilasters shall be done with continuous bracket/angles securely anchored to walls using stainless steel devices.
- D. Attach panels and pilasters to bracket with through sleeve stainless steel tamperproof bolts and nuts.
- E. Provide adjustment for floor variations with screw jack through steel saddles integral with pilaster.
 - 1. Conceal floor fastenings with pilaster shoes.
 - 2. Anchor pilaster shoes to pilaster with stainless steel screws on backside of pilaster.
- F. Support pilasters from built-in framing using minimum of two adjustable studs to provide leveling.
- G. Pilaster Standard height.S
- H. Install door strike and keeper with rubber door bumper on each pilaster in alignment with door latch.
- I. Adjust hinges to locate doors in partial opening position when unlatched. Return out-swing doors to closed position.

- 3.3. ADJUSTING. Adjust and align hardware to uniform clearance at vertical edge of doors, not exceeding 3/16".
- 3.4. SOAP DRIP TRAYS
 - A. Coordinate with fixtures and Owner for locations and mounting heights.
- 3.5. CLEANING
 - A. Remove protective masking and all labels. Clean surfaces.
 - B. Field touch-up of scratches or damaged finish will be permitted only with prior approval of Owner.
 - 1. Replace damaged or scratched materials with new materials.
 - C. Provide cleaning instructions and instructions for removing graffiti and scratches.

END 10 2113

1. GENERAL

1.1. DESCRIPTION

A. Contractor shall furnish and install as listed per schedule:

1. All handicap accessible grab bars by Contractor
2. Soap dispensers by owner install by contractor
3. Toilet paper dispensers in all new toilet compartments, furnish by owner, install by contractor
4. Paper towel dispensers, furnish by owner, install by contractor
5. Soap dispenser drip shelf by contractor see specification in HDPE toilet partition specification and detail on sheet A-3.1 by contractor.
6. Sanitary napkin/tampon dispenser by contractor
7. Sanitary Napkin/tampon disposal receptacles, by contractor

1.2. RELATED WORK

A. Specified elsewhere

1. DIVISION 00 - PROCUREMENT REQUIREMENTS
2. DIVISION 01 - ADMINISTRATIVE REQUIREMENTS

1.3. SUBMITTALS

A. Submit the following in accordance with 01 3300:

1. Manufacturer's Literature: Materials description and installation instructions for products.

2. PRODUCTS

2.1. COMPONENT BY APPROVED MANUFACTURERS

A. Stainless Steel Grab Bars

1. Manufacturers
 - a. G.M. Ketcham Inc., 30 Commercial St., Freeport, NY 11520, Phone 516/379-3500, FAX 516/379-3187 Series C534SS.
 - b. Miami-Carey, Monroe, OH, Series GB5100.
 - c. Bobrick Washroom Equipment, Inc., Northway 10 Industrial Park, Clifton Park, NY 12065-1399, Phone 518/877-7444 FAX 518/877-5029, Series B-490.
 - d. Bradley Corporation, P O BOX 309, W142 N901 Fountain Blvd., Menomonee Falls, WI 53051, Phone 414/354-0100 FAX 414/354-8327, Series 837.
 - e. ASI 441 Saw Mill River Road, Yonkers, NY 10701, Phone 914/476-9000

2. Product quality shall require that the bars be 1-1/2" o.c., stainless steel, material thickness minimum 18 gauge with side of the bar.
 3. Each set includes one at 42" and one at 36" (two at 42" in narrow stalls) or one (1) 48" X 36" corner style, see Plans.
- B. Mirrors - provide one (1) at each lavatory or lavatory station.
1. Glass mirrors - 1/4" laminated glass, frames welded, stainless steel with concealed fasteners.
 2. 24" W X 36" H.
 - a. Bobrick B-165 Series – welded corners
 - b. McKinney 160 Series
 - c. Bradley 780
 - d. Epco #136
 - e. ASI 0600 A – special laminated glass
 - f. Or equal
- C. Soap Dispensers - provide one (1) for each restroom lavatory.
1. Provided by Owner, installed by Owner.
- D. Drip Tray
1. See Detail 8/A1.4.
- E. Toilet Paper Dispensers
1. Large roll - Double roll style,
- F. Hand Towel Dispensers - provide at each lavatory and classroom with lavatory and as scheduled below. Single fold hand towels (white or stainless finish).
1. Provided by Owner, installed by contractor.
- G. Sanitary Napkin/Tampon dispenser
1. Free dispenser
 2. Surface mount
 3. Stainless steel
 4. Bradley Model 426
 5. American Specialties Inc, ASI, Model 0864
 6. Bobrick B-2706C
 7. Or equal
- H. Sanitary napkin waste receptacle with shelf
1. In each women's restroom toilet stall
 2. Stainless steel
 3. Surface mount
 4. Bradley 4791-15

5. Or equal
6. Provide 1000 count replacement liner for project

3. EXECUTION

3.1. INSTALLATION OF ACCESSORIES

- A. Make installations in accordance with the drawings.
- B. Attachment of accessories in compliance with 0155 - Anchorage & Fastenings.
- C. Mounting heights and location: (Always verify with A/E at site)
 1. Grab bars - 42" bar side wall, 33" high, 12" from back wall and 36" bar back wall, 6" from corner.
 2. Shower Room grab bars 35" X 18" around corner mounted 34" high.
 3. Toilet paper dispenser, center at 26" above floor, 36" from back wall.
 4. Mirror, bottom edge at 38" off floor at regular height sinks, align tops when lavatory is lower.
 5. Soap dispenser, between lavatories, so it drips on ledge provided.
 6. Paper towel dispenser, operating height 40" maximum or verify at job site.

3.2. TOILET ACCESSORIES

- A. Staff Restrooms R17 and R18 per room
 1. One (1) set grab bars
 2. One (1) towel dispenser
 3. One (1) toilet paper dispenser
 4. One (1) soap dispenser
 5. One (1) drip ledge
 6. One (1) mirror
- B. Boys' and Girls' Restrooms R19 and R20 per room
 1. One (1) set grab bars
 2. toilet paper dispensers (2) boys and (4) girls
 3. Three (3) soap dispensers
 4. Three (3) drip trays
 5. Three (3) mirrors

END 10 2800

1. GENERAL

1.1. DESCRIPTION

- A. Provide all fire extinguishers and cabinets as scheduled and shown on the Drawings.

1.2. QUALITY CONTROL

- A. All extinguishers shall be UL rated and installed at proper height according to NFPA.

2. PRODUCTS

2.1. CABINETS

- A. Cabinets where called for shall be brushed natural anodized aluminum, acrylic full glazed door, glazing clips all four (4) sides with appropriately sized square edge return trim as needed.
 - 1. Recessed or semi recessed as appropriate to conditions.
 - 2. Nominal inside dimension 24" high X 9.5" wide X 6" deep
 - a. Flush trim (1/2" nominal) at 8" masonry walls
 - b. 1" nominal trim depth at 6" stud or CMU walls.
 - 3. "Academy" by J.L. Industries, 4450 W. 78th Circle, Bloomington, MN 55435 (612) 835-6850 FAX (612) 835-2218.
 - 4. "Architectural Series" by Larsens Manufacturing Co., 7421 Commerce Lane N.E., Minneapolis, MN 55432 (612) 571-1181 FAX (612) 571-6900.
 - 5. "100 Series" by Modern Metal Products, County Rd. 45 North, PO Box 247, Owatonna, MN 55060-0247 (507) 451-7114 FAX (507) 451-0882.
 - 6. "1700 Series" by Potter-Roemer, 1119 Morris Ave., PO Box 745, Union, NJ 07083-3305 (201) 964-5775 FAX (201) 964-9056.
 - 7. Larsen Gemini series.
 - 8. Or approved equal.

2.2. BRACKETS

- A. Provide manufacturer's standard wall brackets for all wall hung extinguishers.

2.3. EXTINGUISHER

- A. Extinguishers unless noted shall be UL rated, 4A/10BC UL rated, 10-lb. dry chemical except where noted otherwise.
- B. Kitchen extinguisher, 2.5 gallon Class K wet chemical 2A:K/UL rated.

- C. All extinguishers shall bear an in service or inspection date within one (1) month of substantial completion.

3. EXECUTION

3.1. INSTALLATION

- A. Install all extinguishers according to NFPA height recommendations which are top of extinguisher below 5' for 40 lbs. or less total weight extinguishers, for over 40 lbs., not more than 4' off floor.
 - 1. Generally, cabinets to be installed with top at 56",
 - 2. Bracket mounted extinguishers, install bracket at 50" with metal expansion anchors, no nylon or plastic.
- B. Cabinets shall be neatly installed and anchored. Cabinets showing poor fit to wall shall be adjusted as directed by the Architect.

3.2. SCHEDULE: See drawing sheets A1.1 and A-1.2 for locations

- 1. Kitchen - 1 ÷ wall bracket – 2A-K rated
- 2. Cafeteria (2) with cabinets – 4A/10BC
- 3. Corridor C1 NE - One (1) with cabinets – 4A/10BC
- 4. Corridor C2 NE One (1) with cabinet – 4A/10BC
- 5. Reading Center - Two (2) with cabinet partial recess– 4A/10BC

END 10 4400

1. GENERAL

1.1. WORK INCLUDED

A. Base Bid

1. Sheet metal corridor lockers as shown on the Drawings and specified herein.
 - a. Kitchen 12" wide x 15" deep 60" high, plus slope top
 - b. Classroom addition corridor double tier, 15" wide x 12" deep 36" high (72" total) plus slope top.
 - c. Classroom addition, one full height locker each floor with opening cut at 30" above floor for trash can and trash toss.
 - 1) Trash opening approximately 12" x 8" in face of door.
 - 2) Coordinate exact requirements at submittal time.
2. Associated trim and base work
3. Coordinate with carpentry and floor to provide 4 1/8" base recessed 3"
 - a. Construct base with 2x4 and 5/8" plywood
 - b. Wrap plywood with trim metal
 - c. Cover with resilient base properly fit.
4. Illinois Steel Procurement Act 30 ILCS 565

1.2. RELATED WORK

A. Specified elsewhere

1. DIVISION 00 – PROCUREMENT REQUIREMENTS
2. DIVISION 01 – ADMINISTRATIVE REQUIREMENTS
3. DIVISION 09 – FINISHES

1.3. QUALITY ASSURANCE

- A. Installers to be experienced in setting and adjusting the lockers for smooth operation.
- B. Check every locker for fit and finish

1.4. SUBMITTALS

- A. Sample locker, demonstrating hardware, ventilation options, steel gauges, hooks, shelves construction methods
- B. Drawings for review

- C. Samples of trim detail to confirm it will be workable prior to fabrication.
- D. Provide letter to certify compliance with Illinois Steel Procurement Act.

1.5. WARRANTY

- A. Five (5) year minimum (or Manufacturer's advertised if extended.)
 - 1. All operable latch parts
 - 2. Hinge
 - 3. Adjustment

2. PRODUCTS

2.1. LOCKERS

- A. Heavy Duty welded steel.
- B. Acceptable Manufacturers/Fabricators;
 - 1. Lyon Metal Products, Inc., PO Box 671, Aurora, IL 60507-0671, phone 630/892-8941 or 800/323-0096 FAX 630/892-8966
 - 2. Republic Storage Systems Co., Inc., 1038 Belden Ave., NE, Canton, OH 44705, phone 330/438-5800 or 800/477-1255 FAX 330/454-7772
 - 3. Penco Products, Inc., 99 Bower Ave., Oaks, PA 19456, phone 610/666-0500 or 800/562-1000 FAX 610/666-7561
 - 4. Medart Locker Company , Cleveland Ohio, 888/446-5797
 - 5. DeBrough, LaJunta, CO, 800/328-8829
 - 6. Olympus Lockers and Storage Products, Minneapolis MN, 888/746-8060
 - 7. Art Metal Products, Deerfield Beach, FL, 800-252-5633.
 - 8. Or Equal
- C. The above list indicates manufacturers that are approved but **does not** guarantee or imply:
 - 1. That they assemble a product as specified for application to meet these specifications. Rather from the catalog information they appear to be able to comply. Always verify product to match specification requirements or clarify variations prior to bidding a particular locker model or assembly.
 - 2. Listing by name does not imply they are approved if they do not have a compliant locker style or cannot custom adapt one to meet specifications.
 - 3. **Listing by manufacturer does not infer that we are aware of the ability to comply with the Illinois Steel Procurement Act 30 ILCS 565**
- D. Single tier – kitchen 12" wide X 15" deep X 60" high plus sloped top

- E. Double tier – Corridor classroom addition 15” wide x 12” deep x 36” high, (72”) total height, plus sloped top. (see also 1.1 above for trash locker space)
1. Welded Heavy duty construction.
 - a. Can be welded into groups of One (1) to six (6) installers option
 - b. Verify groupings to fit specified count
 2. High and low louvers, four (4).
 3. Finish: Powder coat, or equivalent baked finishing system
 - a. After fabrication of parts so all surfaces are covered
 - b. Touch up after installation
 4. Hardware:
 - a. Continuous hinge.
 - b. Stainless steel recessed lift handle latch mechanism that will receive padlock.
 - 1) Two point latching up to 48”, three point latching greater than 48”
 - c. Padlock is by others.
 - d. Coat hooks cast aluminum or zinc, manufacturer’s standard heavy duty style,
 - 1) Single tier lockers, side wall double style and center double style, each locker.
 - e. Rubber silencers.
 - f. Aluminum number plates to be riveted to doors. Numbers to be as directed by the Owner and may include a Letter and up to 4 digits, lightly embossed and contrasting color to plate surface.
 5. Metal gauges and requirements:
 - a. Backs and interior sides 18 gauge
 - b. Bottoms and shelves 16 gauge
 - c. Locker face frame 16 gauge, all perimeters to return and form stop.
 - d. Door 14-gauge.
 - e. No rough or unfinished edges or corners that could snag clothing or cause injury or cut in normal use.

6. Provide top shelf
 - a. 12 down" on single tier
 - b. 8" down on double tier lockers.
 - c. 16 gauge, "j" return all around.
7. Slope head, trim to wall, 16 gauge with internal supports.
8. Fillers and trim accessories to infill to fit, gauges of metal commensurate with the condition encountered.
 - a. End fillers
 - b. End caps
 - c. Base wrap trim
9. End caps

3. EXECUTION

3.1. INSTALLATION

- A. Verify 4" high locker base. Examine all surfaces to receive the parts of work specified herein. Verify all dimensions of in-place and subsequent construction. Application or installation of lockers constitutes acceptance of the existing conditions.
 1. Install the base with the trim cap verified to be ¼" behind the locker frame face.
 2. Always verify before fabrication the installation conditions at every location
 3. Coordinate the soffit work to fit and the new head trim as detailed.
- B. Install lockers at the locations shown in accordance with the manufacturer's instructions, anchoring securely to supporting construction.
 1. All welded construction, Contractor shall inspect and verify job access and material handling such that welded groups are manageable.
 2. No raw metal edges to the corridor side, all edges must return or hem for lockers, and all trim.
 3. End caps at all end of run locations, single piece to fit locker and slope top
- C. Adjust doors and locking devices for proper operation. Instruct Owner's personnel in proper operation and maintenance of lockers.
- D. Level and adjust all runs to present a finished aligned appearance and smooth operation.
- E. Carefully measure and install all trim

1. Wrap back trim at ends to eliminate open gaps and provide finished appearance
2. Hem or return all edges
3. Concealed fastener methods to be used except where detailed and not possible.
4. Touch up as needed
5. Long runs may need minor allowance for expansion and contraction in the end trim detail.

F. RELATED WORK

1. Related work by GC, finish patch and paint surrounds as needed for new installation appearance.

3.2. LOCKER SCHEDULE

A. See Plans for layout.

1. Always inspect for conflict in installation, verify with the A/E
2. Floor plan governs locker count
 - a. Approximately (292) shown
 - b. (5) at 60" tall with slope tops
 - c. (6) at 60" tall with slope tops
3. Always field measure for fillers and final count.

END 10 5113

1. GENERAL

1.1. WORK INCLUDED

A. Base Bid Kitchen

1. Food Service equipment and accessories
 - a. Utility rough-ins and facility preparation
 - b. Equipment
 - c. Installation
 - d. Start-up and training
 - e. Two (2) year service / extended warranty
 - f. Relocate Owner's existing to be reused.
2. Existing equipment, relocate existing dishwasher, re-plumb accordingly and power service to be adapted accordingly.

1.2. RELATED WORK

A. This work shall be coordinated with the General Construction, Electrical, Plumbing, Mechanical, Ventilating and trades, and Fire Protection work. This Contractor shall review Mechanical and Electrical Drawings and include the cost of additional utility extension and installation needed to complete the installation and make properly operable.

1. When coordinating utilities provide accurate dimensional and utility requirements and power requirements.
2. Inaccurate or untimely coordination information is the responsibility of the General Contractor.

B. Specified elsewhere

1. DIVISION 22 – Plumbing
2. DIVISION 26 – Electrical
3. DIVISION 23 HVAC – Ventilation

C. Intent

1. Operable, properly installed equipment.
2. Comply with manufacturer's standards.
3. Comply with health codes.
4. Provide a functional serving Kitchen.

1.3. QUALITY ASSURANCE

A. Whenever the term "Food Service Equipment Supplier" or "Kitchen Subcontractor" is used, it shall mean the General Contractor or his assigned Subcontractor.

- B. Any questions concerning these Specifications or Drawings shall be directed to the Architect.
- C. All equipment of brand name manufacturer shall be of the latest model or succeeding model at the date of bidding documents.
 - 1. Equivalent equipment of alternative manufacturers may be submitted for consideration a minimum of ten (10) days before bidding.
 - a. Same features.
 - b. Fit conditions and dimensions.
 - c. Include any modifications of rough-ins needed.

1.4. REGULATORY AGENCIES

- A. All equipment and equipment modifications shall comply with the following:
 - 1. National Sanitation Foundation (NSF) standards
 - 2. Federal and State and Local Health Codes
 - 3. USDA, Illinois Dept. of Public Health
 - 4. McDonough County Health Department, Environmental Health.
 - 5. NFPA 54, NFPA 96, NFPA / NEC
 - 6. IBC 2006 / IMC 2006
- B. All gas equipment to be UL and AGA approved.
- C. All electrical equipment shall bear Underwriter's stamp of approval.

1.5. SUBMITTALS

- A. Submit the following in accordance with Section 01 3300:
 - 1. Manufacturer's Literature: Description of each piece of equipment, including installation and operating instruction
 - 2. Shop Drawings:
 - a. Within ninety (90) calendar days after award of contract, the Food Service Equipment Supplier shall furnish submittal data fully describing the proposed equipment, option dimensions and all information needed for utility requirements and locations.
 - b. Drawings / Schedule describing all rough-in and utility connection requirements.
 - 3. Operating and Maintenance Manuals.
 - 4. Equipment Warranties.
 - 5. Provide Certification of materials.

1.6. JOB CONDITIONS

- A. Food service equipment supplier/installer shall visit the job site or

coordinate with the General Contractor prior to installation of utility rough-ins.

1. Verify all hookups and locations of service.
2. Verify all capacities, i.e., amps, voltage, connection size, etc.
3. Provide sketch as needed for use by Mechanical/Electrical trade Contractors.

B. The Food Service Equipment Supplier or as coordinated with the General Contractor shall visit the job site to check mechanical rough-ins, prior to the pouring of the floor slabs and adjust as necessary of any discrepancies.

C. Cost to relocate or add utility lines or services due to the failure of the Food Service Equipment Supplier or the assigned coordinator to verify their proper location prior to the pouring of the floor slabs will be assumed by said Food Service Equipment Supplier.

1.7. PRODUCT DELIVERY, STORAGE & HANDLING

A. Deliver, store and handle equipment so as to prevent damage, or disfigurement. Protect all surfaces with covering during transit. Provide temporary skids under units weighing more than 150 lbs. All damaged, or otherwise unsuitable, equipment when so ascertained shall be immediately removed from the job site and replaced with new.

B. See 02 4116 Minor Demolition for Remodeling for Owner salvage of materials.

1.8. SPECIAL WARRANTY

A. All manufactured equipment shall carry equipment manufacturer's extended two (2) year guarantee dated from Substantial Completion acceptance of the Kitchen.

1. Five (5) year refrigeration system extended warranty on refrigeration equipment

B. The Contractor shall warrant the food service equipment work to be free of faults and defects in accordance with the General Conditions, except that the warranty shall include start up and periodic adjustments to get equipment functioning correctly. General maintenance and clean up per manufacturer's instruction is to be by Owner.

2. PRODUCTS

2.1. CUSTOM FABRICATED EQUIPMENT

A. The following are basic specifications for items of custom fabricated equipment covering the type and quality of materials, the method of fabrication, assembly and design and will be referred to in the itemized specifications by the term, "As Specified".

- B. All items of custom fabrication shall be the product of the single manufacturer of such equipment so as to ensure uniformity throughout.
- C. All metal gauges shall be United States Standards.
- D. All workmanship shall be of the finest and all materials shall be new, of best quality and without flaws.
- E. All metal work stainless steel, unless specified otherwise:
 - 1. Type 302/304 18-8 analysis, chrome-nickel bearing steel.
 - 2. All exposed surfaces shall be standard No. 4 finish.
 - 3. All fasteners non-magnetic stainless steel.
- F. All piecing of stainless steel, whether on cabinet surfaces or bases, shall be continuous welded joints. All welded joints shall be smooth and polished to the original finish, cove inside corners.
 - 1. Welds shall be without warping adjacent sheets, grind, fill, regrind and polish.
 - 2. Flat areas shall be backside supported with stainless steel angle or channels to brace against warping or bowing with use.
 - a. Concealed from view reinforcing may be hot dip galvanized.
- G. Pipe Stands and Open Base Tables:
 - 1. All pipe stands shall be constructed of 1-5/8 inch O.D., 14 gauge stainless steel tubing, unless noted otherwise, with all pipe joints welded, ground smooth and polished. Assembly of pipe stands by use of threaded or slip joint fittings will not be accepted. Tables over 6 feet in length shall have legs spaced not over 5 feet apart. Legs to be fitted at top with stainless steel full closed gussets, welded to the channel underbracing, or the table tops, and shall be fitted with approved, polished, stainless steel Bullet type adjustable feet, with the adaptation being internal.
 - a. Bullet feet for moveable (semi-stationary) equipment.
 - b. Swivel castors for moveable equipment, two (2) locking.
 - c. Use flanged feet for equipment bolted to floor.
- H. Field Joints:
 - 1. All field joints in both tops and cabinet bases shall be completely welded on the job and ground smooth and polished to match original finish. Tack welding will not be accepted.
 - 2. Employ stainless steel welding rods of approximate temperature and chemical make up for parent material being welded.
- I. Service Pipe Chases:
 - 1. Cabinet bases are to be so constructed with adequate pipe chases

provided in the equipment prior to delivery to the job site. If necessary to the job site, they are to be provided by the Food Service Equipment Supplier and are to be adequately finished to the complete satisfaction of the Owner.

J. Drain boards and Counter tops:

1. To be constructed of 16-gauge stainless steel minimum, and are to be welded integral with sink compartments.
2. Have all vertical and horizontal corners coved.
3. Underside treated with sound deadened material and painted aluminum.
4. Exposed edges to be as constructed for sinks and where adjacent to walls, or adjoining equipment, to be turned up eight inches (8") and back two inches (2") on a 45-degree angle.
5. Drain boards less than three feet (3') long to be supported on pipe stands as previously specified.
6. Unless otherwise noted the drain boards will be 1½" inches deep, pitched to drain into sink.
7. Counter tops shall support a minimum of 50 lbs. per square foot and a 300 lb. concentrated load, (not concurrently applied) without noticeable deflection.

K. Elevated Shelving:

1. All elevated shelving shall be of length and width specified and constructed of 16-gauge stainless steel minimum, unless noted otherwise. All exposed edges shall be rolled down 1-3/4 inches. Where butting wall or other equipment, the edges shall be coved up two inches (2"). Shelving shall be spaced and mounted as specified in itemized specifications. See Drawing for special rim conditions.

L. Closure Plates:

1. All equipment bodies, where resting on bases, or against walls or columns shall have 20 gauge stainless steel closure plates, where any gaps may occur due to interferences or wall irregularities.

M. Switches and Controls:

1. All switches and control boxes to be NEMA-4 SS stainless steel.
2. All start-stop switches to have 2" diameter mushroom head, red stop switch.

N. Tray Slide:

1. Tray slide to be die-formed 18-gauge stainless steel with three (3) raised rubbing rails, raised guide rail edges, approximately ¾" above rubbing rails. Joints between sections aligned with underside plate and welded and ground smooth to fit over low wall.
2. Material may be manufactured by Duke Manufacturing Co., St. Louis, MO, shop fabricated, or other manufacturer.

2.2. EQUIPMENT

- A. Equipment listed below is by manufacturer and model number to indicate acceptable material and equipment. It is the intention of the architect to consider products other than those listed, however the architect must have substitute equipment name, model number, and catalog cut, ten (10) days before bidding so that the equipment can be reviewed for acceptability and an addendum issued.
- B. Without exception, regardless of specification, all equipment to comply with NSF, NFPA, UL, FDA requirements and the Illinois Dept. of Public Health as interpreted by local county inspectors unless specifically exempted. upgrade specified items as needed to comply.
- C. Base Bid Equipment (Item number corresponds to Drawings). All equipment is stainless steel with #4 finish. See Appendix 11400A at the end of this section for equipment clarification.

2.3. Equipment List (*the term 'provided' means delivered, supplied assembled, installed, adjusted, and made operable.*)

- A. Item 1 - Scullery sink new item, provided by General Contractor
 - 1. 30" x 180" (15 0", field verify installation limitations and if it needs to be field assembled from two pieces to get into the space) standard height approximately 34" work surface height.
 - 2. (3) bowls 24"x26"x 14" deep
 - 3. (2) drain boards 36" and 72", disposer mounted in the 72" end
 - 4. One disposer cone 18" to fit the selected commercial disposer:
 - a. Center approximately 21" from the left end. See Item 1A for full description.
 - 5. Provide bracket to mount disposer control center, positioned so control assembly is under table approximately 1" to 2" back from face of sink edge. (*not a knee knocker*)
 - 6. Coordinate new faucets and sprayers and listed below or as
 - 7. Standard raised front rolled edge.
 - 8. 12" rear back splash for faucet mounts.
 - 9. Adjustable bullet feet.
 - 10. New Faucets, Sprayers, Drains
 - a. Chicago Faucet [510-G613L15XKCAB](#)
 - 1) Back mount
 - a) sprayer
 - b) vacuum breaker
 - c) full flow
 - d) 1.25 gpm sprayer.
 - e) 14" swivel spout

- b. Chicago Faucet [510-G613L15XKCAB](#)
 - 1) Back mount
 - a) NO SPRAYER
 - b) full flow
 - c) 14" swivel spout
 - c. See also below in disposer Item 1A description for back mount sprayer for disposer.
 - d. Drains – Chicago Faucet 1366-NF 2" twist quick drain
 - 1) Three (3) required.
 - 2) Pipe through 2" copper over to floor sink.
 - e. T & S Brass equivalent allowed.
11. Verify delivery conditions to determine if it can be delivered in one piece or must be field assembled.

B. Item 1A Disposer, provide by General Contractor

- 1. Hobart FD4/200, 208v 3 phase 2hp
- 2. Group D
- 3. 18" cone with feed opening
- 4. ½" water swirl
- 5. Group 6 control
- 6. Chicago Faucet pre-rinse sprayer, Model #510-GCTFABCP wall mount to back splash and support bracket.

C. Item 1B Drying shelf and pan rack

- 1. Wall mount such as Advance Tabco PS-10-48
 - a. Stainless steel with bar and pot/pan hooks
 - b. Mount to drain back into sink
 - c. Mount 30" above drainboard or as directed.

D. Item 2 - Prep sink and table new item provided by General Contractor.

- 1. 30" x 156" with single bowl size bowl outlet to receive a future commercial disposer if desired.
- 2. Bowl 24" x 26" x 9"
- 3. Front and ends standard rolled edge
- 4. Rear and left end 12" back splash.
- 5. Undershelf either side of sink.
- 6. Provide two (2) Stainless steel with stainless steel drawer body, double drawer sets, approximately 18" x 24" x 6" drawers, mount uniformly near ends of counter.
- 7. Provide strainer and stop for left sink

8. Faucets, Sprayers,
 - a. Chicago Faucet [510-G613L15XKCAB](#)
 - 1) Back mount
 - a) sprayer
 - b) vacuum breaker
 - c) full flow
 - d) 1.25 gpm sprayer.
 - e) 14" swivel spout
 - 2) Quick Drain Chicago faucet 1366-NF-2"

E. Item 3 and 3A – Three (3) well hot serve, steam table two side work access, new item provided by General Contractor.

1. Thermaduke E-3-CBPG/E-2-CBSS or equivalent
2. Stainless steel construction
3. 4000 watts verify selected equipment
4. 208 volt 10.8 amps single phase, 20 amp circuit(verify) NEMA L14 30P
5. Provide rubber cord
6. Stainless steel shelf work side
7. Under shelf, full width
8. Upper shelf and sneeze guard assembly required
 - a. Nominal 10 to 12" wide manufacturers standard is acceptable.
 - b. Framed to be rigid against side sway without using glass to brace
9. Four (4) casters, two (2) locking casters
10. Standard working height, approximate 36"
11. Provide pan drains to floor sink below, may be heat resistant hose with easy access drain valves.

F. Item 4 – cold holding provided General Contractor

1. CresCor – R-171-SUA-10E or equivalent
2. Cold serve with rack to receive standard serving pans.
3. Stainless steel construction, stainless steel interior frame
4. 5 amp 120v NEMA 5-15P
5. Compressor enclosure below stainless steel
6. Four (4) casters, two (2) locking casters

G. Item 5–Sill shelf below counter window, new items by General Contractor

1. 16 gauge stainless Steel
2. Verify blocking required underneath should be 2 x 12 to get the serving level at 34" to match the serving carts
3. Nominal 48' x 18

- a. Equal overhang both sides
 - b. Return front and back edges to cover top of wall and any blocking provided.
 - c. Close ends where open either side of jamb.
 - d. Brace to be rigid, weld to jambs
 - 4. Coordinate to have rolled edges front rear and ends beyond jamb frame to finish and make attractive.
 - 5. Coordinate or provide also stainless steel jambe to mount behind door guides and weld to shelf surface.
 - 6. Trim out under side to cover all wood.
 - 7. Provide underside anchor clips to secure to wood blocking below.
 - 8. Secure wood blocking to masonry.
- H. Item 6 and 6A – Roll up doors, see specification 08 3313, provide by General Contractor
- 1. Stainless steel wrapped jambs weld to sill item 5 and 5A.
 - 2. Item 6 – 48” wide x 60” vertical, jamb mount
 - 3. Item 6B – 60” wide x 96” tall jamb mount
- I. Item 7 – Stainless Steel Wire Shelving, new items provide by General contractor
- 1. Specification basis is Metro Super Erecta Stainless Steel.
 - 2. All sets, 4 post, no shared posts.
 - 3. Always check and coordinate size for intended location.
 - a. Or equal
 - b. All are 63” nominal post
 - c. NSF legs
 - d. casters.
 - e. Two (2) locking
 - 4. Dry Storage and dish room
 - a. Seven (7) units at 60” X 24”
 - b. Casters, two locking.
 - c. Four (4) shelf
- J. Items 8 / 8A / 8B - Work table 30” x 54” two required new items by GC
- 1. Design Basis Duke Aerohot Deluxe, 16 gauge, rolled edges, pipe legs adjustable bullet feet with undershelf
 - a. Advance Tabco
 - b. Shop fabricated equal
- K. Item 8C / 8D – Work Table 30” x 24” new provide by General Contractor.
- 1. Design Basis Duke Aerohot Deluxe, 16 gauge, rolled edges, pipe

legs adjustable bullet feet with undershelf

- a. Advance Tabco
- b. Shop fabricated equal

L. Item 8E / 8F Work Table 30" x 60" with sneeze guard and upper shelf provide by General Contractor

1. Design Basis Duke Aeroheat Deluxe, 16 gauge, rolled edges, pipe legs adjustable bullet feet with undershelf, sneeze guard and upper shelf

- a. Advance Tabco
- b. Shop fabricated equal.

2. Item 9 – double stack convection oven, provide and install by General Contractor

- a. Southbend G Series GS 25, 180,000 Btuh, (2) at 90,000 Btuh; cook and hold.
- b. Vulcan VC44G series 100,000 Btuh (2) at 50,000 Btuh; cook and hold
- c. Options

- 1) Regulators
- 2) Casters, front locking
- 3) Cable restraint kit
- 4) Stainless steel oven interior
- 5) Quick connect gas to manifold
- 6) Two (2) extra oven racks (six (6) per oven total)
- 7) Insulated construction
- 8) Two (2) year warranty minimum

M. Item 10 – Relocate existing hot holding cabinet by General contractor

N. Item 10A – Future hot or cold holding, not in contract

O. Item 11 – Refrigerator, two door commercial

1. Specification basis is Traulsen G20010 model.

a. Equivalent True or Arctic Air similar features and capacity.

- 2. Right / left hinged doors center open
- 3. Stainless Steel Construction
- 4. Nominal 45.9 sq. ft.
- 5. 10 adjustable shelves, (5) per side.
- 6. Casters, (2) lockable
- 7. 120 volt 5 amp, 15 amp circuit NEMA 5-15P
- 8. Nominal 52.2" wide, by 35" deep x 83.5" tall
- 9. Interior nominal

- P. Item 12 – Freezer, two door commercial
 - 1. Specification basis is Traulsen G20010 model.
 - a. Equivalent True or Arctic Air similar features and capacity.
 - 2. Right / left hinged doors center open
 - 3. Stainless Steel Construction
 - 4. Nominal 45.9 sq. ft.
 - 5. 10 adjustable shelves, (5) per side.
 - 6. Casters, (2) lockable
 - 7. 120 volt , 11.5 amp, 15 amp circuit, NEMA 5-15P
 - 8. Nominal 52.2" wide, by 35" deep x 83.5" tall
- Q. Item 13 – Milk cooler Relocate existing milk cooler by GC
- R. Item 13A – Future additional milk cooler Not in contract
- S. Item 14 – trash containers, by Owner
- T. Item 15 – Micro wave by Owner
- U. Item 16 -- Lockers, see specification 10 5113 by GC.
- V. Item 17 – Desk by Owner
- W. Item 18 - 96" x 54" type 2 exhaust hood and make up air by Mechanical contractor
- X. Item 19 – Salad table, existing, General move from existing cafeteria.
- Y. Item 20 – Cashier, by Owner
- Z. Item 21 and Item 21A – Hand Wash sink by Plumbing Contractor
- AA. Item 22 and Item 22A Upper Wall cabinets
 - 1. Stainless steel upper cabinets, shop fabricate or Manufactured such as Duke, Advance Tabco, Servo-Lift Eastern
 - 2. 48" X 30" high X 12" inside
 - 3. Slide by doors
 - 4. Two (2) adjustable shelves per unit
 - 5. 10 gauge minimum
 - 6. Slope top
 - 7. Recess, smooth for cleaning, pulls
- BB. Item 23 – First Aid Cabinet provide by GC.
 - 1. Medicine cabinet
 - 2. ASI 0952B recessed or equal by Bobrick or similar commercial fabrication

3. Framed mirror 24" X 26"
 4. Three (3) adjustable shelves
 5. Mount bottom at 44"
- CC. Item 24 – Fire Extinguisher see specification 10 440 Fire Protection Specialties provide by GC.
- DD. Item 25 – Grease trap in floor by Plumbing subcontractor.
- EE. Item 26 – Tray slide, two required provide by GC
1. 12" x nominal 17'-4", verify standard school tray dimensions to fit.
 2. 18 gauge stainless steel, underside closure piece may be 22 gauge.
 3. Raised edges and longitudinal dimpled slide rails
 4. Provide underside closure piece on equipment side
 5. Make tray slide to have lap over at coordinated height to the serving equipment to assist in containing spills.
 6. Detail shown on kitchen drawings.

4. EXECUTION

4.1. INSTALLATION

- A. The Food Service Equipment Supplier shall deliver and set in place, ready for related trade contractors to make required plumbing, electrical and ventilation connections, all equipment at locations where shown on Drawings.
1. Install all equipment provided in this subcontract ready for plumbing and electrical hook ups.
 - a. Special equipment, re-circulating water system, fittings on kitchen equipment and all work except power and water hook up.
 - b. Pre-rinse pumps and control switches.
 - c. All equipment provided except items described herein to be given to the plumbing and electrical subcontractors.
 2. All internal wiring, control wiring, switches, switch boxes and switch supports shall be installed by the supplier.
 3. All internal plumbing and plumbing accessories shall be factory installed or field installed by this contractor.
 4. Provide to the on site plumbing and electrical trade contractors or subcontractors ALL necessary accessory pieces required for proper operation.
 - a. Quick open valves, tailpieces and strainers.
 - b. Flow switches.
 - c. Pressure switches.
 - d. Temperature switches.
 - e. Water cut off switches or electrical sensors necessary to proper operation.

- f. Faucets, valves, sprayers, nozzles, strainers and mounting cones.
 - g. Vacuum breakers per Illinois State plumbing code.
 - h. Support hardware and brackets.
 - i. NEMA-4, NEMA 4X SS housing for all electrical switches and controls.
 - j. Control switches, safety switches and starters.
 - k. Cords and plugs.
 - l. Quick fit heavy-duty gas line and quick fit adaptor for gas lines.
- B. All valves, traps, tail pieces, fittings, cut off switches or other materials necessary for connections shall be installed by related trade contractors, except where otherwise specified in itemized specifications. The Food Service Equipment Supplier is to furnish all necessary faucets and sink drains. Loose switches or controls furnished with brand name equipment shall be installed by the Electrical trade Contractor or Subcontractor. Valves, tailpieces, nozzle vacuum breakers, etc., shall be piped and installed by the Plumbing trade Contractor or Subcontractor.
 - C. The kitchen equipment contractor shall coordinate all installations, arrange for installation of control system, final utility hook ups, and start up, including inspection of work by other subcontractors.
 - D. All electrical equipment shall be correct for type of electric current available.
 - E. All items of equipment specified with cord and plug shall match receptacle at job site.
 - F. Kitchen equipment Contractor shall coordinate with other trade contractors to provide brackets, anchors, and hang supports for piping, conduit and switches. All such items to be stainless steel. (Hot dip galvanized allowed when concealed from view).
 - G. All equipment abutting walls or other fixed equipment shall be sealed with NSF approved silicone rubber sealant.
 - H. Food Service Equipment Supplier shall remove all debris accumulated during the delivery and installation of his equipment daily and immediately upon completion of said installation. He will provide a representative, when necessary, to correlate final hook-up by related trade contractors, so as not to impede job progress. After final hook-up, he shall lubricate, start up and check out all equipment requiring this attention, and shall clean equipment and turn over to the Owner, for his acceptance, in first class condition, all items in his contract.
 - I. The Food Service Equipment Supplier shall provide a capable representative or representatives, to demonstrate the proper use of the equipment, at each location, at the time selected by the Owner. The Contractor shall notify the Owner a minimum of seven (7) calendar days notice prior to the demonstration dates.

1. Instructional presentation for maintenance.
 2. Start up demonstration.
 3. Operational start up after occupancy, equipment supplier and fabricator shall have on site a representative to be available for full start up day, first day of scheduled Owner use. They shall remain one day minimum or until equipment works properly.
- J. This representative shall be available for an additional job site visit following equipment start up to further instruct the kitchen personnel if needed. This visit will be per Owner request.
- K. All joints between fixed equipment and masonry shall receive continuous silicone rubber USDA Food Service approved sealant. Joints between adjacent fixed equipment shall receive stainless welded and polished joint or factory built NSF approved connection.

3.2 SCHEDULE FOR INSTALLATION

- A. Provide line item schedule for each site.
1. Utilities
 2. Locations
- B. Schedule work in the following sequence:
1. Do not schedule equipment installation until wall, floor and ceiling finishes are equipment ready.
 2. Proceed with equipment installation and Substantial Completion at the earliest convenient date for Owner take over.

END 11 4000

Items 3 and 3A

Hot serving unit design basis, Duke,

similar equipment such as by Advance Tabco, Servo Lift Eastern Corporation or equal.



Thurmaduke® electric | Standard Steam Table



Part #	Wells	Sealed/ Exposed	Specifications							
			Length	Width	Height	Cube Crated Ft.	Weight	Voltage	Amps	Nema
E-2-CBPG/E-2-CBSS	2	Sealed	32 | 81.3	25-1/2 | 64.8	36 | 91.4	28.1	210 | 95.5	120/208/240	12.5/7.2/6.3	5-15/6-20/6-20
E-3-CBPG/E-2-CBSS	3	Sealed	46 | 116.8	25-1/2 | 64.8	36 | 91.4	39.6	264 | 120.0	120/208/240	18.8/10.8/9.4	L5-30/6-20/6-20
E-4-CBPG/E-2-CBSS	4	Sealed	60 | 152.4	25-1/2 | 64.8	36 | 91.4	51.2	344 | 156.4	120/208/240	25.0/14.4/12.5	5-50/6-20/6-20

E-3 DLPG/E-2-SS Stainless Steel construction

Upper shelf with sneeze guard

Server shelf

208 single phase / 10.8 amp

Design Basis or equal, not intended to be a closed specification.

INSULATED CHILLTEMP® REFRIGERATED CABINET MODEL R-171-SUA-10E

FEATURES AND BENEFITS:

- Fully insulated mobile ChillTemp® refrigerated cabinet for holding food and beverages at serving temperature.
- Forced air system provides even distribution of cold air; cabinet maintains temperatures from 33°F (.5° C) to 40°F (4.5° C). Automatically defrosts. UV bulb improves air quality and food freshness.
- Hi efficiency compressor with automatic overload reset and EC motor R134a refrigerant for environmental compatibility.
- Stainless steel construction throughout for ease of cleaning. One piece extended base protects cabinet body.
- Recessed push/pull handles on both sides prevent damage to walls; allows easy maneuvering.
- Self-closing insulated door prevents temperature loss. Magnetic door gaskets for proper seal. Field reversible for flexibility.
- Standard with right hand hinging; ~~left hand hinging available upon request.~~
- Full length extruded door handles for “easy open”; positive catch (available in USA only) secures door during transport.
- Generous 18-cubic foot interior w/LED light.
- Ten sets of chrome plated wire universal angles accommodate a large variety of pan sizes on adjustable 1-1/2" centers.
- Heavy duty 5" swivel casters, two with brakes. Provides mobility when fully loaded.



R-171-SUA-10E

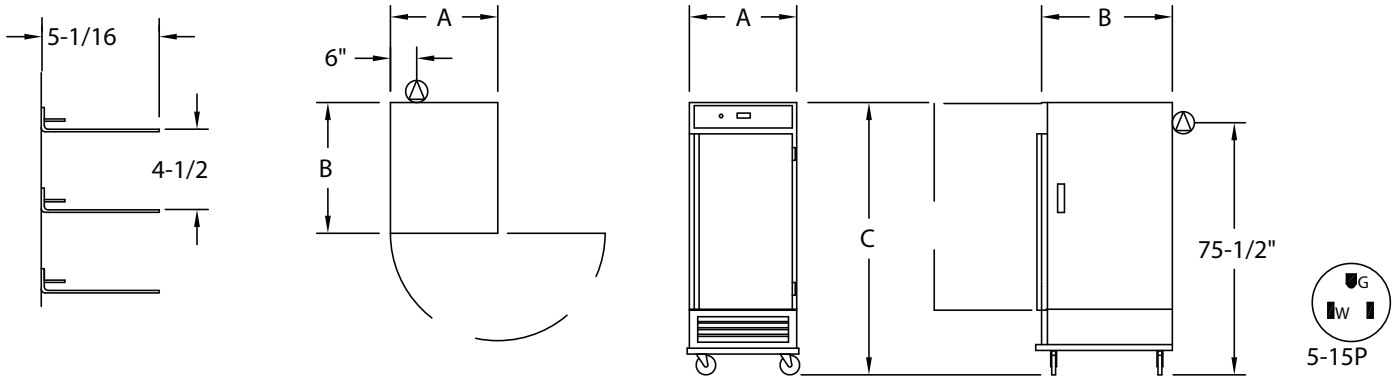


ACCESSORIES and OPTIONS (Available at extra cost):

- Extra Universal Angles
- Menu Card Holder
- Corner Bumpers
- Perimeter Bumper
- Floor Lock
- Polyurethane Casters
- Magnetic Door Latch (USA only)
- 240 Volt Service
- Digital Thermometer
- Interior for (28) 18" x 26" pans

See page K-4 for accessory details.

