

PLACENTIA-YORBA LINDA UNIFIED SCHOOL DISTRICT
FAIRMONT ELEMENTARY SCHOOL
KINDERGARTEN RESTROOM ADDITION

IDENTIFICATION STAMP
DIV. OF THE STATE ARCHITECT

APP: 04-125244 INC:

REVIEWED FOR

SS ☒

FLS ☒

ACS ☒

DATE: 04/22/2026

February 23, 2026



STUDIO+
ARCHITECT



STUDIO+ ENGINEERING
ELECTRICAL ENGINEER



OPTIMUM ENERGY DESIGN
MECHANICAL ENGINEER



OPTIMUM ENERGY DESIGN
PLUMBING ENGINEER

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PROJECT NO: 025.0170.00

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**SECTION 01 31 00
CONTRACTOR'S REQUESTS FOR INFORMATION**

1.00 GENERAL

1.01 SECTION INCLUDES

- A. Summary
- B. Definitions
- C. Contractor's Requests For Information
- D. Architect and Architect's Response to Requests For Information

1.02 SUMMARY

- A. Administrative requirements for Requests For Information (RFI's).

1.03 DEFINITIONS

A. Requests For Information:

- 1. A document submitted by the Contractor to the Architect requesting clarification of a portion of the Contract Documents, hereinafter referred to as RFI.
- 2. A properly prepared RFI shall include a detailed written statement that indicates the specific Drawings or Specification in need of clarification and the nature of the clarification requested. RFI's shall be dated the day they are sent to the architect.
 - a. Drawings shall be identified by drawing number and location on the drawing sheet.
 - b. Specifications shall be identified by Section number, page and paragraph.
 - c. The Contractor shall provide suggestions or alternate solutions to the RFI.
 - d. The contractor shall submit one item per RFI.
 - e. RFI's requiring urgent action shall be so identified.

B. Improper RFI's:

- 1. RFI's that are not properly prepared, as required above.
- 2. Improper RFI's will be processed by the Architect at the Architect's standard hourly rate and Architect will charge the District. Such costs will be deducted from monies due the Contractor. The Contractor will be notified by the Architect prior to the processing of improper RFI's.

C. Frivolous RFI's:

- 1. RFI's that request information that is clearly shown on the Contract Documents.
- 2. Frivolous RFI's may be returned unanswered or may be processed by the Architect at the Architect's standard hourly rate and Architect will charge the District, and such costs will

be deducted from monies due the Contractor. The Architect will notify the Contractor prior to the processing of frivolous RFI's.

1.04 CONTRACTOR'S REQUESTS FOR INFORMATION

- A. When the Contractor is unable to determine from the Contract Documents, the material, process or system to be installed, the Contractor shall submit an RFI to the Architect requesting a clarification of the indeterminate item.
 - 1. When possible, such clarification shall be requested at the next appropriate project meeting, with the response entered into the meeting minutes. When clarification at the meeting is not possible, either because of the urgency of the need, or the complexity of the item the Contractor shall prepare and submit an RFI to the Architect.
- B. RFI's shall be submitted on a form acceptable to the Architect. Forms shall be completely filled in, and if prepared by hand, shall be fully legible after photocopying or scanning. RFI's shall be dated and numbered in consecutive order. Each page of attachments to RFI's shall bear the RFI number in the lower right corner.
- C. RFI's shall be originated by the Contractor.
 - 1. RFI's from subcontractors or material suppliers shall be submitted through, reviewed by, and signed by the Contractor prior to submittal to the Architect.
 - 2. RFI's sent directly to the Architect or the Architect's consultants shall not be accepted and will be returned unanswered.
- D. Each Contractor shall carefully study the Contract Documents to assure that the requested information is not available therein.
- E. In cases where RFI's are issued to request clarification of coordination issues, for example pipe and duct routing, clearances, specific locations of work shown diagrammatically, and similar items, the Contractor shall fully lay out a suggested solution using drawings or sketches drawn to scale, and submit same with the RFI. RFI's, which fail to include a suggested solution, will be returned unanswered with a requirement that the Contractor submit a complete request.
- F. RFI's shall not be used for the following purposes:
 - 1. To request approval of submittals.
 - 2. To request approval of substitutions.
 - 3. To request changes which entail additional cost or credit.
 - 4. To request changes which entail change of time of completion.
 - 5. To request different methods of performing work than those drawn and specified.
- G. In the event the Contractor believes that a clarification by the Architect results in additional cost or time, Contractor shall not proceed with the Work indicated by the RFI without a written authorization from the Architect. RFI's shall not automatically justify a cost increase in the Work or a change in the Schedule.
 - 1. Answered RFI's shall not be construed as approval to perform extra work.
 - 2. Unanswered RFI's will be returned with a stamp or notation: Not Reviewed.

- H. Architect will prepare and maintain a log of RFI's and provide updated copies at the weekly Construction Progress Meetings showing outstanding RFI's.
- I. Contractor shall allow up to seven (7) working days review and response time for RFI's, however, the Architect will endeavor to respond in a timely fashion to RFI's.

1.05 ARCHITECT'S RESPONSE TO RFI'S

- A. Architect will respond to RFI's on one of the following forms:

- 1. Properly prepared RFI's:
 - a. Response on the RFI form.
 - b. Architect's Supplemental Instruction.
 - c. Request for Proposal

2.00 PRODUCTS (NOT USED)

3.00 EXECUTION (NOT USED)

END OF SECTION

**SECTION 01 40 00
QUALITY REQUIREMENTS**

PART 1 -GENERAL

1.01 SECTION INCLUDES

- A. Reference Standards.
- B. Quality Assurance and Control of Installation.
- C. Field Samples.
- D. Mock-up
- E. Project Inspector and Inspections.
- F. Permits and Fees.
- G. Verified Reports.
- H. Manufacturers' Field Services and Reports.
- I. Laboratory Testing Services.

1.02 REFERENCE STANDARDS

- A. Conform to reference standards by date of issue current on date of Contract Documents.
- B. For products or workmanship specified by Association, Trade or Federal Standards, comply with requirements of standard, except when more rigid requirements are specified or are required by applicable codes.
- C. Obtain copies of standards when required by Contract Documents.
- D. Maintain copy of standards at jobsite during submittals, planning and progress of the specified Work until Certified Completion.
- E. Should specified reference standards conflict with Contract Documents, request clarification from the Architect before proceeding.
- F. The contractual relationship of the parties to the Contract shall not be altered from the Contract Documents by mention or inference otherwise in any reference document.

1.03 QUALITY ASSURANCE/CONTROL OF INSTALLATION

- A. Monitor quality control over suppliers, products, services, site conditions and workmanship to produce Work of specified quality.
- B. Comply fully with manufacturers' instructions including each step in sequence.
- C. Should manufacturers' instructions conflict with Contract Documents, request clarification from Architect before proceeding.
- D. Perform Work by persons qualified to produce workmanship of specified quality.
- E. Where experience minimums for workmen, applicators, companies or manufacturers are required in individual Sections, written certification and documentation substantiating such minimums shall be submitted and approved by the Architect, when requested.
- F. Secure products in place with positive anchorage devices designed and sized to withstand stresses, vibration, physical distortion or disfigurement.

1.04 PROJECT INSPECTOR

- A. An Inspector, herein referred to as the "Project Inspector", "Job Inspector", or Inspector of Record (I.O.R.) will be employed by the Owner approved by the Architect, Structural Engineer, and by the Department of General Services, Division of State Architect (DGS/DSA).
- B. Class of Inspector required for this project in accordance with Title 24, Part I, Section 4-333(b):
Class 3 Inspector

- C. The Work of construction in all stages of progress shall be subject to the personal continuous observation of the Project Inspector. He shall have free access to any or all part of the Work at any time. The Contractor shall furnish the Inspector reasonable facilities for obtaining such information as may be necessary to keep him fully informed respecting the progress and manner of the Work and the character of the materials. Inspection of the Work shall not relieve the Contractor from any obligation to fulfill this Contract.