R-171-SUA-10E



DETAIL OF PAN SLIDE

CRES COR MODEL NO.	PAN			DIM "A"	DIM "B"	DIM "C"	INSIDE DIMENSIONS			WEIGHT ACT.	
	CAP/ ANGLES	SIZE		WIDTH	DEPTH	HEIGHT	WIDTH	DEPTH	HEIGHT		
R-171-SUA-10E	10 SETS	SEE NOTE BELOW	IN	28-5/16	37-3/8	76	23-1/2	29-3/4	47-3/8	LBS	375
			MM	719	949	1929	597	755	1203	KG	170

NOTES: 1. Pan sizes 22" x 20" (560 x 510) Roast & Bake Pans, 10" x 20" (255 x 510) Roast & Bake Pans, 18" x 26" (460 x 660) Bun Pans, 14" x 18" (355 x 460) Service Trays, 12" x 20" (305 x 510) Steam Table Pans.
Refer to Pan Size Chart at end of section.

2. When ordering bumpers, add 2" to overall dimensions.

ALL CONSTRUCTION IS RIVETED, WELDED AND FINISHED.

CABINET:

- Body: 22 ga. stainless steel.
- Reinforcement: Internal framework of 16 ga. stainless steel.
- Insulation: Foam in place.
- Push/pull handles (2): 5" vertical; recessed.
- Interior coved corners.

BASE:

- One piece construction, .125 aluminum.
- Casters: 5" dia., swivel, modulus tires, 1-1/4 wide, load cap. 250 lbs. each, temp. range -45°/+180°F. Delrin bearings. Front casters equipped with brakes.

DOOR:

- Field reversible.
- Formed 22 ga. stainless steel.
- Extruded handle.
- Transport latch.
- Hinges: Heavy duty chrome plated steel.
- Gasket: Perimeter type, magnetic Santoprene.
- Pan stop: Embossed.

PAN SLIDES:

- Wire angles (.306 dia.), nickel chrome plated steel, mounted on lift-off posts.
- Spaced on 4-1/2" centers; adjustable on 1-1/2" centers.

ELECTRICAL COMPONENTS:

- Thermostat: Pre-set to 38° F (3.3° C).
- Lighted power switch.
- Power cord: Permanent, 10 ft., 14/3 ga. with molded plug.
- Compressor: high efficiency.
- Condensate evaporator: Air
- R134a refrigerant.

POWER REQUIREMENTS:

- 120 Volts, 4.8A, 60 Hz., single phase, 15 Amp. service.

SHORT FORM SPECIFICATIONS

Cres Cor Refrigerated Cabinet Model R-171-SUA-10E. Cabinet 22 ga. stainless steel; stainless steel internal frame. (10) sets of wire universal angles for multiple pan sizes, adjustable spacing every 1-1/2". Field reversible door, 22 ga. stainless steel. Foam insulation. Interior coved corners. High efficiency compressor, 120 Volts. 4.8A. One piece base, .125 aluminum. 5" swivel casters, Delrin bearings. Load capacity 250 lbs. each. 2-Year Parts / 1-Year Labor warranty. Provide the following accessories: _____ .
CSA-US/C, CSA to NSF7 listed.



Scan QR code to view Spec Sheet, Operating Manual, Wiring Diagram or to call Customer Service.

If you need a QR reader visit your App Store on your Smartphone or Tablet.



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www.crescor.com

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In line with its policy to continually improve its products, CRES COR reserves the right to change materials and specifications without notice.

Made in America Since 1936



701 S Ridge Avenue, Troy, OH 45374
1-888-4HOBART • www.hobartcorp.com

FD4/150 FD4/200 FD4/300 FOODWASTE DISPOSERS



FD4/150 FD4/200 FD4/300 FOODWASTE DISPOSERS

MEDIUM SIZE FAST, ECONOMICAL

In a profitable foodservice operation, there's no space, time or budget allowance for inefficient food waste handling. Here are the medium sized disposers that can end food waste storage, removal and clean-up – fast, economically.

SPECIFICATIONS

MOTORS: Continuous duty rating, equipped with manual reset thermal overload inherent protection. Permanently lubricated ball bearings for upper and lower shaft support.

HOUSINGS: Heavy ductile iron upper housing. Ductile gray cast iron lower housing, primed and powder coated. Four bolts fasten the motor unit to the grind chamber, permit easy removal.

LEGS: Tubular stainless steel with flanged feet to support housing. Adjustable to 3" in either direction.

MOUNTING: All Hobart Disposers fasten to 7" I.D. (throat opening) cones. A vinyl isolating ring eliminates metal-to-metal contact at the cone mounting, reduces vibration and noise transmission.

STATIONARY SHREDDER RING: Abrasion resistant, heated treated cast ductile iron, 1 $\frac{3}{8}$ " high, 40 grinding teeth.

FLYWHEEL: Two hardened ductile iron cutter blocks (fastened to flywheel with loctite) are replaceable, can be indexed for new cutting edges. Hardened cast ductile iron flywheel is 8" diameter.

MOTOR SHAFT SEAL: Mechanical face-type seal consists of spring loaded carbon ring insert in chemical resistant neoprene bellows. Mating surfaces are protected from grit or fibers by being recessed into flywheel.

DRAIN CONNECTOR: The removable outlet flange is tapped for 2" pipe connection.

DUAL DIRECTIONAL GRINDING: Hobart Disposers operate in either direction of flywheel rotation. Direction of rotation can be controlled by the operator (to increase life and efficiency of grinding elements – back flywheel free of a "jam") when installed with Control Groups 5 & 6.

WEIGHT: Shipping – Approx. 158 lbs. (does not include accessory group or controls).

*Design basis
FD4/200, 208 v 3 pahse
Group D accessories
Pre Rinse Chicago Faucet
18" cone,
1/2" cone water swirl
cone cover with feed hole
Group 6 control*



Complies with
ASSE 1009



FD4/150 FD4/200 FD4/300 FOODWASTE DISPOSERS



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ACCESSORY GROUPS

GROUP A



Nitrile Rubber Scrapping Ring



Stainless Steel Silver-Saver Sleeve with Side Feed Hole



Water Swirl



Vacuum Breaker

GROUP B



Nitrile Rubber Silver-Saver Splash Guard Ring



Water Swirl



Vacuum Breaker

GROUP C



Nitrile Rubber Silver-Saver Splash Guard Ring



Vacuum Breaker



Pre-Rinse Spray with Wall Bracket

GROUP D



Nitrile Rubber Silver-Saver Splash Guard Ring



7" I.D. Stainless Steel Weld-in Adapter for Sink



Fixed Direction Water Inlet for Sink



Vacuum Breaker

ACCESSORY COMPONENTS

CONES-SINK – Stainless Steel



Part No.

Cone 15" I.D. w/hole for water swirl inlet 204007

Cone 18" I.D. w/hole for water swirl inlet 204004

Cone 15" I.D. w/out swirl hole 204006

Cone 18" I.D. w/out swirl hole 204003



Sink 16" x 20" x 7" (7" opening) w/hole for water inlet.....204015-2

WATER INLETS



Cone Water Swirl Inlet 1/2" N.P.T. 204380



Fixed Direction Water Inlet (for sinks or troughs) 1/2" N.P.T. 204346

FLOW CONTROL



8 Gallons per minute for Models FD/150 through FD/300 – 3/4" N.P.T. 204368

CONE COVER – STAINLESS STEEL



15" Cone cover w/feed hole 204024

18" Cone Cover w/feed hole..... 204023

CONE FEEDING ACCESSORIES



Part No.

Nitrile Rubber Scrapping Ring 202113



Stainless Steel Silver-Saver Sleeve with side feed hole..... 203870

SILVER-SAVER SPLASH GUARD RING



Nitrile Rubber Silver-Saver and Splash Guard Ring (for 7" opening cones, sinks and adapter)..... 202120

SINK ADAPTER – Standard Group D Accessory



7" I.D. Stainless Steel Adapter for Welding to Sink or Trough 204853

VACUUM BREAKERS – Luster Chrome Plated



3/4" 74338

PRE-RINSE SPRAYS

PR-3 Heavy-duty Flexible Pre-rinse Spray (38" high with wall bracket) ML-32333



Adapters are available to install Hobart Disposers on existing cones. See Form F7543.

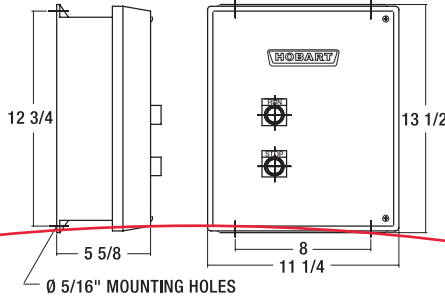


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FD4/150 FD4/200 FD4/300 FOODWASTE DISPOSERS

ELECTRICAL CONTROL GROUPS

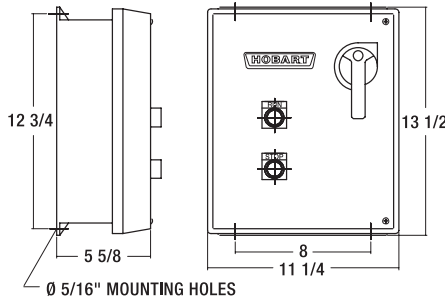
Listed by Underwriters Laboratories Inc., for use with FD3 and FD4 Disposers (50 Hz. Electrical Specifications not UL listed)



Group 5 - For all Models

- Includes:*
Magnetic Contactors
Pushbutton Start and Stop
Automatic Reversing
NEMA 4 Enclosure
Solenoid Valve (24 V only)

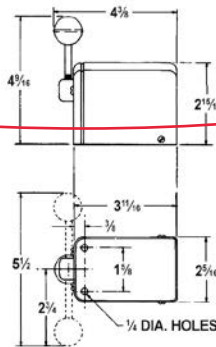
Approximate
Shipping Wt. 19 lbs.



Group 6 - For all Models

- Includes:*
Magnetic Contactors
Pushbutton Start and Stop
Automatic Reversing
Time Delay for water after shut-off
Line Disconnect
Solenoid Valve (24 V only)
NEMA 4 Enclosure

Approximate
Shipping Wt. 20 lbs.



Group 4 - For Model FD4/150 and FD4/200

- Includes:*
Manual Reversing Switch
NEMA 1 Enclosure or NEMA 4 Enclosure
Not available above 250 volts
Optional Solenoid Valve

Approximate
Shipping Wt. 11 lbs.

Model	H.P.	Ph.	Hz.	Volts	Rated Amps
FD4/150	1 1/2	1	60	120/208-240	16.0/8.0
	1 1/2	3	60	208-240/480	4.4-4.2/2.1
FD4/200	2	1	60	120/208-240	17.6/8.8
	2	3	60	208-240/480	6.0-5.8/2.9
FD4/300	3	3	60	208-240/480	9.9-9.0/4.5
FD4/150	1 1/2	1	50	110-120/220-240	15.0/7.5
	1 1/2	3	50	220-240/380-415	4.8/2.4
FD4/200	2	1	50	110-120/220-240	19.0/9.5
	2	3	50	220-240/380-415	6.3/3.3
FD4/300	3	3	50	220-240/380-415	10.4/5.2

The slant (/) indicates the dual voltage operation accomplished by motor lead connection; follow connecting diagram on motor.

SAMPLE SPECIFICATION

FD4/200 — B — 4 (240/60/3)

Electrical Specifications

Electrical Control Group

Accessory Group

Model Number

Cut hole 19" for 18" cone. Hole to be 16" for 15" cone.

Solenoid must be installed in upright position.

Disposer may be easily rotated for better drain line connection.

Center line at wall outlet of trap should not be higher than center line of disposer discharge opening

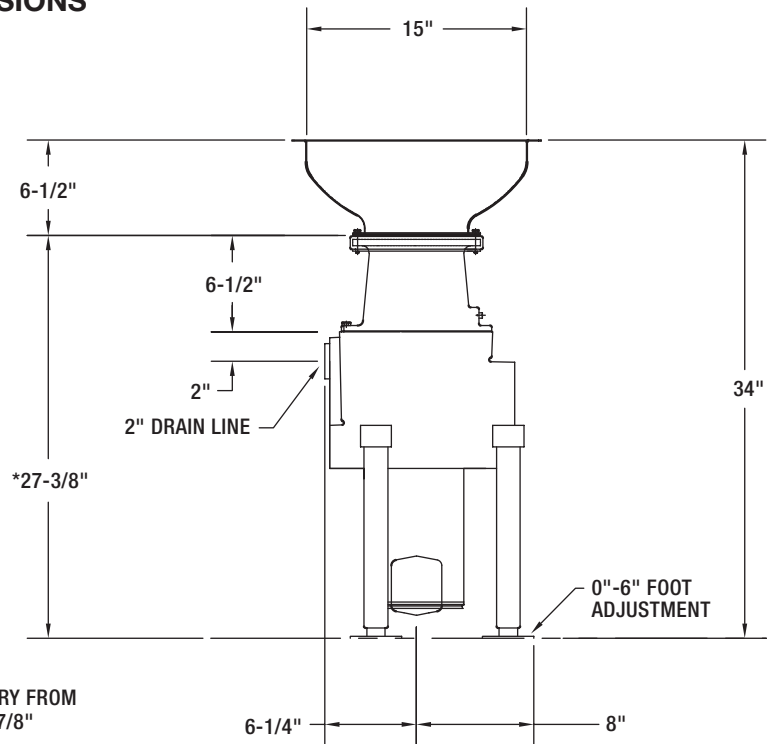
If water pressure is in excess of 60 P.S.I. install a pressure reducing valve.

FD4/150 FD4/200 FD4/300 FOODWASTE DISPOSERS



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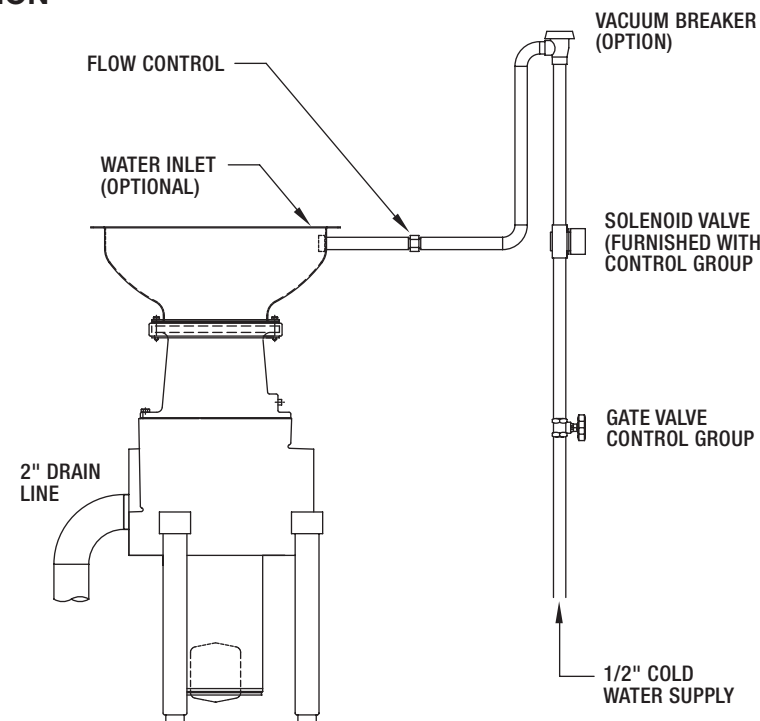
DETAILS AND DIMENSIONS



* HEIGHT CAN VARY FROM
22-5/8" TO 28-7/8"

NOTE: Specify 15" or 18" Cone When Desired.

TYPICAL INSTALLATION



As continued product improvement is a policy of Hobart, specifications are subject to change without notice.

Standard Features

GS/25SC, GS/25CCH

- Energy Star Compliant
- NRG system
- Patented, high efficiency, non-clog Inshot burners
- 90,000 BTU (NAT or LP) per oven cavity
- Double deck convection oven is 66.8" in height
- Patented "plug-in, plug-out" control panel - easy to service
- Slide out control panel for full view servicing
- Stainless Steel front, sides and top
- Stainless steel rear jacket
- Dependent glass doors (Full 180° opening)
- Energy saving high efficiency glass windows
- Heat keeping dual door seal system
- Coved, fastener-free, porcelain interior
- Stay cool heavy duty door handle
- Soft Air, two speed, 1/2 hp, fan motor
- 11-position rack guides and 5 plated oven racks
- Electronic ignition with solid state temperature controls
- Forced cool down fan mode
- Oven "heat" light cycles with burners
- Interior oven lights
- (3) years limited parts and labor warranty (reference <http://www.southbendnc.com/service.html> for limited warranty details).

**Comes with NRG system.
NRG system units are
Energy Star Approved.**



(GS/25SC shown with optional casters)

Available Controls

SC-Standard Controls with NRG sytem

140°F to 500°F solid state thermostat and 60 minute mechanical cook timer.

CCH-Cycle / Cook & Hold Control with NRG system

150°F to 550°F temperature controller with 140°F to 200°F "Hold" thermostat dual digital display shows time and temperature. A fan cycle timer pulses the fan.

STANDARD CONSTRUCTION SPECIFICATIONS

Exterior Finish: Stainless steel front, sides, top and rear jacket.

Doors: Dependent doors with windows. Low emission glass, stainless steel construction, heavy-duty welded steel frame and 5/8" diameter full-length hinge pin.

Oven Interior: Porcelain enamel finish, coved, fastener free.

Rack and Rack Guides: Heavy-duty removable wire rack guides spaced on 1-5/8" centers offer 11 different rack positions. 5 wire racks provided with each oven.

Blower Fan and Motor: 1/2hp, 2-speed motor, 1710/1120 r.p.m

Oven Heating: 90,000 BTU (NAT or LP). Oven heating is regulated by an adjustable solid state thermostat control. Jet Stream style burners direct flame towards rear of combustion chamber. Combustion products are drawn into oven interior and recirculated prior to venting.

Electronic Ignition: Hot surface ignitor with flame safety device.

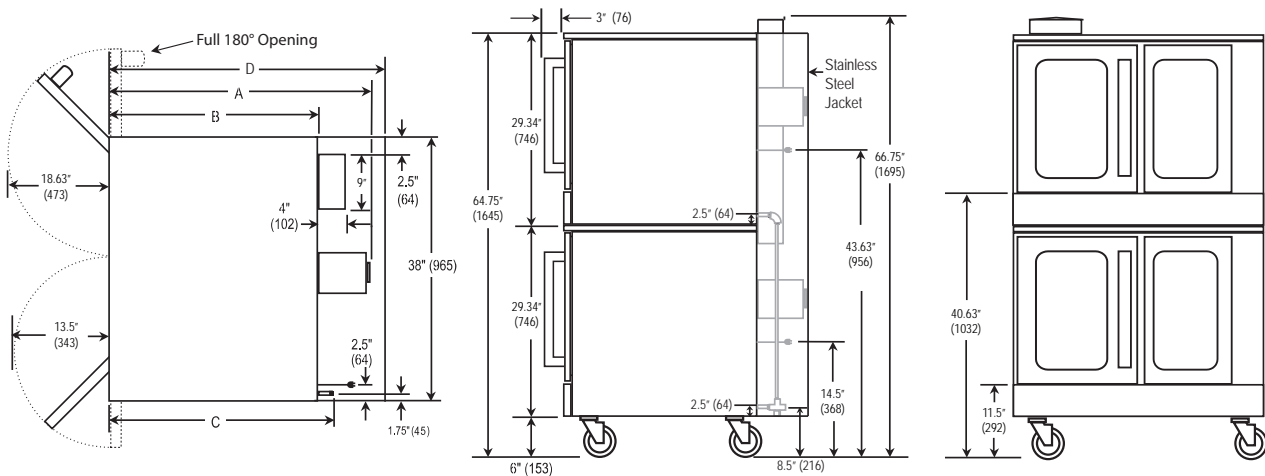
Control Panel: Located on front, at right side of oven, away from heat zone. Slide out panel extends over 17" for easy servicing.

Interior Lights: Two 40 watt high temperature recessed lamps located within the oven cavity.

Legs: 6" stainless steel legs standard.



Models: GS/25SC GS/25CCH



MODEL	DEPTH				OVEN INTERIOR			RACK CLEARANCE		SHIPPING CRATE				
	A	B	C	D	WIDTH	DEPTH	HEIGHT	WIDTH	DEPTH	WIDTH	DEPTH	HEIGHT	VOLUME	WEIGHT
GS/25	37.63" (956)	30.25" (768)	35.50" (902)	39.25" (997)	29" (737)	21.50" (572)	20" (508)	28.25" (718)	21" (533)	57.50" (1461)	45.5" (1156)	81.50" (2070)	123.4 cu. ft. (3.49 cu. m.)	1110 lbs (503.5kg.)

Note: With stacking option, crated height is 69" (1753 mm)

UTILITY INFORMATION

- GAS:**
- Standard and Bakery depth 90,000 BTU (NAT or LP) per oven cavity
 - One 3/4" male connection
 - Required minimum inlet pressure:
 - Natural gas 7" W.C.
 - Propane gas 11" W.C.
- ELECTRIC:** Standard: 120/60/1 phase, furnished with 6' cord w/3-prong plug (1 plug/deck). NEMA #5-15p. Total maximum amps 8.9 per deck.
- Optional: 208/60/1 (190-219 volts). Supply must be wired to junction box with terminal block located at rear. Total maximum amps 4.8 per deck.
- Optional: 240/60/1 (220-240 volts). Supply must be wired to junction box with terminal block located at rear. Total maximum amps 4.3 per deck.
- Optional: 240/50/1 (208-240 volts). Supply must be wired to junction box with terminal block located at rear. Total maximum amps 6.5 per deck

MISCELLANEOUS

- If using flex hose connector, the I.D should not be smaller than 3/4" and must comply with ANSI Z 21.69.
- If casters are used with flex hose, a restraining device should be used to eliminate undue strain on the flex hose.
- Clearances from combustibles: Top-0", bottom-0", right side-0" and left-2"
- Recommend - install under vented hood
- Check local codes for fire and sanitary regulations
- If the unit is connected directly to the outside flue, an CSA approved down draft diverter must be installed at the flue outlet of the oven
- Oven cannot be operated without fan in operation

Notice: Southbend reserves the right to change specifications and product design without notice. Such revisions do not entitle the buyer to corresponding changes, improvements, additions, or replacements for previously purchased equipment.

OPTIONS AND ACCESSORIES

- List the voltage, frequency, and amps (see utility information above). ___VAC, ___Phase, ___Hz
- Stainless steel oven interior
- Stainless steel exterior bottom
- Knocked down packaging
- Marine edge top
- Swivel Caster - front with locks
- Down draft diverter for direct flue
- 3/4" quick disconnect with flexible hose (specify length: 3ft, 4ft, or 5ft)
- 2" air insulation panel (stainless steel only)
- Export crating

**INTENDED FOR COMMERCIAL USE ONLY.
NOT FOR HOUSEHOLD USE.**



1100 Old Honeycutt Road, Fuquay-Varina, NC 27526
(919) 762-1000 www.southbendnc.com



Project _____
 AIA # _____ SIS # _____
 Item # **11** _____ Quantity _____ C.S.I. Section 114000



Traulsen is specification standard, equivalent commercial products such as True

G-SERIES

2-Sections Refrigerator Reach-In
 Self-Contained Solid Door(s)



STANDARD PRODUCT FEATURES

- High Performance, Energy Efficient Refrigeration System
- Reliable Microprocessor Control With LED Temperature Display
- Evaporator Coil Outside Food Zone Provides More Usable Space
- Load-Sure Guard Prevents Problems From Improper Loading
- Durable All Metal Construction
- Stainless Steel Front & Doors, Anodized Aluminum Sides & Interior
- Full or Half Height Door Models with a Variety of Hinging Configurations
- Long Life EZ Clean Door Gaskets
- Three (3) Epoxy Coated Shelves Per Section (factory installed)
- Easy to Maintain Front Facing Condenser Coil
- 6" High Locking Casters
- Guaranteed for Life Door Handles & Hinges
- 3-Year Parts & Labor Warranty
- 2-Years Additional Compressor Parts Warranty



Many models are ENERGY STAR® listed. Please refer to www.energystar.gov to view the most up-to-date product listing and performance data.



This unit is listed to the applicable UL, CSA and NSF Standards by an approved NRTL. Consult the factory or unit's data plate for approval information.

ACCESSORIES & OPTIONS (*field installed)

- ~~■ Tray Slides for 18" x 26" Sheet Pans*~~
- ~~■ Tray Slides for 12" x 26" Food Pans*~~
- ~~■ Tray Slides for 14" x 18" Sheet Pans*~~
- ~~■ Tray Slides for 18" x 26, 12" x 20" & 14" x 18" Pans*~~
- Additional Shelves* **10 adjustable shelves minimum**
- ~~■ 6" High Legs*~~
- Lower Height Casters* **(4) with two locking**
- ~~■ Optional Remote Applications~~

*Please refer to form number TR35872 for precise kit details. See back page for tray slide versatility chart.

AVAILABLE CONFIGURATIONS

Half-Height Door Models

G20000	Hinging Left/Right
G20001	Right/Left
G20002	Right/Right
G20003	Left/Left

Full-Height Door Models

G20010	Hinging Left/Right
G20011	Right/Left
G20012	Right/Right
G20013	Left/Left

DEALERS CHOICE G-SERIES

SECTION 4-3

Approved by _____ Date _____ Approved by _____ Date _____

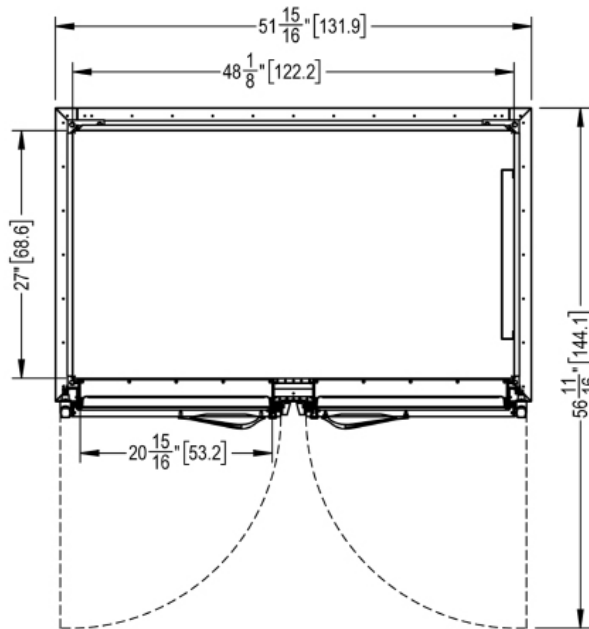
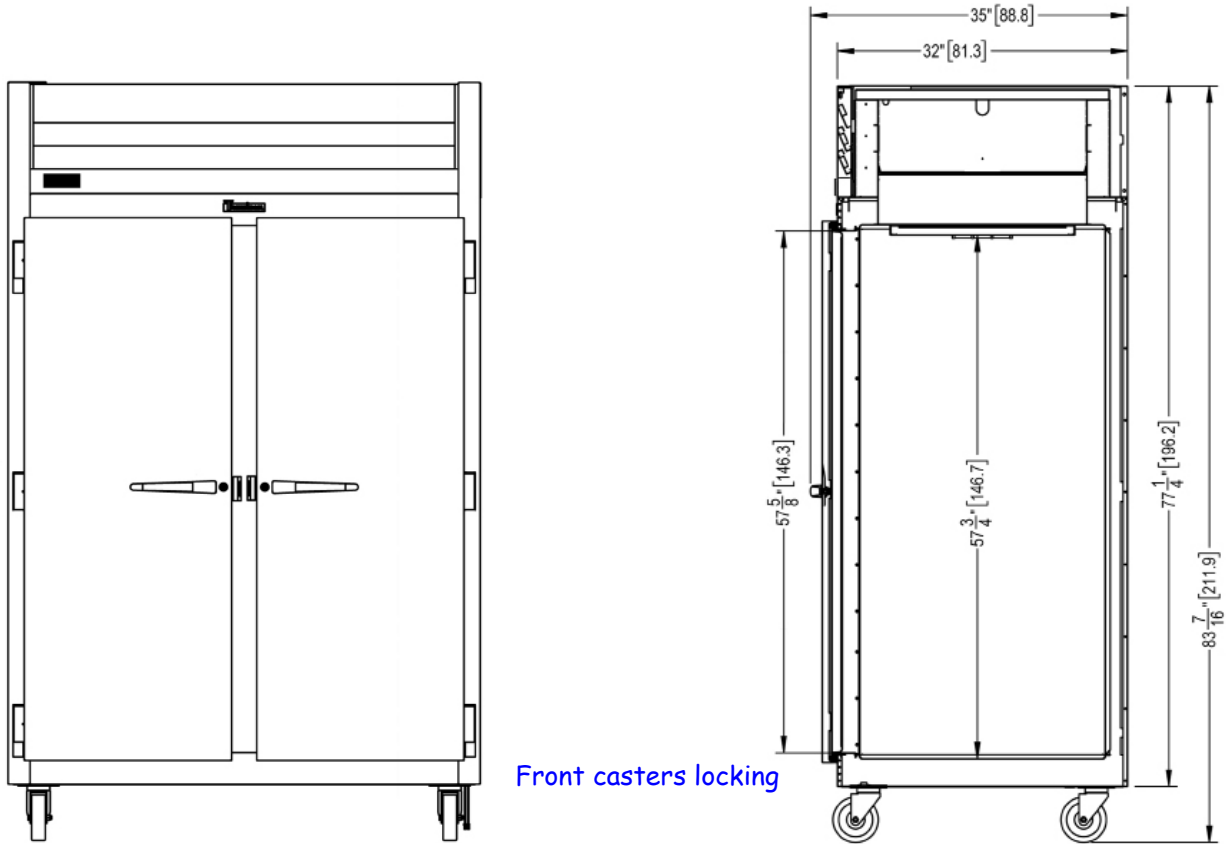
G-SERIES

2-Sections Refrigerator Reach-In Self-Contained Solid Door(s)

MODELS

Full Height Door Models: G20010, G20011, G20012, G20013

CLICK
TRANSFER
For KCL CADalog Website





MODELS

~~Half Height Door Models: G20000, G20001, G20002, G20003~~

Full Height Door Models: G20010, ~~G20011, G20012, G20013~~

EQUIPMENT SPECIFICATIONS

CONSTRUCTION, HARDWARE, INSULATION

Cabinet exterior front, louver assembly and door(s) are constructed of 20 gauge stainless steel. Cabinet sides (including returns), interior and door liners are constructed of anodized aluminum. The exterior cabinet top, back and bottom are constructed of heavy gauge galvanized steel. A set of four (4) 6" high locking casters are included. Doors are equipped with a gasket protecting, raised metal door pan, cylinder locks, and guaranteed for life self-closing cam-lift hinges with a stay open feature at 120 degrees. Hinges include a concealed switch to automatically activate the interior LED lighting. Guaranteed for life, metal work flow door handles are mounted horizontally over recess in door which limits protrusion into aisle ways. Gasket profile and durable long life material simplify cleaning and increase overall gasket life. Anti condensate heaters are located behind each door opening. Both the cabinet and door(s) are insulated with an average of 2" thick high density, non-CFC, 100% foamed in place polyurethane.

SELF-CONTAINED REFRIGERATION SYSTEM

A top mounted, self-contained, balanced refrigeration system using R-134a refrigerant is conveniently located behind the one piece louver assembly. It features an easy to clean front facing condenser, thermostatic expansion valve metering device, air-cooled hermetic compressor, large, high humidity evaporator coil located outside the food zone and a top mounted non-electric condensate evaporator. A 9' cord and plug is provided. Standard operating temperature is 34 to 38°F.

CONTROL

The easy to use water resistant microprocessor control is supplied standard. It includes a 3-Digit LED Display, and a Fahrenheit or Celsius Temperature Scale Display Capability.

INTERIOR ARRANGEMENTS

Standard interior arrangements include three (3) epoxy coated steel wire shelves per section, mounted on shelf pins, installed at the factory. Shelves are full-width, and do not have any large gaps between them requiring the use of "bridge" or "junior shelves." Recommended load limit per shelf should not exceed 225 lbs.

DOMESTIC WARRANTY

Both a three year parts and labor warranty and an additional two year compressor parts warranty (for a total of five on self-contained models) are provided standard.

MODELS	G200__10
DIMENSIONAL DATA	
Net Capacity cu. ft. ¹	45.89 (1300 l) | 46.02 (1303 l)
L x D x H - Overall in. ²	52½ (132.4 cm) x 35 (88.8 cm) x 83⅞ (211.9 cm)
Depth - over body in.	32 (81.3 cm)
Depth - door open 90° in.	57⅞ (146.3 cm)
Clear half-door W x H in.	21⅞ (53.6 cm) x 27½ (69.9 cm)
Clear full-door W X H in.	21⅞ (53.6 cm) x 57⅞ (146.3 cm)
No. Standard Shelves	6 10 adjustable
Shelf Area sq. ft. ³	34.6 (3.21 sq m)
ELECTRICAL DATA	
Voltage | Plug	115/60/1 | NEMA 5-15P (attached)
Feed wires with ground	3
Full Load Amperes | MDEC ⁴	7.4 | 3.48 KWH/Day
REFRIGERATION DATA	
Refrigerant	R-134a
BTU/HR | H.P. ⁵	2240 | 1/3 HP
Required Clearance	12" Above
SHIPPING DATA	
L x D x H Crated in.	62 (158 cm) x 42(107 cm) x 85 (216 cm)
Volume Crated cu. ft.	128 (3625 l)
Uncrated | Crated Weight lbs.	450 (204 kg) | 480 (218 kg)

NOTES:

1. Net Capacity cu. ft. = Half Height Door | Full Height Door models.
2. Height shown when mounted on standard 6" high casters.
3. Figure shown reflects the area of standard shelf compliment.
4. MDEC = Maximum Daily Energy Consumption
5. Based on a 90°F ambient and 20°F evaporator. For remote data please refer to spec sheet TR35837.

OPTIONAL ACCESSORY TRAY SLIDE VERSATILITY CHART						
TRAY SLIDE DRAWINGS						
TRAY SLIDE OFFERING	#1 (1) 18" x26" or (2) 14"x18"	#4 (Rod Type) (1) 18" x26"	Universal (1) 18" x26" or (2) 14"x18" or (2) 12"x20"	#1 EZ-Change (1) 18" x26" or (2) 14"x18"	Universal EZ-Change (1) 18" x26" or (2) 14"x18" or (2) 12"x20"	HD Universal EZ-Change (1) 18" x26" or (2) 14"x18" or (2) 12"x20"
SPACING CAPACITY DOOR SIZE	2" 28 Pairs Full Door & 13 Half 3" 19 Pairs Full Door & 09 Half 4" 14 Pairs Full Door & 07 Half 5" 11 Pairs Full Door & 05 Half	1 1/2" 38 Pairs Full Door (2 Pair) 1 1/2" 18 Pairs Half Door (1 Pair)	4" 14 Pairs Full Door & 06 Half 4" 14 Pairs Full Door & 07 Half 5" 11 Pairs Full Door & 05 Half 6" 09 Pairs Full Door & 04 Half	2" 26 Pairs Full Door & 12 Half 4" 13 Pairs Full Door & 06 Half	2 1/4" 22 Pairs Full Door & 11 Half 4 1/2" 11 Pairs Full Door & 05 Half	4 1/2" 11 Pairs Full Door & 05 Half 9" 05 Pairs Full Door & 02 Half

- Upper Half Height Door¹
- Lower Half Height Door²

CONTINUED PRODUCT DEVELOPMENT MAY NECESSITATE SPECIFICATION CHANGES WITHOUT NOTICE.



Project _____
 AIA # _____ SIS # _____
 Item # **12** _____ Quantity _____ C.S.I. Section 114000



Or equal by True or Arctic Air

G-SERIES

2-Sections Freezer Reach-In
 Self-Contained Solid Door(s)



STANDARD PRODUCT FEATURES

- High Performance, Energy Efficient Refrigeration System
- Reliable Microprocessor Control With LED Temperature Display
- Evaporator Coil Outside Food Zone Provides More Usable Space
- Load-Sure Guard Prevents Problems From Improper Loading
- Durable All Metal Construction
- Stainless Steel Front & Doors, Anodized Aluminum Sides & Interior
- Full or Half Height Door Models with a Variety of Hinging Configurations
- Long Life EZ Clean Door Gaskets
- Three (3) Epoxy Coated Shelves Per Section (factory installed)
- Easy to Maintain Front Facing Condenser Coil
- 6" High Locking Casters
- Guaranteed for Life Door Handles & Hinges
- 3-Year Parts & Labor Warranty
- 2-Years Additional Compressor Parts Warranty



Many models are ENERGY STAR® listed. Please refer to www.energystar.gov to view the most up-to-date product listing and performance data.



This unit is listed to the applicable UL, CSA and NSF Standards by an approved NRTL. Consult the factory or unit's data plate for approval information.

ACCESSORIES & OPTIONS (*field installed)

- Tray Slides for 18" x 26" Sheet Pans*
- Tray Slides for 12" x 20" Food Pans*
- Tray Slides for 14" x 18" Sheet Pans*
- Tray Slides for 18" x 26, 12" x 20" & 14" x 18" Pans*
- Additional Shelves* **10 shelves**
- 6" High Legs*
- Lower Height Casters* **(2) Locking**
- Optional Remote Applications

*Please refer to form number TR35872 for precise kit details. See back page for tray slide versatility chart.

AVAILABLE CONFIGURATIONS

Half-Height Door Models

G22000	Hinging
G22001	Left/Right
G22002	Right/Left
G22003	Right/Right
	Left/Left

Full-Height Door Models

G22010	Hinging	
G22011	Left/Right	Center opening
G22012	Right/Left	
G22013	Right/Right	
	Left/Left	

DEALERS CHOICE G-SERIES

SECTION 4-4

Approved by _____ Date _____ Approved by _____ Date _____

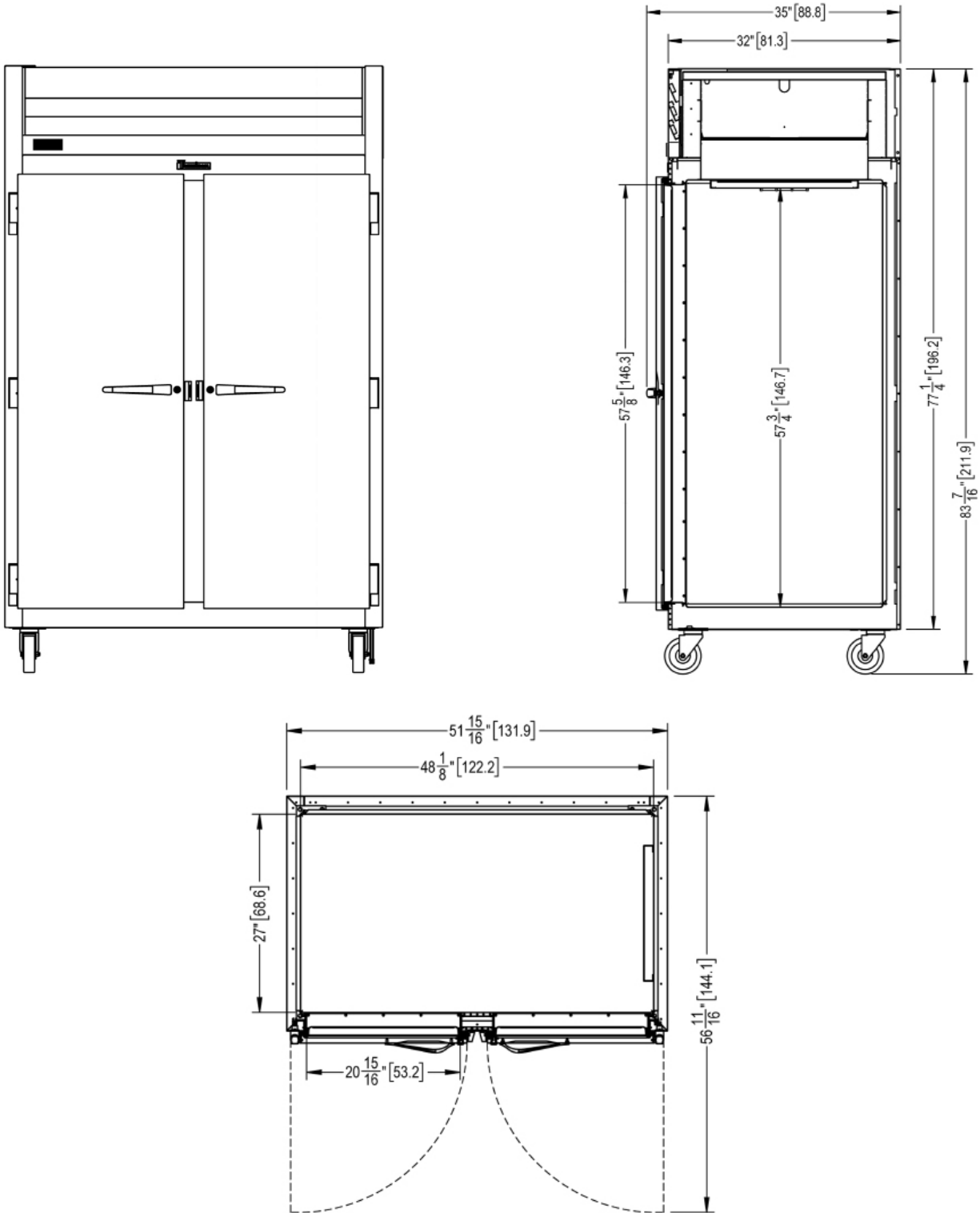
G-SERIES

2-Sections Freezer Reach-In
Self-Contained Solid Door(s)

MODELS

Full Height Door Models: G22010, ~~G22011~~, G22012, ~~G22013~~

CLICK
TRANSFER
For KCL CADalog Website



MODELS

~~Half Height Door Models: G22000, G22001, G22002, G22003~~

Full Height Door Models: G22010, ~~G22011, G22012, G22013~~

EQUIPMENT SPECIFICATIONS

CONSTRUCTION, HARDWARE, INSULATION

Cabinet exterior front, louver assembly and door(s) are constructed of 20 gauge stainless steel. Cabinet sides (including returns), interior and door liners are constructed of anodized aluminum. The exterior cabinet top, back and bottom are constructed of heavy gauge galvanized steel. A set of four (4) 6" high locking casters are included. Doors are equipped with a gasket protecting, raised metal door pan, cylinder locks, and guaranteed for life self-closing cam-lift hinges with a stay open feature at 120 degrees. Hinges include a concealed switch to automatically activate the interior LED lighting. Guaranteed for life, metal work flow door handles are mounted horizontally over recess in door which limits protrusion into aisle ways. Gasket profile and durable long life material simplify cleaning and increase overall gasket life. Anti condensate heaters are located behind each door opening. Both the cabinet and door(s) are insulated with an average of 2" thick high density, non-CFC, 100% foamed in place polyurethane.

SELF-CONTAINED REFRIGERATION SYSTEM

A top mounted, self-contained, balanced refrigeration system using R-404A refrigerant is conveniently located behind the one piece louver assembly. It features an easy to clean front facing condenser, thermostatic expansion valve metering device, air-cooled hermetic compressor, large, high humidity evaporator coil located outside the food zone and a top mounted non-electric condensate evaporator. A 9' cord and plug is provided. Standard operating temperature is 0 to -5°F and can be adjusted to operate as low as -10°F in a 90 degree F or less ambient.

CONTROL

The easy to use water resistant microprocessor control is supplied standard. It includes a 3-Digit LED Display, and a Fahrenheit or Celsius Temperature Scale Display Capability.

INTERIOR ARRANGEMENTS

Standard interior arrangements include three (3) epoxy coated steel wire shelves per section, mounted on shelf pins, installed at the factory. Shelves are full-width, and do not have any large gaps between them requiring the use of "bridge" or "junior shelves." Recommended load limit per shelf should not exceed 225 lbs.

DOMESTIC WARRANTY

Both a three year parts and labor warranty and an additional two year compressor parts warranty (for a total of five on self-contained models) are provided standard.

MODELS	G220__
DIMENSIONAL DATA	
Net Capacity cu. ft. ¹	45.89 (1299 l) | 46.02 (1303 l)
L x D x H - Overall in. ²	52½ (132.4 cm) x 35 (88.8 cm) x 83⅞ (211.9 cm)
Depth - over body in.	32 (81.3 cm)
Depth - door open 90° in.	57⅞ (146.3 cm)
Clear half-door W x H in.	21⅞ (53.6 cm) x 27½ (69.9 cm)
Clear full-door W X H in.	21⅞ (53.6 cm) x 57⅞ (146.3 cm)
No. Standard Shelves	6 10 adjustable
Shelf Area sq. ft. ³	34.6 (3.21 sq m)
ELECTRICAL DATA	
Voltage | Plug	115/60/1 | NEMA 5-15P (attached)
Feed wires with ground	3
Full Load Amperes | MDEC ⁴	11.2 | 9.89 KWH/Day
REFRIGERATION DATA	
Refrigerant	R-404A
BTU/HR | H.P. ⁵	2270 | 3/4 HP
Required Clearance	12" Above
SHIPPING DATA	
L x D x H Crated in.	62 (158 cm) x 42 (107 cm) x 85 (216 cm)
Volume Crated cu. ft.	128 (3625 l)
Uncrated | Crated Weight lbs.	450 (204kg) | 510 (231 kg)

NOTES:

1. Net Capacity cu. ft. = Half Height Door | Full Height Door models.
2. Height shown when mounted on standard 6" high casters.
3. Figure shown reflects the area of standard shelf complement.
4. MDEC = Maximum Daily Energy Consumption
5. Based on a 90°F ambient and -20°F evaporator. For remote data please refer to spec sheet TR35837.

OPTIONAL ACCESSORY TRAY SLIDE VERSATILITY CHART

TRAY SLIDE DRAWINGS						
TRAY SLIDE OFFERING	#1 (1) 18" x26" or (2) 14"x18"	#4 (Rod Type) (1) 18" x26"	Universal (1) 18" x26" or (2) 14"x18" or (2) 12"x20"	#1 EZ-Change (1) 18" x26" or (2) 14"x18"	Universal EZ-Change (1) 18" x26" or (2) 14"x18" or (2) 12"x20"	HD Universal EZ-Change (1) 18" x26" or (2) 14"x18" or (2) 12"x20"
SPACING CAPACITY DOOR SIZE	2" 28 Pairs Full Door & 13 Half 3" 19 Pairs Full Door & 09 Half 4" 14 Pairs Full Door & 07 Half 5" 11 Pairs Full Door & 05 Half	1 1/2" 28 Pairs Full Door (2 Pair) 1 1/2" 18 Pairs Half Door (1 Pair)	4" 14 Pairs Full Door & 06 Half 4" 14 Pairs Full Door & 07 Half 5" 11 Pairs Full Door & 05 Half 6" 09 Pairs Full Door & 04 Half	2" 26 Pairs Full Door & 12 Half 4" 13 Pairs Full Door & 06 Half	2 1/4" 22 Pairs Full Door & 11 Half 4 1/2" 11 Pairs Full Door & 05 Half	4 1/2" 11 Pairs Full Door & 05 Half 9" 05 Pairs Full Door & 02 Half

- Upper Half Height Door¹
- Lower Half Height Door²

CONTINUED PRODUCT DEVELOPMENT MAY NECESSITATE SPECIFICATION CHANGES WITHOUT NOTICE.

1. GENERAL

1.1. WORK INCLUDED

A. Base Bid

1. Removal of some existing equipment as noted on the drawings, phase 1 and Phase 2 site demolition work
2. Phase 2 site work, two three section x 10 swing sets, 6 swings per set 12 swings total.
3. Four (4) basketball, Goose neck Post, Backboard, rim and nets.

B. Alternate Bid

1. None

1.2. RELATED WORK

A. Specified elsewhere

1. DIVISION 01 - General Requirements
2. DIVISION 03 – Concrete
3. Division 31 – Grading and site work

1.3. QUALITY ASSURANCE

- A. Materials shall be installed by persons experienced in the installation of this type of material. All work shall be level and properly aligned.
- B. Installation shall comply with manufacturer's recommendations.

1.4. SUBMITTALS

A. Submit the following in accordance with 01 3300.

1. Manufacturer's Literature: Material description and installation and maintenance instructions.

2. PRODUCTS

2.1. MATERIALS

A. **Swing Sets.**

1. Design standard American Parks Company tripod style swing sets, 10' tall, 3 section, two (2) swings per section, six (6) swings required.
 - a. Galvanized construction
 - b. 2 3/8" standard or heavy pipe.
 - c. Reinforced strap seats

- d. Commercial galvanized
 - e. Two such swing sets required
 - f. chain package with clevis attachment.
2. American Parks Company, 225 E Virginia Street, Ste. 1, McKinney TX 75069, americanparkscompany.com
- a. Bluegrass Playgrounds, 1056 Fedde Lane, Ashland, Nebraska 68003 Toll Free Fax 866.271.4011 / Toll Free Phone: 800.828.9690
<http://www.bluegrassplaygrounds.com>
 - b. APCPLAY
230 E. Hunt Street, Suite 200
McKinney, TX 75069
Fax 888-723-6231
 - c. BYO Recreation
405 Golfway West Drive, Suite #302
Saint Augustine, FL 32095
Phone 904-808-8529
Fax 800 853 5316
2. Perimeter set in 1 ½" cast dap out for edge support, verify grate edge thickness for flush surface.
3. Or equal submitted for consideration at least 8 days before bidding.

B. Basketball

- 1. Design Standard is American Parks Company195SS, Gooseneck Post, Aluminum Backboard, Lifetime rim nylon net and hardware.
- 2. Minimum 4" gooseneck extension on minimum 4 ½" galvanized pipe.
- 3. Set at 10' Rim height
- 4. Other manufacturers are allowed meeting similar specification.

3. EXECUTION

3.1. Installation

- A. Strictly follow the manufacturer recommendations for installation.
 - 1. Set all equipment in concrete filled holes with pipe sleeve for upper 16" of hole to resist frost ledges.
 - 2. Hole to be minimum 42" deep
 - 3. Auger for basketball gooseneck post to be minimum 25% larger than manufacturer recommendation
 - 4. Install basketball goals prior to bituminous paving work.

END 11 6813

1. GENERAL

1.1. WORK INCLUDES

- A. Provide window shades at all classroom windows
 - 1. Two Story classroom wing all windows
 - a. Classrooms – six required
 - b. Cafeteria two north, four east (narrow)
 - c. Verify on plans
 - 2. Commercial style

1.2. RELATED WORK

- A. Specified elsewhere:
 - 1. 04 2000 - Unit Masonry
 - 2. 08 5113– Aluminum windows
- B. Coordinate with opening conditions.
- C. Field coordinate to opening provided.

1.3. QUALITY ASSURANCE

- A. Materials shall be installed by persons experienced in installation of this type material.
 - 1. Installation shall comply with manufacturer’s recommendations, binding, warped, crooked or oil canning not acceptable.

1.4. SUBMITTALS

- A. Submit the following:
 - 1. Shop Drawings or Manufacturer’s Literature to fully describe installation, details, assembly.
 - 2. Operation and Maintenance materials.
 - 3. Certification of storm rated construction.

2. PRODUCTS

2.1. MATERIALS

1.1. SHADES

- A. See the window schedule for openings receiving shades, and the applicable Alternate in which the shades would be included.

- B. Shades shall be commercial type.
 - 1. Hunter Douglas, phone 800-727-8953
 - 2. Or equal
 - 3. Hunter Douglas description:
 - a. Manual roller shade chain drive
 - b. Beaded chain operation and geared pulley
 - c. Dark bronze valance and hardware.
 - d. Size, match window.
 - e. Clutch and bracket as recommended by Manufacturer.
 - f. Bracket as recommended by Manufacturer.
 - g. Fabric 5% open, color to be selected, sheer weave 2100.
 - 4. Other commercial manufacturers such as Levelor will be considered with appropriate submittals to demonstrate equal product.

3. EXECUTION

3.1. INSTALLATION

- A. Installation shall follow instruction of manufacturer.
 - 1. Installed material to operate in smooth manner with locks, springs, etc. properly adjusted.
 - 2. Manual operation to be smooth

3.2. CLEANING

- A. All material to be left in clean condition. smooth operating, and adjusted.

END 12 2400

1. GENERAL

1.1. WORK INCLUDED

- A. Contractor shall provide folding tables and bench seats with integral wall pocket or recessed as shown.
 - 1. Ten (10) table and wall surface housing assemblies
 - a. Nominal 14 tables
 - b. Surface pocket assembly
 - 2. Two (2) table and wall pocket assemblies
 - a. Nominal 12' tables
 - b. Recessed pocket assembly
 - c. Provide a slope top, sheet metal or light gauge framing and gyp board fit and finished, or lintel and CMU up to ceiling.

1.2. REFERENCES

- A. American Welding Society (AWS)
 - 1. AWS D1.1 Structural Welding Code – Steel
 - 2. AWS D1.3 Structural Welding Code – Sheet Steel

1.3. SYSTEM DESCRIPTION

- A. Design Requirements: Provide folding tables and bench seats with integral wall pockets with unitized understructure not requiring the tops of benches for operations.
- B. Performance Requirements: Bench undercarriage shall be able to support 200 lbs. (91 kgs) at any point when top panels are removed.

1.4. SUBMITTALS

- A. General: Submit listed submittals in accord with Conditions of the Contract and Division 1 Submittal Procedures Section.
- B. Product Data: Submit Manufacturer's product data and installation instructions.
 - 1. Supply information for each type of on-wall table/seating system specified, including detail of construction relative to materials, dimensions of individual components, profiles and finishes.
 - 2. Maintenance data for built-in table/seating systems, including a detailed operation and maintenance manual.

- C. Shop Drawings: Show fabrication and installation of built-in table/seating, including plans, elevations, sections, details of components, profiles and finishes.
- D. Samples:
 - 1. For initial selection in the form of Manufacturer's color charts consisting of actual units or sections of the units showing the full range of colors, textures and patterns available for each exposed material involving color selection.
 - 2. For verification of the following items, provide samples from the same material to be used for the work. Where finishes involve normal color and texture variations, include sample sets showing the full range of variations expected.
 - a. High pressure plastic laminate.
- E. Quality Assurance / Control Submittals - Submit the following:
 - 1. Certificates: Manufacturer certification of qualifications of firms or persons specified in the "Quality Assurance" article to demonstrate their capabilities and experience. Include lists of completed projects with project names and addresses of Architects and Owners as well as other information specified.
- F. Closeout Submittals – submit the following:
 - 1. Warranty documents as specified herein.

1.5. QUALITY ASSURANCE

- A. Qualifications:
 - 1. Installer Qualifications: Engage an experienced installer who has specialized in installing built-in tables and seating similar to those required for this project and who is acceptable to and certified by the Manufacturer of the build-in table/seating system to perform the work of this section.
 - 2. Welder Qualifications: Engage certified welders that have satisfactorily passed AWS qualification tests for welding processes involved and, if pertinent, have undergone re-certification.

1.6. DELIVERY, STORAGE & HANDLING

- A. General: Comply with Division 1 Product Requirement Section.
- B. Delivery: Delivery material in Manufacturer's original, unopened, undamaged containers with identification labels intact.
- C. Storage and Protection: Store materials protected from exposure to harmful environmental conditions and at temperature/humidity conditions recommended by the Manufacturer.

1.7. WARRANTY

- A. Project Warranty: Refer to Conditions of the Contract for project warranty provisions.
- B. Manufacturer's Warranty: Submit, for Owner's acceptance, Manufacturer's standard warranty document executed by authorized company official. Manufacturer's warranty is in addition to, and not a limitation of, other rights Owner may have under contract documents.
 - 1. Warranty Coverage: to include replacement or repair of any defect in the original materials and workmanship, including welds, pockets, tables and benches.
 - 2. Warranty Period: Fifteen (15) years from the date of Substantial Completion.

2. PRODUCTS

2.1. WALL- MOUNTED TABLES & BENCHES

- A. Manufacturer: Palmer Hamilton, 143 S. Jackson St., Suite 1, Elkhorn, WI 53121, phone 800/788-1028 or 262/723-8200, Fax 262/723-5180; E-mail: info@palmerhamilton.com, Website: www.palmerhamilton.com, or equal, submit data. Palmer Hamilton specification establishes generic standards, minor deviation that does not compromise structural performance or finish that are another manufacturers standard are acceptable
 - 1. Nelson Adams Company, (NACO) is an approved equal, verify they have a nominal 12' assembly available.
 - a. Palmer Hamilton specification establishes generic standards, minor deviation that does not compromise structural performance or finish that are another manufacturer's standard are acceptable
 - 2. Hamilton Series Surface Wall-Pocket Cafeteria Tables & Benches:
 - a. Tabletop frame shall consist of dual 1.25" X 2.125" (32 cm X 54 mm) 18-gauge steel box channels; bench frame shall consist of dual 1.5" (38mm) 16-gauge steel angle with returned edges rolled to 11-gauge.
 - b. Tubular Members: Stretcher bar shall be 16-gauge, 1" diameter steel tubing. Bench end legs shall be 16-gauge, 1" diameter steel tubing. Table end legs shall be 14-gauge, 1" diameter steel tubing. Center leg assembly outer telescoping tube shall be 14-gauge, 1.375" (35mm) diameter steel tubing; center leg assembly inner telescoping tube shall be 18-gauge, 1.125" (29mm) diameter steel tubing.
 - c. Finish: Epoxy powder coat
 - d. Finish Color: Provide samples.
 - e. Table Top and Bench construction: Top panels 075" thick, resin wood with density of 45 pcf, surfaced with GP-335

vertical grade plastic laminate and BK-25 plastic backing sheet, height 27", width 29.5", Model # 40M03273014

- f. Table Edge: Edge Guard bonded polyurea
- g. Laminate Surface: Provide samples
- h. Bench: Length: 165.5", height 15", width 11.5", Model #42M03151214

1) Two tables to be nominal 12", see plan.

- i. Wheels: Colson Performa non-marking wheels
- j. Tables and benches shall be detachable from and interchangeable in steel pockets.
- k. Tables and benches shall be equipped with compression springs to ensure proper counterbalance in any position.
- l. Tables and benches shall lock automatically when folded into pocket for storage.
- m. Surfaces of tables and benches shall be free of lock holes.
- n. Tables and benches shall have two (2) sets of .5" diameter, solid steel lock bolts. One (1) set of pins is manually activated by means of a remote handle positioned near the center of each table and bench. The second set of pins automatically engage while closing the table and bench.
- o. Tables and Benches shall have field adjustable down latches.

3. Hamilton Series Surface Applied Wall-Storage Pockets:

- a. Material: All welded construction of 16-gauge steel with 11-gauge sill and top plates, without partial back or open studs.
- b. Finish: Phosphate coated for rust prevention.
- c. Coating: Sprayed-on epoxy paint with hardener.
- d. Color to be selected, provide samples.
- e. On-Wall Table Products – Mounted on Wall Surface
- f. Facing: Provide 2" side facing to overlap walls in recessed installation.
- g. Head Panel: Provide custom head panel with 2.5" vertical facing to cover masonry opening of 86.5"
- h. Lock and Retainer

1) Table and bench have self-actuating safety latch with engages automatically when the table/bench is closed.

2) Pockets, tables and benches are provided with key operated mullion locks to prevent unauthorized use.

- i. Strap Anchors: Provide for pockets built into masonry walls.
- j. Anchor Holes: Provide at base and back of pocket for fastening unit to floors and walls.

2.2. FABRICATION

- A. Comply with applicable provisions of AWS D1.1 and AWS D1.3.

3. EXECUTION

3.1. MANUFACTURER'S INSTRUCTIONS

A. Site Verification of Conditions:

1. With General Contractor present, examine area where built-in tables and seating are to be installed.
2. Ensure compliance with installation tolerance requirements and other conditions affecting performance of built-in tables and seating.
3. Do not proceed with installation until unsatisfactory conditions have been corrected.

3.2. PREPARATION

- A. Protection: Protect previously installed finish materials from damage during installation of benches and tables.
- B. Preparation: Make actual field measurements of construction affecting built-in tables and seating prior to fabrication and show record measurements on Shop Drawings.

3.3. INSTALLATION

- A. Installation must be done over a level surface with no more than a .125" (3mm) change in height over a 10' (3m) area.
- B. Install built-in tables and seating to comply with Manufacturer's instructions, Shop Drawings and Specifications.
- C. Provide accessories indicated, including anchors, fasteners, inserts, and other hardware required for installation and attaching units to adjoining construction.
- D. Secure sill level on floor with flat-head screws through each hold provided by the Manufacturer using lead or patent-type anchors for screws in concrete floors. Install screw heads flush with sill.
- E. Seven foot (7') center to center pocket mounting distance is the suggested min. for 26" (660mm) aisles between table/bench seats.

3.4. ADJUSTING

- A. Touch up shop applied finishes to restore damaged or soiled areas.
- B. Lubricate, test and adjust each built-in table and seating unit to operate easily / comply with Manufacturer's specifications, including testing / adjustment of controls and safety features.

3.5. CLEANING

- A. After installation / adjustment: clean exposed and partially exposed surfaces on each installed built-in table, seating unit, and wall pocket. Use materials and methods recommended by the Manufacturer.

3.6. DEMONSTRATION

- A. Demonstrate and train Owner's maintenance personnel on procedures and schedules related to operation, troubleshooting, servicing, inspection and maintenance.

3.7. PROTECTION

- A. Protect installed built-in tables and seating units from damage during subsequent construction.
- B. Ensure tables and seating units are without damage or deterioration at the time of Substantial Completion

3.8. SCHEDULES

- A. Coordinate fabrication and installation schedule with Owner to avoid delaying the work.

END 12 6400

DIVISION 14 – CONVEYING EQUIPMENT
Section 14 2123 -- Passenger Elevator

1.1 SUMMARY

- A. Section Includes: Electric Traction Elevators.
- B. Products Supplied But Not Installed Under this Section:
 - 1. Hoist Beam
 - 2. Pit Ladder
 - 3. Inserts mounted in block walls for rail attachments
- C. Work Supplied Under Other Sections:
 - 1. Temporary lighting, including temporary lighting in hoistway for machine space with switch located in hoistway on the strike jamb side of top landing door.
 - 2. Main line disconnects for each elevator.
 - a. One fused three phase permanent power in building electrical distribution room
 - b. One non fused three phase permanent power in hoist way at top landing
 - 3. Hoistway ventilation shall be in accordance with local and national building code requirements.
 - 4. Guide Rail Support shall be structurally adequate to extend from pit floor to top of hoistway, with spans in accordance with requirements of authority having jurisdiction and final layouts.
 - 5. Removable barricades at all hoistway openings, in compliance with OSHA 29 CFR 1926.502 in addition to any local code requirements.
 - 6. Lifeline attachments capable of withstanding 5000 lb load in accordance with OSHA 29 CFR 1926.502. Provide a minimum of 2 at the top, front of each hoistway.
 - 7. Pit lighting: Fixture with switch and guards. Provide illumination level equal to or greater than that required by ASME A17.1/CSA B44 2000, or applicable version.
 - 8. Control space lighting with switch. Coordinate switch with lighting for machine space as allowable by code.
- D. Related sections, not limited to:
 - 1. Section 01 5000 - Temporary Facilities and Controls
 - 2. Section 03 3000 - Cast-in-Place Concrete:
 - 3. Section 04 2000 - Unit Masonry
 - 4. Section 05 1200 - Metal Fabrications
 - 5. Division 26 - Electrical
 - 6. Voice Communications – coordinate with Owner for voice over IP
 - 7. Section 28 3111 - Fire Detection and Alarm
 - 8. Section 31 2300 – Earthwork & Backfill

- E. Industry and government standards:
 - 1. ICC/ANSI A117.1 Accessible and Usable Buildings and Facilities
 - 2. ADAAG - Accessibility Guidelines for Buildings and Facilities
 - 3. ANSI/NFPA 70, National Electrical Code
 - 4. ANSI/NFPA 80, Standard for Fire Doors and Fire Windows
 - 5. ASME/ANSI A17.1, Safety Code for Elevators and Escalators.

1.2. DESCRIPTION OF ELEVATOR

- A. Elevator Equipment: KONE EcoSpace™ gearless traction elevator
 - 1. Or equal.
 - 2. Equipment Control: KCM831
 - a. Drive: Non Regenerative
 - 3. Landings: (2)
 - 4. Openings: Front Openings (2), Back Openings (0)
 - 5. Travel: Nominal 11' – 4" verify
 - 6. Rated Capacity: 2000 lbs
 - 7. Rated Speed: 150fpm
 - 8. Clear Inside Dimensions ADA compliant, Manufacturers Standard
 - 9. Cab Height: 8' 0"
 - 10. Clear height floor to support beam, 13'-4"
 - 11. Entrance Width and Type: 3'-0", see floor plan
 - 12. Entrance Height: 7'-0"
 - 13. Power Supply: 208, Volts three—phase
 - 14. Machine Location: Inside the hoistway mounted on car guide rail
 - 15. Control Space Location to be coordinated
 - 16. Elevator Equipment non-seismic
 - 17. Maintenance Service Period: 24 months

1.3. PERFORMANCE REQUIREMENTS

- A. Car Performance
 - 1. Car Speed $\pm 5\%$ of contract speed under any loading condition or direction of travel.
 - 2. Car Capacity: Safely lower, stop and hold (per code) up to 125% of rated load.
- B. System Performance
 - 1. Vertical Vibration (maximum): 25 mg
 - 2. Horizontal Vibration (maximum): 25 mg
 - 3. Jerk Rate (maximum): 3.3 ft/sec³
 - 4. Acceleration (maximum) 1.3 ft/sec²
 - 5. In Car Noise: = 55 dB(A)
 - 6. Leveling Accuracy: ± 0.2 inches
 - 7. Starts per hour (maximum): 120

1.4. SUBMITTALS

- A. Comply with Section 01 3300 - Submittal Procedures.
- B. Product Data: Submit manufacturer's product literature for each proposed system.
 - 1. Cab design, dimensions and layout.
 - 2. Layout, finishes, and accessories and available options.
 - 3. Controls, signals and operating system.
 - 4. Color selection charts for cab and entrances.
- C. Shop Drawings:
 - 1. Clearances and travel of car.
 - 2. Clear inside hoistway and pit dimensions.
 - 3. Location and layout of equipment and signals.
 - 4. Car, guide rails, buffers and other components in hoistway.
 - 5. Maximum rail bracket spacing.
 - 6. Maximum loads imposed on building structure.
 - 7. Hoist beam requirements.
 - 8. Location and sizes of access doors.
 - 9. Location and details of hoistway door and frames.
 - 10. Electrical characteristics and connection requirements.
- D. Operation and maintenance data:
 - 1. Provide manufacturer's standard maintenance and operation manual.
- E. Diagnostic Tools
 - 1. Prior to seeking final acceptance for the completed project as specified by the Contract Documents, the Elevator Contractor shall deliver to the Owner any specialized tool(s) that may be required to perform diagnostic evaluations, adjustments, and/or parametric software changes and/or test and inspections on any piece of control or monitoring equipment installed. This shall include any specialized tool(s) required for monitoring, inspection and/or maintenance where the means of suspension other than conventional wire ropes are furnished and installed by the Elevator Contractor. Any and all such tool(s) shall become property of the Owner. Any diagnostic tool provided to the Owner by the Elevator Contractor shall be configured to perform all levels of diagnostics, systems adjustment and parametric software changes which are available to the Elevator Contractor. In those cases where diagnostic tools provided to the Owner require periodic recalibration/or re-initiation, the Elevator Contractor shall perform such tasks at no additional cost to the Owner for a period equal to the term of the maintenance agreement from the date of final acceptance of the completed project During those intervals in which the Owner might find it necessary to surrender a diagnostic tool for re-calibration, re-initiation, or repair, the Elevator Contractor shall provide a temporary replacement for the tool at no additional cost to the Owner.

The Elevator Contractor shall deliver to the Owner, printed instructions for the proper use of any tool that may be necessary to perform diagnostic evaluations, system adjustment, and/or parametric software changes on any unit of microprocessor-based elevator control equipment and means of suspension other than standard elevator steel cables furnished and install by the Elevator Contractor. Accompanying the printed instructions shall be any and all access codes, password, or other proprietary information that is necessary to interface with the microprocessor-control equipment.

1.5. QUALITY ASSURANCE

- A. Manufacturer: Minimum of ten years experience in the fabrication, installation and service of elevators of the type and performance of the specified. The manufacturer shall have a documented quality assurance program.
- B. Installer: The equipment manufacturer shall install the elevator.
- C. Inspection and Testing: In accordance with requirements of local jurisdiction, obtain required permits, inspections and tests.

1.6. DELIVERY, STORAGE AND HANDLING

- A. Comply with manufacturer's recommendations for delivery, storage and handling.
- B. If the construction site is not prepared to receive the elevator equipment at the agreed ship date, the General Contractor shall be responsible to provide a safe, dry, and easily accessible storage area on or off the premises. Additional labor costs for double handling will be the responsibility of the general contractor.
- C. Delivered elevator materials shall be stored in a protected environment in accordance with manufacturer recommendations. A minimum storage area of 10 feet by 20 feet is required adjacent to the hoistway.

1.7. WARRANTY

- A. Provide manufacturer warranty for a period of one year. The warranty period is to begin upon Substantial Completion of the Contract. Warranty covers defects in materials and workmanship. Damage due to ordinary use, vandalism, improper or insufficient maintenance, misuse, or neglect do not constitute defective material or workmanship.

1.8. MAINTENANCE SERVICE

- A. The elevator manufacturer shall provide maintenance service consisting of regular examinations and adjustments of the elevator equipment for a period of 24 months after date of substantial completion. Replacement parts shall be produced by the original equipment manufacturer.

- B. Maintenance service be performed during regular working hours of regular working days and shall include regular time call back service.
- C. Maintenance service shall not include adjustments, repairs or replacement of parts due to negligence, misuse, abuse or accidents.

2. PRODUCTS

2.1. MANUFACTURER

- A. Provide AC gearless machine room-less elevator systems subject to compliance with the design and performance requirements of this specification. Elevator manufacturers may include but are not limited to one of the following:
 - 1. Basis of Design: EcoSpace™ traction elevators by KONE, Inc. (www.kone.com).
 - 2. Other acceptable machine room-less products: manufacturer with minimum 10 years experience in manufacturing, installing, and servicing elevators of the type required for the project.

2.2. EQUIPMENT: CONTROL COMPONENTS AND CONTROL SPACE

- A. Controller: Provide microcomputer based control system to perform all of the functions.
 - 1. All high voltage (110V or above) contact points inside the controller cabinet shall be protected from accidental contact in a situation where the controller doors are open.
 - 2. Controller shall be separated into two distinct halves; Motor Drive side and Control side. High voltage motor power conductors shall be routed and physically segregated from the rest of the controller.
 - 3. Provide a serial cardrack and main CPU board containing a non-erasable EPROM and operating system firmware.
 - 4. Variable field parameters and adjustments shall be contained in a non-volatile memory module.
- B. Drive: Provide Variable Voltage Variable Frequency AC drive system to develop high starting torque with low starting current.
- C. Controller Location: Locate controller in the front wall integrated with the top landing entrance frame, machine side of the elevator. A separate control space should not be required.

2.3. EQUIPMENT: HOISTWAY COMPONENTS

- A. Machine: AC gearless machine, with permanent magnet synchronous motor, direct current electro-mechanical disc brakes and integral traction drive sheave, mounted to the car guide rail at the top of the hoistway.
- B. Governor: Friction type over-speed governor rated for the duty of the elevator specified.

- C. Buffers, Car and Counterweight: Polyurethane buffer.
- D. Hoistway Operating Devices:
 - 1. Emergency stop switch in the pit
 - 2. Terminal stopping switches.
 - 3. Emergency stop switch on the machine
- E. Positioning System: System consisting of magnets and proximity switches.
- F. Guide Rails and Attachments: Steel rails with brackets and fasteners.

2.4. EQUIPMENT: HOISTWAY ENTRANCES

- A. Hoistway Entrances
 - 1. Sills: extruded.
 - 2. Doors: Hollow metal construction with vertical internal channel reinforcements.
 - 3. Fire Rating: Entrance and doors shall be UL fire-rated for 1-1/2 hour.
 - 4. Entrance Finish: Painted Finish.
 - 5. Entrance Markings Jamb Plates: Provide standard entrance jamb tactile markings on both jambs, at all floors. Plate Mounting: Refer to manufacturer drawings.

2.5. EQUIPMENT: CAR COMPONENTS

- A. Car Frame: Provide car frame with adequate bracing to support the platform and car enclosure.
- B. Platform: Platform shall be all steel construction.
- C. Car Guides: Provide guide-shoes mounted to top and bottom of both car and counterweight frame. Each guide-shoe assembly shall be arranged to maintain constant contact on the rail surfaces. Provide retainers in areas with Seismic design requirements.
- D. Steel Cab Finish: [Laminate Series]
 - 1. Car Wall Panels: Non-removable vertical panels plastic laminate selected from standard manufacturer's catalog of choices.
 - 2. Car Front Finish: Painted
 - 3. Car ceiling: Standard Translucent Panels - LF-1: Polygal Translucent three panel suspended ceiling with LED replacement T-5 Fluorescent lighting and Brushed Aluminum frame.
 - 4. Handrail:
 - a. Rails to be located on back of car enclosure.
 - 5. Flooring: By others.
 - 6. Threshold: Aluminum

E. Emergency Car Signals

1. Emergency Siren: Siren mounted on top of cab that is activated when the alarm button in the car operating panel is engaged. Siren shall have rated sound pressure level of 80 dB at a distance of three feet from device. Siren shall respond with a delay of not more than one second after activation of alarm button.
2. Emergency Car Lighting: Provide emergency power unit employing a 12-volt sealed rechargeable battery and totally static circuits shall illuminate the elevator car and provide current to the alarm bell in the event of building power failure.
3. Emergency Exit Contact: An electrical contact shall be provided on the car-top exit.
4. Ventilation: No fan.

2.6. EQUIPMENT: SIGNAL DEVICES AND FIXTURES

A. Car Operating Panel: Provide car operating panel with all push buttons, key switches, and message indicators for elevator operation, Textured Stainless Steel.

1. Flush mounted car operating panel shall contain a bank of round, mechanical, illuminated buttons marked to correspond to landings served, emergency call button, door open button, door close button, and key switches for lights, inspection, and exhaust fan. Buttons have amber illumination. All buttons to have raised text and Braille marking on left hand side. The car operating display panel shall be amber DOT-matrix. All texts, when illuminated, shall be amber. The car operating panel shall have a brushed stainless steel finish.
2. Additional features of car operating panel shall include:
 - a. Car Position Indicator within operating panel [Amber].
 - b. Elevator Data Plate marked with elevator capacity and car number.
 - c. Help buttons with raised markings.
 - d. In car stop switch per local code.
 - e. Firefighter's hat.
 - f. Firefighter's Phase II Key-switch.
 - g. Call Cancel Button.
 - h. Pre-programmed integrated ADA phone.
 - i. Help Button/Communicator. Activation of help button will initiate two-way communication between car and a location inside the building, switching over to alternate location if call is unanswered, where personnel are available to take the appropriate action. Visual indicators are provided for call initiation and call acknowledgement.

B. Hall Fixtures: Wall mounted hall fixtures shall be provided with necessary push buttons and key switches for elevator operation. Wall mounted hall fixtures shall have a brushed stainless steel finish.

1. Hall fixtures shall feature round, mechanical, buttons in applied mount face frame. Hall fixtures shall correspond to options available from that landing. Buttons shall be in a vertically mounted fixture. Hall fixtures shall not be jamb-mounted. Hall lanterns shall feature amber illumination.
- C. Hall Lanterns and Chime: A [vandal resistant] directional lantern visible from the corridor shall be provided at each hall entrance. When the car stops and the doors are opening, the lantern shall indicate the direction in which the car is to travel and a chime will sound. The chime will sound once for up and twice for down.
- 2.7. EQUIPMENT: ELEVATOR OPERATION AND CONTROLLER
- A. Elevator Operation
1. Simplex Collective Operation: Using a microprocessor-based controller, operation shall be automatic by means of the car and hall buttons. If all calls in the system have been answered, the car shall park at the last landing served.
- B. Standard Operating Features to include:
1. Full Collective Operation
 2. Fan and Light Control.
 3. Load Weighing Bypass.
 4. Ascending Car Uncontrolled Movement Protection
 5. Top of Car Inspection Station.
- C. Additional Operating Features to include:
1. Independent Service
 2. Hoistway Access Bottom Landing
 3. Hoistway Access Top Landing
- D. Elevator Control System for Inspections and Emergency
1. Provide devices within controller to run the elevator in inspection operation.
 2. Provide devices on car top to run the elevator in inspection operation.
 3. Provide within controller an emergency stop switch to disconnect power from the brake and prevents motor from running.
 4. Provide the means from the controller to mechanically lift and control the elevator brake to safely bring car to nearest available landing when power is interrupted.
 5. Provide the means from the controller to reset the governor over speed switch and also trip the governor.
 6. Provide the means from the controller to reset the emergency brake when set because of an unintended car movement or ascending car over speed.
 7. Provide the means for the control to reset elevator earthquake operation.

2.8. EQUIPMENT: DOOR OPERATOR AND CONTROL

- A. Door Operator: A closed loop permanent magnet VVVF high-performance door operator shall be provided to open and close the car and hoistway doors simultaneously. Door movement shall be cushioned at both limits of travel. Electro-mechanical interlock shall be provided at each hoistway entrance to prevent operation of the elevator unless all doors are closed and locked. An electric contact shall be provided on the car at each car entrance to prevent the operation of the elevator unless the car door is closed.
- B. The door operator shall be arranged so that, in case of interruption or failure of electric power, the doors can be readily opened by hand from within the car, in accordance with applicable code. Emergency devices and keys for opening doors from the landing shall be provided as required by local code.
- C. Doors shall open automatically when the car has arrived at or is leveling at the respective landings. Doors shall close after a predetermined time interval or immediately upon pressing of a car button. A door open button shall be provided in the car. Momentary pressing of this button shall reopen the doors and reset the time interval.
- D. Door hangers and tracks shall be provided for each car and hoistway door. Tracks shall be contoured to match the hanger sheaves. The hangers shall be designed for power operation with provisions for vertical and lateral adjustment. Hanger sheaves shall have polyurethane tires and pre-lubricated sealed-for-life bearings.
- E. Electronic Door Safety Device. The elevator car shall be equipped with an electronic protective device extending the full height of the car. When activated, this sensor shall prevent the doors from closing or cause them to stop and reopen if they are in the process of closing. The doors shall remain open as long as the flow of traffic continues and shall close shortly after the last person passes through the door opening.

3. EXECUTION

3.1. EXAMINATION

- A. Field measure and examine substrates, supports, and other conditions under which elevator work is to be performed.
- B. Do not proceed with work until unsatisfactory conditions are corrected.
- C. Prior to start of Work, verify hoistway is in accordance with shop drawings. Dimensional tolerance of hoistway from shop drawings: -0 inches +2 inches. Do not begin work of this section until dimensions are within tolerances.
- D. Prior to start of Work, verify projections greater than 2 inches (4 inches if ASME A17.1/CSA B44 2000 applies) must be beveled not less than 75 degrees from horizontal.

- E. Prior to start of Work, verify landings have been prepared for entrance sill installation. Traditional sill angle or concrete sill support shall not be required.
- F. Prior to start of Work, verify elevator pit has been constructed in accordance with requirements, is dry and reinforced to sustain vertical forces, as indicated in approved submittal. Verify that sumps or sump pumps located within pit will not interfere with installed elevator equipment.
- G. Prior to start of Work, verify control space has been constructed in accordance with requirements, with access coordinated with elevator shop drawings, including Sleeves and penetrations.
- H. Verify installation of GFCI protected 20-amp in pit and adjacent to each signal control cabinet in control space.

3.2. PREPARATION

- A. Coordinate installation of anchors, bearing plates, brackets and other related accessories.

3.3. INSTALLATION

- A. Install equipment, guides, controls, car and accessories in accordance with manufacturer installation methods and recommended practices.
- B. Properly locate guide rails and related supports at locations in accordance with manufacturer's recommendations and approved shop drawings. Anchor to building structure using isolation system to minimize transmission of vibration to structure.
- C. All hoistway frames shall be securely fastened to fixing angles mounted in the hoistway. Coordinate installation of sills and frames with other trades.
- D. Lubricate operating system components in accordance with manufacturer recommendations.
- E. Perform final adjustments, and necessary service prior to substantial completion.

3.4. CONSTRUCTION

- A. Interface with Other Work:
 - 1. Guide rail brackets attached to steel shall be installed prior to application of fireproofing.
 - 2. Coordinate construction of entrance walls with installation of door frames and sills. Maintain front wall opening until elevator equipment has been installed.
 - a. Ensure adequate support for entrance attachment points at all landings.

- b. Coordinate wall openings for hall push buttons, signal fixtures and sleeves. Each elevator requires sleeves within the hoistway wall.
- c. Coordinate emergency power transfer switch and power change pending signals as required for termination at the primary elevator signal control cabinet in each group.
- d. Coordinate interface of elevators and fire alarm system.
- e. Coordinate interface of dedicated telephone line.
- f. Coordinate the installation of the non fused three phase permanent power disconnect in hoist way at top landing

3.5 TESTING AND INSPECTIONS

- A. Perform recommended and required testing in accordance with authority having jurisdiction.
- B. Obtain required permits and provide originals to Owner's Representative.

3.6. DEMONSTRATION

- A. Prior to substantial completion, instruct Owner's Representative on the proper function and required daily maintenance of elevators. Instruct personnel on emergency procedures.

END 14 2123

1. GENERAL

1.1. WORK INCLUDES

A. Base Bid

1. Contractor Provide:

- a. Piping materials and installation instructions common to most piping systems.
- b. Mechanical sleeve seals.
- c. Sleeves.
- d. Escutcheons.
- e. Grout.
- f. Equipment installation requirements common to equipment sections.
- g. Painting and finishing.
- h. Supports and anchorages.

1.2. DEFINITIONS

- A. Finished Spaces: Spaces other than mechanical and electrical equipment rooms, furred spaces, pipe chases, unheated spaces immediately below roof, and 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. Exposed, Exterior Installations: Exposed to view outdoors or subject to outdoor ambient temperatures and weather conditions. Examples include rooftop locations.
- D. Concealed, Interior Installations: Concealed from view and protected from physical contact by building occupants. Examples include above ceilings and in chases.
- E. Concealed, Exterior Installations: Concealed from view and protected from weather conditions and physical contact by building occupants but subject to outdoor ambient temperatures. Examples include installations within unheated shelters.
- F. The following are industry abbreviations for plastic materials:
 1. CPVC: Chlorinated polyvinyl chloride plastic.
- G. The following are industry abbreviations for rubber materials:
 1. EPDM: Ethylene-propylene-diene terpolymer rubber.
 2. NBR: Acrylonitrile-butadiene rubber.

1.3. SUBMITTALS

- A. Product Data: For the following:
 1. Mechanical sleeve seals.
 2. Escutcheons.
- B. Welding certificates.

1.4. 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 Fire-Suppression 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.

1.5. 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.

1.6. COORDINATION

- A. Arrange for pipe spaces, chases, slots, and openings in building structure during progress of construction, to allow for fire-suppression installations.
- B. Coordinate installation of required supporting devices and set sleeves in poured-in-place concrete and other structural components as they are constructed.

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. Manufacturers: Subject to compliance with requirements, provide products by the manufacturers specified.

2.2. PIPE, TUBE, AND FITTINGS

- A. Refer to individual Division 21 piping Sections for pipe, tube, and fitting materials and joining methods and see piping schedule on drawings.
- B. Pipe Threads: ASME B1.20.1 for factory-threaded pipe and pipe fittings.

2.3. JOINING MATERIALS

- A. Refer to individual Division 21 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. 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.
- F. 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. MECHANICAL SLEEVE SEALS

- A. Description: Modular sealing element unit, designed for field assembly, to fill annular space between pipe and sleeve.
- 1. Manufacturers:
 - a. Advance Products & Systems, Inc.
 - b. Metraflex Co.
 - c. Pipeline Seal and Insulator, Inc.
 - 2. Sealing Elements: EPDM interlocking links shaped to fit surface of pipe. Include type and number required for pipe material and size of pipe.
 - 3. Pressure Plates: Carbon 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.

2.5. 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.

2.6. 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, Stamped-Steel Type: With set screw or spring clips and chrome-plated finish.
- D. Split-Plate, Stamped-Steel Type: With concealed hinge, set screw or spring clips, and chrome-plated finish.
- E. One-Piece, Floor-Plate Type: Cast-iron floor plate.
- F. Split-Casting, Floor-Plate Type: Cast brass with concealed hinge and set screw.

2.7. 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.

3. EXECUTION

3.1. PIPING SYSTEMS - COMMON REQUIREMENTS

- A. Install piping according to the following requirements and Division 21 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. Bare Piping at Floor Penetrations in Equipment Rooms: One-piece, floor-plate type.
- M. Sleeves are not required for core-drilled holes.
- N. 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 of mechanical equipment areas or other wet areas 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.
- O. Aboveground, Exterior-Wall Pipe Penetrations: Seal penetrations using sleeves with joint sealer.
 - 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.
- 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 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.

3.2. PIPING JOINT CONSTRUCTION

- A. Join pipe and fittings according to the following requirements and Division 21 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.

3.3. PAINTING

- A. Painting of fire-suppression 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.

3.4. 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 fire-suppression materials and equipment.
- C. Field Welding: Comply with AWS D1.1.

3.5. GROUTING

- A. Mix and install grout for fire-suppression 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 21 0500

1. GENERAL

1.1. WORK INCLUDES

A. Base Bid

1. Contractor Provide:
 - a. Pipes, fittings, and specialties.
 - b. Fire-protection valves.
 - c. Sprinklers.
 - d. Alarm devices.
 - e. Manual control stations.
 - f. Pressure gages.

1.2. DEFINITIONS

- A. Standard-Pressure Sprinkler Piping: Wet-pipe sprinkler system piping designed to operate at working pressure of 175 psig maximum.

1.3. SYSTEM DESCRIPTIONS

- A. Wet-Pipe Sprinkler System: Automatic sprinklers are attached to piping containing water and that is connected to water supply through alarm valve. Water discharges immediately from sprinklers when they are opened. Sprinklers open when heat melts fusible link or destroys frangible device. Hose connections are included if indicated.

B. Flow Test Report:

1. Location of Test:
2. Performed by:
3. Date of Test:
4. Static Pressure:
5. Residual Pressure:
6. Pitot Pressure:
7. Outlet Size:
8. Hydrant Outlet Coefficient:
9. Actual Flow:

1.4. PERFORMANCE REQUIREMENTS

- A. Standard-Pressure Piping System Component: Listed for 175-psig maximum working pressure.
- B. Delegated Design: Design sprinkler system(s), including comprehensive engineering analysis by a qualified professional engineer, using performance requirements and design criteria indicated.
- C. Sprinkler system design shall be approved by authorities having jurisdiction.
1. Margin of Safety for Available Water flow and Pressure: 20 percent, including losses through water-service piping, valves, and backflow preventers.
 2. Sprinkler Occupancy Hazard Classifications:

- a. Kitchens and Cafeteria: Ordinary Hazard, Group 1.
 - b. General Storage Areas: Ordinary Hazard, Group 1.
 - c. Mechanical Equipment Rooms: Ordinary Hazard, Group 1.
 - d. Office, classrooms and Public Areas: Light Hazard.
3. Minimum Density for Automatic-Sprinkler Piping Design:
- a. Light-Hazard Occupancy: 0.10 gpm over 1500-sq. ft.
 - b. Ordinary-Hazard, Group 1 Occupancy: 0.15 gpm over 1500-sq. ft.area.
 - c. Special Occupancy Hazard: As determined by authorities having jurisdiction.
4. Maximum Protection Area per Sprinkler:
- a. Classrooms Spaces: 225 sq. ft.
 - b. Storage Areas: 130 sq. ft.
 - c. Mechanical Equipment Rooms: 130 sq. ft.
 - d. Other Areas: According to NFPA 13 recommendations unless otherwise indicated.
5. Total Combined Hose-Stream Demand Requirement: According to NFPA 1142 unless otherwise indicated:
- a. Ordinary-Hazard Occupancies: 1000 gpm for 60 minutes.