1.05 VERIFIED REPORTS

- A. Contractor shall comply with Part 1, Title 24, Sections 4-336 and 4-343 California Code of Regulations and issue verified reports through the Architect as required.

1.06 MANUFACTURERS' FIELD SERVICES AND REPORTS

- A. When specified in individual Specification Sections, require material or product suppliers or manufacturers to provide qualified staff personnel to observe site conditions, conditions of surfaces and installation, quality of workmanship, start-up of equipment, test, adjust and balance of equipment and as applicable and to initiate instructions when necessary.
- B. Manufacturers' representatives shall report observations and site decisions or instructions given to applicators or installers that are supplemental or contrary to manufacturers' written instructions.
- C. Submit report of observation to Architect for review.

1.07 ADDENDA AND CONSTRUCTION CHANGE DIRECTIVES

- A. The intent of these drawings and specifications is that the work of the alteration or reconstruction is to be in accordance with Title 24, California Code of Regulations. Should any conditions such as deterioration or non-complying construction be discovered which is not covered by the contract documents wherein the finished work will not comply with Title 24, California Code of Regulations, a Construction Change Directive, or a separate set of plans and specifications, detailing and specifying the required work shall be submitted to and approved by the Division of the State Architect (DSA) before proceeding with the work.
- B. In accordance with Part 1, Title 24, Section 4-338, California Code of Regulations, all Addenda and Construction Change Directives shall be approved by Division of the State Architect (DSA).

1.08 VARIATIONS WITH LAWS

- A. If Contractor his subcontractors or suppliers, or any of their employees ascertain at any time that requirements of this Contract conflict with or are in violation of applicable laws, codes, regulations and ordinances he shall not proceed with Work in question, except at his own risk. Contractor shall be required to remove that Work from site and replace such Work with all complying Work at no additional cost to Owner.

1.09 SELECTION AND PAYMENT-TESTING LABORATORY AND SPECIAL INSPECTORS

- A. Owner will employ and pay for services of independent Testing Laboratory and Special Inspectors approved by Architect and DSA to perform inspection and testing in accordance with Part 1, Title 24, Section 4-335, California Code of Regulations and this Section.
- B. In accordance with AB1329 dated February 23, 2001, when hazardous materials abatement measures are included in the Work, Owner will employ and pay for the services of an independent testing laboratory, licensed and certified by the State, to conduct clearance and air sampling tests.
- C. Offsite fabrication requiring Inspection and Testing: submit the qualifications of Inspectors and laboratory, including proposals for services, to the Owner and Architect for approval of qualifications and costs. Inspectors and laboratories shall conform to the requirements of Part 1 Title 24 Section 4-335.
- D. When materials tested fail to meet requirements herein specified, they shall be promptly corrected or removed and replaced, re-inspected and retested in a manner required by the Architect.
- E. Employment of testing laboratory shall in no way relieve Contractor of obligation to perform work in accordance with requirements of Contract Documents.

1.10 LABORATORY RESPONSIBILITIES

- A. Laboratory shall be licensed to conduct testing and inspection operations in California and shall be approved by DSA. It shall be supervised by a State Licensed Civil Engineer who shall certify and sign all reports.
- B. Provide qualified personnel at site. Cooperate with Architect, Project Inspector and Contractor in performance of services.
- C. Perform specified inspection, sampling and testing of products in accordance with standards specified herein.
- D. Ascertain compliance of materials and mixes with requirements of Contract Documents.
- E. Promptly notify Architect, Project Inspector and Contractor by letter of observed irregularities or non-conformance of Work or products.
- F. Perform additional inspections and test required by Architect or governing agencies.
- G. Immediately upon Testing Laboratory determination of a test failure, the laboratory shall telephone the results of test to Architect. On the same day, laboratory shall send written test results to those named on the distribution list below.

1.11 LABORATORY REPORTS

- A. After each inspection and test, promptly submit one copy of laboratory report to the following:
 - 1. Owner
 - 2. Contractor
 - 3. Inspector of Record (IOR)
 - 4. Special Inspectors: Special Inspector's Verified Reports shall be submitted in a timely manner.
 - 5. Architect
 - 6. Structural Engineer
 - 7. Mechanical and Electrical Engineers (Related Tests and Inspections).
 - 8. Division of the State Architect (DSA).
- B. Include:
 - 1. Date issued.
 - 2. Project title, Architect's number, DSA Application and File number.
 - 3. Name of inspector.
 - 4. Date and time of sampling and Specifications Section.
 - 5. Identification of product and Specifications Section.
 - 6. Location in the Project.
 - 7. Type of inspection or tests.
 - 8. Date of test and ambient conditions at time of test.
 - 9. Results of tests.
 - 10. Conformance with Contract Documents.
 - 11. Signature by Registered Professional Engineer licensed in California.
 - 12. Statement that tests were conducted in accordance with Parts 1 and 2, Title 24, California Code of Regulations.
- C. Test reports shall include tests made, whether such tests indicate that the material performed satisfactorily or not. Samples taken but not tested shall be reported. Reports shall show that the materials were sampled and tested in accordance with the requirements of the approved Specifications. Reports shall show the specified design strength and shall state whether or not the materials tested comply with requirements. Report special sampling operations where required.
- D. Submit a report verifying that tests and inspections herein specified and otherwise required have been completed and material and workmanship complies with the Contract Documents. Such verification reports shall be submitted at the completion of the Project and at any time the Project is suspended. Parties to receive such reports are the same as listed above.
- E. When requested by Architect, provide interpretation of test results.

1.12 LIMITS ON TESTING LABORATORY AUTHORITY

- A. Laboratory may not release, revoke, alter or enlarge on requirements of Contract Documents.
- B. Laboratory may not approve or accept any portion of the Work.
- C. Laboratory may not assume any duties of Contractor.

- D. Laboratory has no authority to stop the Work.
- E. Laboratory shall not interpret code in relation to the design of the building.

1.13 CONTRACTOR RESPONSIBILITIES

- A. Deliver to laboratory at designated location, adequate samples of materials proposed to be used which require testing. Selection of materials required to be tested shall be by the Lab or Owner's Representative and not by the Contractor.
- B. Cooperate with laboratory personnel, Owner's Representative, Project Inspector and the Architect, and provide access to the Work including weekends and after work hours and to manufacturer's facilities.
- C. Provide incidental labor materials and facilities to provide at all times, safe access to Work to be tested, to obtain and handle samples at the site or at source of products to be tested, to facilitate tests and inspections, storage and curing of test samples.
- D. Notify Architect, Project Inspector and laboratory 24 hours prior to expected time for operations requiring inspection and testing services. Contractor shall pay for costs incurred if testing or inspections are cancelled and are required to be rescheduled due to the Contractor's failure to notify the Project Inspector in advance as required. Also, notify Owner in advance of manufacturer of materials to allow testing at source of supply.
- E. In accordance with CBC-17A, Section 1706A, Contractor shall execute and submit a Statement of Responsibility regarding special inspections and testing required for principle wind- and seismic-load bearing systems to the Inspector of Record and the Owner.
- F. The Owner, Project Inspector or the Architect shall have the right to reject materials and workmanship that are defective or to require their correction. Rejected workmanship shall be satisfactorily corrected and rejected materials shall be removed from the premises without cost to the Owner. If the Contractor fails to correct such rejected Work within a reasonable time, fixed by written notice, the Owner will correct same and charge the expense to the Contractor by Change Order.
- G. Should it be considered necessary or advisable by the Owner at any time before date of completion of the entire Work to make an examination of Work already completed by removing or tearing out the same, the Contractor shall on request promptly furnish all necessary facilities, labor and materials. If such Work is found to be defective in any respect due to fault of the Contractor or his subcontractor, all extra expenses shall be charged to the Contractor by Change Order. If however such Work is found to meet the requirements of the Contract Documents, the additional cost of labor and materials involved in the examination and for replacement costs shall be allowed to the Contractor by Change Order.
- H. When changes of construction schedule are necessary during construction, coordinate such changes with the Testing Laboratory as required.
- I. When the Testing Laboratory is ready to test according to the established schedule, but is prevented from testing or taking specimens due to incompleteness of the Work, extra charges for testing attributable to the delay shall be charged to the Contractor by Change Order.
- J. Inspecting and testing performed exclusively for the Contractor's convenience shall be the sole responsibility of the Contractor.
- K. Selection of materials to be tested shall be made by the Testing Laboratory or the Project Inspector and not by the Contractor.
- L. Any material shipped by the contractor from the source of supply prior to having satisfactorily passed such testing and inspection or prior to the receipt of notice from said representative that such testing and inspection will not be required, shall not be incorporated in the Work.