1.5. ACTION SUBMITTALS

- A. Product Data: For each type of product indicated. Include rated capacities, operating characteristics, electrical characteristics, and furnished specialties and accessories.
- B. Shop Drawings: For wet-pipe sprinkler systems. Include plans, elevations, sections, details, and attachments to other work.
 - 1. Wiring Diagrams: For power, signal, and control wiring.
- C. Delegated-Design Submittal: For sprinkler systems indicated to comply with performance requirements and design criteria, including analysis data signed and sealed by the qualified professional engineer responsible for their preparation.

1.6. INFORMATIONAL SUBMITTALS

- A. Coordination Drawings: Sprinkler systems, drawn to scale, on which the following items are shown and coordinated with each other, using input from installers of the items involved:
 - 1. Domestic water piping.
 - 2. HVAC ductwork.
 - 3. Items penetrating finished ceiling include the following:
 - a. Lighting fixtures.
 - b. Air outlets and inlets.
- B. Qualification Data: For qualified Installer and professional engineer.
- C. Approved Sprinkler Piping Drawings: Working plans, prepared according to NFPA 13, that have been approved by authorities having jurisdiction, including hydraulic calculations if applicable.
- D. Welding certificates.

- E. Fire-hydrant flow test report.
- F. Field Test Reports and Certificates: Indicate and interpret test results for compliance with performance requirements and as described in NFPA 13. Include "Contractor's Material and Test Certificate for Aboveground Piping."
- G. Field quality-control reports.

1.7. CLOSEOUT SUBMITTALS

- A. Operation and Maintenance Data: For sprinkler specialties to include in emergency, operation, and maintenance manuals.

1.8. QUALITY ASSURANCE

A. Installer Qualifications:

- 1. Installer's responsibilities include designing, fabricating, and installing sprinkler systems and providing professional engineering services needed to assume engineering responsibility. Base calculations on results of fire-hydrant flow test.
 - a. Engineering Responsibility: Preparation of working plans, calculations, and field test reports by a qualified professional engineer.

- B. Welding Qualifications: Qualify procedures and operators according to ASME Boiler and Pressure Vessel Code.

- C. 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.

- D. NFPA Standards: Sprinkler system equipment, specialties, accessories, installation, and testing shall comply with the following:

- 1. NFPA 13, "Installation of Sprinkler Systems."

1.9. COORDINATION

- A. Coordinate layout and installation of sprinklers with other construction that penetrates ceilings, including light fixtures, HVAC equipment, and partition assemblies.

1.10. EXTRA MATERIALS

- A. Furnish extra materials that match products installed and that are packaged with protective covering for storage and identified with labels describing contents.

- 1. Sprinkler Cabinets: Finished, wall-mounted, steel cabinet with hinged cover, and with space for minimum of six spare sprinklers plus sprinkler wrench. Include number of sprinklers required by NFPA 13 and sprinkler wrench. Include separate cabinet with sprinklers and wrench for each type of sprinkler used on Project.

2. PRODUCTS

2.1. PIPING MATERIALS

- A. Comply with requirements in "Piping Schedule" Article for applications of pipe, tube, and fitting materials, and for joining methods for specific services, service locations, and pipe sizes.

2.2. STEEL PIPE AND FITTINGS

- A. Standard Weight, Galvanized- and Black Steel Pipe: ASTM A 53/A 53M, Type E. Pipe ends may be factory or field formed to match joining method.
- B. Schedule 40, Black Steel Pipe: ASTM A 135 or ASTM A 795/A 795M, and NFPA 13-specified wall thickness in NPS 6 to NPS 10, plain end.
- C. Galvanized- and Black-Steel Pipe Nipples: ASTM A 733, made of ASTM A 53/A 53 M, standard-weight, seamless steel pipe with threaded ends.
- D. Galvanized, Steel Couplings: ASTM A 865, threaded.
- E. Galvanized, Gray-Iron Threaded Fittings: ASME B16.4, Class 125, standard pattern.
- F. Malleable- or Ductile-Iron Unions: UL 860.
- G. Cast-Iron Flanges: ASME 16.1, Class 125.
- H. Steel Flanges and Flanged Fittings: ASME B16.5, Class 150.
- I. Steel Welding Fittings: ASTM A 234/A 234M and ASME B16.9.
- J. Grooved-Joint, Steel-Pipe Appurtenances:
 - 1. Manufacturers: Subject to compliance with requirements, provide products by one of the following, or approved equal:
 - a. Anvil International, Inc.
 - b. Corcoran Piping System Co.
 - c. National Fittings, Inc.
 - d. Shurjoint Piping Products.
 - e. Tyco Fire & Building Products LP.
 - f. Victaulic Company.
 - 2. Pressure Rating: 175 psig minimum.
 - 3. Galvanized, Grooved-End Fittings for Steel Piping: ASTM A 47/A 47M, malleable-iron casting or ASTM A 536, ductile-iron casting; with dimensions matching steel pipe.
 - 4. Grooved-End-Pipe Couplings for Steel Piping: AWWA C606 and UL 213, rigid pattern, unless otherwise indicated, for steel-pipe dimensions. Include ferrous housing sections, EPDM-rubber gasket, and bolts and nuts.
- K. Steel Pressure-Seal Fittings: UL 213, FM-approved, 175-psig pressure rating with steel housing, rubber O-rings, and pipe stop; for use with fitting manufacturers' pressure-seal tools.
 - 1. Manufacturers: Subject to compliance with requirements, provide products by one of the following, or approved equal:
 - a. Victaulic Company.

2.3. PIPING JOINING MATERIALS

- A. Pipe-Flange Gasket Materials: AWWA C110, rubber, flat face, 1/8 inch thick.
 - 1. Class 125, Cast-Iron Flanges and Class 150, Bronze Flat-Face Flanges: Full-face gaskets.

2. Class 250, Cast-Iron Flanges and Class 300, Steel Raised-Face Flanges: Ring-type gaskets.
- B. Metal, Pipe-Flange Bolts and Nuts: ASME B18.2.1, carbon steel unless otherwise indicated.
 - C. Brazing Filler Metals: AWS A5.8/A5.8M, BCuP Series, copper-phosphorus alloys for general-duty brazing unless otherwise indicated.
 - D. Welding Filler Metals: Comply with AWS D10.12M/D10.12 for welding materials appropriate for wall thickness and chemical analysis of steel pipe being welded.

2.4. LISTED FIRE-PROTECTION VALVES

- A. General Requirements:
 1. Valves shall be UL listed or FM approved.
 2. Minimum Pressure Rating for Standard-Pressure Piping: 175 psig.
- B. Ball Valves:
 1. Manufacturers: Subject to compliance with requirements, provide products by one of the following, or approved equal:
 - a. Anvil International, Inc.
 - b. Victaulic Company.
 2. Standard: UL 1091 except with ball instead of disc.
 3. Valves NPS 1-1/2 and Smaller: Bronze body with threaded ends.
 4. Valves NPS 2 and NPS 2-1/2: Bronze body with threaded ends or ductile-iron body with grooved ends.
 5. Valves NPS 3: Ductile-iron body with grooved ends.
- C. Iron Butterfly Valves:
 1. Manufacturers: Subject to compliance with requirements, provide products by one of the following, or approved equal:
 - a. Global Safety Products, Inc.
 - b. Kennedy Valve; a division of McWane, Inc.
 - c. Milwaukee Valve Company.
 - d. NIBCO INC.
 - e. Tyco Fire & Building Products LP.
 - f. Victaulic Company.
 2. Standard: UL 1091.
 3. Pressure Rating: 300 psig.
 4. Body Material: Cast or ductile iron.
 5. Style: Lug or wafer.
 6. End Connections: Grooved.
- D. Check Valves:
 1. Manufacturers: Subject to compliance with requirements, provide products by one of the following, or approved equal:
 - a. American Cast Iron Pipe Company; Waterous Company Subsidiary.
 - b. Crane Co.; Crane Valve Group; Crane Valves.

- c. Crane Co.; Crane Valve Group; Jenkins Valves.
- d. Crane Co.; Crane Valve Group; Stockham Division.
- e. Fire-End & Croker Corporation.
- f. Kennedy Valve; a division of McWane, Inc.
- g. Metraflex, Inc.
- h. Milwaukee Valve Company.
- i. Mueller Co.; Water Products Division.
- j. NIBCO INC.
- k. Potter Roemer.
- l. Reliable Automatic Sprinkler Co., Inc.
- m. Victaulic Company.
- n. Viking Corporation.
- o. Watts Water Technologies, Inc.

- 2. Standard: UL 312.
- 3. Pressure Rating: 300 psig.
- 4. Type: Swing check.
- 5. Body Material: Cast iron.
- 6. End Connections: Flanged or grooved.

E. Iron OS&Y Gate Valves:

- 1. Manufacturers: Subject to compliance with requirements, provide products by one of the following, or approved equal:
 - a. American Cast Iron Pipe Company; Waterous Company Subsidiary.
 - b. American Valve, Inc.
 - c. Crane Co.; Crane Valve Group; Crane Valves.
 - d. Crane Co.; Crane Valve Group; Jenkins Valves.
 - e. Crane Co.; Crane Valve Group; Stockham Division.
 - f. Hammond Valve.
 - g. Milwaukee Valve Company.
 - h. Mueller Co.; Water Products Division.
 - i. NIBCO INC.
 - j. Watts Water Technologies, Inc.
- 2. Standard: UL 262.
- 3. Pressure Rating: 300 psig.
- 4. Body Material: Cast or ductile iron.
- 5. End Connections: Flanged or grooved.

F. Indicating-Type Butterfly Valves:

- 1. Manufacturers: Subject to compliance with requirements, provide products by one of the following, or approved equal:
 - a. Global Safety Products, Inc.
 - b. Kennedy Valve; a division of McWane, Inc.
 - c. Milwaukee Valve Company.
 - d. NIBCO INC.
 - e. Tyco Fire & Building Products LP.
 - f. Victaulic Company.
- 2. Standard: UL 1091.
- 3. Pressure Rating: 300 psig minimum.
- 4. Valves NPS 2-1/2 and Larger:

- a. Valve Type: Butterfly.
 - b. Body Material: Cast or ductile iron.
 - c. End Connections: Flanged, grooved, or wafer.
5. Valve Operation: Integral electrical, 115-V ac, prewired, single-circuit, supervisory switch indicating device.

G. Automatic Control Valves

- 1. Manufacturers: Subject to compliance with requirements, provide products by one of the following, or approved equal:
 - a. Anvil International, Inc.
 - b. OCV Control Valves.
 - c. Globe Fire Sprinkler Corporation.
 - d. Cla-Val.
 - e. Victaulic Company.
- 2. Standard: UL 312.
- 3. Pressure Rating: 175 psig minimum
- 4. Type: Solenoid Control Valve (Slow opening and closing), Pump Suction Valve.
- 5. Body Material: Cast iron.
- 6. End Connections: Flanged or grooved.

2.5. TRIM AND DRAIN VALVES

A. General Requirements:

- 1. Standard: UL's "Fire Protection Equipment Directory "listing or "Approval Guide," published by FM Global, listing.
- 2. Pressure Rating: 175 psig minimum.

B. Angle Valves:

- 1. Manufacturers: Subject to compliance with requirements, provide products by one of the following, or approved equal:
 - a. Fire Protection Products, Inc.
 - b. United Brass Works, Inc.

C. Ball Valves:

- 1. Manufacturers: Subject to compliance with requirements, provide products by one of the following, or approved equal:
 - a. Affiliated Distributors.
 - b. Fire-End & Croker Corporation.
 - c. Kennedy Valve; a division of McWane, Inc.
 - d. Milwaukee Valve Company.
 - e. NIBCO INC.
 - f. Potter Roemer.
 - g. Red-White Valve Corporation.
 - h. Tyco Fire & Building Products LP.
 - i. Victaulic Company.
 - j. Watts Water Technologies, Inc.

D. Globe Valves:

1. Manufacturers: Subject to compliance with requirements, provide products by one of the following, or approved equal:
 - a. Fire Protection Products, Inc.
 - b. United Brass Works, Inc.

E. Plug Valves:

1. Manufacturers: Subject to compliance with requirements, provide products by one of the following, or approved equal:
 - a. Southern Manufacturing Group.

2.6. SPECIALTY VALVES

A. General Requirements:

1. Standard: UL's "Fire Protection Equipment Directory "listing or "Approval Guide," published by FM Global, listing.
2. Pressure Rating:
 - a. Standard-Pressure Piping Specialty Valves: 175 psig.
3. Body Material: Cast or ductile iron.
4. Size: Same as connected piping.
5. End Connections: Flanged or grooved.

B. Automatic (Ball Drip) Drain Valves:

1. Manufacturers: Subject to compliance with requirements, provide products by one of the following, or approved equal:
 - a. AFAC Inc.
 - b. Reliable Automatic Sprinkler Co., Inc.
 - c. Tyco Fire & Building Products LP.
2. Standard: UL 1726.
3. Pressure Rating: 175 psig minimum.
4. Type: Automatic draining, ball check.
5. Size: NPS 3/4.
6. End Connections: Threaded.

C. Alarm Valves:

1. Manufacturers: Subject to compliance with requirements, provide products by one of the following, or approved equal.
 - a. Reliable Automatic Sprinkler Co., Inc.
 - b. Victaulic Company.
 - c. Viking Corporations.
2. Standard: UL 193.
3. Design: For horizontal or vertical installation.
4. Include trim sets for bypass, drain, electrical sprinkler alarm switch, pressure gages, and fill-line attachment with strainer.
5. Drip Cup Assembly: Pipe drain without valves and separate from main drain piping.

2.7. FIRE-DEPARTMENT CONNECTIONS

A. Flush-Type, Fire-Department Connection:

1. Manufacturers: Subject to compliance with requirements, provide products by one of the following, or approved equal:
 - a. Elkhart Brass Mfg. Company, Inc.
 - b. GMR International Equipment Corporation.
 - c. Guardian Fire Equipment, Inc.
 - d. Potter Roemer.
2. Standard: UL 405.
3. Type: Flush, for wall mounting.
4. Pressure Rating: 175 psig minimum.
5. Body Material: Corrosion-resistant metal.
6. Inlets: Brass with threads according to NFPA 1963 and matching local fire-department sizes and threads. Include extension pipe nipples, brass lugged swivel connections, and check devices or clappers.
7. Caps: Plastic, lugged type, with gasket.
8. Escutcheon Plate: Rectangular, brass, wall type.
9. Outlet: With pipe threads.
10. Body Style: Horizontal.
11. Number of Inlets: Two.
12. Outlet Location: Back.
13. Escutcheon Plate Marking: Similar to "AUTO SPKR."
14. Finish: Polished chrome plated.
15. Outlet Size: To match system design requirements.

2.8. SPRINKLER SPECIALTY PIPE FITTINGS

A. Branch Outlet Fittings:

1. Manufacturers: Subject to compliance with requirements, provide products by one of the following, or approved equal:
 - a. National Fittings, Inc.
 - b. Tyco Fire & Building Products LP.
 - c. Victaulic Company.
2. Standard: UL 213.
3. Pressure Rating: 300 psig.
4. Body Material: Ductile-iron housing with EPDM seals and bolts and nuts.
5. Type: Mechanical-T and -cross fittings.
6. Configurations: Snap-on and strapless, ductile-iron housing with branch outlets.
7. Size: Of dimension to fit onto sprinkler main and with outlet connections as required to match connected branch piping.
8. Branch Outlets: Grooved, plain-end pipe, or threaded.

B. Flow Detection and Test Assemblies:

1. Manufacturers: Subject to compliance with requirements, provide products by one of the following, or approved equal:
 - a. AGF Manufacturing Inc.
 - b. Reliable Automatic Sprinkler Co., Inc.
 - c. Tyco Fire & Building Products LP.

- d. Victaulic Company.
 2. Standard: UL's "Fire Protection Equipment Directory" listing or "Approval Guide," published by FM Global, listing.
 3. Pressure Rating: 175 psig.
 4. Body Material: Cast- or ductile-iron housing with orifice, sight glass, and integral test valve.
 5. Size: Same as connected piping.
 6. Inlet and Outlet: Threaded.
- C. Branch Line Testers:
1. Manufacturers: Subject to compliance with requirements, provide products by one of the following, or approved equal:
 - a. Elkhart Brass Mfg. Company, Inc.
 - b. Fire-End & Croker Corporation.
 - c. Potter Roemer.
 2. Standard: UL 199.
 3. Pressure Rating: 175 psig.
 4. Body Material: Brass.
 5. Size: Same as connected piping.
 6. Inlet: Threaded.
 7. Drain Outlet: Threaded and capped.
 8. Branch Outlet: Threaded, for sprinkler.
- D. Sprinkler Inspector's Test Fittings:
1. Manufacturers: Subject to compliance with requirements, provide products by one of the following, or approved equal:
 - a. AGF Manufacturing Inc.
 - b. Triple R Specialty.
 - c. Tyco Fire & Building Products LP.
 - d. Victaulic Company.
 - e. Viking Corporation.
 2. Standard: UL's "Fire Protection Equipment Directory" listing or "Approval Guide," published by FM Global, listing.
 3. Pressure Rating: 175 psig.
 4. Body Material: Cast- or ductile-iron housing with sight glass.
 5. Size: Same as connected piping.
 6. Inlet and Outlet: Threaded.
- E. Adjustable Drop Nipples:
1. Manufacturers: Subject to compliance with requirements, provide products by one of the following, or approved equal:
 - a. CECA, LLC.
 - b. Corcoran Piping System Co.
 - c. Merit Manufacturing; a division of Anvil International, Inc.
 2. Standard: UL 1474.

3. Pressure Rating: 175 psig.
4. Body Material: Steel pipe with EPDM-rubber O-ring seals.
5. Size: Same as connected piping.
6. Length: Adjustable.
7. Inlet and Outlet: Threaded.

F. Flexible, Sprinkler Hose Fittings:

1. Manufacturers: Subject to compliance with requirements, provide products by one of the following, or approved equal:
 - a. Fivalco Inc.
 - b. FlexHead Industries, Inc.
 - c. Gateway Tubing, Inc.
2. Standard: UL 1474.
3. Type: Flexible hose for connection to sprinkler, and with bracket for connection to ceiling grid.
4. Pressure Rating: 175 psig.
5. Size: Same as connected piping, for sprinkler.

2.9. SPRINKLERS

A. Manufacturers: Subject to compliance with requirements, provide products by one of the following, or approved equal:

1. AFAC Inc.
2. Globe Fire Sprinkler Corporation.
3. Reliable Automatic Sprinkler Co., Inc.
4. Tyco Fire & Building Products LP.
5. Venus Fire Protection Ltd.
6. Victaulic Company.
7. Viking Corporation.

B. General Requirements:

1. Standard: UL's "Fire Protection Equipment Directory" listing or "Approval Guide," published by FM Global, listing.
2. Pressure Rating for Standard Automatic Sprinklers: 175 psig.

C. Automatic Sprinklers with Heat-Responsive Element:

1. Early-Suppression, Fast-Response Applications: UL 1767.
2. Nonresidential Applications: UL 199.
3. Characteristics: Nominal 1/2-inch orifice with Discharge Coefficient K of 5.6, and for "Ordinary" temperature classification rating unless otherwise indicated or required by application.

D. Open Sprinklers with Heat-Responsive Element Removed: UL 199.

1. Characteristics:
 - a. Nominal 1/2-inch Orifice: With Discharge Coefficient K between 5.3 and 5.8.
 - b. Nominal 17/32-inch Orifice: With Discharge Coefficient K between 7.4 and 8.2.

E. Sprinkler Finishes:

1. Refer to sprinkler schedule on plans.

F. Sprinkler Escutcheons: Materials, types, and finishes for the following sprinkler mounting applications. Escutcheons for concealed, flush, and recessed-type sprinklers are specified with sprinklers.

1. Ceiling Mounting: Chrome-plated steel, two piece, with 1-inch vertical adjustment.

G. Sprinkler Guards:

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

- a. Reliable Automatic Sprinkler Co., Inc.
- b. Tyco Fire & Building Products LP.
- c. Victaulic Company.
- d. Viking Corporation.

2. Standard: UL 199.

3. Type: Wire cage with fastening device for attaching to sprinkler.

2.10. ALARM DEVICES

A. Alarm-device types shall match piping and equipment connections.

B. Electrically Operated Alarm Bell:

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

- a. Fire-Lite Alarms, Inc.; a Honeywell company.
- b. Notifier; a Honeywell company.
- c. Potter Electric Signal Company.

2. Standard: UL 464.

3. Type: Vibrating, metal alarm bell.

4. Size: 8-inch minimum diameter.

5. Finish: Red-enamel factory finish, suitable for outdoor use.

C. Water-Flow Indicators:

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

- a. ADT Security Services, Inc.
- b. McDonnell & Miller; ITT Industries.
- c. Potter Electric Signal Company.
- d. System Sensor; a Honeywell company.
- e. Viking Corporation.
- f. Watts Industries (Canada) Inc.

2. Standard: UL 346.

3. Water-Flow Detector: Electrically supervised.

4. Components: Two single-pole, double-throw circuit switches for isolated alarm and auxiliary contacts, 7 A, 125-V ac and 0.25 A, 24-V dc; complete with factory-set, field-adjustable retard element to prevent false signals and tamperproof cover that sends signal if removed.

5. Type: Paddle operated.

6. Pressure Rating: 175 psig.

7. Design Installation: Horizontal or vertical.

D. Pressure Switches:

1. Manufacturers: Subject to compliance with requirements, provide products by one of the following, or approved equal:
 - a. Potter Electric Signal Company.
 - b. Tyco Fire & Building Products LP.
 - c. Viking Corporation.
2. Standard: UL 346.
3. Type: Electrically supervised water-flow switch with retard feature.
4. Components: Single-pole, double-throw switch with normally closed contacts.
5. Design Operation: Rising pressure signals water flow.

E. Valve Supervisory Switches:

1. Manufacturers: Subject to compliance with requirements, provide products by one of the following, or approved equal:
 - a. Fire-Lite Alarms, Inc.; a Honeywell company.
 - b. Kennedy Valve; a division of McWane, Inc.
 - c. Potter Electric Signal Company.
 - d. System Sensor; a Honeywell company.
2. Standard: UL 346.
3. Type: Electrically supervised.
4. Components: Single-pole, double-throw switch with normally closed contacts.
5. Design: Signals that controlled valve is in other than fully open position.

2.11. PRESSURE GAGES

- A. Manufacturers: Subject to compliance with requirements, provide products by one of the following, or approved equal:
1. AMETEK; U.S. Gauge Division.
 2. Ashcroft, Inc.
 3. Brecco Corporation.
 4. WIKA Instrument Corporation.
- B. Standard: UL 393.
- C. Dial Size: 3-1/2- to 4-1/2-inch diameter.
- D. Pressure Gage Range: 0 to 250 psig.
- E. Water System Piping Gage: Include "WATER" or "AIR/WATER" label on dial face.
- F. Air System Piping Gage: Include retard feature and "AIR" or "AIR/WATER" label on dial face.

2.12. ESCUTCHEONS

- A. General: Manufactured ceiling, floor, and wall escutcheons and floor plates.
- B. One-Piece, Cast-Brass Escutcheons: Polished chrome-plated finish with set-screws.

- C. One-Piece, Deep-Pattern Escutcheons: Deep-drawn, box-shaped brass with chrome-plated finish.
- D. One-Piece, Stamped-Steel Escutcheons: Chrome-plated finish with spring clips.
- E. Split-Casting, Cast-Brass Escutcheons: Polished chrome-plated finish with concealed hinge and set-screw.
- F. Split-Plate, Stamped-Steel Escutcheons: Chrome-plated finish with exposed-rivet hinge, spring clips.
- G. One-Piece Floor Plates: Cast-iron flange with holes for fasteners.
- H. Split-Casting Floor Plates: Cast brass with concealed hinge.

2.13. SLEEVES

- A. Cast-Iron Wall Pipe Sleeves: Cast or 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, standard weight, zinc coated, 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 set-screws.

2.14. SLEEVE SEALS

- A. Manufacturers: Subject to compliance with requirements, provide products by one of the following, or approved equal:
 - 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, to fill annular space between pipe and sleeve.
 - 1. Sealing Elements: EPDM-rubber or NBR interlocking links shaped to fit surface of pipe. Include type and number required for pipe material and size of pipe.
 - 2. Pressure Plates: Carbon steel.
 - 3. Connecting Bolts and Nuts: Stainless steel of length required to secure pressure plates to sealing elements.

2.15. GROUT

- A. Standard: ASTM C 1107, Grade B, posthardening and volume adjusting, dry, hydraulic-cement grout.
- B. Characteristics: Nonshrink, and recommended for interior and exterior applications.
- C. Design Mix: 5000-psi, 28-day compressive strength.

- D. Packaging: Premixed and factory packaged.

3. EXECUTION

3.1. PREPARATION

- A. Perform fire-hydrant flow test according to NFPA 13 and NFPA 291. Use results for system design calculations required in "Quality Assurance" Article.
- B. Report test results promptly and in writing.

3.2. PIPING INSTALLATION

- A. Locations and Arrangements: Drawing plans, schematics, and diagrams indicate general location and arrangement of piping. Install piping as indicated, as far as practical.
 - 1. Deviations from approved working plans for piping require written approval from authorities having jurisdiction. File written approval with Architect before deviating from approved working plans.
- B. Piping Standard: Comply with requirements for installation of sprinkler piping in NFPA 13.
- C. Install seismic restraints on piping. Comply with requirements for seismic-restraint device materials and installation in NFPA 13.
- D. Use listed fittings to make changes in direction, branch takeoffs from mains, and reductions in pipe sizes.
- E. Install unions adjacent to each valve in pipes NPS 2 and smaller.
- F. Install flanges, flange adapters, or couplings for grooved-end piping on valves, apparatus, and equipment having NPS 2-1/2 and larger end connections.
- G. Install "Inspector's Test Connections" in sprinkler system piping, complete with shutoff valve, and sized and located according to NFPA 13.
- H. Install sprinkler piping with drains for complete system drainage.
- I. Install automatic (ball drip) drain valve at each check valve for fire-department connection, to drain piping between fire-department connection and check valve. Install drain piping to and spill over floor drain or to outside building.
- J. Install alarm devices in piping systems.
- K. Install hangers and supports for sprinkler system piping according to NFPA 13. Comply with requirements for hanger materials in NFPA 13.
- L. Install pressure gages on riser or feed main and at each sprinkler test connection. Include pressure gages with connection not less than NPS 1/4 and with soft metal seated globe valve, arranged for draining pipe between gage and valve. Install gages to permit removal, and install where they will not be subject to freezing.
- M. Fill sprinkler system piping with water.

3.3. JOINT CONSTRUCTION

- A. Install couplings, flanges, flanged fittings, unions, nipples, and transition and special fittings that have finish and pressure ratings same as or higher than system's pressure rating for aboveground applications unless otherwise indicated.

- B. Install unions adjacent to each valve in pipes NPS 2 and smaller.
- C. Install flanges, flange adapters, or couplings for grooved-end piping on valves, apparatus, and equipment having NPS 2-1/2 and larger end connections.
- D. Ream ends of pipes and tubes and remove burrs. Bevel plain ends of steel pipe.
- E. Remove scale, slag, dirt, and debris from inside and outside of pipes, tubes, and fittings before assembly.
- F. Flanged Joints: Select appropriate gasket material in size, type, and thickness suitable for water service. Join flanges with gasket and bolts according to ASME B31.9.
- G. 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.
- H. Welded Joints: Construct joints according to AWS D10.12M/D10.12, using qualified processes and welding operators according to "Quality Assurance" Article.
 - 1. Shop weld pipe joints where welded piping is indicated. Do not use welded joints for galvanized-steel pipe.
- I. Steel-Piping, Cut-Grooved Joints: Cut square-edge groove in end of pipe according to AWWA C606. Assemble coupling with housing, gasket, lubricant, and bolts. Join steel pipe and grooved-end fittings according to AWWA C606 for steel-pipe joints.
- J. Steel-Piping, Roll-Grooved Joints: Roll rounded-edge groove in end of pipe according to AWWA C606. Assemble coupling with housing, gasket, lubricant, and bolts. Join steel pipe and grooved-end fittings according to AWWA C606 for steel-pipe grooved joints.
- K. Brazed Joints: Join copper tube and fittings according to CDA's "Copper Tube Handbook," "Braze Joints" Chapter.
- L. Dissimilar-Material Piping Joints: Make joints using adapters compatible with materials of both piping systems.

3.4. VALVE AND SPECIALTIES INSTALLATION

- A. Install listed fire-protection valves, trim and drain valves, specialty valves and trim, controls, and specialties according to NFPA 13 and authorities having jurisdiction.
- B. Install listed fire-protection shutoff valves supervised open, located to control sources of water supply except from fire-department connections. Install permanent identification signs indicating portion of system controlled by each valve.
- C. Install check valve in each water-supply connection. Install backflow preventers instead of check valves in potable-water-supply sources.
- D. Specialty Valves:
 - 1. General Requirements: Install in vertical position for proper direction of flow, in main supply to system.

3.5. SPRINKLER INSTALLATION

- A. Install sprinklers in suspended ceilings in center of narrow dimension of acoustical ceiling panels.
- B. Install dry-type sprinklers with water supply from heated space. Do not install pendent or sidewall, wet-type sprinklers in areas subject to freezing.
- C. Install sprinklers into flexible, sprinkler hose fittings and install hose into bracket on ceiling grid.

3.6. FIRE-DEPARTMENT CONNECTION INSTALLATION

- A. Install wall-type, fire-department connection.
- B. Install automatic (ball drip) drain valve at each check valve for fire-department connection.

3.7. ESCUTCHEON INSTALLATION

- A. Install escutcheons for penetrations of walls, ceilings, and floors.
- B. Escutcheons for New Piping:
 - 1. Piping with Fitting or Sleeve Protruding from Wall: One piece, deep pattern.
 - 2. 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. Permanent sleeves are not required for holes formed by removable PE sleeves.
- D. Cut sleeves to length for mounting flush with both surfaces unless otherwise indicated.
- E. Install sleeves in new partitions, slabs, and walls as they are built.
- F. 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. Comply with requirements for joint sealants in Division 07 Section "Joint Sealants."
- G. For exterior wall penetrations above grade, seal annular space between sleeve and pipe using joint sealants appropriate for size, depth, and location of joint. Comply with requirements for joint sealants in Division 07 Section "Joint Sealants."
- 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: Galvanized-steel pipe.
 - 2. Sleeves for Piping Passing through Concrete Floor Slabs of Mechanical Equipment Areas or Other Wet Areas: Galvanized-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. Comply with requirements for flashing in Division 07 Section "Sheet Metal Flashing and Trim."
- 3. Sleeves for Piping Passing through Gypsum-Board Partitions:
 - a. Galvanized-steel-pipe sleeves for pipes smaller than NPS 6.
 - b. Galvanized-steel-sheet sleeves for pipes NPS 6 and larger.
 - c. 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 Exterior Concrete Walls:
 - a. Galvanized-steel-pipe sleeves for pipes smaller than NPS 6.
 - b. Cast-iron wall-pipe sleeves for pipes NPS 6 and larger.
 - c. Install sleeves that are large enough to provide 1-inch annular clear space between sleeve and pipe or pipe insulation when sleeve seals are used.
- 5. Sleeves for Piping Passing through Interior Concrete Walls:
 - a. Galvanized-steel-pipe sleeves for pipes smaller than NPS 6.
 - b. Galvanized-steel-sheet sleeves for pipes NPS 6 and larger.
- K. Fire-Barrier Penetrations: Maintain indicated fire rating of walls, partitions, ceilings, and floors at pipe penetrations. Seal pipe penetrations with firestop materials. Comply with requirements for firestop materials and installations in Division 07 Section "Penetration Firestopping."

3.9. SLEEVE SEAL INSTALLATION

- A. Install sleeve seals in sleeves in exterior concrete walls at water-service piping entries to building.
- B. Select type and number of sealing elements required for pipe material and size. Position pipe in center of sleeve. Assemble sleeve seal components and install in annular space between pipe and sleeve. Tighten bolts against pressure plates that cause sealing elements to expand and make watertight seal.

3.10. IDENTIFICATION

- A. Install labeling and pipe markers on equipment and piping according to requirements in NFPA 13.
- B. Identify system components, wiring, cabling, and terminals. Comply with requirements for identification specified in Division 26 Section "Identification for Electrical Systems."

3.11. FIELD QUALITY CONTROL

- A. Perform tests and inspections.
- B. Tests and Inspections:
 - 1. Leak Test: After installation, charge systems 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. Flush, test, and inspect sprinkler systems according to NFPA 13, "Systems Acceptance" Chapter.
 4. Energize circuits to electrical equipment and devices.
 5. Coordinate with fire-alarm tests. Operate as required.
 6. Verify that equipment hose threads are same as local fire-department equipment.
- C. Perform additional leak test and provide a test report for any and all punch list items requiring the addition/removal of piping or sprinkler heads.
 - D. Sprinkler piping system will be considered defective if it does not pass tests and inspections.
 - E. Prepare test and inspection reports.
- 3.12. CLEANING
- A. Clean dirt and debris from sprinklers.
 - B. Remove and replace sprinklers with paint other than factory finish.
- 3.13. DEMONSTRATION
- A. Engage a factory-authorized service representative to train Owner's maintenance personnel to adjust, operate, and maintain specialty valves and pressure-maintenance pumps.
- 3.14. PIPING SCHEDULE
- A. Piping between Fire-Department Connections and Check Valves: Galvanized, standard-weight steel pipe with grooved ends; grooved-end fittings; grooved-end-pipe couplings; and grooved joints.
 - B. Sprinkler specialty fittings may be used, downstream of control valves, instead of specified fittings.
 - C. Copper-tube, extruded-tee connections may be used for tee branches in copper tubing instead of specified copper fittings. Branch-connection joints must be brazed.
 - D. Standard-pressure, wet-pipe sprinkler system, NPS 2 and smaller, shall be one of the following:
 1. Standard-weight, black-steel pipe with threaded ends; uncoated, gray-iron threaded fittings; and threaded joints.
 2. Standard-weight, black-steel pipe with plain ends; uncoated, plain-end-pipe fittings; and twist-locked joints.
 3. Standard-weight, black-steel pipe with cut-grooved ends; uncoated, grooved end fittings for steel piping; grooved-end-pipe couplings for steel piping; and grooved joints.
 4. Standard-weight, black-steel pipe with plain ends; steel welding fittings; and welded joints.
 - E. Standard-pressure, wet-pipe sprinkler system, NPS 2-1/2 to NPS 4, shall be one of the following:
 1. Standard-weight, black-steel pipe with threaded ends; uncoated, gray-iron threaded

- fittings; and threaded joints.
2. Standard-weight, black-steel pipe with roll-grooved ends; uncoated, grooved-end fittings for steel piping; grooved-end-pipe couplings for steel piping; and grooved joints.
 3. Standard-weight, black-steel pipe with plain ends; steel welding fittings; and welded joints.
 4. Schedule 10, black-steel pipe with roll-grooved ends; uncoated, grooved-end fittings for steel piping; grooved-end-pipe couplings for steel piping; and grooved joints.
 5. Schedule 10, black-steel pipe with plain ends; welding fittings; and welded joints.

F. Standard-pressure, wet-pipe sprinkler system, NPS 5 and larger, shall be the following:

1. Standard-weight, black-steel pipe with cut- or roll-grooved ends; uncoated, grooved-end fittings for steel piping; grooved-end-pipe couplings for steel piping; and grooved joints.

3.15. SPRINKLER SCHEDULE

A. Use sprinkler types in subparagraphs below for the following applications:

1. Rooms without Ceilings: Upright sprinklers.
2. Rooms with Suspended Ceilings: Pendent, recessed sprinklers as indicated.
3. Wall Mounting: Sidewall sprinklers.
4. Spaces Subject to Freezing: Upright, pendent, dry sprinklers; and sidewall, dry sprinklers as indicated.

B. Provide sprinkler types in subparagraphs below with finishes indicated.

1. Recessed Sprinklers: White, with white escutcheon.
2. Refer to sprinkler schedule on plans.
3. Upright Pendent and Sidewall Sprinklers: Chrome plated in finished spaces exposed to view; rough bronze in unfinished spaces.

END 21 1313

1. GENERAL

1.1. WORK INCLUDES

A. Base Bid

1. Contractor Provide:

- a. Piping materials and installation instructions common to most piping systems.
- b. Mechanical sleeve seals.
- c. Sleeves.
- d. Escutcheons.
- e. Grout.
- f. Equipment installation requirements common to equipment sections.
- g. Supports and anchorages.

1.2. DEFINITIONS

- A. Finished Spaces: Spaces other than mechanical and electrical equipment rooms, furred spaces, pipe chases, unheated spaces immediately below roof, and 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. Exposed, Exterior Installations: Exposed to view outdoors or subject to outdoor ambient temperatures and weather conditions. Examples include rooftop locations.
- D. Concealed, Interior Installations: Concealed from view and protected from physical contact by building occupants. Examples include above ceilings and in chases.
- E. Concealed, Exterior Installations: Concealed from view and protected from weather conditions and physical contact by building occupants but subject to outdoor ambient temperatures. Examples include installations within unheated shelters.
- F. 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.
 5. PP: Polypropylene
- G. The following are industry abbreviations for rubber materials:
1. EPDM: Ethylene-propylene-diene terpolymer rubber.
 2. NBR: Acrylonitrile-butadiene rubber.

1.3. SUBMITTALS

- A. Product Data: For the following:

1. Mechanical sleeve seals.
2. Escutcheons.

B. Welding certificates.

1.4. CLOSEOUT SUBMITTALS

A. Record Drawings: Comply with Division 01 and the following:

1. Final Submittal:

- a. Submit record digital data files and two set(s) of record digital data file plots.
- b. Plot each drawing file, whether or not changes and additional information were recorded.

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.

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 Panels."

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. Manufacturers: Subject to compliance with requirements, provide products by 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. MECHANICAL SLEEVE SEALS

- A. Description: Modular sealing element unit, designed for field assembly, to fill annular space between pipe and sleeve.
 - 1. Manufacturers:
 - a. Advance Products & Systems, Inc.
 - b. Calpico, Inc.
 - c. Metraflex Co.
 - d. Pipeline Seal and Insulator, Inc.
 - 2. Sealing Elements: EPDM 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.

2.4. STACK-SLEEVE FITTINGS

- A. Description: Manufactured, cast-iron sleeve with integral clamping flange. Include clamping ring, bolts, and nuts for membrane flashing.
 - 1. Manufacturers:
 - a. Jay R. Smith Mfg. Co.
 - b. Zurn Industries
 - 2. Underdeck clamp: Claiming ring with setscrews.

2.5. SLEEVES

- A. Cast-Iron Wall Pipes: Cast or fabricated of cast or ductile iron and equivalent to ductile-iron pressure pipe, with plain ends and integral waterstop unless otherwise indicated.
- B. Galvanized-Steel Wall Pipes: ASTM A 53/A 53M, Schedule 40, with plain ends and welded steel collar; zinc coated.

- C. Galvanized-Steel-Pipe Sleeves: ASTM A 53/A 53M, Type E, Grade B, Schedule 40, zinc coated, with plain ends.
- D. PVC-Pipe Sleeves: ASTM D 1785, Schedule 40.
- E. Galvanized-Steel-Sheet Sleeves: 0.0239-inch minimum thickness; round tube closed with welded longitudinal joint.
- F. Molded-PE or -PP Sleeves: Removable, tapered-cup shaped, and smooth outer surface with nailing flange for attaching to wooden forms.
- G. Molded-PVC Sleeves: With nailing flange for attaching to wooden forms.

2.6. ESCUTCHEONS

- A. One-Piece, Cast-Brass Type: With polished, chrome-plated finish and setscrew fastener.
- B. One-Piece, Deep-Pattern Type: Deep-drawn, box-shaped brass with chrome-plated finish and spring-clip fasteners.
- C. One-Piece, Stamped-Steel Type: With chrome-plated finish and spring-clip fasteners.
- D. Split-Casting Brass Type: With polished, chrome-plated finish and with concealed hinge and setscrew.
- E. Split-Plate, Stamped-Steel Type: With chrome-plated finish, concealed hinge, and spring-clip fasteners.

2.7. GROUT

- A. Standard: ASTM C 1107/C 1107M, 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.

3. EXECUTION

3.1. 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.

3.2. ESCUTCHEON INSTALLATION

- A. Install escutcheons for penetrations of walls, ceilings, and floors according to the following:
- B. Install escutcheons with ID to closely fit around pipe, tube, and insulation of insulated piping and with OD that completely covers opening.
 - 1. Escutcheons for New Piping:
 - a. Piping with Fitting or Sleeve Protruding from Wall: One-piece, deep-pattern type.
 - b. Chrome-Plated Piping: One-piece, cast-brass or split-casting brass type with polished, chrome-plated finish.
 - c. Insulated Piping: One-piece, stamped-steel type or split-plate, stamped-steel type with concealed hinge.
 - a. Bare Piping at Wall and Floor Penetrations in Finished Spaces: One-piece, stamped-steel type or split-plate, stamped-steel type with concealed hinge.
 - d. Bare Piping at Ceiling Penetrations in Finished Spaces: One-piece, stamped-steel type or split-plate, stamped-steel type with concealed hinge.
 - e. Bare Piping in Unfinished Service Spaces: One-piece, stamped-steel type or split-plate, stamped-steel type with concealed hinge.
 - f. Bare Piping in Equipment Rooms: One-piece, stamped-steel type or split-plate, stamped-steel type with concealed hinge.

3.3. SLEEVE INSTALLATION

- A. Install sleeves for piping passing through penetrations in floors, partitions, roofs, and walls.
- B. For sleeves that will have mechanical sleeve seal installed, select sleeves of size large enough to provide 1-inch annular clear space between piping and concrete slabs and walls.
 - 1. Sleeves are not required for core-drilled holes.
- C. Install sleeves in concrete floors, concrete roof slabs, and concrete walls as new slabs and walls are constructed.

1. Permanent sleeves are not required for holes in slabs formed by molded-PE or -PP sleeves.
 2. 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 above finished floor level.
 3. Using grout, seal the space outside of sleeves in slabs and walls without mechanical sleeve seal.
- D. Install sleeves for pipes passing through interior partitions.
1. Cut sleeves to length for mounting flush with both surfaces.
 2. Install sleeves that are large enough to provide 1/4-inch annular clear space between sleeve and pipe or pipe insulation.
 3. Seal annular space between sleeve and piping or piping insulation; use joint sealants appropriate for size, depth, and location of joint. Comply with requirements for sealants specified in Section 079200 "Joint Sealants."
- E. Fire-Barrier Penetrations: Maintain indicated fire rating of walls, partitions, ceilings, and floors at pipe penetrations. Seal pipe penetrations with firestop materials. Comply with requirements for firestopping specified in Section 078400 "Firestopping."

3.4. STACK-SLEEVE-FITTING INSTALLATION

- A. Install stack-sleeve fittings in new slabs as slabs are constructed.
1. Install fittings that are large enough to provide 1/4-inch annular clear space between sleeve and pipe or pipe insulation.
 2. Secure flashing between clamping flanges for pipes penetrating floors with membrane waterproofing. Comply with requirements for flashing specified in Section 076200 "Sheet Metal Flashing and Trim."
 3. Install section of cast-iron soil pipe to extend sleeve to 2 inches above finished floor level.
 4. Extend cast-iron sleeve fittings below floor slab as required to secure clamping ring if ring is specified.
 5. Using grout, seal the space around outside of stack-sleeve fittings.
- B. Fire-Barrier Penetrations: Maintain indicated fire rating of floors at pipe penetrations. Seal pipe penetrations with firestop materials. Comply with requirements for firestopping specified in Section 078400 "Firestopping."

3.5. MECHANICAL SLEEVE SEAL INSTALLATION

- A. 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.

3.6. SLEEVE AND MECHANICAL SLEEVE-SEAL SCHEDULE

- A. Use sleeves and mechanical sleeve seals for the following piping-penetration applications:
 - 1. Exterior Concrete Walls above Grade:
 - a. Piping Smaller Than NPS 6: Galvanized-steel-pipe sleeves.
 - b. Piping NPS 6 and Larger: Cast-iron wall sleeves.
 - 2. Exterior Concrete Walls below Grade:
 - a. Cast-iron wall sleeves with mechanical sleeve-seal system.
 - 1) Select sleeve size to allow for 1-inch annular clear space between piping and sleeve for installing mechanical sleeve-seal system.
 - 3. Concrete Slabs-on-Grade:
 - a. Piping Smaller Than NPS 6: Galvanized-steel-pipe sleeves with mechanical sleeve-seal system.
 - 1) Select sleeve size to allow for 1-inch annular clear space between piping and sleeve for installing mechanical sleeve-seal system.
 - b. Piping NPS 6 and Larger: Cast-iron sleeves with sleeve-seal system.
 - 1) Select sleeve size to allow for 1-inch annular clear space between piping and sleeve for installing sleeve-seal system.
 - 4. Concrete Slabs above Grade:
 - a. Piping Smaller Than NPS 6: Stack-sleeve fittings.
 - b. Piping NPS 6 and Larger: Stack-sleeve fittings.
 - 5. Interior Partitions:
 - a. Piping Smaller Than NPS 6: PVC-pipe sleeves.
 - b. Piping NPS 6 and Larger: Galvanized-steel-sheet sleeves.

3.7. 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.

3.8. 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.

3.9. PAINTING

- A. Painting of plumbing systems, equipment, and components is specified in Division 09 Section "Painting".
- B. Damage and Touchup: Repair marred and damaged factory-painted finishes with materials and procedures to match original factory finish.

3.10. 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.

3.11. 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 22 0500

1. GENERAL

1.1. WORK INCLUDES

A. Base Bid

1. Contractor Provide:
 - a. Alignment guides and anchors.
 - b. Pipe loops and swing connections.

1.2. ACTION SUBMITTALS

A. Product Data: For each type of product.

B. Delegated-Design Submittal: For each anchor and alignment guide, including analysis data, signed and sealed by the qualified professional engineer responsible for their preparation.

1. Design Calculations: Calculate requirements for thermal expansion of piping systems and for selecting and designing expansion joints, loops, and swing connections.
2. Anchor Details: Detail fabrication of each anchor indicated. Show dimensions and methods of assembly and attachment to building structure.
3. Alignment Guide Details: Detail field assembly and attachment to building structure.
4. Schedule: Indicate type, manufacturer's number, size, material, pressure rating, end connections, and location for each expansion joint.

1.3. INFORMATIONAL SUBMITTALS

A. Welding certificates.

1.4. CLOSEOUT SUBMITTALS

A. Maintenance Data: For expansion joints to include in maintenance manuals.

1.5. QUALITY ASSURANCE

- A. Welding Qualifications: Qualify procedures and personnel according to AWS D1.1/D1.1M, "Structural Welding Code - Steel."
- B. Pipe and Pressure-Vessel Welding Qualifications: Qualify procedures and operators according to ASME Boiler and Pressure Vessel Code.

2. PRODUCTS

2.1. PERFORMANCE REQUIREMENTS

- A. Compatibility: Products shall be suitable for piping service fluids, materials, working pressures, and temperatures.
- B. Capability: Products to absorb 200 percent of maximum axial movement between anchors.

2.2. ALIGNMENT GUIDES AND ANCHORS

A. Alignment Guides:

1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
 - a. Flex-Hose Co., Inc.
 - b. Flexicraft Industries.
 - c. Mason Industries, Inc.
 - d. Metraflex Company
2. Description: Steel, factory-fabricated alignment guide, with bolted two-section outer cylinder and base for attaching to structure; with two-section guiding slider for bolting to pipe.

B. Anchor Materials:

1. Steel Shapes and Plates: ASTM A 36/A 36M.
2. Bolts and Nuts: ASME B18.10 or ASTM A 183, steel hex head.
3. Washers: ASTM F 844, steel, plain, flat washers.
4. Mechanical Fasteners: Insert-wedge-type stud with expansion plug anchor for use in hardened portland cement concrete, with tension and shear capacities appropriate for application.
 - a. Stud: Threaded, zinc-coated carbon steel.
 - b. Expansion Plug: Zinc-coated steel.
 - c. Washer and Nut: Zinc-coated steel.
5. Chemical Fasteners: Insert-type stud, bonding-system anchor for use with hardened portland cement concrete, with tension and shear capacities appropriate for application.
 - a. Bonding Material: ASTM C 881/C 881M, Type IV, Grade 3, two-component epoxy resin suitable for surface temperature of hardened concrete where fastener is to be installed.
 - b. Stud: ASTM A 307, zinc-coated carbon steel with continuous thread on stud, unless otherwise indicated.
 - c. Washer and Nut: Zinc-coated steel.

3. EXECUTION

3.1. EXPANSION JOINT INSTALLATION

- A. Install expansion joints of sizes matching sizes of piping in which they are installed.

3.2. PIPE LOOP AND SWING CONNECTION INSTALLATION

- A. Install pipe loops cold-sprung in tension or compression as required to partly absorb tension or compression produced during anticipated change in temperature.
- B. Connect risers and branch connections to mains with at least five pipe fittings, including tee in main.

- C. Connect risers and branch connections to terminal units with at least four pipe fittings, including tee in riser.
- D. Connect mains and branch connections to terminal units with at least four pipe fittings, including tee in main.

3.3. ALIGNMENT-GUIDE AND ANCHOR INSTALLATION

- A. Install alignment guides to guide expansion and to avoid end-loading and torsional stress.
- B. Install one guide on each side of pipe expansion fittings and loops. Install guides nearest to expansion joint not more than four pipe diameters from expansion joint.
- C. Attach guides to pipe, and secure guides to building structure.
- D. Install anchors at locations to prevent stresses from exceeding those permitted by ASME B31.9 and to prevent transfer of loading and stresses to connected equipment.
- E. Anchor Attachments:
 - 1. Anchor Attachment to Steel Pipe: Attach by welding. Comply with ASME B31.9 and ASME Boiler and Pressure Vessel Code: Section IX, "Welding and Brazing Qualifications."
 - 2. Anchor Attachment to Copper Tubing: Attach with pipe hangers. Use MSS SP-69, Type 24; U bolts bolted to anchor.
- F. Fabricate and install steel anchors by welding steel shapes, plates, and bars. Comply with ASME B31.9 and AWS D1.1/D1.1M.
 - 1. Anchor Attachment to Steel Structural Members: Attach by welding.
 - 2. Anchor Attachment to Concrete Structural Members: Attach by fasteners. Follow fastener manufacturer's written instructions.
- G. Use grout to form flat bearing surfaces for guides and anchors attached to concrete.

END 22 0516

1. GENERAL

1.1. WORK INCLUDES

A. Base Bid

1. Contractor Provide:

- a. Liquid in glass thermometers.
- b. Dial-type pressure gages.
- c. Gage attachments.
- d. Test plugs.
- e. Test-plug kits.

B. Related Sections:

1. Section 211313 "Wet-Pipe Sprinkler Systems"

1.2. ACTION SUBMITTALS

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

1.3. CLOSEOUT SUBMITTALS

- A. Operation and Maintenance Data: For meters and gages to include in operation and maintenance manuals.

2. PRODUCTS

2.1. METAL-CASE, INDUSTRIAL STYLE, LIQUID-IN-GLASS THERMOMETERS

- A. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
1. Trerice, Ho.O.Co.
 2. Weiss Instruments, Inc.
 3. Weksler Glass.
- B. Standard: ASME B40.200.
- ~~C.~~ Case: Cast aluminum:-9-inch unless otherwise indicated.
- D. Case Form: adjustable angle unless otherwise indicated.
- E. Tube: Glass with magnifying lens and blue or red organic liquid.
- F. Tube: Background: Nonreflective aluminum with permanently etched scale marking graduated in deg F and deg C.
- G. Window: Glass.
- H. Stem: Aluminum and of length to suit installation.

- I. Design for Thermowell installation: Bare stem.
- J. Connector: 1-1/4 inches, with ASME B1.1 screw threads.
- K. Accuracy: Plus or minus 1 percent of scale range or one scale division, to a maximum of 1.5 percent of scale range.

2.2. PRESSURE GAGES

A. Direct-Mounted, Metal-Case, Dial-Type Pressure Gages:

- 1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
 - a. Ernst Flow Industries.
 - b. Marsh Bellofram.
 - c. Trerice, H.O. Co.
 - d. Watts.
 - e. Weiss Instruments, Inc.
 - f. Weksler Glass.
- 2. Standard: ASME B40.100.
- 3. Case: Sealed type; cast aluminum or drawn steel; 4-1/2-inch nominal diameter.
- 4. Pressure-Element Assembly: Bourdon tube unless otherwise indicated.
- 5. Pressure Connection: Brass, with NPS 1/4 or NPS 1/2, ASME B1.20.1 pipe threads and bottom-outlet type unless back-outlet type is indicated.
- 6. Movement: Mechanical, with link to pressure element and connection to pointer.
- 7. Dial: Nonreflective aluminum with permanently etched scale markings graduated in psi.
- 8. Pointer: Dark-colored metal.
- 9. Window: Glass.
- 10. Ring: Stainless steel.
- 11. Accuracy: Grade A, plus or minus 1 percent of middle half of scale range.

2.3. GAGE ATTACHMENTS

- A. Snubbers: ASME B40.100, brass; with NPS 1/4 or NPS 1/2, ASME B1.20.1 pipe threads and piston-type surge-dampening device. Include extension for use on insulated piping.
- B. Valves: Brass or stainless-steel needle, with NPS 1/4 or NPS 1/2, ASME B1.20.1 pipe threads.

2.4. TEST PLUGS

- A. Description: Test-station fitting made for insertion into piping tee fitting.
- B. Body: Brass or stainless steel with core inserts and gasketed and threaded cap. Include extended stem on units to be installed in insulated piping.
- C. Thread Size: NPS 1/4 or NPS 1/2, ASME B1.20.1 pipe thread.
- D. Minimum Pressure and Temperature Rating: 500 psig at 200 deg F.
- E. Core Inserts: Chlorosulfonated polyethylene synthetic and EPDM self-sealing rubber.

2.5. TEST-PLUG KITS

- A. Furnish one test-plug kit containing two thermometer(s), one pressure gage and adapter, and carrying case. Thermometer sensing elements, pressure gage, and adapter probes shall be of diameter to fit test plugs and of length to project into piping.
- B. High-Range Thermometer: Small, bimetallic insertion type with 1- to 2-inch- diameter dial and tapered-end sensing element. Dial range shall be at least 0 to 220 deg F.
- C. Pressure Gage: Small, Bourdon-tube insertion type with 2- to 3-inch- diameter dial and probe. Dial range shall be at least 0 to 200 psig.
- D. Carrying Case: Metal or plastic, with formed instrument padding.

3. EXECUTION

3.1. INSTALLATION

- A. Install direct-mounted thermometers in thermowells and adjust vertical and tilted positions.
- B. Install direct-mounted pressure gages in piping tees with pressure gage located on pipe at the most readable position.
- C. Install valve and snubber in piping for each pressure gage for fluids.
- D. Install test plugs in piping tees.
- E. Install thermometers in the following locations:
 - 1. Inlet and outlet of each water heater.
 - 2. Inlet and outlet of each thermostatic mixing valve.
 - 3. And as indicated on plans.
- F. Install pressure gages in the following locations:
 - 1. Inlet and outlet of each pressure-reducing valve.
 - 2. Inlet and outlet of each domestic water circulating pump.

3.2. CONNECTIONS

- A. Install gages adjacent to machines and equipment to allow service and maintenance of gages, machines, and equipment.

3.3. ADJUSTING

- A. Adjust faces of gages to proper angle for best visibility.

3.4. THERMOMETER SCALE-RANGE SCHEDULE

- A. Scale Range for Domestic Cold-Water Piping: 0 to 100 deg F and minus 20 to plus 50 deg C.
- B. Scale Range for Domestic Hot-Water Piping: 0 to 250 deg F and 0 to 150 deg C.

3.5. PRESSURE-GAGE SCALE-RANGE SCHEDULE

A. Scale Range for Water Service Piping: 0 to 100 psi.

END 22 0519

1. GENERAL

1.1. WORK INCLUDES

A. Base Bid

1. Contractor Provide:
 - a. Ball valves.
 - b. Butterfly valves.
 - c. Check valves.

1.2. DEFINITIONS

- A. CWP: Cold working pressure.
- B. EDPM: Ethylene propylene-diene terpolymer rubber.
- C. NBR: Acrylonitrile-butadiene, Buna-N, or nitrile rubber.

1.3. ACTION SUBMITTALS

- A. Product Data: For each type of valve.
 1. Certification that products comply with NSF 61 Annex G and NSF 372.

1.4. 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 soldered ends.
 3. Set ball valves open to minimize exposure of functional surfaces.
 4. Set butterfly valves closed or slightly open.
 5. Set 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.
- C. Use sling to handle large valves; rig sling to avoid damage to exposed parts. Do not use operating handles or stems as lifting or rigging points.

2. PRODUCTS

2.1. GENERAL REQUIREMENTS FOR VALVES

- A. Source Limitations for Valves: Obtain each type of valve from single source from single manufacturer.

- B. ASME Compliance:
 - 1. ASME B1.20.1 for threads for threaded end valves.
 - 2. ASME B16.1 for flanges on iron valves.
 - 3. ASME B16.5 for flanges on steel valves.
 - 4. ASME B16.10 and ASME B16.34 for ferrous valve dimensions and design criteria.
 - 5. ASME B16.18 for solder-joint connections.
 - 6. ASME B31.9 for building services piping valves.
- C. NSF Compliance: NSF 61 Annex G and NSF 372 for valve materials for potable-water service.
- D. Bronze valves shall be made with dezincification-resistant materials. Bronze valves made with copper alloy (brass) containing more than 15 percent zinc are not permitted.
- E. Valve Pressure-Temperature Ratings: Not less than indicated and as required for system pressures and temperatures.
- F. Valve Sizes: Same as upstream piping unless otherwise indicated.
- G. Valve Bypass and Drain Connections: MSS SP-45.
- H. Valve Actuator Types:
 - 1. Gear Actuator: For quarter-turn valves NPS 4 and larger.
 - 2. Handlever: For quarter-turn valves smaller than NPS 4.
- I. Valves in Insulated Piping:
 - 1. Include 2-inch stem extensions.
 - 2. Extended operating handles of nonthermal-conductive material and protective sleeves that allow operation of valves without breaking vapor seals or disturbing insulation.
 - 3. Memory stops that are fully adjustable after insulation is applied.

2.2. BALL VALVES

- A. Two-Piece, Lead free, Bronze Ball Valves with Full Port and Stainless-Steel Trim:
 - 1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
 - a. Conbraco Industries, Inc.
 - b. NIBCO, Inc.
 - c. Watts; a Watts Water Technologies Company.
 - 2. Description:
 - a. Standard: MSS SP-110.
 - b. CWP Rating: 600 psig.
 - c. Body Design: Two piece.
 - d. Body Material: Lead free Bronze.
 - e. Ends: Threaded or soldered.
 - f. Seats: PTFE.
 - g. Stem: Stainless steel.

- h. Ball: Stainless steel, vented.
- i. Port: Full.

2.3. IRON, SINGLE-FLANGE BUTTERFLY VALVES

A. Iron, Single-Flange Butterfly Valves with Aluminum-Bronze Disc:

1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
 - a. Conbraco Industries, Inc.
 - b. NIBCO, Inc.
 - c. Watts; a Watts Water Technologies Company.
2. Description:
 - a. Standard: MSS SP-67, Type I.
 - b. CWP Rating: 200 psig.
 - c. Body Design: Lug type; suitable for bidirectional dead-end service at rated pressure without use of downstream flange.
 - d. Body Material: ASTM A 126, cast iron or ASTM A 536, ductile iron.
 - e. Seat: EPDM.
 - f. Stem: One- or two-piece stainless steel.
 - g. Disc: Lead free Aluminum bronze.

2.4. BRONZE CHECK VALVES

A. Class 125, Spring Actuated – Bronze Check Valves:

1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
 - a. Conbraco Industries, Inc.
 - b. NIBCO, Inc.
 - c. Apollo Valve.
2. Description:
 - a. Standard: Lead free bronze.
 - b. CWP Rating: 200 psig.
 - c. Body Design: Inline lift type, spring actuated.
 - d. Body Material: Silicon Bronze ASTM B584.
 - e. Spring: Stainless Steel S31600
 - f. Disc: PTFE
 - g. Stem: Stainless Steel ASTM A582.
 - h. Listing: NSF/ANSI-61-8 and NSF/ANSI-372.

2.5. IRON SWING CHECK VALVES

A. Class 125, Iron Swing Check Valves with Metal Seats:

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

- b. Milwaukee Valve Company.
 - c. Watts; a Watts Water Technologies Company
2. Description:
- a. Standard: MSS SP-71, Type I.
 - b. CWP Rating: 200 psig.
 - c. Body Design: Clear or full waterway.
 - d. Body Material: ASTM A 126, gray iron with bolted bonnet.
 - e. Ends: Flanged or threaded.
 - f. Trim: Bronze.
 - g. Gasket: Asbestos free.

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 close. 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:
 - 1. With stem upright and plumb.
 - 2. In vertical or horizontal position.
- F. Install valve tags. Comply with requirements in Section 220553 "Identification for Plumbing Piping and Equipment" for valve tags and schedules.

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, butterfly valves.
 - 2. Butterfly Valve Dead-End Service: Single-flange (lug) type.
 - 3. Throttling Service: Ball, or butterfly valves.
 - 4. Check Valves:
 - a. NPS 2 and Smaller for Domestic Water: Bronze body, spring loaded, check valves with nonmetallic disc.
 - b. NPS 2-1/2 and Larger for Domestic Water: Iron swing check valves with lever and weight or with spring or iron, center-guided, resilient-seat check 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, except wafer types, with the following end connections:
 - 1. For Polypropylene Piping, NPS 2 and Smaller: Threaded ends.
 - 2. For Polypropylene Piping, NPS 2-1/2 to NPS 4: Flanged ends except where threaded valve-end option is indicated.
 - 3. For Polypropylene Piping, NPS 5 and Larger: Flanged ends.
 - 4. For Steel Piping, NPS 2 and Smaller: Threaded ends.
 - 5. For Steel Piping, NPS 2-1/2 to NPS 4: Flanged ends except where threaded valve-end option is indicated.
 - 6. For Steel Piping, NPS 5 and Larger: Flanged ends.

END 22 0523

1. GENERAL

1.1. WORK INCLUDES

A. Base Bid

1. Contractor Provide:

- a. Metal pipe hangers and supports.
- b. Trapeze pipe hangers.
- c. Metal framing systems.
- d. Thermal-hanger shield inserts.
- e. Fastener systems.
- f. Pipe positioning systems.
- g. Equipment supports.

B. Related Sections:

1. Section 055000 "Metal Fabrications" for structural-steel shapes and plates for trapeze hangers for pipe and equipment supports.
2. Section 220516 "Expansion Fittings and Loops for Plumbing Piping" for pipe guides and anchors.
3. Section 220548 "Seismic Protection for Plumbing Piping and Equipment"

1.2. DEFINITIONS

- A. MSS: Manufacturers Standardization Society of the Valve and Fittings Industry Inc.

1.3. PERFORMANCE REQUIREMENTS

- A. Delegated Design: Design trapeze pipe hangers and equipment supports, including comprehensive engineering analysis by a qualified professional engineer, using performance requirements and design criteria indicated.
- B. Structural Performance: Hangers and supports for plumbing piping and equipment shall withstand the effects of gravity loads and stresses within limits and under conditions indicated according to ASCE/SEI 7.
1. Design supports for multiple pipes, including pipe stands, capable of supporting combined weight of supported systems, system contents, and test water.
 2. Design equipment supports capable of supporting combined operating weight of supported equipment and connected systems and components.
 3. Design seismic-restraint hangers and supports for piping and equipment and obtain approval from authorities having jurisdiction.

1.4. ACTION SUBMITTALS

- A. Product Data: For each type of product indicated.
- B. Shop Drawings: Signed and sealed by a qualified professional engineer. Show fabrication and installation details and include calculations for the following; include Product Data for components:

1. Trapeze pipe hangers.
 2. Metal framing systems.
 3. Equipment supports.
- C. Delegated-Design Submittal: For trapeze hangers indicated to comply with performance requirements and design criteria, including analysis data signed and sealed by the qualified professional engineer responsible for their preparation.
1. Detail fabrication and assembly of trapeze hangers.
 2. Design Calculations: Calculate requirements for designing trapeze hangers.
- 1.5. INFORMATIONAL SUBMITTALS
- A. Welding certificates.
- 1.6. QUALITY ASSURANCE
- A. Structural Steel Welding Qualifications: Qualify procedures and personnel according to AWS D1.1/D1.1M, "Structural Welding Code - Steel."
- B. Pipe Welding Qualifications: Qualify procedures and operators according to ASME Boiler and Pressure Vessel Code.

2. PRODUCTS

2.1. METAL PIPE HANGERS AND SUPPORTS

- A. Carbon-Steel Pipe Hangers and Supports:
1. Description: MSS SP-58, Types 1 through 58, factory-fabricated components.
 2. Galvanized Metallic Coatings: Pregalvanized or hot dipped.
 3. Nonmetallic Coatings: Plastic coating, jacket, or liner.
 4. Padded Hangers: Hanger with fiberglass or other pipe insulation pad or cushion to support bearing surface of piping.
 5. Hanger Rods: Continuous-thread rod, nuts, and washer made of carbon steel.
- B. Stainless-Steel Pipe Hangers and Supports:
1. Description: MSS SP-58, Types 1 through 58, factory-fabricated components.
 2. Padded Hangers: Hanger with fiberglass or other pipe insulation pad or cushion to support bearing surface of piping.
 3. Hanger Rods: Continuous-thread rod, nuts, and washer made of stainless steel.
- C. Copper Pipe Hangers:
1. Description: MSS SP-58, Types 1 through 58, copper-coated-steel, factory-fabricated components.
 2. Hanger Rods: Continuous-thread rod, nuts, and washer made of copper-coated steel.

2.2. TRAPEZE PIPE HANGERS

- A. Description: MSS SP-69, Type 59, shop- or field-fabricated pipe-support assembly made from structural carbon-steel shapes with MSS SP-58 carbon-steel hanger rods, nuts, saddles, and U-bolts.

2.3. METAL FRAMING SYSTEMS

A. MFMA Manufacturer Metal Framing Systems:

1. Description: Shop- or field-fabricated pipe-support assembly for supporting multiple parallel pipes.
2. Standard: MFMA-4.
3. Channels: Continuous slotted steel channel with inturned lips.
4. Channel Nuts: Formed or stamped steel nuts or other devices designed to fit into channel slot and, when tightened, prevent slipping along channel.
5. Hanger Rods: Continuous-thread rod, nuts, and washer made of carbon steel.
6. Plastic Coating: Vinyl

2.4. THERMAL-HANGER SHIELD INSERTS

- A. Insulation-Insert Material for Cold Piping: ASTM C 552, Type II cellular glass with 100-psig or ASTM C 591, Type VI, Grade 1 polyisocyanurate with 125-psig minimum compressive strength and vapor barrier.
- B. Insulation-Insert Material for Hot Piping: Water-repellent treated, ASTM C 533, Type I calcium silicate with 100-psig or ASTM C 552, Type II cellular glass with 100-psig or ASTM C 591, Type VI, Grade 1 polyisocyanurate with 125-psig minimum compressive strength.
- C. For Trapeze or Clamped Systems: Insert and shield shall cover entire circumference of pipe.
- D. For Clevis or Band Hangers: Insert and shield shall cover lower 180 degrees of pipe.
- E. Insert Length: Extend 2 inches beyond sheet metal shield for piping operating below ambient air temperature.

2.5. 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.
- B. Mechanical-Expansion Anchors: Insert-wedge-type, zinc-coated steel anchors, for use in hardened Portland cement concrete; with pull-out, tension, and shear capacities appropriate for supported loads and building materials where used.

2.6. PIPE POSITIONING SYSTEMS

- A. Description: IAPMO PS 42, positioning system of metal brackets, clips, and straps for positioning piping in pipe spaces; for plumbing fixtures in commercial applications.

2.7. EQUIPMENT SUPPORTS

- A. Description: Welded, shop- or field-fabricated equipment support made from structural carbon-steel shapes.

2.8. MISCELLANEOUS MATERIALS

- A. Structural Steel: ASTM A 36/A 36M, carbon-steel plates, shapes, and bars; black and galvanized.
- B. 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.

3. EXECUTION

3.1. HANGER AND SUPPORT INSTALLATION

- A. Metal 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 the building structure.
- B. Metal 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 for individual pipe hangers.
 - 2. Field fabricate from ASTM A 36/A 36M, carbon-steel shapes selected for loads being supported. Weld steel according to AWS D1.1/D1.1M.
- C. Metal Framing System Installation: Arrange for grouping of parallel runs of piping, and support together on field-assembled metal framing systems.
- D. Thermal-Hanger Shield Installation: Install in pipe hanger or shield for insulated piping.
- E. 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.
- F. Pipe Positioning-System Installation: Install support devices to make rigid supply and waste piping connections to each plumbing fixture.
- G. Install hangers and supports complete with necessary attachments, inserts, bolts, rods, nuts, washers, and other accessories.
- H. Equipment Support Installation: Fabricate from welded-structural-steel shapes.
- I. 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.

- J. Install lateral bracing with pipe hangers and supports to prevent swaying.
- K. 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.
- L. Load Distribution: Install hangers and supports so that piping live and dead loads and stresses from movement will not be transmitted to connected equipment.
- M. Pipe Slopes: Install hangers and supports to provide indicated pipe slopes and to not exceed maximum pipe deflections allowed by ASME B31.9 for building services piping.
- N. Insulated Piping:
 - 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 allowed by 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.
 - e. NPS 16 to NPS 24: 24 inches long and 0.105 inch thick.
 - 5. Pipes NPS 8 and Larger: Include wood or reinforced calcium-silicate-insulation inserts of length at least as long as protective shield.
 - 6. Thermal-Hanger Shields: Install with insulation same thickness as piping insulation.

3.2. EQUIPMENT SUPPORTS

- A. Fabricate structural-steel stands to suspend equipment from structure overhead or to support equipment above floor.
- B. Grouting: Place grout under supports for equipment and make bearing surface smooth.

- C. Provide lateral bracing, to prevent swaying, for equipment supports.

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/D1.1M 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 so 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. Touchup: Cleaning and touchup painting of field welds, bolted connections, and abraded areas of shop paint on miscellaneous metal are specified in Section 099100 "Painting."
- B. Galvanized Surfaces: Clean welds, bolted connections, and abraded areas and apply galvanizing-repair paint to comply with ASTM A 780.

3.6. HANGER AND SUPPORT SCHEDULE

- A. Specific hanger and support requirements are 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 carbon-steel pipe hangers and supports, metal trapeze pipe hangers and metal framing systems and attachments for general service applications.
- F. Use stainless-steel pipe hangers and stainless-steel or corrosion-resistant attachments for hostile environment applications.

- G. Use copper-plated pipe hangers and copper or stainless-steel attachments for copper piping and tubing.
- H. Use padded hangers for piping that is subject to scratching.
- I. Use thermal-hanger shield inserts for insulated piping and tubing.
- J. 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. 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.
 - 3. 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.
 - 4. Adjustable, Swivel Split- or Solid-Ring Hangers (MSS Type 6): For suspension of noninsulated, stationary pipes NPS 3/4 to NPS 8.
 - 5. Adjustable, Steel Band Hangers (MSS Type 7): For suspension of noninsulated, stationary pipes NPS 1/2 to NPS 8.
 - 6. Adjustable Band Hangers (MSS Type 9): For suspension of noninsulated, stationary pipes NPS 1/2 to NPS 8.
 - 7. Adjustable, Swivel-Ring Band Hangers (MSS Type 10): For suspension of noninsulated, stationary pipes NPS 1/2 to NPS 8.
 - 8. Split Pipe Ring with or without Turnbuckle Hangers (MSS Type 11): For suspension of noninsulated, stationary pipes NPS 3/8 to NPS 8.
 - 9. Extension Hinged or Two-Bolt Split Pipe Clamps (MSS Type 12): For suspension of noninsulated, stationary pipes NPS 3/8 to NPS 3.
 - 10. U-Bolts (MSS Type 24): For support of heavy pipes NPS 1/2 to NPS 30.
 - 11. Clips (MSS Type 26): For support of insulated pipes not subject to expansion or contraction.
 - 12. 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 or carbon-steel plate.
 - 13. 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 or carbon-steel plate, and with U-bolt to retain pipe.
 - 14. 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.
 - 15. Single-Pipe Rolls (MSS Type 41): For suspension of pipes NPS 1 to NPS 30, from two rods if longitudinal movement caused by expansion and contraction might occur.
 - 16. Adjustable Roller Hangers (MSS Type 43): For suspension of pipes NPS 2-1/2 to NPS 24, from single rod if horizontal movement caused by expansion and contraction might occur.
 - 17. 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.
 - 18. 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.
 - 19. 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.
- K. 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 24.
 2. Carbon- or Alloy-Steel Riser Clamps (MSS Type 42): For support of pipe risers NPS 3/4 to NPS 24 if longer ends are required for riser clamps.
- L. 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.
- M. 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-joist 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.
 13. Side-Beam Brackets (MSS Type 34): For sides of steel or wooden beams.
 14. Plate Lugs (MSS Type 57): For attaching to steel beams if flexibility at beam is required.
 15. Horizontal Travelers (MSS Type 58): For supporting piping systems subject to linear horizontal movement where headroom is limited.
- N. 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.
- O. Spring Hangers and Supports: Unless otherwise indicated and except as specified in piping system Sections, install the following types:
1. Restraint-Control Devices (MSS Type 47): Where indicated to control piping movement.
 2. Spring Cushions (MSS Type 48): For light loads if vertical movement does not exceed 1-1/4 inches.
 3. Spring-Cushion Roll Hangers (MSS Type 49): For equipping Type 41, roll hanger with springs.
 4. Spring Sway Braces (MSS Type 50): To retard sway, shock, vibration, or thermal expansion in piping systems.
 5. Variable-Spring Hangers (MSS Type 51): Preset to indicated load and limit variability factor to 25 percent to allow expansion and contraction of piping system from hanger.
 6. Variable-Spring Base Supports (MSS Type 52): Preset to indicated load and limit variability factor to 25 percent to allow expansion and contraction of piping system from base support.
 7. Variable-Spring Trapeze Hangers (MSS Type 53): Preset to indicated load and limit variability factor to 25 percent to allow expansion and contraction of piping system from trapeze support.
 8. Constant Supports: For critical piping stress and if necessary to avoid transfer of stress from one support to another support, critical terminal, or connected equipment. Include auxiliary stops for erection, hydrostatic test, and load-adjustment capability. These supports include the following types:
 - a. Horizontal (MSS Type 54): Mounted horizontally.
 - b. Vertical (MSS Type 55): Mounted vertically.
 - c. Trapeze (MSS Type 56): Two vertical-type supports and one trapeze member.
- P. Comply with MSS SP-69 for trapeze pipe-hanger selections and applications that are not specified in piping system Sections.
- Q. Comply with MFMA-103 for metal framing system selections and applications that are not specified in piping system Sections.
- R. Use powder-actuated fasteners or mechanical-expansion anchors instead of building attachments where required in concrete construction.
- S. Use pipe positioning systems in pipe spaces behind plumbing fixtures to support supply and waste piping for plumbing fixtures.

END 22 0529

1. GENERAL

1.1. WORK INCLUDED

A. Base Bid

1. Contractor Provide:
 - a. Equipment labels.
 - b. Warning signs and labels.
 - c. Pipe labels.
 - d. Valve tags.
 - e. Warning tags.

1.2. ACTION 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.

2. PRODUCTS

2.1. EQUIPMENT LABELS

A. Metal Labels for Equipment:

1. Material and Thickness: Brass, 0.032-inch; stainless steel, 0.025-inch; aluminum, 0.032-inch; or anodized aluminum, 0.032-inch minimum thickness, and having predrilled or stamped holes for attachment hardware.
2. Letter Color: Black.
3. Background Color: White.
4. Minimum Label Size: Length and width vary for required label content, but not less than 2-1/2 by 3/4 inch.
5. 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-quarters the size of principal lettering.
6. Fasteners: Stainless-steel rivets or self-tapping screws.
7. Adhesive: Contact-type permanent adhesive, compatible with label and with substrate.

B. Plastic Labels for Equipment:

1. Material and Thickness: Multilayer, multicolor, plastic labels for mechanical engraving, 1/16 inch thick, and having predrilled holes for attachment hardware.
2. Letter Color: Black.
3. Background Color: White.
4. Maximum Temperature: Able to withstand temperatures up to 160 deg F.
5. Minimum Label Size: Length and width vary for required label content, but not less than 2-1/2 by 3/4 inch.
6. 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-quarters the size of principal lettering.
7. Fasteners: Stainless-steel rivets or self-tapping screws.
8. Adhesive: Contact-type permanent adhesive, compatible with label and with substrate.

C. Label Content: Include equipment's Drawing designation or unique equipment number, Drawing numbers where equipment is indicated (plans, details, and schedules), and the Specification Section number and title where equipment is specified.

D. Equipment Label Schedule: For each item of equipment to be labeled, on 8-1/2-by-11-inch bond paper. Tabulate equipment identification number, and identify Drawing numbers where equipment is indicated (plans, details, and schedules) and the Specification Section number and title where equipment is specified. Equipment schedule shall be included in operation and maintenance data.

2.2. WARNING SIGNS AND LABELS

A. Material and Thickness: Multilayer, multicolor, plastic labels for mechanical engraving, 1/16 inch thick, and having predrilled holes for attachment hardware.

B. Letter Color: White.

C. Background Color: Red.

D. Maximum Temperature: Able to withstand temperatures up to 160 deg F.

E. Minimum Label Size: Length and width vary for required label content, but not less than 2-1/2 by 3/4 inch.

F. 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-quarters the size of principal lettering.

G. Fasteners: Stainless-steel rivets or self-tapping screws.

H. Adhesive: Contact-type permanent adhesive, compatible with label and with substrate.

I. Label Content: Include caution and warning information plus emergency notification instructions.

2.3. PIPE LABELS

- A. General Requirements for Manufactured Pipe Labels: Preprinted, color-coded, with lettering indicating service, and showing flow direction.
- 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; also include 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: Size letters according to ASME A13.1 for piping.
- E. Stencils will not be allowed.

2.4. 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; stainless steel, 0.025-inch; aluminum, 0.032-inch; or anodized aluminum, 0.032-inch minimum thickness, and having predrilled or stamped holes for attachment hardware.
 - 2. Fasteners: Brass wire-link chain or beaded chain.
- B. Valve Schedules: For each piping system, on 8-1/2-by-11-inch 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.

2.5. WARNING TAGS

- A. Description: Preprinted or partially preprinted accident-prevention tags of plasticized card stock with matte finish suitable for writing.
 - 1. Size: 3 by 5-1/4 inches minimum.
 - 2. Fasteners: Brass grommet and wire.
 - 3. Nomenclature: Large-size primary caption such as "DANGER," "CAUTION," or "DO NOT OPERATE."
 - 4. Color: Safety yellow background with black lettering.

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. GENERAL INSTALLATION REQUIREMENTS

- 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.

3.3. EQUIPMENT LABEL INSTALLATION

- A. Install or permanently fasten labels on each major item of mechanical equipment.
- B. Locate equipment labels where accessible and visible.

3.4. PIPE LABEL INSTALLATION

- A. Pipe Label Locations: 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 50 feet along each run. Reduce intervals to 25 feet in areas of congested piping and equipment.
 - 7. On piping above removable acoustical ceilings. Omit intermediately spaced labels.
- B. Directional Flow Arrows: Arrows shall be used to indicate direction of flow in pipes, including pipes where flow is allowed in both directions.
- C. Pipe Label Color Schedule:
 - 1. Domestic Water Piping
 - a. Background: Safety green.
 - b. Letter Color: White.
 - 2. Sanitary Waste and Storm Drainage Piping:
 - a. Background Color: Safety white.
 - b. Letter Color: Black.

3.5. 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. All Systems: 1-1/2 inches, round.

2. Valve-Tag Colors:

a. Cold Water: Blue.

b. Hot Water: Red

3. Letter Colors:

a. All Systems: White.

3.6. WARNING-TAG INSTALLATION

A. Write required message on, and attach warning tags to, equipment and other items where required.

END 22 0553

1. GENERAL

1.1 WORK INCLUDES

- A. Base Bid:
 - 1. Contractor Provide:
 - a. Balancing Piping System:
 - 1) Domestic hot water and hot water circulation systems.

1.2 RELATED WORK

- A. Specified elsewhere:
 - 1. Refer to General Commissioning Requirements for additional project requirements. This work shall be coordinated with the project Commissioning Authority.

1.3 DEFINITIONS

- A. NEBB: National Environmental Balancing Bureau.
- B. TAB: Testing, adjusting, and balancing.
- C. TABB: Testing, Adjusting, and Balancing Bureau.
- D. TAB Specialist: An entity engaged to perform TAB Work.

1.4 SUBMITTALS

- A. Certified TAB reports.
- B. Instrument calibration reports, to include the following:
 - 1. Instrument type and make.
 - 2. Serial number.
 - 3. Application.
 - 4. Dates of use.
 - 5. Dates of calibration.

1.5 QUALITY ASSURANCE

- A. TAB Contractor Qualifications: Engage a TAB entity certified.
 - 1. TAB Field Supervisor: Employee of the TAB contractor and certified.
 - 2. TAB Technician: Employee of the TAB contractor and who is certified by a TAB technician.
- B. Certify TAB field data reports and perform the following:
 - 1. Review field data reports to validate accuracy of data and to prepare certified TAB

- reports.
- 2. Certify that the TAB team complied with the procedures specified and referenced in this Specification.
- C. TAB Report Forms: Use standard TAB contractor's forms approved by Engineer and/or Commissioning Authority.

1.6 COORDINATION

- A. Notice: Provide seven days' advance written notice for each test. Include scheduled test dates and times.
- B. Perform TAB after leakage and pressure tests on water distribution systems have been satisfactorily completed.

2. PRODUCTS (Not Applicable)

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.
- B. Examine systems for installed balancing devices, such as test ports, gage cocks, thermometer wells, flow-control devices, balancing valves and fittings. Verify that locations of these balancing devices are accessible.
- C. Examine the approved submittals for plumbing systems and equipment.
- D. Examine design data including plumbing system descriptions, statements of design assumptions for environmental conditions and systems' output, and statements of philosophies and assumptions about plumbing system and equipment controls.
- E. Examine equipment performance data including pump curves.
 - 1. 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.
 - 2. Calculate system-effect factors to reduce performance ratings of plumbing equipment when installed under conditions different from the conditions used to rate equipment performance.
- F. Examine system and equipment installations and verify that field quality-control testing, cleaning, and adjusting specified in individual Sections have been performed.
- G. Examine test reports specified in individual system and equipment Sections.
- H. Examine strainers. Verify that startup screens are replaced by permanent screens with indicated perforations.
- I. Examine thermostatic mixing valves for proper installation for their intended function of diverting or mixing fluid flows.

- J. Examine system pumps to ensure absence of entrained air in the suction piping.
- K. Examine operating safety interlocks and controls on Plumbing equipment.
- L. 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 reports. Verify the following:
 - 1. Permanent electrical-power wiring is complete.
 - 2. Plumbing systems are filled, clean, and free of air.
 - 3. Thermostatic mixing valves are operational and set to specified temperatures.
 - 4. Isolating and balancing valves are open and control valves are operational.
 - 5. Circulating pumps are operational.
 - 6. Bleed air from system.

3.3 GENERAL PROCEDURES FOR TESTING AND BALANCING

- A. Perform testing and balancing procedures on domestic hot water system in this section.
- B. Cut insulation, pipes, and equipment cabinets for installation of test probes to the minimum extent necessary for TAB procedures.
 - 1. After testing and balancing, cap probe holes in pipes with same material and thickness.
 - 2. Install and join new insulation that matches removed materials. Restore insulation, coverings, vapor barrier, and finish according to Section 22 07 19 - Plumbing Piping Insulation.
- C. Mark equipment and balancing devices, including valve position indicators, and similar controls and devices, with paint or other suitable, permanent identification material to show final settings.
- D. Take and report testing and balancing measurements in gpm flow rate.

3.4 GENERAL PROCEDURES FOR PLUMBING SYSTEMS

- A. Prepare test reports with pertinent design data, and number in sequence starting at pump to end of system. Check the sum of branch-circuit flows against the approved pump flow rate. Correct variations that exceed plus or minus 5 percent.
- B. Prepare schematic diagrams of systems' "as-built" piping layouts.
- C. Prepare plumbing systems for testing and balancing according to the following, in addition to the general preparation procedures specified above:
 - 1. Open all manual valves for maximum flow.
 - 2. Check liquid level in expansion tank.
 - 3. Check flow-control valves for specified sequence of operation, and set at indicated flow.

4. Check pump-motor load.

3.5 PROCEDURES FOR MOTORS

- A. Motors, 1/2 HP and Larger: Test at final balanced conditions and record the following data:
 1. Manufacturer's name, model number, and serial number.
 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.

3.6 FINAL REPORT

- A. General: Prepare a certified written report; tabulate and divide the report into separate sections for tested systems and balanced systems.
 1. Include a certification sheet at the front of the report's binder, signed and sealed by the certified testing and balancing engineer.
 2. Include a list of instruments used for procedures, along with proof of calibration.
- B. Final Report Contents: In addition to certified field-report data, include the following:
 1. Pump curves.
 2. Manufacturers' test data.
 3. Field test reports prepared by system and equipment installers.
 4. Other information relative to equipment performance; do not include Shop Drawings and product data.
- C. General Report Data: In addition to form titles and entries, include the following data:
 1. Title page.
 2. Name and address of the TAB contractor.
 3. Project name.
 4. Project location.
 5. Engineer's name and address.
 6. Contractor's name and address.
 7. Report date.
 8. Signature of TAB supervisor who certifies the report.
 9. Table of Contents with the total number of pages defined for each section of the report. Number each page in the report.
 10. 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.
 11. Nomenclature sheets for each item of equipment.
 12. Notes to explain why certain final data in the body of reports vary from indicated values.
 13. Test conditions for pump performance forms including the following:

- D. System Diagrams: Include schematic layouts of hydronic distribution system. Present each system with single-line diagram and include the following:
1. Water flow rates in gpm.
 2. Pipe and valve sizes and locations.
 3. Balancing stations.
 4. Position and gpm setting of balancing devices.
- E. Pump Test Reports: Calculate impeller size by plotting the shutoff head on pump curves and include the following:
1. Unit Data:
 - a. Unit identification.
 - b. Location.
 - c. Service.
 - d. Make and size.
 - e. Model number and serial number.
 - f. Water flow rate in gpm.
 - g. Water pressure differential in feet of head or psig.
 - h. Required net positive suction head in feet of head or psig.
 - i. Pump rpm.
 - j. Impeller diameter in inches.
 - k. Motor make and frame size.
 - l. Motor horsepower and rpm.
 - m. Voltage at each connection.
 - n. Amperage for each phase.
 - o. Full-load amperage and service factor.
 - p. Seal type.
 2. Test Data (Indicated and Actual Values):
 - a. Static head in feet of head or psig.
 - b. Pump shutoff pressure in feet of head or psig.
 - c. Actual impeller size in inches.
 - d. Full-open flow rate in gpm.
 - e. Full-open pressure in feet of head or psig.
 - f. Final discharge pressure in feet of head or psig.
 - g. Final suction pressure in feet of head or psig.
 - h. Final total pressure in feet of head or psig.
 - i. Final water flow rate in gpm.
 - j. Voltage at each connection.
 - k. Amperage for each phase.
- F. Instrument Calibration Reports:
1. Report Data:
 - a. Instrument type and make.
 - b. Serial number.
 - c. Application.
 - d. Dates of use.
 - e. Dates of calibration.

3.7 INSPECTIONS

A. Initial Inspection:

1. After testing and balancing are complete, operate each system and randomly check measurements to verify that the system is operating according to the final test and balance readings documented in the final report.
2. Check the following for each system:
 - a. Measure water flow of at least 10 percent of balancing valves.
 - b. Verify that balancing devices are marked with final balance position.
 - c. Note deviations from the Contract Documents in the final report.