END OF SECTION

**SECTION 01 40 01
TESTING AND INSPECTION REQUIREMENTS**

1.00 GENERAL

1.01 SUMMARY

- A. This Section establishes general requirements for testing and inspections and supplements similar provisions found elsewhere in the Contract Documents.
- B. The District will select an independent, DSA approved testing laboratory to conduct the tests. Selection of the material required to be tested shall be by the laboratory or the District representative and not by the Contractor.
- C. Prior to the manufacture of any part of the work, which requires test, in conformance with the Contract Documents, notify the District representative. Timing of this notice shall provide sufficient time for the District to arrange for test of same at the source of supply.
- D. Materials shipped by the Contractor from the source of supply prior to having satisfactorily passed such test and inspection, or prior to the receipt of notice from said representative that such test and inspection will not be required, shall not be incorporated in the Work.
- E. The District will select and pay testing laboratory costs for all tests and inspections, but may be reimbursed by Contractor for such costs under the Contract conditions.
- F. Retesting of defective materials or workmanship shall be paid for by Contractor.

1.02 VERIFICATION OF TEST REPORTS

- A. Each testing agency shall submit to the Division of the State Architect (DSA) a verified report, in duplicate covering tests required to be made by DSA during progress of Work. Furnish such report each time that work on the Project is suspended, covering tests up to that time, and at completion of the Project, covering all tests.

1.03 INSPECTION BY THE DISTRICT

- A. The District and its representative shall, at all times, have access for purpose of inspection to all parts of Work and to shops wherein work is in preparation. Contractor shall, at all times, maintain proper facilities and provide safe access for such inspection.
- B. The District shall have the right to reject materials and workmanship which are defective or to require their correction. Rejected workmanship shall be corrected, as directed by Architect, at no additional cost to District. If Contractor does not correct such rejected work within a reasonable time, fixed by written notice, the District may correct same and charge the expense to the Contractor.
- C. Should it be considered necessary or advisable by the District at any time, before Final Acceptance of entire work, to make an examination of work already completed, by removing or tearing out same, Contractor shall, on request, promptly furnish all necessary facilities, labor and materials. If such work is found to be defective in any respect due to Contractor's fault or his subcontractor, he shall defray all expenses of such examinations and of satisfactory reconstruction. If, however, such work is found to meet requirements of the Contract, the additional cost of labor and materials necessarily involved in examination and replacement shall be borne by the District.

1.04 DISTRICT INSPECTOR

- A. An Inspector will be employed by the District in accordance with the requirements of the State of

California Code of Regulations, Title 24. The Inspector's duties are specifically defined in Title 24.

- B. Construction in all stages of progress is subject to the personal continuous observation of the Inspector. The Inspector shall have free access to any or all parts of the work at any time. The Contractor shall furnish the Inspector reasonable facilities for obtaining such information as may be necessary to keep the Inspector fully informed respecting progress and manner of work and character of materials. Inspection of work shall not relieve Contractor from any obligation to fulfill this Contract.

**SECTION 01 45 00
SAFETY PROCEDURES**

1.00 GENERAL

1.01 SECTION INCLUDES

- A. The Contractor shall ensure that all employees, visitors, subcontractors, employees, and suppliers, employees, while on the worksite, comply with the requirements of OSHA, these requirements and the safety precautions contained in the several Specification Sections.
- B. The Contractor shall promptly and fully comply with execute, without separate charge thereof to the District, shall enforce compliance with the provisions of the Williams Steiger Occupational Safety Health Act of 1970 (Public Law 91-596 with most recent updates) with particular attention paid, but not limited to, Title 29-Labor, Chapter XVII - Occupational Safety and Health Administration, Department of Labor Part 1926 - (Safety and Health Regulations for Construction), and part 1910 - (Occupational Safety and Health Standards), as printed, respectively, in the June 24, 1974, and June 27, 1974, Federal Register, and changes thereto.

1.02 PRELIMINARY WORK

- A. Prior to the start of and during the course of the work (above and below ground) the Contractor shall make a thorough survey of the entire worksite to determine all potential hazards. Workmen shall be made aware of those hazards and shall be instructed in procedures and the use of equipment for their protection. The Contractor shall verify the location and condition ("live" or "dead") of all utilities on and near the worksite and take precautions to protect his employees, the general public, and the property.

1.03 IMMINENT DANGER

- A. The Architect and/or the DSA Project Inspector may stop those operations, which create an imminent danger to employees (as defined by OSHA), to the public and to property.
- B. The Contractor shall be wholly responsible for any accident (including death) occurring at any time during the progress of the work and until the final acceptance of the work by the District which may happen to any of his workmen or those of any Subcontractor employed on the building, or for any damage or injuries (including death) which his work and operations may cause to the work being constructed, or to existing buildings, or to any occupants of the property, or of the adjoining properties, or to the public, or to any public or private property.

1.04 COOPERATION

- A. The Contractor shall cooperate with the safety representatives of the District, District's Insurance Managers, and the District Architect.

1.05 SAFETY RESPONSIBILITIES

- A. Contractor's Superintendent shall:
 - 1. Ensure compliance with these requirements, OSHA requirements and other safety requirements.
 - 2. Supervise and support the Contractor's Project Safety Supervisor to enable him to execute effectively his duties and responsibilities.
 - 3. Authorize immediate action to correct substandard safety conditions.

4. Review and act to ensure compliance with safety procedures with his supervisors, subcontractors and suppliers.
 5. Take an active part in all supervisory safety meetings.
 6. Cooperate with safety representatives of the District, District Insurance Managers, and the District's insurance company.
 7. Ensure that all security and temporary fencing has been secured.
 8. Refer to General Conditions, Article 66.
- B. Contractor's Project Safety Supervisor shall:
1. Make thorough daily safety inspections of the worksite and immediately act to eliminate unsafe acts and unsafe conditions, and record all suggestions made and corrective action taken.
 2. Investigate worksite accidents and recommend immediate corrective action.
 3. Furnish job foremen with appropriate material for use by job foreman in conducting weekly "tool box" safety meetings.
 4. Review safety meetings reports submitted by job foremen and act to ensure that meaningful weekly safety meeting are held by the job foremen.
 5. Attend foremen "tool box" safety meetings and evaluate effectiveness.
 6. Assist in the preparation of accident investigation and reporting procedures.
 7. Implement training programs for supervisors and employees as they apply to their specific responsibilities.
 8. Be responsible for the control, availability, and use of safety equipment, including employee personal protective equipment.
 9. Coordinate his activities with those of the District's safety representative, and immediately implement their safety suggestions.
 10. Coordinate public relations aspects of the Contractor's safety program.
 11. Contractor is responsible for pre-planning and checking over the site to avoid accidents.
- C. Contractor's Job Foreman shall:
1. Instruct workmen regarding safe work practices and work methods at the time workmen are given work assignments.
 2. Furnish and enforce the use of protective equipment and suitable tools for the job.
 3. Continuously check to see that no unsafe practices and conditions are allowed to exist on this portion of the work.
 4. Set a good example for his personnel.
 5. Make a complete investigation of accidents to determine facts necessary to take corrective action to prevent a recurrence.