B. Final Inspection:

1. After initial inspection is complete and documentation by random checks verifies that testing and balancing are complete and accurately documented in the final report, request that a final inspection be made by Engineer.
2. The TAB contractor's test and balance engineer shall conduct the inspection in the presence of Engineer.
3. Engineer shall randomly select measurements, documented in the final report, to be rechecked. Rechecking shall be limited to either 10 percent of the total measurements recorded or the extent of measurements that can be accomplished in a normal 8-hour business day.
4. If rechecks yield measurements that differ from the measurements documented in the final report by more than the tolerances allowed, the measurements shall be noted as "FAILED."
5. If the number of "FAILED" measurements is greater than 10 percent of the total measurements checked during the final inspection, the testing and balancing shall be considered incomplete and shall be rejected.

C. TAB Work will be considered defective if it does not pass final inspections. If TAB Work fails, proceed as follows:

1. Recheck all measurements and make adjustments. Revise the final report and balancing device settings to include all changes; resubmit the final report and request a second final inspection.
2. If the second final inspection also fails, Owner may contract the services of another TAB contractor to complete TAB Work according to the Contract Documents and deduct the cost of the services from the original TAB contractor's final payment.

D. Prepare test and inspection reports.

END 22 0593

1. GENERAL

1.1. WORK INCLUDES

A. Base Bid

1. Contractor Provide insulation for the following plumbing piping services:
 - a. Domestic cold-water piping.
 - b. Domestic hot-water piping.
 - c. Domestic circulating hot-water piping.
 - d. Roof drains and rainwater leaders.
 - e. Supplies and drains for handicap-accessible lavatories and sinks.

1.2. ACTION SUBMITTALS

- A. Product Data: For each type of product indicated. Include thermal conductivity, water-vapor permeance thickness, and jackets (both factory- and field-applied, if any).
- B. Shop Drawings: Include plans, elevations, sections, details, and attachments to other work.
 1. Detail application of protective shields, saddles, and inserts at hangers for each type of insulation and hanger.
 2. Detail insulation application at pipe expansion joints for each type of insulation.
 3. Detail insulation application at elbows, fittings, flanges, valves, and specialties for each type of insulation.
 4. Detail removable insulation at piping specialties, equipment connections, and access panels.
 5. Detail application of field-applied jackets.
 6. Detail application at linkages of control devices.

1.3. INFORMATIONAL SUBMITTALS

- A. Qualification Data: For qualified Installer.
- B. 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.
- C. 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. Surface-Burning Characteristics: For insulation and related materials, as determined by testing identical products according to ASTM E 84 by a testing 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 agency.

1. Insulation Installed Indoors: Flame-spread index of 25 or less, and smoke-developed index of 50 or less.

C. Comply with the following applicable standards and other requirements specified for miscellaneous components:

1. Supply and Drain Protective Shielding Guards: ICC A117.1.

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 sizes and locations of supports, hangers, and insulation shields specified in Section 220529 "Hangers and Supports for Plumbing Piping and Equipment."

B. Coordinate clearance requirements with piping Installer for piping 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.

B. Complete installation and concealment of plastic materials as rapidly as possible in each area of construction.

2. PRODUCTS

2.1. INSULATION MATERIALS

A. Comply with requirements in "Piping Insulation Schedule, General," "Indoor Piping Insulation 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. Insulation materials for use on austenitic stainless steel shall be qualified as acceptable according to ASTM C 795.

E. Foam insulation materials shall not use CFC or HCFC blowing agents in the manufacturing process.

F. Flexible Elastomeric Insulation: Closed-cell, sponge- or expanded-rubber materials. Comply with ASTM C 534, Type I for tubular materials.

1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
 - a. Aeroflex USA, inc.
 - b. Armacell LLC
 - c. K-Flex USA

G. Fiberglass, Preformed Pipe Insulation:

1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
 - a. Johns Manville.
 - b. Knauf Insulation.
 - c. Manson Insulation Inc.
 - d. Owens Corning.
2. Type I, 850 Deg F Materials: 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. INSULATING CEMENTS

- A. Mineral-Fiber Insulating Cement: Comply with ASTM C 195.
- B. Expanded or Exfoliated Vermiculite Insulating Cement: Comply with ASTM C 196.
- C. Mineral-Fiber, Hydraulic-Setting Insulating and Finishing Cement: Comply with ASTM C 449.

2.3. 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. Cellular-Glass Adhesive: Two-component, thermosetting urethane adhesive containing no flammable solvents, with a service temperature range of minus 100 to plus 200 deg F.
 1. For indoor applications, adhesive shall have a VOC content of 50 g/L or less when calculated according to 40 CFR 59, Subpart D (EPA Method 24).
 2. Adhesive shall comply with the testing and product requirements of the California Department of Health Services' "Standard Practice for the Testing of Volatile Organic Emissions from Various Sources Using Small-Scale Environmental Chambers."
- C. Flexible Elastomeric and Polyolefin Adhesive: Comply with MIL-A-24179A, Type II, Class I.
 1. For indoor applications, adhesive shall have a VOC content of 50 g/L or less when calculated according to 40 CFR 59, Subpart D (EPA Method 24).
 2. Adhesive shall comply with the testing and product requirements of the California Department of Health Services' "Standard Practice for the Testing of Volatile Organic Emissions from Various Sources Using Small-Scale Environmental Chambers."
- D. Mineral-Fiber Adhesive: Comply with MIL-A-3316C, Class 2, Grade A.

1. For indoor applications, adhesive shall have a VOC content of 80 g/L or less when calculated according to 40 CFR 59, Subpart D (EPA Method 24).
 2. Adhesive shall comply with the testing and product requirements of the California Department of Health Services' "Standard Practice for the Testing of Volatile Organic Emissions from Various Sources Using Small-Scale Environmental Chambers."
- E. Phenolic Adhesive: Solvent-based resin adhesive, with a service temperature range of minus 75 to plus 300 deg F.
1. For indoor applications, adhesive shall have a VOC content of 50 g/L or less when calculated according to 40 CFR 59, Subpart D (EPA Method 24).
 2. Adhesive shall comply with the testing and product requirements of the California Department of Health Services' "Standard Practice for the Testing of Volatile Organic Emissions from Various Sources Using Small-Scale Environmental Chambers."
- F. ASJ Adhesive: Comply with MIL-A-3316C, Class 2, Grade A for bonding insulation jacket lap seams and joints.
1. For indoor applications, adhesive shall have a VOC content of 50 g/L or less when calculated according to 40 CFR 59, Subpart D (EPA Method 24).
 2. Adhesive shall comply with the testing and product requirements of the California Department of Health Services' "Standard Practice for the Testing of Volatile Organic Emissions from Various Sources Using Small-Scale Environmental Chambers."
- G. PVC Jacket Adhesive: Compatible with PVC jacket.
1. For indoor applications, adhesive shall have a VOC content of 50 g/L or less when calculated according to 40 CFR 59, Subpart D (EPA Method 24).
 2. Adhesive shall comply with the testing and product requirements of the California Department of Health Services' "Standard Practice for the Testing of Volatile Organic Emissions from Various Sources Using Small-Scale Environmental Chambers."

2.4. MASTICS

- A. Materials shall be compatible with insulation materials, jackets, and substrates; comply with MIL-PRF-19565C, Type II.
1. For indoor applications, use mastics that have a VOC content of 50 g/L or less when calculated according to 40 CFR 59, Subpart D (EPA Method 24).
- B. Vapor-Barrier Mastic: Water based; suitable for indoor use on below-ambient services.
1. Water-Vapor Permeance: ASTM E 96/E 96M, Procedure B, 0.013 perm at 43-mil dry film thickness.
 2. Service Temperature Range: Minus 20 to plus 180 deg F.
 3. Solids Content: ASTM D 1644, 58 percent by volume and 70 percent by weight.
 4. Color: White.
- C. Breather Mastic: Water based; suitable for indoor and outdoor use on above-ambient services.
1. Water-Vapor Permeance: ASTM F 1249, 1.8 perms at 0.0625-inch dry film thickness.
 2. Service Temperature Range: Minus 20 to plus 180 deg F.
 3. Solids Content: 60 percent by volume and 66 percent by weight.
 4. Color: White.

2.5. SEALANTS

A. Joint Sealants:

1. Materials shall be compatible with insulation materials, jackets, and substrates.
2. Permanently flexible, elastomeric sealant.
3. Service Temperature Range: Minus 100 to plus 300 deg F.
4. Color: White or gray.
5. For indoor applications, sealants shall have a VOC content of 420 g/L or less when calculated according to 40 CFR 59, Subpart D (EPA Method 24).
6. Sealants shall comply with the testing and product requirements of the California Department of Health Services' "Standard Practice for the Testing of Volatile Organic Emissions from Various Sources Using Small-Scale Environmental Chambers."

B. ASJ Flashing Sealants, and Vinyl, PVDC, and PVC Jacket Flashing Sealants:

1. Materials shall be compatible with insulation materials, jackets, and substrates.
2. Fire- and water-resistant, flexible, elastomeric sealant.
3. Service Temperature Range: Minus 40 to plus 250 deg F.
4. Color: White.
5. For indoor applications, sealants shall have a VOC content of 420 g/L or less when calculated according to 40 CFR 59, Subpart D (EPA Method 24).
6. Sealants shall comply with the testing and product requirements of the California Department of Health Services' "Standard Practice for the Testing of Volatile Organic Emissions from Various Sources Using Small-Scale Environmental Chambers."

2.6. 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-SSL: ASJ with self-sealing, pressure-sensitive, acrylic-based adhesive covered by a removable protective strip; complying with ASTM C 1136, Type I.

2.7. 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. Adhesive: As recommended by jacket material manufacturer.
2. Color: White.
3. 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.

2.8. TAPES

A. ASJ Tape: White vapor-retarder tape matching factory-applied jacket with acrylic adhesive, complying with ASTM C 1136.

1. Width: 3 inches.
 2. Thickness: 11.5 mils.
 3. Adhesion: 90 ounces force/inch in width.
 4. Elongation: 2 percent.
 5. Tensile Strength: 40 lbf/inch in width.
 6. ASJ Tape Disks and Squares: Precut disks or squares of ASJ tape.
- B. PVC Tape: White vapor-retarder tape matching field-applied PVC jacket with acrylic adhesive; suitable for indoor and outdoor applications.
1. Width: 2 inches.
 2. Thickness: 6 mils.
 3. Adhesion: 64 ounces force/inch in width.
 4. Elongation: 500 percent.
 5. Tensile Strength: 18 lbf/inch in width.

2.9. SECUREMENTS

A. Bands:

1. Stainless Steel: ASTM A 167 or ASTM A 240/A 240M, Type 304 or Type 316; 0.015 inch thick, 1/2 inch wide with wing seal or closed seal.
2. Aluminum: ASTM B 209, Alloy 3003, 3005, 3105, or 5005; Temper H-14, 0.020 inch thick, 1/2 inch wide with wing seal or closed seal.

B. Staples: Outward-clinching insulation staples, nominal 3/4-inch-wide, stainless steel or Monel.

C. Wire: 0.062-inch soft-annealed, stainless steel.

2.10. PROTECTIVE SHIELDING GUARDS

A. Protective Shielding Pipe Covers:

1. Description: Manufactured plastic wraps for covering plumbing fixture hot- and cold-water supplies and trap and drain piping. Comply with Americans with Disabilities Act (ADA) requirements.

3. EXECUTION

3.1. EXAMINATION

A. Examine substrates and conditions for compliance with requirements for installation tolerances and other conditions affecting performance of insulation application.

1. Verify that systems to be insulated have been tested and are free of defects.
2. Verify that surfaces to be insulated are clean and dry.

B. 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. Mix insulating cements with clean potable water; if insulating cements are to be in contact with stainless-steel surfaces, use demineralized water.

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 piping including fittings, valves, and specialties.
- B. Install insulation materials, forms, vapor barriers or retarders, jackets, and thicknesses required for each item of 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 2 inches o.c.

- a. For below-ambient services, apply vapor-barrier mastic over staples.
- 4. Cover joints and seams with tape, according to insulation material manufacturer's written instructions, 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. Testing agency labels and stamps.
 - 2. Nameplates and data plates.
 - 3. 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 Aboveground Exterior Wall Penetrations: Install insulation continuously through wall penetrations.
 - 1. Seal penetrations with flashing sealant.
 - 2. For applications requiring only indoor insulation, terminate insulation inside wall 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 wall flashing and overlap wall flashing at least 2 inches.
 - 4. Seal jacket to wall flashing with flashing sealant.
- D. Insulation Installation at Interior Wall and Partition Penetrations (That Are Not Fire Rated): Install insulation continuously through walls and partitions.

- E. 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 Section 078400 "Firestopping" for firestopping and fire-resistive joint sealers.
- F. Insulation Installation at Floor Penetrations:
 - 1. Pipe: Install insulation continuously through floor penetrations.
 - 2. Seal penetrations through fire-rated assemblies. Comply with requirements in Section 078400 "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. Cover segmented insulated surfaces with a layer of finishing cement and coat with a mastic. Install vapor-barrier mastic for below-ambient services and a breather mastic for above-ambient services. Reinforce the mastic with fabric-reinforcing mesh. Trowel the mastic to a smooth and well-shaped contour.
 - 8. 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.

9. 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. 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. Finish exposed surfaces with a PVC jacket.

3.6. INSTALLATION OF FLEXIBLE ELASTOMERIC INSULATION

- A. Seal longitudinal seams and end joints with manufacturers recommended adhesive to eliminate openings in insulation that allow passage of air to surface being insulated.
- B. Insulation Installation on Pipe Flanges:
1. Install 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 cut sections of sheet insulation of same thickness as pipe insulation.
 4. Secure insulation to flanges and seal seams with manufacturers recommended adhesive to eliminate openings in insulation that allow passage of air to surface being insulated.
- C. Insulation Installation on Pipe Fittings and Elbows:
1. Install mitered sections of pipe insulation.
 2. Secure insulation materials and seal seams with manufacturer's recommended adhesive to eliminate openings in insulation that allow passage of air to surface being insulated.

D. Insulation Installation on Valves and Pipe Specialties:

1. Install preformed valve covers manufactured of same material as pipe insulation when available.
2. When preformed valve covers are not available, install cut sections of pipe and sheet insulation to valve body. Arrange insulation to permit access to packing and to allow valve operation without disturbing insulation.
3. Install insulation to flanges as specified for flange insulation application.
4. Secure insulation to valves and specialties and seal seams with manufacturer's recommended adhesive to eliminate openings in insulation that allow passage of air to surface being insulated.

3.7. INSTALLATION OF FIBERGLASS INSULATION

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. Instead, 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.

3.8. FIELD-APPLIED JACKET INSTALLATION

- A. Where PVC jackets are indicated, install with 1-inch overlap at longitudinal seams and end joints. Seal with manufacturers 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.

3.9. FINISHES

- A. Flexible Elastomeric Thermal Insulation: After adhesive has fully cured, apply two coats of insulation manufacturer's recommended protective coating.

3.10. FIELD QUALITY CONTROL

- A. Testing Agency: Engage a qualified testing agency to perform tests and inspections.
- B. Tests and Inspections:
 - 1. Inspect pipe, fittings, strainers, and valves, randomly selected by Architect, by removing field-applied jacket and insulation in layers in reverse order of their installation. Extent of inspection shall be limited to three locations of straight pipe, three locations of threaded fittings, three locations of welded fittings, two locations of threaded strainers, two locations of welded strainers, three locations of threaded valves, and three locations of flanged valves for each pipe service defined in the "Piping Insulation Schedule, General" Article.
- C. All insulation applications will be considered defective Work if sample inspection reveals noncompliance with requirements.

3.11. 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. Drainage piping located in crawl spaces.
 - 2. Underground piping.
 - 3. Chrome-plated pipes and fittings unless there is a potential for personnel injury.

3.12. INDOOR PIPING INSULATION SCHEDULE

- A. Domestic Cold Water:
 - 1. NPS 1-1/4 and Smaller: Insulation shall be the following:
 - a. Fiberglass, Preformed Pipe Insulation: 1/2 inch thick.
 - 2. NPS 1-1/2 and Larger: Insulation shall be the following:
 - a. Fiberglass, Preformed Pipe Insulation, Type I: 1 inch thick.

- B. Domestic Hot and Circulating Hot Water:
 - 1. NPS 1-1/4 and Smaller: Insulation shall be the following:
 - a. Fiberglass, Preformed Pipe Insulation, Type I: 1 inch thick.
 - 2. NPS 1-1/2 and Larger: Insulation shall be the following:
 - a. Fiberglass, Preformed Pipe Insulation, Type I: 1-1/2 inch thick.
- C. Stormwater:
 - 1. All Pipe Sizes: Insulation shall be the following:
 - a. Flexible Elastomeric: 1/2 inch thick.
- D. Roof Drain Bodies:
 - 1. All Pipe Sizes: Insulation shall be the following:
 - a. Flexible Elastomeric: 1/2 inch thick.
- E. Sanitary Drains above ceilings, all Domestic Water, Domestic Hot Water, and Stops for Plumbing Fixtures for People with Disabilities:
 - 1. All Pipe Sizes: Insulation shall be the following:
 - a. Manufactured plastic wraps
- F. Floor Drains, Traps, and Sanitary Drain Piping within 10 Feet of Drain Receiving Condensate and Equipment Drain Water below 60 Deg F:
 - 1. All Pipe Sizes: Insulation shall be the following:
 - a. Flexible Elastomeric: 3/4 inch thick.

3.13. 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.
- C. Piping, Concealed:
 - 1. None.
- D. Piping, Exposed:
 - 1. PVC: 20 mils thick.

END 22 0719

1. GENERAL

1.1. WORK INCLUDES

A. Base Bid

1. Contractor Provide:

- a. Under-building-slab and aboveground slab domestic water pipes, tubes, and fittings inside buildings.
- b. Flexible connectors.

1.2. ACTION SUBMITTALS

A. Product Data: For the following products:

- 1. Flexible connectors.
- 2. Pipe and fittings.

1.3. INFORMATIONAL SUBMITTALS

A. System purging and disinfecting activities report.

B. Field quality-control reports.

1.4. REFERENCE DOCUMENTS

- A. ASTM F 2389-06 – Standard Specification for Pressure-rated Polypropylene (PP) Piping Systems.
- B. CSA B137.11 – Polypropylene (PP-R) Composite Pipe and Fittings for Pressure Applications.
- C. NSF/ANSI 61 – Drinking Water systems Components – Health Effects.

1.5. WARRANTY

- A. Manufacturer shall warrant polypropylene pipe and fittings for 10 years to be free of defects in materials or workmanship.
- B. Warranty shall cover labor and material costs of repairing and/or replacing and/or replacing defective materials and repairing any incidental damage caused by failure of the piping system due to defects in materials or workmanship.
- C. Warranty shall be in effect only upon submission, by the contractor to the polypropylene pipe and fitting manufacturer, of a valid pressure/leak test documentation indicating that the system was tested and passed the manufacturer's pressure/leak test.

1.6. QUALITY ASSURANCE

- A. Material shall be certified by NSF International as complying with NSF 14, NSF61, and ASTM F 2389 or CSA B137.11.

- B. Comply with Reduction of Lead in Drinking Water Act "Lead Free Law".
- C. Material shall comply with manufacturers specifications.
- D. Piping materials shall bear label, stamp, or other markings of specified testing agency.
- E. Special Engineered products shall be certified by NSF International as complying with NSF 14.

2. PRODUCTS

2.1. PIPING MATERIALS

- A. Comply with requirements in "Piping Schedule on drawings" 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.
- B. Soft Copper Tube: ASTM B 88, Type K (ASTM B 88M, Type A) and ASTM B 88, Type L (ASTM B 88M, Type B) water tube, annealed temper.
- C. Cast-Copper, Solder-Joint Fittings: ASME B16.18, pressure fittings.
- D. Wrought-Copper, Solder-Joint Fittings: ASME B16.22, wrought-copper pressure fittings.
- E. Bronze Flanges: ASME B16.24, Class 150, with solder-joint ends.
- F. Copper Unions:
 - 1. MSS SP-123.
 - 2. Cast-copper-alloy, hexagonal-stock body.
 - 3. Ball-and-socket, metal-to-metal seating surfaces.
 - 4. Solder-joint or threaded ends.
- G. Copper Pressure-Seal-Joint Fittings:
 - 1. Manufacturers: Subject to compliance with requirements, [provide products by the following] [provide products by one of the following] [available manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following]:
 - a. Elkhart Products Corporation.
 - b. NIBCO Inc.
 - c. Viega.
 - 2. Fittings for NPS 2 (DN 50) and Smaller: Wrought-copper fitting with EPDM-rubber, O-ring seal in each end.
 - 3. Fittings for NPS 2-1/2 to NPS 4 (DN 65 to DN 100): Cast-bronze or wrought-copper fitting with EPDM-rubber, O-ring seal in each end.

H. Copper Push-on-Joint Fittings:

1. Manufacturers: Subject to compliance with requirements, [provide products by the following] [provide products by one of the following] [available manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following]:
 - a. Victaulic Company.
2. Description:
 - a. Cast-copper fitting complying with ASME B16.18 or wrought-copper fitting complying with ASME B 16.22.
 - b. Stainless-steel teeth and EPDM-rubber, O-ring seal in each end instead of solder-joint ends.

I. Copper-Tube, Extruded-Tee Connections:

1. Manufacturers: Subject to compliance with requirements, [provide products by the following] [provide products by one of the following] [available manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following]:
 - a. T-Drill Industries Inc.
2. Description: Tee formed in copper tube according to ASTM F 2014.

J. Appurtenances for Grooved-End Copper Tubing:

1. Manufacturers: Subject to compliance with requirements, [provide products by the following] [provide products by one of the following] [available manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following]:
 - a. Anvil International.
 - b. Shurjoint Piping Products.
 - c. Victaulic Company.
2. Bronze Fittings for Grooved-End, Copper Tubing: ASTM B 75 (ASTM B 75M) copper tube or ASTM B 584 bronze castings.
3. Mechanical Couplings for Grooved-End Copper Tubing:
 - a. Copper-tube dimensions and design similar to AWWA C606.
 - b. Ferrous housing sections.
 - c. EPDM-rubber gaskets suitable for hot and cold water.
 - d. Bolts and nuts.
 - e. Minimum Pressure Rating: 300 psig (2070 kPa).

2.3. FLEXIBLE CONNECTORS

- A. Manufacturers: subject to compliance with requirements, provide products by one of the following:
1. Flex-Hose Co., Inc.
 2. Flexicraft Industries.

3. Flex Pression, Ltd.
 4. Flex-Weld, Inc.
 5. Mercer Rubber Co.
 6. Metraflex, Inc.
 7. Unaflex, 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-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 and 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.

2.4. TRANSITION FITTINGS

- A. General Requirements:
1. Same size as pipe to be joined.
 2. Pressure rating at least equal to pipes to be joined.
 3. End connections compatible with pipes to be joined.
- B. Fitting-Type Transition Couplings: Manufactured piping coupling or specified piping system fitting.
- C. Sleeve-Type Transition Coupling: AWWA C219.
- D. Plastic-to-Metal Transition Fittings:
1. Description:
 - a. CPVC or PVC one-piece fitting with manufacturer's Schedule 80 equivalent dimensions.
 - b. One end with threaded brass insert and one solvent-cement-socket or threaded end.
- E. Plastic-to-Metal Transition Unions:
1. Description:
 - a. CPVC or PVC four-part union.
 - b. Brass or stainless-steel threaded end.
 - c. Solvent-cement-joint or threaded plastic end.
 - d. Rubber O-ring.
 - e. Union nut.

2.5. DIELECTRIC FITTINGS

- A. General Requirements: Assembly of copper alloy and ferrous materials with separating nonconductive insulating material. Include end connections compatible with pipes to be joined.
- B. Dielectric Unions:
 - 1. Standard: ASSE 1079.
 - 2. Pressure Rating: 125 psig minimum at 180 deg F.
 - 3. End Connections: Solder-joint copper alloy and threaded ferrous.
- C. Dielectric Flanges:
 - 1. Standard: ASSE 1079.
 - 2. Factory-fabricated, bolted, companion-flange assembly.
 - 3. Pressure Rating: 125 psig minimum at 180 deg F.
 - 4. End Connections: Solder-joint copper alloy and threaded ferrous; threaded solder-joint copper alloy and threaded ferrous.
- D. Dielectric-Flange Insulating Kits:
 - 1. Nonconducting materials for field assembly of companion flanges.
 - 2. Pressure Rating: 150 psig.
 - 3. Gasket: Neoprene or phenolic.
 - 4. Bolt Sleeves: Phenolic or polyethylene.
 - 5. Washers: Phenolic with steel backing washers.
- E. Dielectric Nipples:
 - 1. Standard: IAPMO PS 66.
 - 2. Electroplated steel nipple complying with ASTM F 1545.
 - 3. Pressure Rating and Temperature: 300 psig at 225 deg F.
 - 4. End Connections: Male threaded or grooved.
 - 5. Lining: Inert and noncorrosive, propylene.

3. EXECUTION

3.1. EARTHWORK

- A. Comply with requirements in Section 312318 "Excavating, Backfilling and Compacting for structures" for excavating, trenching, and backfilling.

3.2. 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 shutoff valve, hose-end drain valve, strainer, pressure gage, and test tee with valve inside the building at each domestic water-service entrance. Comply with requirements for pressure gages in Section 220519 "Meters and Gages for Plumbing Piping" and with requirements for drain valves and strainers in Section 221119 "Domestic Water Piping Specialties."

- C. Install shutoff valve immediately upstream of each dielectric fitting.
- D. Install domestic water piping level without pitch 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 to permit valve servicing.
- I. Install nipples, unions, special fittings, and valves with pressure ratings the same as or higher than the system pressure rating used in applications below unless otherwise indicated.
- J. Install piping free of sags and bends.
- K. Install fittings for changes in direction and branch connections.
- L. Install unions in piping at final connection to each piece of equipment, machine, and specialty.
- M. Install pressure gages on suction and discharge piping for each plumbing pump. Comply with requirements for pressure gages in Section 220519 "Meters and Gages for Plumbing Piping."
- N. Install thermometer in hot-water circulation piping.
- O. Install thermometers on inlet and outlet piping from each water heater. Comply with requirements for thermometers in Section 220519 "Meters and Gages for Plumbing Piping."
- P. Install sleeves for piping penetrations of walls, ceilings, and floors. Comply with requirements for sleeves specified in Section 220500 "Common Work Results for Plumbing."
- Q. Install sleeve seals for piping penetrations of concrete walls below grade and slabs. Comply with requirements for sleeve seals specified in Section 220500 "Common Work Results for Plumbing."
- R. Install escutcheons for piping penetrations of walls, ceilings, and floors. Comply with requirements for escutcheons specified in Section 220500 "Common Work Results for Plumbing."

3.3. 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. Flanged Joints: Select appropriate asbestos-free, nonmetallic gasket material in size, type, and thickness suitable for domestic water service. Join flanges with gasket and bolts according to ASME B31.9.
- E. Joints for Dissimilar-Material Piping: Make joints using adapters compatible with materials of both piping systems.

3.4. 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 2 and smaller. Use butterfly valves for piping NPS 2-1/2 and larger.
- C. Install drain valves for equipment at base of each water riser, 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.
- D. Install calibrated balancing valves in each hot-water circulation return branch and discharge side of each pump and circulator. Set calibrated balancing valves partly open to restrict but not stop flow. Comply with requirements in Division 22 Sections "Domestic Water Piping Specialties" and "Testing, Adjusting and Balancing for Plumbing" for calibrated balancing valves and balancing.

3.5. TRANSITION FITTING INSTALLATION

- A. Install transition couplings at joints of dissimilar piping.
- B. Transition Fittings in Underground Domestic Water Piping:
 - 1. Fittings for NPS 1-1/2 and Smaller: Fitting-type coupling.
 - 2. Fittings for NPS 2 and Larger: Sleeve-type coupling.
- C. Transition Fittings in Aboveground Domestic Water Piping NPS 2 and Smaller: Plastic-to-metal transition fittings or unions.

3.6. DIELECTRIC FITTING INSTALLATION

- A. Install dielectric fittings in piping at connections of dissimilar metal piping and tubing.
- B. Dielectric Fittings for NPS 2 and Smaller: Use dielectric couplings.

- C. Dielectric Fittings for NPS 2-1/2 to NPS 4: Use dielectric flanges.
- D. Dielectric Fittings for NPS 5 and Larger: Use dielectric flange kits.

3.7. HANGER AND SUPPORT INSTALLATION

- A. Comply with requirements for seismic-restraint devices in Section 220548 "Seismic Protection for Plumbing Piping and Equipment."
- B. Comply with requirements for pipe hanger, support products, and installation in Section 220529 "Hangers and Supports for Plumbing Piping and Equipment."
 - 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.
- C. Support vertical piping and tubing at base and at each floor.
- D. Rod diameter may be reduced one size for double-rod hangers, to a minimum of 3/8 inch.
- E. Install vinyl-coated hangers for copper piping with the following maximum horizontal spacing and minimum rod diameters:
 - 1. NPS 1 and Smaller: 36 inches with 3/8-inch rod.
 - 2. NPS 1-1/4 to NPS 2: 48 inches with 3/8-inch rod.
 - 3. NPS 2-1/2 to NPS 3-1/2: 48 inches with 1/2-inch rod.
 - 4. NPS 4 and NPS 5: 48 inches with 5/8-inch rod.
 - 5. NPS 6: 48 inches with 3/4-inch rod.
 - 6. NPS 8: 48 inches with 7/8-inch rod.
- F. Install supports for vertical piping every 60 inches for NPS 1 and smaller, and every 72 inches for NPS 1-1/4 and larger.
- G. Support piping and tubing not listed in this article according to MSS SP-69 and manufacturer's written instructions.

3.8. FLEXIBLE CONNECTOR INSTALLATION

- A. Install flexible connectors in suction and discharge piping connections to each domestic water pump.

3.9. CONNECTIONS

- A. Drawings indicate general arrangement of piping, fittings, and specialties.
- B. When installing piping adjacent to equipment and machines, allow space for service and maintenance.

- C. Connect domestic water piping to exterior water-service piping. Use transition fitting to join dissimilar piping materials.
- D. Connect domestic water piping to water-service piping with shutoff valve; extend and connect to the following:
 - 1. Water Heaters: Cold-water inlet and hot-water outlet piping in sizes indicated, but not smaller than sizes of water heater connections.
 - 2. Plumbing Fixtures: Cold- and hot-water-supply piping in sizes indicated, but not smaller than that required by plumbing code.
 - 3. Equipment: Cold- and hot-water-supply piping as indicated, but not smaller than equipment connections. Provide shutoff valve and union for each connection. Use flanges instead of unions for NPS 2-1/2 and larger.
 - 4. Domestic Water Heat Pumps: Cold-water inlet and hot-water outlet piping in sizes indicated, but not smaller than sizes of water heater connections.

3.10. IDENTIFICATION

- A. Identify system components. Comply with requirements for identification materials and installation in Section 220553 "Identification for Plumbing Piping and Equipment."

3.11. FIELD QUALITY CONTROL

- A. Perform the following tests and inspections:

- 1. Piping Inspections:

- a. Do not enclose, cover, or put piping into operation until it has been inspected and approved by authorities having jurisdiction.
- b. 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:
 - 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 authorities having jurisdiction to observe tests specified in "Piping Tests" Subparagraph below and to ensure compliance with requirements.
- c. Reinspection: If authorities having jurisdiction find that piping will not pass tests or inspections, make required corrections and arrange for reinspection.
- d. Reports: Prepare inspection reports and have them signed by authorities having jurisdiction.

- 2. Piping Tests:

- a. Fill domestic water piping. Check components to determine that they are not air bound and that piping is full of water.
- b. 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.
- c. 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.

- d. 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 it to stand for four hours. Leaks and loss in test pressure constitute defects that must be repaired.
 - e. Repair leaks and defects with new materials, and retest piping or portion thereof until satisfactory results are obtained.
 - f. Prepare reports for tests and for corrective action required.
- B. Domestic water piping will be considered defective if it does not pass tests and inspections.
 - C. Prepare test and inspection reports.
 - D. Inspections and testing shall be completed with each phase of work.

3.12. 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. Adjust balancing valves in hot-water-circulating piping to provide adequate flow.
 - a. Adjust calibrated balancing valves to flows indicated.
 - 4. Remove plugs used during testing of piping and for temporary sealing of piping during installation.
 - 5. Remove and clean strainer screens. Close drain valves and replace drain plugs.
 - 6. Remove filter cartridges from housings and verify that cartridges are as specified for application where used and are clean and ready for use.
 - 7. Check plumbing specialties and verify proper settings, adjustments, and operation.
 - 8. Bleed air from entire system.

3.13. CLEANING

- A. Clean and disinfect potable domestic water piping as follows:
 - 1. Purge new piping and parts of existing piping that have been altered, extended, or repaired 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. Repeat procedures if biological examination shows contamination.
 - e. Submit water samples in sterile bottles to authorities having jurisdiction.

- B. Clean non-potable domestic water piping as follows:
 - 1. Purge new piping and parts of existing piping that have been altered, extended, or repaired before using.
 - 2. Use purging procedures prescribed by authorities having jurisdiction or; if methods are not prescribed, follow procedures described below:
 - a. Flush piping system with clean, potable water until dirty water does not appear at outlets.
 - b. Submit water samples in sterile bottles to authorities having jurisdiction. Repeat procedures if biological examination shows contamination.
- C. Prepare and submit reports of purging and disinfecting activities. Include copies of water-sample approvals from authorities having jurisdiction.
- D. Clean interior of domestic water piping system. Remove dirt and debris as work progresses.
- E. Cleaning shall be completed with each phase of work.

3.14. 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. Under-building-slab, domestic water, building-service piping shall be the following:
 - 1. Type "K" Copper, brazed joints
- D. Aboveground domestic water piping shall be the following:
 - 1. Type "L" Copper with soldered joints with 95-5.

3.15. 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 for piping NPS 2 and smaller. Use butterfly or ball valves with flanged ends for piping NPS 2-1/2 and larger.
 - 2. Hot-Water Circulating Piping, Balancing Duty: Calibrated balancing 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 22 1116

DIVISION 22 – PLUMBING
SECTION 22 1119 - DOMESTIC WATER PIPING SPECIALTIES

1. GENERAL

1.1. WORK INCLUDES

A. Base Bid

1. Contractor Provide:

- a. Vacuum breakers.
- b. Backflow preventers.
- c. Balancing valves.
- d. Temperature-actuated, water mixing valves.
- e. Strainers.
- f. Wall hydrants.
- g. Hose bibbs.
- h. Roof hydrants.
- i. Drain valves.
- j. Hot water circulating pumps.
- k. Water-hammer arresters.
- l. Specialty valves.

B. Related Requirements:

1. Section 220519 "Meters and Gages for Plumbing Piping" for thermometers and pressure gages, in domestic water piping.
2. Section 224000 "Plumbing Fixtures".

1.2. ACTION SUBMITTALS

A. Product Data: For each type of product.

B. Shop Drawings: For domestic water piping specialties.

1. Include diagrams for power, signal, and control wiring.

1.3. INFORMATIONAL SUBMITTALS

A. Field quality-control reports.

1.4. CLOSEOUT SUBMITTALS

A. 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.

2. PRODUCTS

2.1. GENERAL REQUIREMENTS FOR PIPING SPECIALTIES

- A. Potable-water piping and components shall comply with NSF 61 Annex G and NSF 14. Mark "NSF-pw" on plastic piping components.
- B. Comply with Reduction of Lead in Drinking Water Act "Lead Free Law".

2.2. PERFORMANCE REQUIREMENTS

- A. Minimum Working Pressure for Domestic Water Piping Specialties: 125 psig unless otherwise indicated.

2.3. VACUUM BREAKERS

- A. Pipe-Applied, Atmospheric-Type Vacuum Breakers:
 - 1. Standard: ASSE 1001.
 - 2. Size: NPS 1/4 to NPS 3, as required to match connected piping.
 - 3. Body: Bronze.
 - 4. Inlet and Outlet Connections: Threaded.
 - 5. Finish: Chrome plated.
- B. Hose-Connection Vacuum Breakers:
 - 1. Standard: ASSE 1011.
 - 2. Body: Bronze, nonremovable, with manual drain.
 - 3. Outlet Connection: Garden-hose threaded complying with ASME B1.20.7.
 - 4. Finish: Chrome or nickel plated.

2.4. BACKFLOW PREVENTERS

- A. Reduced-Pressure-Principle Backflow Preventers (RPZ)
 - 1. Standard: ASSE 1013.
 - 2. Operation: Continuous-pressure applications.
 - 3. Pressure Loss: 12 psig maximum, through middle third of flow range.
 - 4. Size: See Plans.
 - 5. Design Flow Rate: See Plans.
 - 6. Selected Unit Flow Range Limits: See Plans.
 - 7. Pressure Loss at Design Flow rate: 12 psig.
 - 8. Body: Bronze for NPS 2 and smaller.
 - 9. End Connections: Threaded for NPS 2 and smaller.
 - 10. Configuration: Designed for horizontal, straight-through flow.
 - 11. Accessories:
 - a. Valves: Ball type with threaded ends on inlet and outlet of NPS 2 and smaller.
 - b. Air-Gap Fitting: ASME A112.1.2, matching backflow-preventer connection. Extend air gap drain full size to floor drain.
- B. Double-Check, Backflow-Prevention Assemblies (BFP):
 - 1. Standard: ASSE 1015.
 - 2. Operation: Continuous-pressure applications unless otherwise indicated.

3. Pressure Loss: 5 psig maximum, through middle third of flow range.
4. Size: See Plans.
5. Design Flow Rate: See Plans.
6. Selected Unit Flow Range Limits: See Plans.
7. Pressure Loss at Design Flow Rate: 4 psig.
8. Body: Bronze for NPS 2 and smaller.
9. End Connections: Threaded for NPS 2 and smaller.
10. Configuration: Designed for horizontal, straight-through flow.
11. Accessories:
 - a. Valves: Ball type with threaded ends on inlet and outlet of NPS 2 and smaller.
 - b. Air-Gap Fitting: ASME A112.1.2, matching backflow preventer connection. Extend air gap drain full size to floor drain.

C. Hose-Connection Backflow Preventers

1. Standard: ASSE 1052.
2. Operation: Up to 10-foot head of water back pressure.
3. Inlet Size: NPS 1/2 or NPS 3/4.
4. Outlet Size: Garden-hose thread complying with ASME B1.20.7.
5. Capacity: At least 3-gpm flow.

2.5. BALANCING VALVES

A. Copper-Alloy Calibrated Balancing Valves:

1. Type: Ball or Y-pattern globe valve with two readout ports and memory-setting indicator.
2. Body: bronze.
3. Size: Same as connected piping, but not larger than NPS 2.
4. Accessories: Meter hoses, fittings, valves, differential pressure meter, and carrying case.

2.6. TEMPERATURE-ACTUATED, WATER MIXING VALVES

A. Thermostatic, Water Mixing Valves (TMV):

1. Standard: ASSE 1017.
2. Pressure Rating: 125 psig minimum unless otherwise indicated.
3. Type: Exposed-mounted, thermostatically controlled, water mixing valve.
4. Material: Bronze body with corrosion-resistant interior components.
5. Connections: Threaded union inlets and outlet.
6. Accessories: Manual temperature control, check stops on hot- and cold-water supplies, and adjustable, temperature-control handle.
7. Tempered-Water Setting: See Plans.
8. Tempered-Water Design Flow Rate: See Plans.
9. Selected Valve Flow Rate at 45-psig Pressure Drop: See Plans.
10. Pressure Drop at Design Flow Rate: See Plans.
11. Valve Finish: Rough bronze.
12. Piping Finish: Polypropylene.

B. Individual-Fixture, Water Tempering Valves (TMV)

1. Standard: ASSE 1070, thermostatically controlled, water tempering valve.
2. Pressure Rating: 125 psig minimum unless otherwise indicated.

3. Body: Bronze body with corrosion-resistant interior components.
4. Temperature Control: Adjustable.
5. Inlets and Outlet: Threaded.
6. Finish: Rough or chrome-plated bronze.
7. Tempered-Water Setting: See Plans.
8. Tempered-Water Design Flow Rate: See Plans.

2.7. STRAINERS FOR DOMESTIC WATER PIPING

A. Y-Pattern Strainers:

1. Pressure Rating: 125 psig minimum unless otherwise indicated.
2. Body: Bronze for NPS 2 and smaller; cast iron with interior lining that complies with AWWA C550 or that is FDA approved, epoxy coated and for NPS 2-1/2 and larger.
3. End Connections: Threaded for NPS 2 and smaller; flanged for NPS 2-1/2 and larger.
4. Screen: Stainless steel with round perforations unless otherwise indicated.
5. Perforation Size:
 - a. Strainers NPS 2 and Smaller: 0.020 inch.
 - b. Strainers NPS 2-1/2 to NPS 4: 0.045 inch.
 - c. Strainers NPS 5 and Larger: 0.10 inch.
6. Drain: Factory-installed, hose-end drain valve.

2.8. WALL HYDRANTS

A. Nonfreeze Wall Hydrants (WH-1):

1. Manufacturers: Subject to compliance with requirements, provide products by one of the following.
 - a. Woodford Manufacturing Co. #B67
 - b. Smith, Jay R Mfg. Co.
 - c. Watts Drainage Products
2. Standard: ASME A112.21.3M for concealed-outlet, self-draining wall hydrants.
3. Pressure Rating: 125 psig.
4. Operation: Loose key.
5. Casing and Operating Rod: Of length required to match wall thickness. Include wall clamp.
6. Inlet: NPS 3/4.
7. Outlet: Concealed, with integral vacuum breaker and garden-hose thread complying with ASME B1.20.7.
8. Box: Deep, flush mounted with cover.
9. Box and Cover Finish: Chrome plated.
10. Nozzle and Wall-Plate Finish: Chrome.
11. Operating Keys(s): Two with each wall hydrant.

2.9. HOSE BIBBS

A. Hose bibbs (HB-1):

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

- a. Woodford Manufacturing Co. #24
 - b. Smith, Jay R. Mfg. Co.
 - c. Watts Drainage Products.
2. Standard: ASME A112.18.1 for sediment faucets.
 3. Pressure Rating: 125 psig.
 4. Operation: Wheel handle.
 5. Body material: Bronze.
 6. Seat: Bronze, replaceable.
 7. Outlet: Exposed, with integral vacuum breaker and garden-hose thread complying with ASME B1.20.7.
 8. Finish: Chrome.

2.10. ROOF HYDRANT

A. Non-Freeze, All-weather Yard Hydrant (YH-1):

1. Manufacturers:
 - a. Freeze Flow.
 - b. Woodford Manufacturing Co. #Y34
 - c. Smith, Jay R. Mfg. Co.
 - d. Watts Drainage Products.
2. Standard: ASME A112.21.3M.
3. Type: Non-freeze, exposed-outlet post hydrant.
4. Operation: Locking lever handle.
5. Casing and Operating Rod: Of at least length required for location of valve below roof deck line.
6. Casing: Bronze with casing guard.
7. Inlet: NPS 3/4.
8. Outlet: Garden-hose thread complying with ASME B1.20.7.
9. Drain: Designed with hole to drain into ground when shut off.
10. Vacuum Breaker: Non-removable, drainable, hose-connection vacuum breaker complying with ASSE 1011; and garden-hose thread complying with ASME B1.20.7 on outlet.
11. Roof Hydrant Made Easy
 - a. Installed per Manufacturers written instruction.

2.11. 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.

B. Stop-and-Waste Drain Valves:

1. Standard: MSS SP-110 for ball valves or MSS SP-80 for gate valves.
2. Pressure Rating: 200-psig minimum CWP or Class 125.
3. Size: NPS 3/4.
4. Body: Copper alloy or ASTM B 62 bronze.
5. Drain: NPS 1/8 side outlet with cap.

2.12. WATER-HAMMER ARRESTERS

A. Water-Hammer Arresters (WHA):

1. Standard: ASSE 1010 or PDI-WH 201.
2. Type: Copper tube with piston.
3. Size: ASSE 1010, Sizes AA and A through F, or PDI-WH 201, Sizes A through F.

2.13. AIR VENTS

A. Bolted-Construction Automatic Air Vents:

1. Body: Bronze.
2. Pressure Rating and Temperature: 125-psig minimum pressure rating at 140 deg F.
3. Float: Replaceable, corrosion-resistant metal.
4. Mechanism and Seat: Stainless steel.
5. Size: NPS 3/8 minimum inlet.
6. Inlet and Vent Outlet End Connections: Threaded.