6. Promptly supply information for, or complete, the Accident Report and Investigation Form as directed by the Safety Supervisor and Contractor's Superintendent.
 7. Hold weekly "tool box" safety meetings with his personnel to:
 - a. Discuss observed unsafe work practices and unsafe conditions.
 - b. Review the accident experience of his crew and discuss correction of the accident causes.
 - c. Encourage safety suggestions from his crew and report those suggestions to the Safety Supervisor.
 8. Ensure that first aid is promptly administered to an injured employee.
 9. Report immediately, to Contractor's Superintendent or Architect, violations of job safety and security.
- D. Subcontractor's Job Superintendent shall:
- a. Plan and execute his work so as to comply with the Construction Safety Program.
 - b. Furnish and enforce the use of personal protective equipment.
 - c. Attend supervisory personnel safety meetings schedule by the Contractor.
 - d. Schedule and attend weekly "tool box" safety meetings to be held by job foremen for all employees.
 - e. Report to the Contractor's Safety Supervisor or Contractor's Superintendent all observed unsafe conditions, unsafe practices, and violations of job security.
 - f. Cooperate with the District's safety representative.

1.06 REQUEST FOR VARIANCES

- A. Request for variances to deviate from OSHA requirements must follow the current established procedures by that Agency.

1.07 FAILURE TO COMPLY

- A. If the Contractor fails to comply with the requirements of OSHA, the safety requirements, and the safety precautions contained in the Specifications Sections, the District may modify or stop the work and portions thereof, until such failure is remedied. Willful and repeated failure to comply could result in the shutdown of the work, and portions thereof. No part of the time lost due to any such modification of operations or stop orders shall be made the subject of a claim for extension of time or for increased costs of damage by the Contractor.

2.00 PRODUCTS - (NOT USED)**3.00 EXECUTION - (NOT USED)****END OF SECTION****SAFETY PROCEDURES**

**SECTION 01 50 00
TEMPORARY FACILITIES**

1.00 GENERAL

1.01 SUMMARY

- A. Provide all temporary facilities and controls required for the performance of the Work.
- B. Supervise use of all temporary facilities and controls. Enforce compliance with applicable standards. Prevent abuses of services.

1.02 SAFETY

- A. Guard machinery, equipment, and all hazards in accordance with safety provisions of latest edition of the Manual of Accident Prevention in Construction, published by the Associated General Contractors of America, to the extent that such provisions are not in contravention of applicable law.
 - 1. Protect all hazards with adequately constructed guard rails or barricades and provide lanterns, warning lights, and the like, as necessary. Eliminate all attractive nuisance from the work and the room site.
 - 2. To this end, dispose, store, guard, and protect premises and all work materials, equipment and both permanent and temporary construction so as to preclude unauthorized use thereof by children or others and particularly to eliminate possible consequent injury to all persons.
- B. Structural design of items used in the construction and remodeling of the buildings and not a permanent part thereof, is the sole responsibility of the Contractor.

1.03 SCAFFOLDING AND HOISTS

- A. Furnish and maintain hoists, staging, rigging, scaffolding, and runways required in the prosecution of the Work. Erect, equip and maintain such temporary work in accordance with statutes, laws, ordinances, rules or regulations of the State of California and other authorities and Insurance Companies having jurisdiction.

1.04 DUST CONTROL

- A. During the life of the Contract provide effective means of dust control, both within the structure and on the surrounding site.
- B. Obtain the Architect approval before use of any means except water.

1.05 MAINTENANCE OF TRAFFIC

- A. Maintain traffic on streets adjacent to or leading to the site.
- B. Where construction operations interfere with free movement of traffic, provide traffic controls, flagmen or similar devices to efficiently control traffic movement.
- C. Provide a traffic control permit from the local authorities if required.

1.06 DEWATERINGS

- A. Furnish and maintain all pumps or other dewaterings devices required by this work.

1.07 PROJECT OFFICE

- A. Provide and maintain, for the duration of the Contract, a project office, complete with heat, light, ventilation and convenience outlets. The office shall be of sufficient size for the Contractor's personnel and operators.

1.08 FENCES AND BARRICADES

- A. Erect fences and barricades, with gates, around construction site as required by local governing authorities and the District, for security and to prevent unauthorized entry to work site. Maintain in good condition until completion of Project.

END OF SECTION

**SECTION 01 70 00
CONTRACT CLOSE-OUT**

1.00 GENERAL

1.01 SECTION INCLUDES

- A. Procedures for closing-out Project.

1.02 RELATED SECTIONS:

- A. Closeout Submittals: See Respective Specification Sections.

1.03 GENERAL:

- A. As a prerequisite for final payment, Contractor shall complete the work of this Section.
- B. Comply with requirements stated in Conditions of the Contract and in Specifications for administrative procedures in closing out the Work.

1.04 PREFINAL INSPECTION; SUBSTANTIAL COMPLETION:

- A. Pre-final Inspection:
 - 1. Upon "substantial completion" of the Work, Contractor shall notify District Inspector / Architect and request a "pre-final inspection" of the Work.
 - 2. If District Inspector concurs that "substantial completion" has been reached, he will review the Work and list items to be completed or corrected. List will be amended as required to include items subsequently observed.
- B. Substantial Completion Defined: "Substantial Completion" of the Work is the status, as approved by the Architect, when construction is sufficiently complete, in accordance with the Contract Documents, so the Owner can occupy or utilize the Work for the use for which it is intended.

1.05 FINAL INSPECTION:

- A. Not Used
- B. Final Inspection: When Contractor has complied with above Article at the end of the final phase, District Inspector will review the Work and list any items to be completed or corrected.
- C. Contractor shall correct and/or complete the Work.

1.06 GUARANTEES:

- A. General: Contractor shall guarantee in writing to Owner that:

"Contractor will repair or replace any or all of such work, together with any other adjacent work which may be displaced in connection with such replacement, that may prove to be defective in workmanship or material within a period of (stated below) years from the date of acceptance of the above mentioned structure by the Newport Mesa Unified School District, ordinary wear and tear, and unusual abuse or neglect excepted."
- B. Format: Contractor shall submit guarantees typed in the format indicated in "Guarantee Form".

- C. Number of Copies: Submit four (4) to Architect.
- D. Required Guarantees:
 - 1. General: Submit all guarantees listed herein or required by various Specification Sections.
 - 2. General Guarantee:
 - a. By Contractor; For the Entire Work: 1 Year.

1.07 WARRANTIES:

- A. General: Submit all warranties required by various Specification Sections.

1.08 CERTIFICATES:

- A. General: Submit in triplicate all certificates required by various Specification Sections or listed herein, notarized as required.
- B. Certificates:
 - 1. Division 8: Finish Hardware.

1.09 OPERATION & MAINTENANCE DATA:

- A. General: Submit all manuals required by various Specification Sections or listed herein; four (4) copies each. Provide durable binders, approximately 8-1/2" x 11" in size and provide the following information:
 - 1. Identification on, or readable through, the front cover stating general nature of the manual.
 - 2. Neatly typewritten index at the front of the Manual, furnishing immediate information as to location in the Manual of all data or equipment involved.
 - 3. Complete instructions regarding operation and maintenance of all equipment involved.
 - 4. Complete nomenclature of all replaceable parts, their part numbers, current cost, and name and address of nearest vendor of parts.
 - 5. Copy of all Guarantees and Warranties issued.
 - 6. Copy of the approved Shop Drawings with all data concerning changes made during construction.
- B. Extraneous data: Where contents of Manuals include Manufacturers' catalog pages, clearly indicate the precise items included in this installation and delete, or otherwise clearly indicate, all manufacturers' data with which this installation is not concerned.

1.10 AS-BUILT DRAWINGS:

- A. Procedures:
 - 1. Promptly following contract award, Contractor shall secure from the District one complete set of Drawings. Identify the set as "As-Built."
 - 2. Timing of Entries: Make entries within 24 hours after receipt of information.

3. Contractor shall be responsible for maintaining and recording the changes on the set.
 4. Do not use the "As-Built" set for any purpose except entry of new data and for review by the Architect. Maintain separate job sets for subcontractors and workers daily use.
 5. Maintain the "As-Built" set at the job site where designated by the Architect.
 6. Use all means necessary to protect the "As-Built" set from deterioration, loss or damage until completion of the work.
 7. Making entries on Drawings: Using an erasable color pencil, other than blue, not ink or indelible pencil, clearly describe the change by note and by graphic line as required. Date all entries. Call attention to the entry by a "cloud" around the area or areas affected. In the event of overlapping changes, different colors may be used for each of the changes.
 - a. Changes due to approved change orders may be indicated by referencing the change order number and scope of change in lieu of revising the Drawings.
 - b. The location and depth below finish grade or above ceilings and attic spaces of utilities shall be fully dimensioned and indicated on Drawings. Dimensions shall be taken to building lines or permanent landmarks.
 8. The District Inspector's approval of the current status of the "As-Built" drawings will be a prerequisite to the Architect's approval of requests for progress payments and request for final payment.
 - a. Progress approvals: Prior to submitting each request for progress payments, secure the District Inspector's approval of the status of the "As-Built" Drawings.
 - b. Prior to submitting request for final payment and final inspection, Contractor shall submit the set to the District Inspector, with transmittal letter, in duplicate, for approval and further processing.
- B. Required Record Drawing Content: The following shall be noted on the "As-Built" drawings as a minimum. Locations shall be dimensioned from existing buildings.
1. Location of buried utility lines, conduit, valve boxes, manholes, stubouts and provisions for future connections.
 2. Location of point of connections to existing plumbing lines.

2.00 PRODUCTS - NOT USED

3.00 EXECUTION - NOT USED

END OF SECTION

**SECTION 01 78 00
PROJECT RECORD DOCUMENTS**

1.00 GENERAL

1.01 SUMMARY

- A. Section includes General requirements for preparation, maintenance and delivery of record documents.

1.02 SUBMITTALS

- A. Deliver record documents in electronic (PDF) format to Architect at completion of Project.
- B. Accompany submittal with transmittal letter, in duplicate, containing date, Project title and number, Contractor's name and address, title and number of each record document, certification that each document as submitted is complete and accurate, and signature of Contractor or its authorized representative.

2.00 PRODUCTS

Not Used.

3.00 EXECUTION

3.01 DOCUMENT MAINTENANCE

- A. Maintain one copy of the following in Contractor's field office at the site:
 - 1. Contract Drawings, including the DSA stamped set.
 - 2. Specifications and Addenda.
 - 3. Reviewed shop drawings.
 - 4. Bulletins and change orders, field change authorization and notice of clarification, request for information and other modifications to Contract.
 - 5. Field test records.
- B. File record documents apart from construction documents and maintain in clean, dry, legible condition. Make record documents available for review by the District and Architect during regular business hours.
- C. Do not use record documents for construction purposes.
- D. Record documents will be subject to a monthly review by the Architect prior to approval of each progress payment.

3.02 RECORDING

- A. Clearly label each document "PROJECT RECORD".

- B. Keep record documents current.
- C. Record and properly dimension deviations on the record drawings within 24 hours after work in affected area is completed. Dimensions shall be accurate to within 1 in.
 - 1. Use a fine felt or nylon tip pen with waterproof colored ink for marking.
 - 2. Legibly mark to record actual construction of the following:
 - a. Depths of various elements of foundation in relation to first floor level.
 - b. Horizontal and vertical location of underground utilities and appurtenances referenced to permanent surface improvements. Cut-off points and point of connections of utilities. Horizontal and vertical locations shall be established by survey to an established benchmark.
 - c. Location of internal utilities and appurtenances concealed in construction referenced to visible and accessible features of structure.
 - d. Field changes of dimension and detail.
 - e. Changes made by Change Order, Field Change Authorization, Request for Information and Notice of Clarification.
 - f. Details not on original Contract Drawings.
 - g. Do not permanently conceal any work until required information has been recorded.
- D. Legibly mark-up each Section of the Specifications to record the following.
 - 1. Manufacturer, trade name, catalog number, and supplier of each product and item of equipment installed.
 - 2. Changes made by change order, field change authorization, request for information and notice of clarification.
 - 3. Other matters not originally specified.
- E. Maintain shop drawings as record documents. Legibly annotate to record changes made after approval.

END OF SECTION

**SECTION 02 41 19
SELECTIVE DEMOLITION**

PART 1 - GENERAL

1.01 DEFINITIONS

- A. Remove: Detach items from existing construction and legally dispose of them off-site unless indicated to be removed and salvaged or removed and reinstalled.
- B. Remove and Salvage: Carefully detach from existing construction, in a manner to prevent damage, and deliver to Owner.
- C. Remove and Reinstall: Detach items from existing construction, prepare for reuse, and reinstall where indicated.
- D. Existing to Remain: Existing items of construction that are not to be permanently removed and that are not otherwise indicated to be removed, removed and salvaged, or removed and reinstalled.

1.01 MATERIALS OWNERSHIP

- A. Unless otherwise indicated, demolition waste becomes property of Contractor.
- B. Items of interest or value to Owner that may be uncovered during demolition remain the property of Owner. Carefully salvage in a manner to prevent damage and promptly return to Owner.

1.02 FIELD CONDITIONS

- A. Owner may occupy portions of building immediately adjacent to selective demolition area. Conduct selective demolition so Owner's operations will not be disrupted.
- B. Notify Architect of discrepancies between existing conditions and Drawings before proceeding with selective demolition.
- D. Hazardous Materials: If suspected hazardous materials are encountered, do not disturb; immediately notify Owner. Hazardous materials will be removed by Owner under a separate contract.
- E. Storage or sale of removed items or materials on-site is not permitted.
- F. Utility Service: Maintain existing utilities noted to remain in service and protect them against damage.
- G. Maintain fire-protection facilities in service during selective demolition operations.

PART 2 - PRODUCTS

2.01 PERFORMANCE REQUIREMENTS

- A. Regulatory Requirements: Comply with governing EPA notification regulations before beginning selective demolition. Comply with hauling and disposal regulations of authorities having jurisdiction.
- B. Standards: Comply with ANSI/ASSE A10.6 and NFPA 241.

PART 3 - EXECUTION

3.01 EXAMINATION

- A. Verify that utilities have been disconnected and capped before starting selective demolition operations.
- B. Review record documents of existing construction provided by Owner. Owner does not guarantee that existing conditions are same as those indicated in record documents.
- C. Survey existing conditions and correlate with requirements indicated to determine extent of selective demolition required.
- D. When unanticipated mechanical, electrical, or structural elements that conflict with intended function or design are encountered, investigate and measure the nature and extent of conflict. Promptly submit a written report to Architect.

END OF SECTION

SECTION 03 35 01

CONCRETE FINISHING (INTERIOR)

PART 1 GENERAL

1.01 SUMMARY

A. Section Includes

1. Application of clear reactive, penetrating liquid hardener to interior concrete.
2. Refining the interior concrete slab with a high grit diamond impregnated burnishing system.
3. Application of stain resistant surface treatment.