B. Welded-Construction Automatic Air Vents:

1. Body: Stainless steel.
2. Pressure Rating: 150-psig minimum pressure rating.
3. Float: Replaceable, corrosion-resistant metal.
4. Mechanism and Seat: Stainless steel.
5. Size: NPS 3/8 minimum inlet.
6. Inlet and Vent Outlet End Connections: Threaded.

2.14. SPECIALTY VALVES

- A. Comply with requirements for general-duty metal valves in Section 220523 "General Duty Valves for Plumbing Piping,"

2.15. DOMESTIC HOT WATER CIRCULATING PUMP (DCP)

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

1. TACO Incorporated.
2. Grundfos Pumps Corp.
3. Bell & Gossett Domestic Pump; ITT Corporation.

- B. Description: Factory assembled and tested, in-line, close-coupled, stainless steel pump housing, canned rotor type, corrosion-resistant impeller.

- C. Electrical: 115V, single phase, 60 HZ.

3. EXECUTION

3.1. INSTALLATION

- A. Install backflow preventers in each water supply to mechanical equipment and systems and to other equipment and water systems that may be sources of contamination. Comply with authorities having jurisdiction.
 - 1. Locate backflow preventers in same room as connected equipment or system.
 - 2. Install drain for backflow preventers with atmospheric-vent drain connection with air-gap fitting, fixed air-gap fitting, or equivalent positive pipe separation of at least two pipe diameters in drain piping and pipe-to-floor drain. Locate air-gap device attached to or under backflow preventer. Simple air breaks are unacceptable for this application.
 - 3. Do not install bypass piping around backflow preventers.
- B. Install balancing valves in locations where they can easily be adjusted.
- C. Install temperature-actuated, water mixing valves with check stops or shutoff valves on inlets and with shutoff valve on outlet.
- D. Install Y-pattern strainers for water on supply side of each control valve water pressure-reducing valve and pump.
- E. Install outlet boxes recessed in wall. Install 2-by-4-inch fire-retardant-treated-wood blocking, wall reinforcement between studs. Comply with requirements for fire-retardant-treated-wood blocking in Section 061001 "Rough Carpentry."
- F. Install water-hammer arresters in water piping according to PDI-WH 201.
- G. Install air vents at high points of water piping. Install drain piping and discharge onto floor drain.

3.2. CONNECTIONS

- A. Comply with requirements for ground equipment in Section 260526 "Grounding and Bonding."

3.3. LABELING AND IDENTIFYING

- A. Equipment Nameplates and Signs: Install engraved plastic-laminate equipment nameplate or sign on or near each of the following:
 - 1. Pressure vacuum breakers.
 - 2. Intermediate atmospheric-vent backflow preventers.
 - 3. Double-check, backflow-prevention assemblies.
 - 4. Dual check valves.
 - 5. Calibrated balancing valves.
 - 6. Thermostatic, water mixing valves.
 - 7. Outlet boxes.
 - 8. Domestic Circulation Pumps.
- B. Distinguish among multiple units, inform operator of operational requirements, indicate safety and emergency precautions, and warn of hazards and improper operations, in

addition to identifying unit. Nameplates and signs are specified in Section 220553 "Identification for Plumbing Piping and Equipment."

3.4. FIELD QUALITY CONTROL

A. Perform the following tests and inspections:

1. Test each double-check, backflow-prevention assembly according to authorities having jurisdiction and the device's reference standard.

B. Domestic water piping specialties will be considered defective if they do not pass tests and inspections.

C. Prepare test and inspection reports.

3.5. ADJUSTING

A. Set field-adjustable flow set points of balancing valves.

B. Set field-adjustable temperature set points of temperature-actuated, water mixing valves.

END 22 1119

1. GENERAL

1.1. WORK INCLUDES

A. Base Bid

1. Contractor Provide:

- a. Pipe, tube, and fittings.
- b. Specialty pipe fittings.

1.2. 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.

1.3. ACTION SUBMITTALS

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

1.4. INFORMATIONAL SUBMITTALS

A. Field quality-control reports.

1.5. QUALITY ASSURANCE

- A. Piping materials shall bear label, stamp, or other markings of specified testing agency.
- B. All cast iron pipe and fittings shall be manufactured in the **U.S.A.** and marked with the collective trademark of the Cast Iron Soil Pipe Institute (CISPI) and listed by NSF International. All cast-iron pipe and fittings shall be by the same manufacturer.
- C. Comply with NSF/ANSI 14, "Plastics Piping Systems Components and Related Materials," for plastic piping components. Include marking with "NSF-dwv" for plastic drain, waste, and vent piping and "NSF-sewer" for plastic sewer piping.
- D. All PVC DWV pipe and fittings shall be solid-core and manufactured from virgin rigid (polyvinyl chloride) vinyl compounds with a cell class of 12454 as identified in ASTM D1784, ASTM D 2665 and shall be manufactured as a system and be the product of one manufacturer. All PVC-DWV pipe and fitting shall be manufactured in the **U.S.A** conforming to NSF standard 14. All PVC-DWV pipe and fittings shall be by the same manufacturer.
- E. Foreign manufactured or imported pipe or fittings will **not** be allowed.

PVC DWV pipe and fittings **shall not** be installed in return air plenum space with out 1.5" fiberglass insulation applied. Refer to HVAC plans for return air plenum space. Contact engineer, in writing, if unclear where return air plenums are located.

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. HUBLESS CAST-IRON SOIL PIPE AND FITTINGS (Interior above slab and only in return air plenums)

- A. Pipe and Fittings: ASTM A 888 or CISPI 301.
- B. Shielded Couplings: ASTM C 1277 and ASTM C 1540 assembly of metal shield or housing, corrosion-resistant fasteners, and rubber sleeve with integral, center pipe stop, UPC emblem.
 - 1. Heavy-Duty, Shielded, 304 Stainless Steel Couplings: With 304 corrugated stainless-steel shield, stainless-steel bands and slotted tightening devices, and ASTM C 564, rubber sleeve.
 - a. Manufacturers:
 - 1) ANACO.
 - 2) Ideal Div.; Stant Corp.
 - 3) Mission Rubber Co.
 - 4) Tyler Pipe; Soil Pipe Div.
 - 2. Standard, Shielded, Stainless-Steel Couplings: CISPI 310, with 304 stainless-steel corrugated shield; 304 stainless-steel bands and slotted tightening devices; and ASTM C 564, rubber sleeve & bear the NSF Trademark.
 - a. Manufacturers:
 - 1) ANACO
 - 2) Mission Rubber Co.
 - 3) Tyler Pipe: Soil Pipe Div.

2.3. COPPER TUBE AND FITTINGS (Indirect Waste Only)

- A. Copper DWV Tube: ASTM B 306, drainage tube, drawn temper.
- B. Copper Drainage Fittings: ASME B16.23, cast copper or ASME B16.29, wrought copper, solder-joint fittings.
- C. Hard Copper Tube: ASTM B 88, Type L and Type M, water tube, drawn temper.
- D. Soft Copper Tube: ASTM B 88, Type L, water tube, annealed temper.
- E. Copper Pressure Fittings:
 - 1. Copper Fittings: ASME B16.18, cast-copper-alloy or ASME B16.22, wrought-copper, solder-joint fittings. Furnish wrought-copper fittings if indicated.

2. 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.
- F. Copper Flanges: ASME B16.24, Class 150, cast copper with solder-joint end.
1. Flange Gasket Materials: ASME B16.21, full-face, flat, nonmetallic, asbestos-free, 1/8-inch maximum thickness unless thickness or specific material is indicated.
 2. Flange Bolts and Nuts: ASME B18.2.1, carbon steel unless otherwise indicated.
- G. Solder: ASTM B 32, lead free with ASTM B 813, water-flushable flux.
- 2.4. PVC PIPE AND FITTINGS
- A. Solid-Wall PVC Pipe: ASTM D 2665, drain, waste, and vent.
- B. PVC Socket Fittings: ASTM D 2665, made to ASTM D 3311, drain, waste, and vent patterns and to fit Schedule 40 pipe.
- C. Adhesive Primer: ASTM F 656.
1. Adhesive primer shall have a VOC content of 550 g/L or less when calculated according to 40 CFR 59, Subpart D (EPA Method 24, color purple).
 2. Adhesive primer shall comply with the testing and product requirements of the California Department of Health Services' "Standard Practice for the Testing of Volatile Organic Emissions from Various Sources Using Small-Scale Environmental Chambers."
- D. Solvent Cement: ASTM D 2564.
1. PVC solvent cement shall have a VOC content of 510 g/L or less when calculated according to 40 CFR 59, Subpart D (EPA Method 24).
 2. Solvent cement shall comply with the testing and product requirements of the California Department of Health Services' "Standard Practice for the Testing of Volatile Organic Emissions from Various Sources Using Small-Scale Environmental Chambers."
- 2.5. SPECIALTY PIPE FITTINGS
- A. Transition Couplings:
1. General Requirements: Fitting or device for joining piping with small differences in OD's or of different materials. Include end connections same size as and compatible with pipes to be joined.
 2. Fitting-Type Transition Couplings: Manufactured piping coupling or specified piping system fitting.
 3. Unshielded, Nonpressure Transition Couplings:
 - a. Standard: ASTM C 1173.
 - b. Description: Elastomeric, sleeve-type, reducing or transition pattern. Include shear ring and corrosion-resistant-metal tension band and tightening mechanism on each end.
 - c. Sleeve Materials:
 - 1) For Cast-Iron Soil Pipes: ASTM C 564, rubber.
 - 2) For Plastic Pipes: ASTM F 477, elastomeric seal or ASTM D 5926, PVC.

- 3) For Dissimilar Pipes: ASTM D 5926, PVC or other material compatible with pipe materials being joined.
4. Shielded, Nonpressure Transition Couplings:
 - a. Standard: ASTM C 1460.
 - b. Description: Elastomeric or rubber sleeve with full-length, corrosion-resistant outer shield and corrosion-resistant-metal tension band and tightening mechanism on each end.

3. EXECUTION

3.1. EARTH MOVING

- A. Comply with requirements for excavating, trenching, and backfilling specified in Section 312318 "Excavation, Backfilling and Compacting for Structures."

3.2. PIPING INSTALLATION

- A. 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.
- B. Install piping in concealed locations unless otherwise indicated and except in equipment rooms and service areas.
- C. 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.
- D. Install piping above accessible ceilings to allow sufficient space for ceiling panel removal.
- E. Install piping at indicated slopes.
- F. Install piping free of sags and bends.
- G. Install fittings for changes in direction and branch connections.
- H. Install piping to allow application of insulation.
- I. 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 two 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.
- J. 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.

- K. Install soil and waste drainage and vent piping at the following minimum slopes unless otherwise indicated:
 - 1. Building Sanitary Drain/ Horizontal Sanitary Piping: ¼-inch per foot downward in direction of flow for piping NPS 3 and smaller; 1/8-inch per foot downward in direction of flow for piping NPS 4 and larger.
 - 2. Vent Piping: 1/8-inch per foot down toward vertical fixture vent or toward vent stack.
- L. Install aboveground copper tubing according to CDA's "Copper Tube Handbook."
- M. Install aboveground PVC piping according to ASTM D 2665.
- N. Install underground PVC piping according to ASTM D 2321.
- O. Install cast-iron 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 A674 or AWWA C105.
- P. Plumbing Specialties:
 - 1. Install cleanouts at grade and extend to where building sanitary drains connect to building sanitary sewers in sanitary drainage gravity-flow piping. Comply with requirements for cleanouts specified in Section 221319 "Sanitary Waste Piping Specialties."
 - 2. Install drains in sanitary drainage gravity-flow piping. Comply with requirements for drains specified in Section 221319 "Sanitary Waste Piping Specialties."
- Q. Do not enclose, cover, or put piping into operation until it is inspected and approved by authorities having jurisdiction.
- R. Install sleeves for piping penetrations of walls, ceilings, and floors. Comply with requirements for sleeves specified in Section 220500 "Common Work Results for Plumbing."
- S. Install sleeve seals for piping penetrations of concrete walls below grade and slabs. Comply with requirements for sleeve seals specified in Section 220500 "Common Work Results for Plumbing."
- T. Install escutcheons for piping penetrations of walls, ceilings, and floors. Comply with requirements for escutcheons specified in Section 220500 "Common Work Results for Plumbing."

3.3. JOINT CONSTRUCTION

- A. Join copper tube and fittings with soldered joints according to ASTM B 828. Use ASTM B 813, water-flushable, lead-free flux and ASTM B 32, lead-free-alloy solder.
- B. Plastic, Nonpressure-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. PVC Piping: Join according to ASTM D 2855 and ASTM D 2665 Appendixes.

- C. Join hubless cast-iron soil piping according to CISPI 310 and CISPE's "Cast Iron Soil Pipe and Fittings Handbook" for hubless-coupling joint.

3.4. SPECIALTY PIPE FITTING INSTALLATION

A. Transition Couplings:

1. Install transition couplings at joints of piping with small differences in OD's.
2. In Drainage Piping: Shielded, nonpressure transition couplings.

B. Dielectric Fittings:

1. Install dielectric fittings in piping at connections of dissimilar metal piping and tubing.
2. Dielectric Fittings for NPS 2 and Smaller: Use dielectric unions.
3. Dielectric Fittings for NPS 2-1/2 to NPS 4: Use dielectric flanges.
4. Dielectric Fittings for NPS 5 and Larger: Use dielectric flange kits.

3.5. HANGER AND SUPPORT INSTALLATION

A. Comply with requirements for pipe hanger and support devices and installation specified in Section 220529 "Hangers and Supports for Plumbing Piping and Equipment."

1. Install carbon-steel pipe hangers for horizontal piping in noncorrosive environments.
2. Install stainless-steel pipe hangers for horizontal piping in corrosive environments.
3. Install carbon-steel pipe support clamps for vertical piping in noncorrosive environments.
4. Install stainless-steel pipe support clamps for vertical piping in corrosive environments.
5. Vertical Piping: MSS Type 8 or Type 42, clamps.
6. Install 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.
7. Multiple, Straight, Horizontal Piping Runs 100 Feet or Longer: MSS Type 44, pipe rolls. Support pipe rolls on trapeze.
8. Base of Vertical Piping: MSS Type 52, spring hangers.

B. Support horizontal piping and tubing within 12 inches of each fitting and coupling.

C. Support vertical piping and tubing at base and at each floor.

D. Rod diameter may be reduced one size for double-rod hangers, with 3/8-inch minimum rods.

E. 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 and 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.

- F. Install supports for vertical copper tubing every 10 feet.
- G. 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 NPS 5: 48 inches with 5/8-inch rod.
 - 4. NPS 6 and NPS 8: 48 inches with 3/4-inch rod.
 - 5. NPS 10 and NPS 12: 48 inches with 7/8-inch rod.
- H. Install supports for vertical PVC piping every 48 inches.
- I. 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 and NPS 12: 60 inches with 7/8-inch rod.
- J. Install supports for vertical cast-iron soil piping every 15 feet.
- 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. Install test tees (wall cleanouts) in conductors near floor and floor cleanouts with cover flush with floor.
 - 5. 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.
- D. Where installing piping adjacent to equipment, allow space for service and maintenance of equipment.

3.7. IDENTIFICATION

- A. Identify exposed sanitary waste and vent piping. Comply with requirements for identification specified in Section 220553 "Identification for Plumbing Piping and Equipment."

3.8. 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 10-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.
- E. Inspections and tests shall be completed at the end of each phase of work.

3.9. CLEANING AND PROTECTION

- 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.
- D. Exposed PVC Piping: Protect plumbing vents exposed to sunlight with two coats of water-based latex paint.
- E. Cleaning shall be completed at the end of each phase of work.

3.10. PIPING SCHEDULE

- A. Aboveground, vent, soil and waste piping NPS 2 and smaller shall be one of the following:
 - 1. Copper DWV tube, copper drainage fittings, and soldered joints. (Indirect waste only)
 - 2. Solid-wall PVC pipe, PVC socket fittings, and solvent-cemented joints.
 - 3. Hubless cast-iron soil pipe and fittings; standard shielded, stainless-steel couplings; and hubless-coupling joints.
- B. Aboveground, vent, soil and waste piping NPS 3 and larger shall be the following:
 - 1. Solid-wall PVC pipe, PVC socket fittings, and solvent-cemented joints.
 - 2. Hubless cast-iron soil pipe and fittings; heavy-duty shielded, stainless-steel couplings; and hubless-coupling joints.
- C. Underground, soil, waste, and vent piping NPS 4 and smaller shall be the following:
 - 1. Solid wall PVC pipe, PVC socket fittings, and solvent-cemented joints.
- D. Underground, soil and waste piping NPS 5 and larger shall be the following:
 - 1. Solid-wall PVC pipe; PVC socket fittings; and solvent-cemented joints.

END 22 1316

DIVISION 22 – PLUMBING
SECTION 22 1319 - SANITARY WASTE PIPING SPECIALTIES

1. GENERAL

1.1. WORK INCLUDES

A. Base Bid

1. Contractor Provide:

- a. Cleanouts.
- b. Floor drains.
- c. Roof flashing assemblies.
- d. Through-penetration firestop assemblies.
- e. Miscellaneous sanitary drainage piping specialties.
- f. Flashing materials.
- g. Garbage disposal.
- h. Grease Interceptor.

B. Related Requirements:

1. Section 221423 "Storm Drainage Piping Specialties" for storm drainage piping inside the building, drainage piping specialties, and drains.

1.2. DEFINITIONS

- A. ABS: Acrylonitrile-butadiene-styrene plastic.
- B. FOG: Fats, oils, and greases.
- C. FRP: Fiberglass-reinforced plastic.
- D. HDPE: High-density polyethylene plastic.
- E. PE: Polyethylene plastic.
- F. PP: Polypropylene plastic.
- G. PVC: Polyvinyl chloride plastic.

1.3. ACTION SUBMITTALS

- A. Product Data: For each type of product indicated. Include rated capacities, operating characteristics, and accessories for the following:
 1. Cleanouts.
 2. Floor Drains.
 3. Trench Drains.
 4. Garbage Disposal.
 5. Grease Interceptor.

1.4. CLOSEOUT SUBMITTALS

- A. 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 Section 033000 "Cast-in-Place Concrete."
- B. Coordinate size and location of roof penetrations.

2. PRODUCTS

2.1. CLEANOUTS

A. Exposed Metal Cleanouts (CO):

1. ASME A112.36.2M, Cast-Iron Cleanouts:
2. Standard: ASME A112.36.2M for cast iron test tee.
3. Size: Same as connected drainage piping
4. Body Material: 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.

B. Metal Floor Cleanouts (FCO):

1. ASME A112.36.2M, Cast-Iron Cleanouts:
2. Standard: ASME A112.36.2M for cast-iron soil pipe with cast-iron ferrule threaded, adjustable housing cleanout.
3. Size: Same as connected branch.
4. Type: Threaded, adjustable housing.
5. Body or Ferrule: Cast iron.
6. Clamping Device: Required.
7. Outlet Connection: Inside calk.
8. Closure: Brass plug with straight threads and gasket.
9. Adjustable Housing Material: Cast iron with threads set-screws or other device.
10. Frame and Cover Material and Finish: Nickel-bronze, copper alloy.
11. Frame and Cover Shape: Round.
12. Top Loading Classification: Medium Duty.
13. Riser: ASTM A 74, Service class, cast-iron drainage pipe fitting and riser to cleanout.

C. Wall Cleanouts (WCO):

1. Standard: ASME A112.36.2M. Include wall access.
2. Size: Same as connected drainage piping.
3. Body: Pipe test tee as required to match connected piping.
4. Closure: Countersunk or raised-head, plug.
5. Closure Plug Size: Same as or not more than one size smaller than cleanout size.
6. Wall Access: Round, flat, chrome-plated brass or stainless-steel cover plate with screw.

2.2. FLOOR DRAINS

A. Cast-Iron Floor Drains (FD):

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

- a. Jay R. Smith Mfg.Co.
- b. Josam Company
- c. Watts
- d. Zurn.
- e. Sioux Chief.

1. Standard: ASME A112.6.3.
2. Pattern: Floor drain.
3. Body Material: Gray iron.
4. Seepage Flange: Required.
5. Anchor Flange: Not required.
6. Clamping Device: Not required.
7. Outlet: Bottom.
8. Coating on Interior and Exposed Exterior Surfaces: Not required.
9. Sediment Bucket: See Plans.
10. Top or Strainer Material: Nickel bronze.
11. Top Shape: Round.
12. Dimensions of Top or Strainer: 6"
13. Top Loading Classification: See Plans.
14. Funnel: See Plans.
15. Trap Material: PVC.
16. Trap Pattern: Deep-seal P-trap.

2.3. ROOF FLASHING ASSEMBLIES

A. Roof Flashing Assemblies:

1. Description: Manufactured assembly made of 4.0-lb/sq. ft., 0.0625-inch- thick, lead flashing collar and skirt extending at least 6 inches from pipe, with galvanized-steel boot reinforcement and counterflashing fitting.
 - a. Open-Top Vent Cap: Without cap.

2.4. THROUGH-PENETRATION FIRESTOP ASSEMBLIES

A. Through-Penetration Firestop Assemblies:

1. Standard: UL 1479 assembly of sleeve and stack fitting with firestopping plug.

2. Size: Same as connected soil, waste, or vent stack.
3. 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.
4. 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.
5. Special Coating: Corrosion resistant on interior of fittings.

2.5. MISCELLANEOUS SANITARY DRAINAGE PIPING SPECIALTIES

A. Open Drains – (hub 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 or bronze 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.

D. Sleeve Flashing Device:

1. Description: Manufactured, cast-iron fitting, with clamping device that forms sleeve for pipe floor penetrations of floor membrane. Include galvanized-steel pipe extension in top of fitting that will extend 2 inches above finished floor and galvanized-steel pipe extension in bottom of fitting that will extend through floor slab.
2. Size: As required for close fit to riser or stack piping.

E. Stack Flashing Fittings:

1. Description: Counterflashing-type, cast-iron fitting, with bottom recess for terminating roof membrane, and with threaded or hub top for extending vent pipe.
2. Size: Same as connected stack vent or vent stack.

F. Expansion Joints:

1. Standard: ASME A112.21.2M.
2. Body: Cast iron with bronze sleeve, packing, and gland.
3. End Connections: Matching connected piping.
4. Size: Same as connected soil, waste, or vent piping.

2.6. 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.

2.7. Grease Interceptor

- A. Grease Interceptor (GT):
 - 1. Basis-of-design product: Subject to compliance with requirements indicated on plans, provide a comparable product by one of the following:
 - a. See schedule on drawings.
 - 2. Fiberglass-reinforced poly tank system with built-in inlet piping and flow control valve.
 - 3. Single compartment, 50 gallon capacity with 4" inlet, cleanouts and (1) 3" vent connections.

2.8. GARBAGE DISPOSAL (GD)

- 1. Basis-of-design product: Subject to compliance with requirements, provide a comparable product by one of the following:
 - a. Supplied by General Contractor.

2. Feed: Continuous with auto reverse grind system.
3. Switch: Control panel mounted.
4. Electric: Single Phase, 1 HP, 120 volts, 60 Hz, 10.2 amps.
5. RPM: 1725
6. Lubrication: Permanently lubricated upper and lower bearings.

3. EXECUTION

3.1. INSTALLATION

A. Equipment Mounting:

1. Install oil holding tank on cast-in-place concrete equipment base(s). Comply with requirements for equipment bases and foundations specified in Section 033000 "Cast-in-Place Concrete."

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.
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 frame and 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 roof flashing assemblies on sanitary stack vents and vent stacks that extend through roof.

G. Install through-penetration firestop assemblies in plastic conductors and stacks at floor penetrations.

- H. Assemble open drain fittings and install with top of hub 2 inches above floor.
- I. Install deep-seal traps on floor drains and other waste outlets, if indicated.
- J. Install air-gap fittings on draining-type backflow preventers and on indirect-waste piping discharge into sanitary drainage system.
- K. Install sleeve flashing device with each riser and stack passing through floors with waterproof membrane.
- L. Install expansion joints on vertical stacks and conductors. Position expansion joints for easy access and maintenance.
- M. Install grease interceptor tank according to authorities having jurisdiction and with clear space for servicing.
- 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.

3.2. CONNECTIONS

- A. Comply with requirements in Section 221316 "Sanitary Waste and Vent Piping" for piping installation requirements. 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 Section 260526 "Grounding and Bonding."
- D. Connect wiring according to Section 260523 "Building Wire and Cable."

3.3. 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 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 Section 076200 "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.

3.4. LABELING AND IDENTIFYING

- A. Equipment Nameplates and Signs: Install engraved plastic-laminate equipment nameplate or sign on or near each of the following:
 - 1. Oil Holding Tank.
- B. Distinguish among multiple units, inform operator of operational requirements, indicate safety and emergency precautions, and warn of hazards and improper operations, in addition to identifying unit. Nameplates and signs are specified in Section 220553 "Identification for Plumbing Piping and Equipment."

3.5. 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 22 1319

1. GENERAL

1.1. WORK INCLUDES

A. Base Bid

1. Contractor Provide:

- a. Pipe, tube, and fittings.
- b. Specialty pipe fittings.

1.2. PERFORMANCE REQUIREMENTS

A. Components and installation shall be capable of withstanding the following minimum working pressure unless otherwise indicated:

- 1. Storm Drainage Piping: 10-foot head of water.

1.3. ACTION SUBMITTALS

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

1.4. QUALITY ASSURANCE

A. Piping materials shall bear label, stamp, or other markings of specified testing agency.

B. Comply with NSF/ANSI 14, "Plastics Piping System Components and Related Materials," for plastic piping components. Include marking with "NSF-drain" for plastic drain piping and "NSF-sewer" for plastic sewer piping.

C. All PVC DWV pipe and fittings shall be solid-core and manufactured from virgin rigid (polyvinyl chloride) vinyl compounds with a cell class of 12454 as identified in ASTM D1784, ASTM D 2665 and shall be manufactured as a system and be the product of one manufacturer. All PVC-DWV pipe and fitting shall be manufactured in the **U.S.A** conforming to NSF standard 14. All PVC-DWV pipe and fittings shall be by the same manufacturer.

D. Foreign manufactured or imported pipe or fittings will **not** be allowed.

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. PVC PIPE AND FITTINGS

A. Solid-Wall PVC Pipe: ASTM D 2665, drain, waste, and vent.

B. PVC Socket Fittings: ASTM D 2665, made to ASTM D 3311, drain, waste, and vent patterns and to fit Schedule 40 pipe.

C. Adhesive Primer: ASTM F 656.

1. Adhesive primer shall have a VOC content of 550 g/L or less when calculated according to 40 CFR 59, Subpart D (EPA Method 24, color purple).
2. Adhesive primer shall comply with the testing and product requirements of the California Department of Health Services' "Standard Practice for the Testing of Volatile Organic Emissions from Various Sources Using Small-Scale Environmental Chambers."

D. Solvent Cement: ASTM D 2564.

1. PVC solvent cement shall have a VOC content of 510 g/L or less when calculated according to 40 CFR 59, Subpart D (EPA Method 24).
2. Solvent cement shall comply with the testing and product requirements of the California Department of Health Services' "Standard Practice for the Testing of Volatile Organic Emissions from Various Sources Using Small-Scale Environmental Chambers."

2.3. SPECIALTY PIPE FITTINGS

A. Transition Couplings:

1. General Requirements: Fitting or device for joining piping with small differences in OD's or of different materials. Include end connections same size as and compatible with pipes to be joined.
2. Fitting-Type Transition Couplings: Manufactured piping coupling or specified piping system fitting.
3. Unshielded, Nonpressure Transition Couplings:
 - a. Standard: ASTM C 1173.
 - b. Description: Elastomeric, sleeve-type, reducing or transition pattern. Include shear ring and corrosion-resistant-metal tension band and tightening mechanism on each end.
 - c. Sleeve Materials:
 - 1) For Cast-Iron Soil Pipes: ASTM C 564, rubber.
 - 2) For Plastic Pipes: ASTM F 477, elastomeric seal or ASTM D 5926, PVC.
 - 3) For Dissimilar Pipes: ASTM D 5926, PVC or other material compatible with pipe materials being joined.
1. Shielded, Nonpressure Transition Couplings:
 - a. Standard: ASTM C 1460.
 - b. Description: Elastomeric or rubber sleeve with full-length, corrosion-resistant outer shield and corrosion-resistant-metal tension band and tightening mechanism on each end.

B. Dielectric Fittings:

1. General Requirements: Assembly of copper alloy and ferrous materials with separating nonconductive insulating material. Include end connections compatible with pipes to be joined.
2. Dielectric Unions:
 - a. Description:

- 1) Standard: ASSE 1079.
 - 2) Pressure Rating: 125 psig minimum at 180 deg F.
 - 3) End Connections: Solder-joint copper alloy and threaded ferrous.
3. Dielectric Flanges:
- a. Description:
 - 1) Standard: ASSE 1079.
 - 2) Factory-fabricated, bolted, companion-flange assembly.
 - 3) Pressure Rating: 125 psig minimum at 180 deg F.
 - 4) End Connections: Solder-joint copper alloy and threaded ferrous; threaded solder-joint copper alloy and threaded ferrous.
4. Dielectric-Flange Insulating Kits:
- a. Description:
 - 1) Nonconducting materials for field assembly of companion flanges.
 - 2) Pressure Rating: 150 psig.
 - 3) Gasket: Neoprene or phenolic.
 - 4) Bolt Sleeves: Phenolic or polyethylene.
 - 5) Washers: Phenolic with steel backing washers.
5. Dielectric Nipples:
- a. Description:
 - 1) Standard: IAPMO PS 66
 - 2) Electroplated steel nipple.
 - 3) Pressure Rating: 300 psig at 225 deg F.
 - 4) End Connections: Male threaded or grooved.
 - 5) Lining: Inert and noncorrosive, propylene.

3. EXECUTION

3.1. EARTH MOVING

- A. Comply with requirements for excavating, trenching, and backfilling specified in Section 312318 "Excavation, Backfilling and Compacting for Structures."

3.2. PIPING INSTALLATION

- A. 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 from layout are approved on coordination drawings.
- B. Install piping in concealed locations unless otherwise indicated and except in equipment rooms and service areas.
- C. 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.

- D. Install piping above accessible ceilings to allow sufficient space for ceiling panel removal.
- E. Install piping at indicated slopes.
- F. Install piping free of sags and bends.
- G. Install fittings for changes in direction and branch connections.
- H. Install piping to allow application of insulation.
- I. Make changes in direction for storm drainage piping using appropriate branches, bends, and long-sweep bends. 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.
- J. Lay buried building storm 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.
- K. Install storm drainage piping at the following minimum slopes unless otherwise indicated:
 - 1. Building Storm Drain: ¼-inch per foot downward in direction of flow for piping NPS 3 and smaller; 1/8-inch per foot downward in direction of flow for piping NPS 4 and larger.
- L. Install aboveground PVC piping according to ASTM D 2665.
- M. Install underground PVC piping according to ASTM D 2321.
- N. Plumbing Specialties:
 - 1. Install cleanouts at grade and extend to where building storm drains connect to building storm sewers in storm drainage gravity-flow piping. Install cleanout fitting with closure plug inside the building in storm drainage force-main piping. Comply with requirements for cleanouts specified in Section 221423 "Storm Drainage Piping Specialties."
 - 2. Install drains in storm drainage gravity-flow piping. Comply with requirements for drains specified in Section 221423 "Storm Drainage Piping Specialties."
- O. Do not enclose, cover, or put piping into operation until it is inspected and approved by authorities having jurisdiction.
- P. Install sleeves for piping penetrations of walls, ceilings, and floors. Comply with requirements for sleeves specified in Section 220500 "Common Work Results for Plumbing."
- Q. Install sleeve seals for piping penetrations of concrete walls below grade and slabs. Comply with requirements for sleeve seals specified in Section 220500 "Common Work Results for Plumbing."
- R. Install escutcheons for piping penetrations of walls, ceilings, and floors. Comply with requirements for escutcheons specified in Section 220500 "Common Work Results for Plumbing."

- S. PVC piping installed in return air plenums shall be insulated with 1.5" fiberglass insulation with all-purpose jacket and labeled.

3.3. JOINT CONSTRUCTION

- A. Plastic, Nonpressure-Piping, Solvent-Cemented 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. ABS Piping: Join according to ASTM D 2235 and ASTM D 2661 Appendixes.
 - 3. PVC Piping: Join according to ASTM D 2855 and ASTM D 2665 Appendixes.

3.4. SPECIALTY PIPE FITTING INSTALLATION

- A. Transition Couplings:
 - 1. Install transition couplings at joints of piping with small differences in OD's.
 - 2. In Drainage Piping: Shielded, nonpressure transition couplings.
- B. Dielectric Fittings:
 - 1. Install dielectric fittings in piping at connections of dissimilar metal piping and tubing.
 - 2. Dielectric Fittings for NPS 2 and Smaller: Use dielectric unions.
 - 3. Dielectric Fittings for NPS 2-1/2 to NPS 4: Use dielectric flanges.
 - 4. Dielectric Fittings for NPS 5 and Larger: Use dielectric flange kits.

3.5. HANGER AND SUPPORT INSTALLATION

- A. Comply with requirements for pipe hanger and support devices and installation specified in Section 220529 "Hangers and Supports for Plumbing Piping and Equipment."
 - 1. Install carbon-steel pipe hangers for horizontal piping in noncorrosive environments.
 - 2. Install stainless-steel pipe hangers for horizontal piping in corrosive environments.
 - 3. Install carbon-steel pipe support clamps for vertical piping in noncorrosive environments.
 - 4. Install stainless-steel pipe support clamps for vertical piping in corrosive environments.
 - 5. Vertical Piping: MSS Type 8 or Type 42, clamps.
 - 6. 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.
 - 7. Multiple, Straight, Horizontal Piping Runs 100 Feet or Longer: MSS Type 44, pipe rolls. Support pipe rolls on trapeze.
 - 8. Base of Vertical Piping: MSS Type 52, spring hangers.
- B. Support horizontal piping and tubing within 12 inches of each fitting and coupling.
- C. Support vertical piping and tubing at base and at each floor.
- D. Rod diameter may be reduced one size for double-rod hangers, with 3/8-inch minimum rods.

- E. 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 NPS 5: 48 inches with 5/8-inch rod.
 - 4. NPS 6 and NPS 8: 48 inches with 3/4-inch rod.
 - 5. NPS 10 and NPS 12: 48 inches with 7/8-inch rod.
- F. Install supports for vertical PVC piping every 48 inches.
- G. 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 interior storm drainage piping to exterior storm drainage piping. Use transition fitting to join dissimilar piping materials.
- C. Connect storm drainage piping to roof drains and storm drainage specialties.
 - 1. Install test tees (wall cleanouts) in conductors near floor.

3.7. IDENTIFICATION

- A. Identify exposed storm drainage piping. Comply with requirements for identification specified in Section 220553 "Identification for Plumbing Piping and Equipment."

3.8. 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.
 - 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 storm drainage 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 storm drainage piping until it has been tested and approved. Expose work that was covered or concealed before it was tested.

3. Test Procedure: Test storm drainage 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 10-foot head of water. From 15 minutes before inspection starts until completion of inspection, water level must not drop. Inspect joints for leaks.
4. Repair leaks and defects with new materials and retest piping, or portion thereof, until satisfactory results are obtained.
5. Prepare reports for tests and required corrective action.

E. Inspection and testing shall be completed at the end of each phase of work.

3.9. 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.
- D. Cleaning shall be completed at the end of each phase of work.

3.10. PIPING SCHEDULE

- A. Aboveground storm drainage piping NPS 6 and smaller shall be the following:
 1. Solid-wall PVC pipe, PVC socket fittings, and solvent-cemented joints.
- B. Aboveground, storm drainage piping NPS 8 and larger shall be the following:
 1. Solid-wall PVC pipe, PVC socket fittings, and solvent-cemented joints.
- C. Underground storm drainage piping NPS 6 and smaller shall be the following:
 1. Solid-wall PVC pipe, PVC socket fittings, and solvent-cemented joints.
- D. Underground, storm drainage piping NPS 8 and larger shall be the following:
 1. Solid-wall PVC pipe, PVC socket fittings, and solvent-cemented joints.

END 22 1413

1. GENERAL

1.1. WORK INCLUDES

A. Base Bid

1. Contractor Provide:

- a. Roof drains.
- b. Miscellaneous storm drainage piping specialties.
- c. Cleanouts.
- d. Through-penetration firestop assemblies.
- e. Flashing materials.

1.2. ACTION SUBMITTALS

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

1.3. QUALITY ASSURANCE

- A. Drainage piping specialties shall bear label, stamp, or other markings of specified testing agency.

2. PRODUCTS

2.1. METAL ROOF DRAINS

A. Cast-Iron, Roof Drains (RD-1):

1. Manufacturer: Subject to compliance with requirements, provide product by one of the following or approved equal:
 - a. Smith, Jay R. Mfg. co.; Division of Smith Industries, Inc.
 - b. Watts Drainage Products Inc.
 - c. Zurn Plumbing Products Group.
2. Standard: ASME A112.6.4, for general-purpose roof drains.
3. Body Material: Cast iron.
4. Combination Flashing Ring and Gravel Stop: As required.
5. Flow-Control Weirs: Not required.
6. Outlet: Bottom.
7. Extension Collars: Required.
8. Underdeck Clamp: Required.
9. Sump Receiver Plate: Required.
10. Dome Material: Cast iron.
11. Perforated Gravel Guard: Not required.
12. Vandal-Proof Dome: Not required.
13. Water Dam: Not Required.

2.2. CLEANOUTS

A. Exposed Metal Cleanouts (CO):

1. ASME A112.36.2M, Cast-Iron Cleanouts:
2. Standard: ASME A112.36.2M for cast iron test tee.
3. Size: Same as connected drainage piping
4. Body Material: 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.

B. Wall Cleanouts (WCO):

1. Standard: ASME A112.36.2M. Include wall access.
2. Size: Same as connected drainage piping.
3. Body: Pipe test tee as required to match connected piping.
4. Closure: Countersunk or raised-head plug.
5. Closure Plug Size: Same as or not more than one size smaller than cleanout size.
6. Wall Access: Round, flat, chrome-plated brass or stainless-steel cover plate with screw.

2.3. THROUGH-PENETRATION FIRESTOP ASSEMBLIES

A. Through-Penetration Firestop Assemblies:

1. Standard: UL 1479 assembly of sleeve and stack fitting with firestopping plug.
2. Size: Same as connected soil, waste, or vent stack.
3. 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.
4. 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.
5. Special Coating: Corrosion resistant on interior of fittings.

2.4. FLASHING MATERIALS

- A. Copper Sheet: ASTM B 152/B 152M, 12 oz. /sq. ft.
- B. 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.
- C. Elastic Membrane Sheet: ASTM D 4068, flexible, chlorinated polyethylene, 40-mil minimum thickness.
- D. Fasteners: Metal compatible with material and substrate being fastened.
- E. Metal Accessories: Sheet metal strips, clamps, anchoring devices, and similar accessory units required for installation; matching or compatible with material being installed.
- F. Solder: ASTM B 32, lead-free alloy.

3. EXECUTION

3.1. INSTALLATION

- A. Install roof drains at low points of roof areas according to roof membrane manufacturer's written installation instructions.

1. Install flashing collar or flange of roof drain to prevent leakage between drain and adjoining roofing. Maintain integrity of waterproof membranes where penetrated.
 2. Install expansion joints, if indicated, in roof drain outlets.
 3. Position roof drains for easy access and maintenance.
- B. Install cleanouts in aboveground piping and building drain piping according to the following instructions unless otherwise indicated:
1. Use cleanouts the same size as drainage piping up to NPS 4. Use NPS 4 for larger drainage piping unless larger cleanout is indicated.
 2. Locate cleanouts at each change in direction of piping greater than 45 degrees.
 3. Locate cleanouts at minimum intervals of 50 feet Insert dimension for piping NPS 4 and smaller and 100 feet for larger piping.
 4. Locate cleanouts at base of each vertical storm stack.
- C. For cleanouts located in concealed piping, install cleanout wall access covers, of types indicated, with frame and cover flush with finished wall.
- D. Install wall cleanouts in vertical conductors.
- E. Install through-penetration firestop assemblies in plastic conductors at concrete floor penetrations.
- F. Install sleeve flashing device with each conductor passing through floors with waterproof membrane.

3.2. CONNECTIONS

- A. Comply with requirements for piping specified in Section 221413 "Storm Drainage Piping." Drawings indicate general arrangement of piping, fittings, and specialties.

3.3. FLASHING INSTALLATION

- A. Fabricate flashing from single piece of metal unless large pans, sumps, or other drainage shapes are required. Join flashing according to the following if required:
1. Lead Sheets: Burn joints of 6.0-lb/sq. ft. lead sheets, 0.0938-inch thickness or thicker. Solder joints of 4.0-lb/sq. ft. lead sheets, 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 the pipe size, with a minimum length of 10 inches and with 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 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. Fabricate and install flashing and pans, sumps, and other drainage shapes.

3.4. 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 22 1423

1. GENERAL

1.1. WORK INCLUDES

A. Base Bid

1. Contractor Provide:

- a. Commercial, electric, storage, domestic-water heaters.
- b. Domestic-water heater accessories.

1.2. PERFORMANCE REQUIREMENTS

A. Seismic Performance: Commercial domestic-water heaters shall withstand the effects of earthquake motions determined according to ASCE/SEI 7.

1. The term "withstand" means "the unit will remain in place without separation of any parts from the device when subjected to the seismic forces specified."

1.3. ACTION SUBMITTALS

A. Product Data: For each type and size of domestic-water heater indicated.

B. Shop Drawings:

1. Wiring Diagrams: For power, signal, and control wiring.

1.4. INFORMATIONAL SUBMITTALS

A. Seismic Qualification Certificates: For fuel-fired, domestic-water heaters, accessories, and components, from manufacturer.

1. Basis for Certification: Indicate whether withstand certification is based on actual test of assembled components or on calculation.
2. Dimensioned Outline Drawings of Equipment Unit: Identify center of gravity and locate and describe mounting and anchorage provisions.
3. Detailed description of equipment anchorage devices on which the certification is based and their installation requirements.

B. Product Certificates: For each type of commercial, gas-fired, domestic-water heater, from manufacturer.

C. Domestic-Water Heater Labeling: Certified and labeled by testing agency acceptable to authorities having jurisdiction.

D. Source quality-control reports.

E. Field quality-control reports.

F. Warranty: Sample of special warranty.

1.5. CLOSEOUT SUBMITTALS

- A. Operation and Maintenance Data: For electric, domestic-water heaters to include in emergency, operation, and maintenance manuals.

1.6. QUALITY ASSURANCE

- A. Electrical Components, Devices, and Accessories: Listed and labeled as defined in NFPA 70, by a qualified testing agency, and marked for intended location and application.
- B. ASHRAE/IESNA Compliance: Fabricate and label electric, domestic-water heaters to comply with ASHRAE/IESNA 90.1.
- C. ASME Compliance:
 - 1. Where ASME-code construction is indicated, fabricate and label commercial, domestic-water heater storage tanks to comply with ASME Boiler and Pressure Vessel Code: Section VIII, Division 1.
- D. NSF Compliance: Fabricate and label equipment components that will be in contact with potable water to comply with NSF 61 Annex G, "Drinking Water System Components - Health Effects."

1.7. COORDINATION

- A. Coordinate sizes and locations of concrete bases with actual equipment provided.

1.8. WARRANTY

- A. Special Warranty: Manufacturer's standard form in which manufacturer agrees to repair or replace components of electric, domestic-water heaters that fail in materials or workmanship within specified warranty period.
 - 1. Failures include, but are not limited to, the following:
 - a. Structural failures including storage tank and supports.
 - b. Faulty operation of controls.
 - c. Deterioration of metals, metal finishes, and other materials beyond normal use.
 - 2. Warranty Periods: From date of Substantial Completion.
 - a. Commercial, Electric, Storage, Domestic-Water Heaters:
 - 1) Storage Tank: Ten years.
 - 2) Controls and Other Components: Two year.
 - b. Expansion Tanks: Three years.
 - c. Circulating Pumps: Three years.