1.2 REFERENCES

- A. The date of the standard is that in effect as the date of receipt of bids for the project.
- B. American National Standard Institute / National Floor Safety Institute:
 1. ANSI B101.1-Test Method for Measuring Wet SCOF of Common Hard-Surface Floor Materials.
 2. ANSI B101.3-Test Method for Measuring Wet DCOF of Common Hard-Surface Floor Materials.
- C. ASTM International (ASTM):
 1. C418 — Standard Test Method for Abrasion Resistance of Concrete by Sandblasting
 2. C1028 - Standard Test Method for Determining the Static Coefficient of Friction of Ceramic Tile and Other Like Surfaces by the Horizontal Dynamometer Pull-Meter Method.
 3. C1353 — Standard Test Method for Abrasion Resistance of Dimension Stone Subjected to Foot Traffic Using a Rotary Platform, Double-Head Abraser.
 4. D4541 - Standard Test Method for Pull-Off Strength of Coatings Using Portable Adhesion Testers.
 5. E96/96M Method B (Water Method) - Standard Test Methods for Water Vapor Transmission of Materials.

1.3 ADMINISTRATIVE REQUIREMENTS

- A. Pre-Installation Meeting: Convene before the start of work on new concrete slabs, patching of existing concrete slabs and start of application of concrete finish system.
 1. Require attendance of parties directly affecting work of this Section, including the Owner's Representative, Contractor, Architect, concrete installer, and applicator. Meeting should only convene when required parties are present.
 2. Review the following:
 - a. Physical requirements of completed concrete slab and slab finish.
 - b. Locations and time of test areas.
 - c. Protection of surfaces not scheduled for finish application.
 - d. Surface preparation.
 - e. Application procedure.
 - f. Quality control.
 - g. Cleaning.
 - h. Protection of finish system.
 - i. Coordination with other work.

1.4 SUBMITTALS

- A. Product Data:
 - 1. Submit manufacturer's product data sheets and tested physical and performance properties on products to be used for the work.
- B. VOC Certification: Submit certification that products furnished comply with regulations controlling use of volatile organic compounds (VOC).
- C. Certificates:
 - 1. Certificates by manufacturer stating that installer is listed applicator of special concrete finishes, and has completed the necessary training programs.
- D. Floor Protection Plan.
- E. Closeout Submittals: Submit the following:
 - 1. Laminated Maintenance Instructions: Operation and maintenance instructions for installed concrete flooring products in accordance with Division 1 Closeout Submittals Section. Include methods for maintaining final finish gloss and cleanliness of concrete slab surface.

1.5 QUALITY ASSURANCE

- A. Installer Qualifications:
 - 1. Applicator to be familiar with the specified requirements and the methods needed for proper performance of work of this section. Applicator must have availability of proper equipment to perform work within scope of this project on a timely basis.
Applicator should have successfully performed a minimum of 5 projects of similar scope and complexity.
- B. Mock-up: On site, prior to the first application of the densifier.
 - 1. Require attendance of parties directly affecting work of this Section, including the Contractor, Architect, applicator, and Owner's Representative.
 - 2. Notify the above parties one week in advance of date and time when mock-up will be completed.
 - 3. Demonstrate the materials, equipment and application methods to be used for work specified herein in pre-approved location approximately 50 sq. ft. in area or as directed by [Architect][Owner's Representative].
 - 4. Retain approved mock-up during construction as a standard for judging the completed Work. Areas may remain as part of the completed work.

1.6 DELIVERY, STORAGE AND HANDLING

- A. Deliver materials in original containers, with seals unbroken, bearing manufacturer labels indicating brand name and directions for storage.
- B. Store concrete hardener/densifier in environment recommended on published manufacturer's product data sheets.
 - 1. Store containers upright in a cool, dry, well-ventilated place, out of the sun with temperature between 40 and 100 degrees F (4 and 38 degrees C).
 - 2. Protect from freezing.
 - 3. Store away from other chemicals and potential sources of contamination.
 - 4. Keep lights, fire, sparks and heat away from containers.
 - 5. Do not drop containers or slide across sharp objects.
 - 6. Do not stack pallets more than three high.
 - 7. Keep containers tightly closed when not in use.

1.7 FIELD CONDITIONS

- A. Environmental limitations:
 - 1. Comply with manufacturer's written instructions for substrate temperature and moisture content, ambient temperature and humidity, ventilation, and other conditions affecting performance and finishing requirements.
- B. Close areas to traffic during floor application and after application for time period recommended in writing by manufacturer.
- C. Protect the completed slab to prevent damage by the other trades during floor completion.
- D. Temperature Limitations:
 - 1. Apply when surface and air temperature are between 40 degrees F (4 degrees C) and above 100 degrees F (38 degrees C) unless otherwise indicated by manufacturer's written instructions.
 - 2. Apply when surface and air temperatures are expected to remain above 40 degrees F (4 degrees C) for a minimum of 8 hours after application, unless otherwise indicated by manufacturer's written instructions.
- E. Apply when air conditions are calm to minimize surface treatment contacting surface not intended to be finished.
- F. Do not apply to frozen substrate. Allow adequate time for substrate to thaw, if freezing conditions exist before application.
- G. Apply a minimum of 24 hours after rain event. Suspend application when rain is anticipated for a period of 8 hours after application, unless otherwise indicated by manufacturer's written instructions.
- H. Temporary Lighting: Minimum 200 W light source, placed 8 feet (2.5 meters) above horizontal concrete surface for each 425 square feet (40 square meters) of concrete being finished.
- I. Temporary Heat: Ambient temperature of 50 degrees F (10 degrees C) minimum.
- J. Ventilation: Provide ventilation during coating evaporation stage in confined or enclosed areas in accordance with manufacturer's instructions.

PART 2 PRODUCTS

2.1 MANUFACTURERS

- A. Substitutions: [No Substitutions] [In accordance with Section 01 25 00 — Substitution Procedures].

2.2 MATERIALS

- A. Pre-Densifier Concrete Cleaner: Cleaner to remove dirt, oil, grease, and other stains from existing slab surface.
 - 1. Product: Consolideck Cleaner/Degreaser manufactured by PROSOCO, Inc., Lawrence, KS, (800) 255-4255, www.prosoco.com.
- B. Penetrating Concrete Hardener/Densifier: Blended silicate hardener/densifier.
 - 1. Product: Consolideck Blended Densifier, manufactured by PROSOCO, Inc., Lawrence, KS, (800) 255-4255, www.prosoco.com.
 - 2. Subject to compliance with the following minimum performance requirements:
 - a. Comply with national, state and district AIM VOC regulations and contain 50 g/L or less.
 - b. Microabrasion Resistance: Greater than 30 percent improvement over the untreated samples when tested in accordance with ASTM C418.
 - c. Abrasion Resistance: Greater than 40 percent improvement over untreated samples when tested in accordance with ASTM C1353.

- d. Achieve 'High Traction Range' readings when tested in accordance with ANSI B101.3.
- e. Coefficient of Friction: Greater than 0.60 dry, Greater than 0.60 wet when tested in accordance with ASTM C1028.
- f. Adhesion: Greater than 10 percent increase in pull-off strength when compared to an untreated sample when tested in accordance with ASTM D4541.
- g. Water Vapor Transmission: 99 percent retained when compared to untreated samples when tested in accordance with ASTM E96/96M Method B (Water Method).