2. PRODUCTS

2.1. COMMERCIAL, ELECTRIC, STORAGE, DOMESTIC-WATER HEATERS

- A. Commercial, Electric, Storage, Domestic-Water Heaters:

1. Manufacturers: Subject to compliance with requirements, provide products by one of the following: See schedule on drawings.
 - a. Bradford White Corporation.
 - b. A.O. Smith Corporation.
 - c. State Industries.
 - d. Rheem Manufacturing Company.

2. Standard: UL 1453.
3. Storage-Tank Construction: ASME-code steel with 150-psig minimum working-pressure rating.
 - a. Tappings: Factory fabricated of materials compatible with tank. Attach tappings to tank before testing.
 - 1) NPS 2 and Smaller: Threaded ends according to ASME B1.20.1.
 - 2) NPS 2-1/2 and Larger: Flanged ends according to ASME B16.5 for steel and stainless-steel flanges and according to ASME B16.24 for copper and copper-alloy flanges.
 - b. Interior Finish: Comply with NSF 61 Annex G barrier materials for potable-water tank linings, including extending finish into and through tank fittings and outlets.
 - c. Lining: Glass complying with NSF 61 Annex G barrier materials for potable-water tank linings, including extending lining into and through tank fittings and outlets.

4. Factory-Installed Storage-Tank Appurtenances:
 - a. Anode Rod: Replaceable magnesium.
 - b. Dip Tube: Required unless cold-water inlet is near bottom of tank.
 - c. Drain Valve: Corrosion-resistant metal complying with ASSE 1005.
 - d. Insulation: Comply with ASHRAE/IESNA 90.1. Surround entire storage tank except connections and controls.
 - e. Jacket: Steel with enameled finish.
 - f. Heating Elements: Electric, screw-in or bolt-on immersion type arranged in multiples of three.
 - g. Temperature Control: Adjustable thermostat.
 - h. Safety Controls: Automatic, high-temperature-limit and low-water cutoff devices or systems.
 - i. Combination Temperature-and-Pressure Relief Valves: ANSI Z21.22/CSA 4.4-M. Include one or more relief valves with total relieving capacity at least as great as heat input, and include pressure setting less than domestic-water heater working-pressure rating. Select one relief valve with sensing element that extends into storage tank.

5. Capacity and Characteristics: See water heater schedule on drawings.

2.2. DOMESTIC-WATER HEATER ACCESSORIES

A. Domestic-Water Expansion Tanks (ET):

1. Description: Steel, pressure-rated tank constructed with welded joints and factory-installed butyl-rubber diaphragm. Include air precharge to minimum system-operating pressure at tank.

2. Construction:
 - a. Tappings: Factory-fabricated steel, welded to tank before testing and labeling. Include ASME B1.20.1 pipe thread.
 - b. Interior Finish: Comply with NSF 61 Annex G barrier materials for potable-water tank linings, including extending finish into and through tank fittings and outlets.
 - c. Air-Charging Valve: Factory installed.
 3. Capacity and Characteristics:
 - a. Working-Pressure Rating: 150 psig.
 - b. Capacity Acceptable: See plans
 - c. Air Precharge Pressure: 55 psig.
- B. Drain Pans: Corrosion-resistant metal with raised edge. Comply with ANSI/CSA LC 3. Include dimensions not less than base of domestic-water heater, and include drain outlet not less than NPS 3/4 with ASME B1.20.1 pipe threads or with ASME B1.20.7 garden-hose threads.
 - C. Piping-Type Heat Traps: Field-fabricated piping arrangement according to ASHRAE/IESNA 90.1 or ASHRAE 90.2.
 - D. Heat-Trap Fittings: ASHRAE 90.2.
 - E. Relief valves in first three paragraphs below are for installation in piping or where no relief valve is specified with the domestic-water heater.
 - F. Combination Temperature-and-Pressure Relief Valves: Include relieving capacity at least as great as heat input, and include pressure setting less than domestic-water heater working-pressure rating. Select relief valves with sensing element that extends into storage tank.
 - G. Pressure Relief Valves: Include pressure setting less than domestic-water heater working-pressure rating.
 - H. Vacuum Relief Valves: ANSI Z21.22/CSA 4.4-M.

2.3. SOURCE QUALITY CONTROL

- A. Factory Tests: Test and inspect assembled domestic-water heaters specified to be ASME-code construction, according to ASME Boiler and Pressure Vessel Code.
- B. Hydrostatically test commercial domestic-water heaters to minimum of one and one-half times pressure rating before shipment.
- C. Domestic-water heaters will be considered defective if they do not pass tests and inspections. Comply with requirements in Section 014000 "Quality Requirements" for retesting and reinspecting requirements.
- D. Prepare test and inspection reports.

3. EXECUTION

3.1. DOMESTIC-WATER HEATER INSTALLATION

- A. Commercial, Domestic-Water Heater Mounting: Install commercial domestic-water heaters on concrete base. Comply with requirements for concrete base specified in Section 033000 "Cast-in-Place Concrete."
 - 1. Maintain manufacturer's recommended clearances.
 - 2. Arrange units so controls and devices that require servicing are accessible.
 - 3. 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 concrete base.
 - 4. For supported equipment, install epoxy-coated anchor bolts that extend through concrete base and anchor into structural concrete floor.
 - 5. Place and secure anchorage devices. Use setting drawings, templates, diagrams, instructions, and directions furnished with items to be embedded.
 - 6. Install anchor bolts to elevations required for proper attachment to supported equipment.
 - 7. Anchor domestic-water heaters to substrate.
- B. Install domestic-water heaters level and plumb, according to layout drawings, original design, and referenced standards. Maintain manufacturer's recommended clearances. Arrange units so controls and devices needing service are accessible.
 - 1. Install shutoff valves on domestic-water-supply piping to domestic-water heaters and on domestic-hot-water outlet piping. Comply with requirements for shutoff valves specified in Section 220523 "General Duty Valves for Plumbing Piping,"
- C. Install combination temperature-and-pressure relief valves in top portion of storage tanks. Use relief valves with sensing elements that extend into tanks. Extend commercial-water-heater relief-valve outlet, with drain piping same as domestic-water piping in continuous downward pitch, and discharge by positive air gap onto closest floor drain.
- D. Install water-heater drain piping as indirect waste to spill by positive air gap into open drains or over floor drains.
- E. Install thermometer on outlet piping of domestic-water heaters. Comply with requirements for thermometers specified in Section 220519 "Meters and Gages for Plumbing Piping."
- F. Install piping-type heat traps on inlet and outlet piping of domestic-water heater storage tanks without integral or fitting-type heat traps.
- G. Fill domestic-water heaters with water.
- H. Charge domestic-water expansion tanks with air.

3.2. CONNECTIONS

- A. Coordinate piping installations and specialty arrangements with schematics on Drawings and with requirements specified in piping systems. If Drawings are explicit enough, these requirements may be reduced or omitted.
- B. Comply with requirements for domestic-water piping specified in Section 221116 "Domestic Water Piping."

- C. Drawings indicate general arrangement of piping, fittings, and specialties.
- D. Where installing piping adjacent to electric, domestic-water heaters, allow space for service and maintenance of water heaters. Arrange piping for easy removal of domestic-water heaters.

3.3. IDENTIFICATION

- A. Identify system components. Comply with requirements for identification specified in Section 220553 "Identification for Plumbing Piping and Equipment."

3.4. FIELD QUALITY CONTROL

- A. Perform tests and inspections.
 - 1. Manufacturer's Field Service: Engage a factory-authorized service representative to inspect components, assemblies, and equipment installations, including connections, and to assist in testing.
 - 2. Leak Test: After installation, charge system and test for leaks. Repair leaks and re-test until no leaks exist.
 - 3. Operational Test: After electrical circuitry has been energized, start units to confirm proper operation.
 - 4. Test and adjust controls and safeties. Replace damaged and malfunctioning controls and equipment.
- B. Domestic-water heaters will be considered defective if they do not pass tests and inspections. Comply with requirements in Section 014000 "Quality Requirements" for retesting and reinspecting requirements and Section 017000 "Execution and Closeout Requirements" for requirements for correcting the Work.
- C. Prepare test and inspection reports.

3.5. DEMONSTRATION

- A. Engage a factory-authorized service representative to train Owner's maintenance personnel to adjust, operate, and maintain commercial, electric, storage, domestic-water heaters.

END 22 3400

DIVISION 22 PLUMBING

Section 22 42 13.13 - Commercial Water Closets

1. GENERAL

1-01 RELATED DOCUMENTS

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

1-02 SUMMARY

- A. Section Includes:

- 1. Water closets.
- 2. Flushometer valves.
- 3. Toilet seats.

- B. Related Requirements:

1-03 ACTION SUBMITTALS

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

- 1. Include construction details, material descriptions, dimensions of individual components and profiles, and finishes for water closets.
- 2. Include rated capacities, operating characteristics, electrical characteristics, and furnished specialties and accessories.

- B. Shop Drawings: Include diagrams for power, signal, and control wiring.

1-04 CLOSEOUT SUBMITTALS

- A. Operation and Maintenance Data: For flushometer valves to include in operation and maintenance manuals.

1-05 MAINTENANCE MATERIAL SUBMITTALS

- A. Furnish extra materials that are packaged with protective covering for storage and identified with labels describing contents.

- 1. Flushometer-Valve Repair Kits: Equal to 10 percent of amount of each type installed, but no fewer than two of each type.

2. PRODUCTS

2-01 WALL-MOUNTED WATER CLOSETS

- A. Water Closets WC-1 and WC-2-ADA Floor mounted, top spud.

- 1. Manufacturers: Subject to compliance with requirements, provide products by one of the following manufacturers offering products that may be incorporated into the Work include the following: See Plumbing Fixture Schedule on Drawings.

- a. American Standard America.
 - b. Kohler Co.
 - c. Zurn Industries, LLC; Commercial Brass and Fixtures.
2. Bowl:
- a. Standards: ASME A112.19.2/CSA B45.1 and ASME A112.19.5.
 - b. Material: Vitreous china.
 - c. Type: Siphon jet.
 - d. Style: Flushometer valve.
 - e. Height: Standard.
 - f. Rim Contour: Elongated.
 - g. Water Consumption: 1.28 gal. (4.8 L) per flush.
 - h. Spud Size and Location: NPS 1-1/2 (DN 40); top.
3. Flushometer Valve: FV-1
4. Toilet Seat: Anti-microbial treated seat.
5. Support:
- a. Standard: ASME A112.6.1M.
 - b. Description: Waste-fitting assembly as required to match drainage piping material and arrangement with faceplates, couplings gaskets, and feet; bolts and hardware matching fixture. Include additional extension coupling, faceplate, and feet for installation in wide pipe space.
 - c. Water-Closet Mounting Height: WC-1 Standard WC-2 Handicapped/elderly according to ICC/ANSI A117.1.

2-02 FLUSHOMETER VALVES

- A. Touchless battery operated, Diaphragm Flushometer Valves FV-1, see schedule on drawings.
- 1. Manufacturers: Subject to compliance with requirements, provide products by one of the following manufacturers offering products that may be incorporated into the Work include the following:
 - a. Sloan Valve Company.
 - 2. Standard: ASSE 1037.
 - 3. Minimum Pressure Rating: 125 psig (860 kPa).
 - 4. Features: Include integral check stop and backflow-prevention device.
 - 5. Material: Brass body with corrosion-resistant components.
 - 6. Exposed Flushometer-Valve Finish: Chrome plated.

7. Panel Finish: Chrome plated or stainless steel.
8. Style: Exposed.
9. Consumption: 1.28 gal. (4.8 L) per flush.
10. Minimum Inlet: NPS 1 (DN 25).
11. Minimum Outlet: NPS 1-1/4 (DN 32).

2-03 TOILET SEATS

A. Toilet Seats:

1. Manufacturers: Subject to compliance with requirements provide products by one of the following manufacturers offering products that may be incorporated into the Work include the following:
 - a. American Standard America.
 - b. Bemis Manufacturing Company.
 - c. Church Seats.
 - d. Kohler Co.
 - e. Olsonite Seat Co.
 - f. TOTO USA, INC.
 - g. Zurn Industries, LLC; Commercial Brass and Fixtures.
2. Standard: IAPMO/ANSI Z124.5.
3. Material: Plastic.
4. Type: Commercial (Heavy duty).
5. Shape: Elongated rim, open front for WC-1 and Elongated rim, closed front for WC-2.
6. Hinge: Self-sustaining, check.
7. Hinge Material: Non-corroding metal.
8. Seat Cover: Required only for WC-2.
9. Color: White.

3. EXECUTION

3-01 EXAMINATION

- A. Examine roughing-in of water supply and sanitary drainage and vent piping systems to verify actual locations of piping connections before water-closet installation.
- B. Examine walls and floors for suitable conditions where water closets will be installed.
- C. Proceed with installation only after unsatisfactory conditions have been corrected.

3-02 INSTALLATION

A. Water-Closet Installation:

1. Install level and plumb according to roughing-in drawings.
2. Install floor-mounted water closets on bowl-to-drain connecting fitting attachments to piping or building substrate.
3. Install accessible, wall-mounted water closets at mounting height for handicapped/elderly, according to ICC/ANSI A117.1.

B. Support Installation:

1. Install supports, affixed to building substrate, for floor-mounted, back-outlet water closets.
2. Use carrier supports with waste-fitting assembly and seal.
3. Install floor-mounted, back-outlet water closets attached to building floor substrate, onto waste-fitting seals; and attach to support.
4. Install wall-mounted, back-outlet water-closet supports with waste-fitting assembly and waste-fitting seals; and affix to building substrate.

C. Flushometer-Valve Installation:

1. Install flushometer-valve, water-supply fitting on each supply to each water closet.
2. Attach supply piping to supports or substrate within pipe spaces behind fixtures.
3. Install lever-handle flushometer valves for accessible water closets with handle mounted on open side of water closet.
4. Install actuators in locations that are easy for people with disabilities to reach.
5. Install fresh batteries in battery-powered, electronic-sensor mechanisms.

D. Install toilet seats on water closets.

E. Wall Flange and Escutcheon Installation:

1. Install wall flanges or escutcheons at piping wall penetrations in exposed, finished locations and within cabinets and millwork.
2. Install deep-pattern escutcheons if required to conceal protruding fittings.
3. Comply with escutcheon requirements specified in Section 220518 "Escutcheons for Plumbing Piping."

F. Joint Sealing:

1. Seal joints between water closets and walls and floors using sanitary-type, one-part, mildew-resistant silicone sealant.
2. Match sealant color to water-closet color.
3. Comply with sealant requirements specified in Section 079200 "Joint Sealants."

3-03 CONNECTIONS

- A. Connect water closets with water supplies and soil, waste, and vent piping. Use size fittings required to match water closets.
- B. Comply with water piping requirements specified in Section 221116 "Domestic Water Piping."
- C. Comply with soil and waste piping requirements specified in Section 221316 "Sanitary Waste and Vent Piping."
- D. Where installing piping adjacent to water closets, allow space for service and maintenance.

3-04 ADJUSTING

- A. Operate and adjust water closets and controls. Replace damaged and malfunctioning water closets, fittings, and controls.
- B. Adjust water pressure at flushometer valves to produce proper flow.
- C. Install fresh batteries in battery-powered, electronic-sensor mechanisms.

3-05 CLEANING AND PROTECTION

- A. Clean water closets and fittings with manufacturers' recommended cleaning methods and materials.
- B. Install protective covering for installed water closets and fittings.
- C. Do not allow use of water closets for temporary facilities unless approved in writing by Owner.

END OF SECTION

1. GENERAL

1-01 RELATED DOCUMENTS

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

1-02 SUMMARY

- A. Section Includes:
 - 1. Urinals.
 - 2. Flushometer valves.

1-03 ACTION SUBMITTALS

- A. Product Data: For each type of product.
 - 1. Include construction details, material descriptions, dimensions of individual components and profiles, and finishes for urinals.
 - 2. Include rated capacities, operating characteristics, electrical characteristics, and furnished specialties and accessories.
- B. Shop Drawings: Include diagrams for power, signal, and control wiring.

1-04 CLOSEOUT SUBMITTALS

- A. Operation and Maintenance Data: For flushometer valves to include in operation and maintenance manuals.

1-05 MAINTENANCE MATERIAL SUBMITTALS

- A. Furnish extra materials that are packaged with protective covering for storage and identified with labels describing contents.
 - 1. Flushometer-Valve Repair Kits: Equal to 10 percent of amount of each type installed, but no fewer than two of each type.

2. PRODUCTS

2-01 STALL URINALS

2-02 WALL-HUNG URINALS

- A. Urinals UR-1 and UR-2 Wall hung, back outlet, washout.

1. Manufacturers: Subject to compliance with requirements provide products by one of the following manufacturers offering products that may be incorporated into the Work include the following: See plumbing fixture schedule on drawings.
 - a. American Standard America.
 - b. Kohler Co.
 - c. TOTO USA, INC.
 - d. Zurn Industries, LLC; Commercial Brass and Fixtures
 2. Fixture:
 - a. Standards: ASME A112.19.2/CSA B45.1 and ASME A112.19.5.
 - b. Material: Vitreous china.
 - c. Type: Washout with extended shields.
 - d. Strainer or Trapway: Manufacturer's standard strainer with integral trap.
 - e. Water Consumption: Low.
 - f. Spud Size and Location: NPS 3/4 (DN 20), top.
 - g. Outlet Size and Location: NPS 2 (DN 50), back.
 - h. Color: White.
 3. Flushometer Valve: FV-2.
 4. Waste Fitting:
 - a. Standard: ASME A112.18.2/CSA B125.2 for coupling.
 - b. Size: NPS 2 (DN 50).
 5. Support: ASME A112.6.1M, Type I, urinal carrier with fixture support plates and coupling with seal and fixture bolts and hardware matching fixture. Include rectangular, steel uprights.
- B. Urinals UR-2 Wall hung, back outlet, washout, ADA accessible.
1. Manufacturers: Subject to compliance with requirements, provide products by one of the following manufacturers offering products that may be incorporated into the Work include the following:
 - a. American Standard America.
 - b. Kohler Co.
 - c. TOTO USA, INC.

- d. Zurn Industries, LLC: Commercial Brass and Fixtures.
- 2. Fixture:
 - a. Standards: ASME A112.19.2/CSA B45.1 and ASME A112.19.5.
 - b. Material: Vitreous china.
 - c. Type: Washout with extended shields.
 - d. Strainer or Trapway: Manufacturer's standard strainer with integral trap.
 - e. Water Consumption: Low.
 - f. Spud Size and Location: NPS 3/4 (DN 20), top.
 - g. Outlet Size and Location: NPS 2 (DN 50), back.
 - h. Color: White.
- 3. Flushometer Valve: FV-2.
- 4. Waste Fitting:
 - a. Standard: ASME A112.18.2/CSA B125.2 for coupling.
 - b. Size: NPS 2 (DN 50).
- 5. Support: ASME A112.6.1M, Type I, urinal carrier with fixture support plates and coupling with seal and fixture bolts and hardware matching fixture. Include rectangular, steel uprights.

2-03 URINAL FLUSHOMETER VALVES

A. Touchless battery operated, Diaphragm Flushometer Valves FV-2

- 1. Manufacturers: Subject to compliance with requirements provide products by one of the following manufacturers offering products that may be incorporated into the Work include the following:
 - a. Sloan Valve Company.
- 2. Standard: ASSE 1037.
- 3. Minimum Pressure Rating: 125 psig (860 kPa).
- 4. Features: Include integral check stop and backflow-prevention device.
- 5. Material: Brass body with corrosion-resistant components.
- 6. Exposed Flushometer-Valve Finish: Chrome plated.
- 7. Panel Finish: Chrome plated or stainless steel.

8. Style: Exposed.
9. Consumption: 0.5 gal. (1.9 L) per flush.
10. Minimum Inlet: NPS 3/4 (DN 20).
11. Minimum Outlet: NPS 3/4 (DN 20).

3. EXECUTION

3-01 EXAMINATION

- A. Examine roughing-in of water supply and sanitary drainage and vent piping systems to verify actual locations of piping connections before urinal installation.
- B. Examine walls and floors for suitable conditions where urinals will be installed.
- C. Proceed with installation only after unsatisfactory conditions have been corrected.

3-02 INSTALLATION

A. Urinal Installation:

1. Install urinals level and plumb according to roughing-in drawings.
2. Install wall-hung, back-outlet urinals onto waste fitting seals and attached to supports.
3. Install wall-hung, bottom-outlet urinals with tubular waste piping attached to supports.
4. Install accessible, wall-mounted urinals at mounting height for the handicapped/elderly, according to ICC/ANSI A117.1.
5. Install trap-seal liquid in waterless urinals.

B. Support Installation:

1. Install supports, affixed to building substrate, for wall-hung urinals.
2. Use off-floor carriers with waste fitting and seal for back-outlet urinals.
3. Use carriers without waste fitting for urinals with tubular waste piping.
4. Use chair-type carrier supports with rectangular steel uprights for accessible urinals.

C. Flushometer-Valve Installation:

1. Install flushometer-valve water-supply fitting on each supply to each urinal.
2. Attach supply piping to supports or substrate within pipe spaces behind fixtures.
3. Install lever-handle flushometer valves for accessible urinals with handle mounted on open side of compartment.

4. Install fresh batteries in battery-powered, electronic-sensor mechanisms.

D. Wall Flange and Escutcheon Installation:

1. Install wall flanges or escutcheons at piping wall penetrations in exposed, finished locations.

2. Install deep-pattern escutcheons if required to conceal protruding fittings.

3. Comply with escutcheon requirements specified in Section 220518 "Escutcheons for Plumbing Piping."

E. Joint Sealing:

1. Seal joints between urinals and walls and floors using sanitary-type, one-part, mildew-resistant silicone sealant.

2. Match sealant color to urinal color.

3. Comply with sealant requirements specified in Section 079200 "Joint Sealants."

3-03 CONNECTIONS

A. Connect urinals with water supplies and soil, waste, and vent piping. Use size fittings required to match urinals.

B. Comply with water piping requirements specified in Section 221116 "Domestic Water Piping."

C. Comply with soil and waste piping requirements specified in Section 221316 "Sanitary Waste and Vent Piping."

D. Where installing piping adjacent to urinals, allow space for service and maintenance.

3-04 ADJUSTING

A. Operate and adjust urinals and controls. Replace damaged and malfunctioning urinals, fittings, and controls.

B. Adjust water pressure at flushometer valves to produce proper flow.

C. Install fresh batteries in battery-powered, electronic-sensor mechanisms.

3-05 CLEANING AND PROTECTION

A. Clean urinals and fittings with manufacturers' recommended cleaning methods and materials.

B. Install protective covering for installed urinals and fittings.

C. Do not allow use of urinals for temporary facilities unless approved in writing by Owner.

END OF SECTION

1. GENERAL

1-01 RELATED DOCUMENTS

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

1-02 SUMMARY

- A. Section Includes:

- 1. Lavatories.
- 2. Faucets.

1-03 ACTION SUBMITTALS

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

- 1. Include construction details, material descriptions, dimensions of individual components and profiles, and finishes for lavatories.
- 2. Include rated capacities, operating characteristics, electrical characteristics, and furnished specialties and accessories.

- B. Shop Drawings: Include diagrams for power, signal, and control wiring of automatic faucets.

1-04 INFORMATIONAL SUBMITTALS

- A. Coordination Drawings: Counter cutout templates for mounting of counter-mounted lavatories.

1-05 CLOSEOUT SUBMITTALS

- A. Operation and Maintenance Data: For lavatories and faucets to include in operation and maintenance manuals.

- 1. In addition to items specified in Section 017823 "Operation and Maintenance Data," include the following:
 - a. Servicing and adjustments of automatic faucets.

1-06 MAINTENANCE MATERIAL SUBMITTALS

- A. Furnish extra materials that match products installed and that are packaged with protective covering for storage and identified with labels describing contents.

- 1. Faucet Washers and O-Rings: Equal to 10 percent of amount of each type and size installed.

2. Faucet Cartridges and O-Rings: Equal to 5 percent of amount of each type and size installed.

2. PRODUCTS

2-01 VITREOUS-CHINA, WALL-MOUNTED LAVATORIES

A. Lavatory LAV-1 and LAV-2 ADA Vitreous china, wall mounted, with back.

1. Manufacturers: Subject to compliance with requirements, provide products by one of the following manufacturers offering products that may be incorporated into the Work include the following: See plumbing fixture schedule on drawings.
 - a. American Standard America.
 - b. Kohler Co.
 - c. Zurn Industries, LLC; Commercial Brass and Fixtures.
2. Fixture:
 - a. Standard: ASME A112.19.2/CSA B45.1.
 - b. Type: For wall hanging.
 - c. Nominal Size: Oval, 22 by 14 inches (559 by 356 mm).
 - d. Faucet-Hole Punching: One hole centers
 - e. Faucet-Hole Location: Top.
 - f. Color: White.
 - g. Mounting Material: Chair carrier.
3. Faucet: F-1
4. Support: ASME A112.6.1M, Type II, concealed-arm lavatory carrier Type II, Include rectangular, steel uprights.

2-02 SOLID-BRASS, MANUALLY OPERATED FAUCETS

- A. NSF Standard: Comply with NSF/ANSI 61, "Drinking Water System Components - Health Effects," for faucet materials that will be in contact with potable water.
- B. Lavatory Faucets F-1 Touchless, battery operated, single-control mixing commercial, solid-brass valve. See schedule on drawings.
 1. Manufacturers: Subject to compliance with requirements, provide products by one of the following manufacturers offering products that may be incorporated into the Work include the following:

- a. American Standard America.
 - b. Bradley Corporation.
 - c. Chicago Faucets.
 - d. Moen Incorporated.
 - e. Zurn Industries, LLC; Commercial Brass and Fixtures.
2. Standard: ASME A112.18.1/CSA B125.1.
 3. General: Include hot- and cold-water indicators; coordinate faucet inlets with supplies and fixture hole punchings; coordinate outlet with spout and fixture receptor.
 4. Body Type: Single hole
 5. Body Material: Commercial, solid brass.
 6. Finish: Polished chrome plate.
 7. Maximum Flow Rate: 0.5 gpm (1.5 L/min.).
 8. Mounting Type: Deck, concealed.
 9. Valve Handle(s): Single lever.
 10. Spout: Rigid type.
 11. Spout Outlet: Aerator.
 12. Operation: Compression, manual.
 13. Drain: Strained grate

2-03 SUPPLY FITTINGS

- A. NSF Standard: Comply with NSF/ANSI 61, "Drinking Water System Components - Health Effects," for supply-fitting materials that will be in contact with potable water.
- B. Standard: ASME A112.18.1/CSA B125.1.
- C. Supply Piping: Chrome-plated-brass pipe or chrome-plated copper tube matching water-supply piping size. Include chrome-plated-brass or stainless-steel wall flange.
- D. Supply Stops: Chrome-plated-brass, one-quarter-turn, ball-type or compression valve with inlet connection matching supply piping.
- E. Operation: Loose key.

F. Risers:

1. NPS 1/2 (DN 15).
2. ASME A112.18.6, braided- or corrugated-stainless-steel, flexible hose riser.

2-04 WASTE FITTINGS

A. Standard: ASME A112.18.2/CSA B125.2.

B. Drain: Grid type with NPS 1-1/4 (DN 32) offset and straight tailpiece.

C. Trap:

1. Size: NPS 1-1/2 by NPS 1-1/4 (DN 40)
2. Material: Chrome-plated, two-piece, cast-brass trap and swivel elbow with 0.032-inch- (0.83-mm-) thick brass tube to wall and chrome-plated, brass or steel wall flange.
3. Material: Stainless-steel, two-piece trap and swivel elbow with 0.012-inch- (0.30-mm-) thick stainless-steel tube to wall; and stainless-steel wall flange.

3. EXECUTION

3-01 EXAMINATION

- A. Examine roughing-in of water supply and sanitary drainage and vent piping systems to verify actual locations of piping connections before lavatory installation.
- B. Examine counters and walls for suitable conditions where lavatories will be installed.
- C. Proceed with installation only after unsatisfactory conditions have been corrected.

3-02 INSTALLATION

- A. Install lavatories level and plumb according to roughing-in drawings.
- B. Install supports, affixed to building substrate, for wall-mounted lavatories.
- C. Install accessible wall-mounted lavatories at handicapped/elderly mounting height for people with disabilities or the elderly, according to ICC/ANSI A117.1.
- D. Install wall flanges or escutcheons at piping wall penetrations in exposed, finished locations. Use deep-pattern escutcheons if required to conceal protruding fittings. Comply with escutcheon requirements specified in Section 220518 "Escutcheons for Plumbing Piping."
- E. Seal joints between lavatories, counters, and walls using sanitary-type, one-part, mildew-resistant silicone sealant. Match sealant color to fixture color. Comply with sealant requirements specified in Section 079200 "Joint Sealants."

- F. Install protective shielding pipe covers and enclosures on exposed supplies and waste piping of accessible lavatories. Comply with requirements in Section 220719 "Plumbing Piping Insulation."

3-03 CONNECTIONS

- A. Connect fixtures with water supplies, stops, and risers, and with traps, soil, waste, and vent piping. Use size fittings required to match fixtures.
- B. Comply with water piping requirements specified in Section 221116 "Domestic Water Piping."
- C. Comply with soil and waste piping requirements specified in Section 221316 "Sanitary Waste and Vent Piping."

3-04 ADJUSTING

- A. Operate and adjust lavatories and controls. Replace damaged and malfunctioning lavatories, fittings, and controls.
- B. Adjust water pressure at faucets to produce proper flow.
- C. Install fresh batteries in battery-powered, electronic-sensor mechanisms.

3-05 CLEANING AND PROTECTION

- A. After completing installation of lavatories, inspect and repair damaged finishes.
- B. Clean lavatories, faucets, and other fittings with manufacturers' recommended cleaning methods and materials.
- C. Provide protective covering for installed lavatories and fittings.
- D. Do not allow use of lavatories for temporary facilities unless approved in writing by Owner.

END OF SECTION

1. GENERAL

1-01 RELATED DOCUMENTS

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

1-02 SUMMARY

- A. Section Includes:

1. Mop sinks.
2. Sink, drop in mounted.
3. Sink faucets.
4. Supply fittings.
5. Waste fittings.

1-03 ACTION SUBMITTALS

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

1. Include construction details, material descriptions, dimensions of individual components and profiles, and finishes for sinks.
2. Include rated capacities, operating characteristics and furnished specialties and accessories.

1-04 INFORMATIONAL SUBMITTALS

- A. Coordination Drawings: Counter cutout templates for mounting of counter-mounted lavatories.

1-05 CLOSEOUT SUBMITTALS

- A. Maintenance Data: For sinks to include in maintenance manuals.

1-06 MAINTENANCE MATERIAL SUBMITTALS

- A. Furnish extra materials that match products installed and that are packaged with protective covering for storage and identified with labels describing contents.

1. Faucet Washers and O-Rings: Equal to 10 percent of amount of each type and size installed.

2. Faucet Cartridges and O-Rings: Equal to 5 percent of amount of each type and size installed.

2. PRODUCTS

2-01 MOP SINK

A. Mop Sink MS-1 trap standard mounted.

1. Manufacturers: Subject to compliance with requirements, provide products by one of the following manufacturers offering products that may be incorporated into the Work include the following: See plumbing Fixture Schedule on drawings.
 - a. American Standard America.
 - b. Kohler Co.
 - c. Zurn Industries, LLC; Commercial Brass and Fixtures.
2. Fixture:
 - a. Standard: ASME A112.19.1/CSA B45.2.
 - b. Type: floor mounted mop sink.
 - c. Back: None.
 - d. Nominal Size: 24 by 24 inches.
 - e. Color: White.
 - f. Mounting: NPS 3" (DN 80) P-trap standard with grid strainer inlet, cleanout, and floor flange.
 - g. Rim Guard: On front and sides, Stainless steel.
 - h. Hose and hose wall clamp.
 - i. Mop Hanger.

2-02 SINK FAUCETS

- A. NSF Standard: Comply with NSF/ANSI 61, "Drinking Water System Components - Health Effects," for faucet-spout materials that will be in contact with potable water.
- B. Sink Faucets F-2: See faucet schedule on drawings
 1. Commercial, Solid-Brass Faucets.

a. Manufacturers: Subject to compliance with requirements provide products by one of the following manufacturers offering products that may be incorporated into the Work include the following:

- 1) American Standard America.
- 2) Chicago Faucets.
- 3) Moen Incorporated.
- 4) Zurn Plumbing Products Group.

2. Standard: ASME A112.18.1/CSA B125.1.
3. General: Include hot- and cold-water indicators; coordinate faucet inlets with supplies and fixture hole punchings; coordinate outlet with spout and sink receptor.
4. Body Type: Centerset.
5. Body Material: Commercial, solid brass
6. Finish: Polished chrome plate.
7. Maximum Flow Rate: 2.2 gpm (8.3 L/min.).
8. Handle(s): Levers.
9. Mounting Type: Back, exposed.
10. Spout Type: Swing, solid brass.
11. Vacuum Breaker: Required for hose outlet.
12. Spout Outlet: Hose thread according to ASME B1.20.7.

2-03 STAINLESS STEEL SINK

A. Mop Sink SK-1 trap standard mounted.

1. Manufacturers: Subject to compliance with requirements, provide products by one of the following manufacturers offering products that may be incorporated into the Work include the following: See plumbing Fixture Schedule on drawings.
 - a. Elkay.
 - b. Kohler Co.
 - c. Advance Tabco.

2. Fixture:
 - a. Standard: ASME A112.19.1/CSA B45.2.
 - b. Type: floor mounted mop sink.
 - c. Back: None.
 - d. Nominal Size: See plumbing schedule on drawings.
 - e. Heavy gauge insulated bottom.
 - f. Mounting: NPS 2" P-trap standard with grid strainer inlet.

2-04 SINK FAUCETS

- A. NSF Standard: Comply with NSF/ANSI 61, "Drinking Water System Components - Health Effects," for faucet-spout materials that will be in contact with potable water.
- B. Sink Faucets F-3: See faucet schedule on drawings
 1. Commercial, Solid-Brass Faucets.
 - a. Manufacturers: Subject to compliance with requirements provide products by one of the following manufacturers offering products that may be incorporated into the Work include the following:
 - 1) American Standard America.
 - 2) Chicago Faucets.
 - 3) Moen Incorporated.
 - 4) Zurn Plumbing Products Group.
 2. Standard: ASME A112.18.1/CSA B125.1.
 3. General: Include hot- and cold-water indicators; coordinate faucet inlets with supplies and fixture hole punchings; coordinate outlet with spout and sink receptor.
 4. Body Type: Centerset.
 5. Body Material: Commercial, solid brass
 6. Finish: Polished chrome plate.
 7. Maximum Flow Rate: 2.2 gpm (8.3 L/min.).
 8. Handle(s): Levers.

9. Mounting Type: Back, exposed.
10. Spout Type: Swing, solid brass.
11. Vacuum Breaker: Required for hose outlet.
12. Spout Outlet: Hose thread according to ASME B1.20.7.

2-05 SUPPLY FITTINGS

- A. NSF Standard: Comply with NSF/ANSI 61, "Drinking Water System Components - Health Effects," for supply-fitting materials that will be in contact with potable water.
- B. Standard: ASME A112.18.1/CSA B125.1.
- C. Supply Piping: Chrome-plated brass pipe or chrome-plated copper tube matching water-supply piping size. Include chrome-plated brass or stainless-steel wall flange.
- D. Supply Stops: Chrome-plated brass, one-quarter-turn, ball-type or compression valve with inlet connection matching supply piping.
- E. Operation: Loose key.
- F. Risers:
 1. NPS 1/2 (DN 15)
 2. ASME A112.18.6 braided or corrugated stainless-steel flexible hose.

2-06 WASTE FITTINGS

- A. Standard: ASME A112.18.2/CSA B125.2.
- B. Drain: Grid type with NPS 1-1/2 (DN 40) offset and straight tailpiece.
- C. Trap:
 1. Size: NPS 1-1/2 (DN 40).
 2. Material: Chrome-plated, two-piece, cast-brass trap and swivel elbow with 0.032-inch- (0.83-mm-) thick brass tube to wall and chrome-plated brass or steel wall flange.

2-07 GROUT

- A. Standard: ASTM C 1107/C 1107M, 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 (34.5-MPa), 28-day compressive strength.
- D. Packaging: Premixed and factory packaged.

3. EXECUTION

3-01 EXAMINATION

- A. Examine roughing-in of water supply and sanitary drainage and vent piping systems to verify actual locations of piping connections before sink installation.
- B. Examine walls, floors, and counters for suitable conditions where sinks will be installed.
- C. Proceed with installation only after unsatisfactory conditions have been corrected.

3-02 INSTALLATION

- A. Install sinks level and plumb according to roughing-in drawings.
- B. Set drop in sink in a bead of sealant and anchor to counter.
- C. Install supports, affixed to building substrate, for wall-hung sinks.
- D. Install water-supply piping with stop on each supply to each sink faucet.
 - 1. Exception: Use ball valves if supply stops are not specified with sink. Comply with valve requirements specified in Section 220523 "General-Duty Valves for Plumbing Piping."
 - 2. Install stops in locations where they can be easily reached for operation.
- E. Install wall flanges or escutcheons at piping wall penetrations in exposed, finished locations. Use deep-pattern escutcheons if required to conceal protruding fittings. Comply with escutcheon requirements specified in Section 220518 "Escutcheons for Plumbing Piping."
- F. Seal joints between sinks and counters, floors, and walls using sanitary-type, one-part, mildew-resistant silicone sealant. Match sealant color to fixture color. Comply with sealant requirements specified in Section 079200 "Joint Sealants."
- G. Install protective shielding pipe covers and enclosures on exposed supplies and waste piping of accessible sinks. Comply with requirements in Section 220719 "Plumbing Piping Insulation."

3-03 CONNECTIONS

- A. Connect sinks with water supplies, stops, and risers, and with traps, soil, waste, and vent piping. Use size fittings required to match fixtures.
- B. Comply with water piping requirements specified in Section 221116 "Domestic Water Piping."
- C. Comply with soil and waste piping requirements specified in Section 221316 "Sanitary Waste and Vent Piping."

3-04 ADJUSTING

- A. Operate and adjust sinks and controls. Replace damaged and malfunctioning sinks, fittings, and controls.
- B. Adjust water pressure at faucets to produce proper flow.

3-05 CLEANING AND PROTECTION

- A. After completing installation of sinks, inspect and repair damaged finishes.
- B. Clean sinks, faucets, and other fittings with manufacturers' recommended cleaning methods and materials.
- C. Provide protective covering for installed sinks and fittings.
- D. Do not allow use of sinks for temporary facilities unless approved in writing by Owner.

END OF SECTION

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. Linear wash fountains.

- B. Related Requirements:

- 1. Section 224216.13 "Commercial Lavatories."
 - 2. Section 224216.16 "Commercial Sinks."

1.3. ACTION SUBMITTALS

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

- 1. Include construction details, material descriptions, dimensions of individual components and profiles, and finishes for wash fountains.
 - 2. Include rated capacities, operating characteristics, electrical characteristics, and furnished specialties and accessories.

- B. Shop Drawings: For each type of wash fountain.

- 1. Include plans, elevations, sections, and mounting and attachment details.
 - 2. Include details of equipment assemblies. Indicate dimensions, weights, loads, and required clearances, method of field assembly, components, and location and size of each field connection.
 - 3. Include diagrams for power, signal, and control wiring.

1.4. CLOSEOUT SUBMITTALS

- A. Operation and Maintenance Data: For wash fountains and components to include in operation and maintenance manuals.

1.5. MAINTENANCE MATERIAL SUBMITTALS

- A. Furnish extra materials that match products installed and that are packaged with protective covering for storage and identified with labels describing contents.

- 1. Faucet Washers and O-Rings: Equal to **10** percent of quantity of each type and size installed.
 - 2. Faucet Cartridges and O-Rings: Equal to **5** percent of quantity of each type and size installed.

2. PRODUCTS

2.1. SOLID-SURFACE, LINEAR WASH FOUNTAINS

A. Wash Fountains WF-1 Solid-surface, linear (side-by-side) receptor.

1. Manufacturers: Subject to compliance with requirements, products by one of the following manufacturers offering products that may be incorporated into the Work include the following: See plumbing fixture schedule on drawings for all options. See Plumbing Fixture Schedule on Drawings for model number.
 - a. Acorn Engineering Company.
 - b. Bradley.
2. Standard: IAPMO IGC 156.
3. 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.
4. Bowl(s) and Counter:
 - a. Standard: ICPA SS-1 for solid-surface bowls.
 - b. Height to Rim: 34 inches (864 mm) above floor.
 - c. Color or Finish: Color selected by the architect.
 - d. Number of stations: Two stations.
 - e. Drain: Grid with NPS 1-1/2 (DN 40) tailpiece, each bowl.
5. Pedestal: Not required.
6. Faucets:
 - a. Standards: ASME A112.18.1/CSA B125.1 and NSF 61.
 - b. Type: Manufacturer's standard, chrome-plated solid brass, each bowl.
 - c. Control: Hardwired, sensor-actuated, pressure-balancing mixing valve with check stops for each user station.
 - d. Sensor: ASME A112.18.1/CSA B125.1 and UL 1951.
7. Liquid-Soap Dispensers: Manual for each user station.
 - a. Sensor: ASME A112.18.1/CSA B125.1 and UL 1951.
8. Mounting: Off floor on wall brackets and ASME A112.6.1M, Type II urinal carriers.
9. Supply Fittings:
 - a. Piping: NPS 1/2 (DN 15) copper tubing, each bowl.
 - b. Valves: Shutoff valve on each supply.
 - c. Supply Piping: From wall.
10. Waste Fittings:
 - a. Standard: ASME A112.18.2/CSA B125.2.
 - b. Trap and Drain Piping: NPS 1-1/2 (DN 40), each bowl.

3. EXECUTION

3.1. EXAMINATION

- A. Examine roughing-in of water-supply, sanitary drainage, and vent piping systems to verify actual locations of piping connections before wash-fountain installation.
- B. Examine walls and floors for suitable conditions where wash fountains will be installed.
- C. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2. INSTALLATION

- A. Install wash fountains level and plumb according to roughing-in drawings.
- B. Mount wash fountains on wall construction, coordinate with GC on wall framing to support wash fountain.
- C. Install off-floor carrier supports, affixed to building substrate, for wall-mounted wash fountains.
- D. Install accessible, wall-mounted wash fountains at mounting height for handicapped/elderly according to ICC A117.1.
- E. Install water-supply piping with shutoff valve on each supply to each wash fountain to be connected to domestic-water distribution piping. Use ball, gate, or globe valve. Install valves in locations where they can be easily reached for operation. Valves are specified in Section 220523 "General-Duty Valves for Plumbing Piping."
- F. Install trap and waste piping on each drain outlet of each wash fountain to be connected to sanitary drainage system.
- G. Install wall flanges or escutcheons at piping wall penetrations in exposed, finished locations. Use deep-pattern escutcheons if required to conceal protruding fittings. Comply with escutcheon requirements specified in Section 220518 "Escutcheons for Plumbing Piping."
- H. Seal joints between fixtures and walls using sanitary-type, one-part, mildew-resistant, silicone sealant. Match sealant color to fixture color. Comply with sealant requirements specified in Section 079200 "Joint Sealants."
- I. Place (2) two wash fountains with electric water heater option in cafeteria.

3.3. CONNECTIONS

- A. Connect wash fountains with water supplies, stops, and risers, and with traps, soil, waste, and vent piping. Use size fittings required to match fixtures.
- B. Comply with requirements for water piping specified in Section 221116 "Domestic Water Piping."
- C. Comply with requirements for soil and waste drainage piping and vent piping specified in Section 221316 "Sanitary Waste and Vent Piping."

- D. Install protective-shielding pipe covers and enclosures on exposed supplies and waste piping of accessible wash fountains. Comply with requirements in Section 220719 "Plumbing Piping Insulation."

3.4. ADJUSTING

- A. Operate and adjust wash fountains and controls. Replace damaged and malfunctioning wash fountains, fittings, and controls.
- B. Adjust water pressure at faucets to produce proper flow.
- C. Install fresh batteries in battery-powered, electronic-sensor mechanisms.

3.5. CLEANING AND PROTECTION

- A. After installing wash fountains, inspect and repair damaged finishes.
- B. Clean wash fountains, faucets, and other fittings with manufacturers' recommended cleaning methods and materials.
- C. Provide protective covering for installed wash fountains and fittings.
- D. Do not allow use of wash fountains for temporary facilities unless approved in writing by Owner.

END 22 4233