C. Interior Concrete Protective Treatments:

1. General Purpose high-gloss film forming premium sealer, lithium silicate hardener/densifier.
 - a. Product: Consolideck LSGuard, manufactured by PROSOCO, Inc., Lawrence, KS, (800) 255-4255, www.prosoco.com.
 - b. Subject to compliance with the following requirements:
 - i. Living Building Challenge 3.0 Red List Compliant.
 - ii. Recipient of Scientific Certification System (SCS) Indoor Air Quality Gold Certification.
 - iii. Comply with national, state and district AIM VOC regulations.
 - iv. Registered as an approved NSF International/Nonfood Compound Registration.
 - v. Achieve 'High Traction Range' readings when tested in accordance with ANSI B101.1.
 - vi. Coefficient of Friction: Greater than 0.60 dry, greater than 0.60 wet when tested in accordance with ASTM C1028.
 - vii. Adhesion: : Greater than 10 percent increase in pull-off strength when compared to an untreated sample when tested in accordance with ASTM D4541.
 - viii. UV Stability: No degradation or yellowing of material when tested in accordance with ASTM G154.
2. General Purpose medium gloss, film forming sealer.
 - a. Product: Consolideck PolishGuard, manufactured by PROSOCO, Inc., Lawrence, KS, (800) 255-4255, www.prosoco.com.
 - b. Subject to compliance with the following requirements:
 - i. Living Building Challenge 2.0/2.1 Red List Compliant.
 - ii. Recipient of Scientific Certification System (SCS) Indoor Air Quality Gold Certification.
 - iii. Comply with national, state and district AIM VOC regulations.
 - iv. Achieve 'High Traction Range' readings when tested in accordance with ANSI B101.1.
 - v. Coefficient of Friction: Greater than 0.60 dry, Greater than 0.60 wet when tested in accordance with ASTM C1028.
 - vi. Stain Resistance: Achieve limited or no adverse effects when tested in accordance with ASTM D1038.
 - vii. UV Stability: No degradation or yellowing of material when tested in accordance with ASTM G154.
3. Modified silane blend, penetrating clear, reactive sealer.
 - a. Product: Consolideck SLX 100 Water & Oil Repellent, manufactured by PROSOCO, Inc., Lawrence, KS, (800) 255-4255, www.prosoco.com.

- b. Subject to compliance with the following requirements:
 - i. Comply with national, state and district AIM VOC regulations.
 - ii. Achieve 'High Traction Range' readings when tested in accordance with ANSI B101.1.
 - iii. Coefficient of Friction: Greater than 0.60 dry, greater than 0.60 wet when tested in accordance with ASTM C1028.
 - iv. Stain Resistance: Achieve limited or no adverse effects when tested in accordance with ASTM D1038.
 - v. Water Vapor Transmission: 100 percent retained when compared to untreated samples when tested in accordance with ASTM E96/96M Method B (Water Method).
 - vi. UV Stability: No degradation or yellowing of material when tested in accordance with ASTM G154.
- 4. Water-based, penetrating clear sealer with a VOC content of 100 g/L or less shall repel and prevent stains from water and oil substances.
 - a. Product: Consolidack Concrete Protector, manufactured by PROSOCO, Inc., Lawrence, KS, (800) 255-4255, www.prosoco.com.
 - b. Subject to compliance with the following requirements:
 - i. Comply with national, state and district AIM VOC regulations.
 - ii. Achieve 'High Traction Range' readings when tested in accordance with ANSI B101.1.
 - iii. Coefficient of Friction: Greater than 0.60 dry, greater than 0.60 wet when tested in accordance with ASTM C1028.
 - iv. Stain Resistance: Achieve limited or no adverse effects when tested in accordance with ASTM D1038.
 - v. Water Vapor Transmission: 100 percent retained when compared to untreated samples when tested in accordance with ASTM E96/96M Method B (Water Method).
 - vi. UV Stability: No degradation or yellowing of material when tested in accordance with ASTM G154.

2.3 EQUIPMENT

- A. Auto Scrubber Machine: For cleaning operations.
- B. Burnishing Machine and Diamond Impregnated Burnishing Pads to produce specified results.
 - 1. Burnishing Machine: High speed burnisher, generating pad speeds of 1,500 RPM or higher, as recommended by diamond impregnated burnishing system manufacturer. Dust skirt must be installed at time of work.
 - 2. Diamond Impregnated Burnishing Pads:
 - a. Resin Diamond Pad Grit Sizes: 800, 1500 or 3000 grit.

2.4 CONCRETE MAINTENANCE SUPPLIES

- A. Concrete Maintenance Cleaner: Lithium silicate concentrated maintenance cleaner to keep maintain concrete surface sheen and remove dirt and soils.
 - 1. Consolidack LSKlean ULTRA [15] [30], pre-measured 4 oz packs, manufactured by PROSOCO, Inc., www.prosoco.com, (NO SUBSTITUTE).
- B. Floor Maintenance Pads:
 - 1. White floor maintenance pads.

- C. Spill Clean-up Kit: Provide critical cleaning items to remove spills from concrete floors. Spill Clean-up Kit should include the following:
1. One quart of Consolideck Cleaner Degreaser, one quart of Consolideck Oil and Grease Remover, two pound Spill Guard Neutralizer Absorbent, one package of multi absorbent shop towels, one small plastic scraper, one hand broom and dust pan, a collapsible warning sign, 50 waste bags liners for 24 x 24 can liner, and one box of general purpose vinyl gloves.

PART 3 EXECUTION

3.1 EXAMINATION

- A. Examine substrate with installer present for conditions affecting performance of finish. Correct conditions detrimental to timely and proper work. Notify the [Architect][Owner's Representative] in writing of conditions detrimental to the proper and timely completion of the work.
- B. Do not begin installation until unsatisfactory conditions are resolved. Beginning work constitutes acceptance of site conditions and responsibility for defective installation caused by prior observable conditions.

3.2 PREPARATION

- A. Clean dirt, dust, oil, grease and other contaminants that interfere with penetration or performance of specified product from surfaces.
- B. Remove remnants of curing compound, bond breaker, and construction laitance prior to application of densifier. Remove by cleaning and scrubbing in accordance with manufacturer's instructions.
- C. Repair, patch and fill cracks, voids, defects and damaged areas in surface as approved by the [Architect][Owner's Representative]. Allow repair materials to cure completely before application of product.
- D. Scrub floor with pre-densifier floor cleaner to remove latent salts.
- E. Do not proceed until unsatisfactory conditions have been corrected.

3.3 APPLICATION OF CONCRETE HARDENER/DENSIFIER

- A. Cured Steel Troweled Concrete: Apply concrete hardener/densifier to cured steel troweled concrete. Apply according to manufacturer's written instructions and as follows:
1. Remove remnants of bond breakers, curing agents, surface grease and oil and construction debris. Contact manufacturer for recommended cleaner and cleaning method.
 2. Apply hardener/densifier per manufacturer's recommended application rate to designated finished floor area, with a low pressure sprayer fitted with a 0.5 gpm spray tip.
 3. Apply sufficient material to wet the surface without producing puddles. Use a clean microfiber pad to spread the hardener/densifier evenly to achieve uniform wetting. Avoid spreading once drying begins. Surface should remain wet for 10 to 15 minutes. Avoid over-application. (Scrubbing is not necessary) Allow treated surface to dry.
 4. Apply second coat of concrete hardener/densifier, as necessary to product desired finishing results.
 5. Once thoroughly dry, concrete may be auto-scrubbed or burnished with slab surface refinement system.

3.4 INTERIOR CONCRETE SLAB SURFACE REFINEMENT SYSTEM

- A. Sequential progression of surface refinement shall be required and limited to no more than double the grit value of the previous diamond grit used after application of the concrete hardener/densifier.
- B. Overlap adjacent burnishing passes by 25 percent
- C. Perform each pass perpendicular to the other pass north/south then east/west; multiple passes may be needed.
- D. Progressively refine surface utilizing approved diamond impregnated burnishing system, to produce Finishing Requirements.

3.5 APPLICATION OF INTERIOR CONCRETE PROTECTIVE TREATMENT

- A. Application of general purpose, high gloss protective treatment:
 - 1. Apply per manufacturer's published recommendations to clean, dry slab at the completion of mechanically polishing the slab surface.
 - 2. Lightly wet a clean microfiber pad with protective treatment and wring out excess, leaving the pad damp.
 - 3. Working from one control joint to another, apply a light, fine spray of protective treatment to a small section of the floor using a clean, pump-up sprayer fitted with a 0.5 gpm spray tip, at an estimated coverage rate of 2000 to 3000 square feet per gallon.
 - 4. Using the damp microfiber pad and firm downward pressure, immediately spread the protective treatment to produce a thin, even coating. Spread the product as far as possible while maintaining a wet edge. Properly applied, protective treatment dries quickly. Stop spreading once drying begins. Avoid overlapping.
 - 5. Allow to dry tack free, typically 20 to 60 minutes.
 - 6. Once dry, high- speed burnish slab surface fitted with manufacturer recommended burnishing pad to increase gloss and to help the treatment fuse and bond with the concrete for increased durability and longevity. Surface temperatures immediately behind the burnisher must achieve 90.5 degrees Fahrenheit. (Burnish between coats if multiple applications are desired.)
 - 7. Repeat above steps 1 through 6, as necessary for additional applications of protective treatment, to achieve desired final finish (Maximum 3 coats).
- B. Application of general purpose, medium gloss protective treatment:
 - 1. Apply per manufacturer's published recommendations to clean, dry slab at the completion of mechanically polishing the slab surface.
 - 2. Lightly wet a clean microfiber pad with PolishGuard and wring out excess, leaving the pad damp.
 - 3. Spray-apply protective treatment using a clean, pump-up sprayer fitted with a 0.5 gpm conical or fan spray tip at an estimated coverage rate of 400 to 800 square feet per gallon. Work from one control joint to another.
 - 4. Spread with the damp microfiber pad. Maintain a thin, even coating and wet edge. Stop spreading once drying begins. Do not overlap. Repeat steps 1 through 4. Two coats are recommended for maximum protection.
 - 5. To increase gloss, wait at least 60 minutes after the final coat is applied, then use a high-speed burnisher fitted with a white polishing pad. Burnish at a fast walking pace.
- a. Application of a modified silane blend, penetrating clear reactive oil and water protective treatment with a VOC content of 400 g/L or less:
 - 1. Apply per manufacturer's published recommendations to clean, dry slab at the completion of mechanically polishing the slab surface.
 - 2. Apply in a single application in a well-ventilated area, at an estimated coverage rate

- of 200 to 600 square feet per gallon. Use enough material to keep the surface wet for about a minute before penetrating. Do not atomize.
3. Remove all puddles thoroughly per manufacturer's recommendations until protective treatment completely penetrates the surface.
 4. Wipe down excess with a clean, absorbent towel.
 5. Do not burnish slab.
- D. Application of water-based, penetrating oil and water protective treatment with a VOC content of 100 g/L or less:
1. Apply per manufacturer's published recommendations to clean, dry slab at the completion of mechanically polishing the slab surface.
 2. Apply saturating application at an estimated coverage rate of 400 to 800 square feet per gallon. Do not atomize.
 3. Even out all puddles with a microfiber applicator before material has a chance to fully dry.
 4. Do not burnish slab.

3.6 FINISHING REQUIREMENTS

- A. Appearance:
1. Interior exposed finished slab areas must consist of the following:
 - a. Slab surface must meet the desired sheen, as discussed in Pre-Installation meeting and be consistent with approved Mock-up.
 - b. Slab surface must have a consistent look and exhibit a finish that has no evidence of streaking or burnish marks.
 - c. White residue or hazy appearance is not acceptable.
 - d. Exposure of aggregate beyond CPAA Class [A-Cream][B-Fine Aggregate][C-Medium Aggregate][D-Large Aggregate] is not acceptable.
 2. Interior exposed finished slab areas must consist of the following CPAA Gloss Level:
 - a. [Finished Gloss Level 1 — Flat Gloss Appearance.]

3.7 SLAB PROTECTION

- A. Protect finished floors to prevent damage including staining, gouges and scratching by construction traffic and activities until possession.
- B. Do not drag or drop equipment or material across the slab which will scratch or chip it.
- C. Inspect tires for debris prior to use on slab. Remove embedded items which may cause damage to floor slab. .
- D. Clean up spills on slab immediately. Provide cleaning chemicals and absorptive materials.
- E. Develop a concrete protection procedure which addresses the following procedures:
 1. Communication of protection plan to subcontractors and vendors.
 2. Procedures for cleaning up slab spills, including use of and availability of cleaning chemicals and absorptive materials at Site.
- F. Provide a clean slab surface using concrete maintenance cleaner within an auto scrubber, equipped with soft nylon brushes, in accordance with manufacturer's published recommendations.

3.8 CLOSEOUT ACTIVITIES

- A. Provide and post the laminated methods for maintaining final finish gloss and cleanliness of concrete slab surface.
- B. Post 16" x 30" Concrete Floor Maintenance Guidelines provided by concrete flooring chemical manufacturer.
 - 1. Contact PROSOCO, Inc. at 800.255.4255 to obtain colored poster.
- C. Provide Store Manager the following concrete floor maintenance supplies:
 - 1. One Spill Clean-Up Kit.
 - 2. [XX] cases, pre-measured 4 oz Concrete Maintenance Cleaner Packs.
 - 3. [XX] Floor Maintenance Pads.

END OF SECTION

**SECTION 06 10 00
ROUGH CARPENTRY**

PART 1 – GENERAL

1.01 SECTION INCLUDES

A. Rough Carpentry

1.02 REFERENCES

A. ASTM D4601/D4601M – Standard Specification for Asphalt-Coated Glass Fiber Base Sheet Used in Roofing, latest edition.

B. Voluntary Product Standard PS 1 – Structural Plywood; U.S. Department of Commerce / National Institute of Standards and Technology (NIST); latest edition.

C. Voluntary Product Standard PS 20 – American Softwood Lumber Standard; U.S. Department of Commerce / American Lumber Standard Committee; latest edition.

D. Voluntary Product Standard PS 2 – Performance Standard for Wood Structural Panels; U.S. Department of Commerce / NIST; latest edition.

E. ANSI A135.4 – Basic Hardboard; latest edition.

F. WWPAA – Western Lumber Grading Rules; Western Wood Products Association; latest edition.

G. APA – The Engineered Wood Association – APA design and construction guides and technical publications; latest edition.

H. SCAQMD – South Coast Air Quality Management District rules and regulations; latest edition.

I. AWPA – American Wood Protection Association standards, including C1, C2, C3, C9, and C27; latest edition.

J. AWPA C20 – Structural Lumber—Fire-Retardant Treatment by Pressure Process; latest edition.

K. WCLIB – West Coast Lumber Inspection Bureau standard grading rules; latest edition.
ASTM E84 – Standard Test Method for Surface Burning Characteristics of Building Materials.

L. Title 8, California Code of Regulations – Construction Safety Orders; latest edition.

M. ICC-ES – International Code Council Evaluation Service reports (ESR), including legacy reports where applicable; current.

N. RIS – Redwood Inspection Service, Standard Specifications for Grades of California Redwood Lumber; latest edition.

1.03 SUBMITTALS

A. Product data and current ICC Legacy Reports for framing anchors.

1.04 QUALITY ASSURANCE

A. Rough Carpentry Lumber: Visible grade stamp on all products required.

- B. Grade Stamp: Association under whose rules it was graded, or official grade mark of other recognized grading agencies using grading rules, equivalent to WWF•A or WCLIB.
- C. Association performing grading and grade marking of lumber shall be approved by Architect and Division of the State Architect.
- D. Nailing guns and nail operators shall be approved in accordance with Title 8 Construction Safety Orders

1.05 DELIVERY STORAGE AND HANDLING

- A. Do not deliver rough carpentry items until site conditions are adequate to receive the work. Protect items from weather while in transit.
- B. Store lumber and plywood at the site under cover or otherwise protected against exposure to weather, raise above ground and out of contact with damp or wet surfaces. Stack lumber and plywood and provide for air circulation within and around stacks and under temporary covers. For pressure treated lumber and plywood, provide spacers between courses to permit air circulation.

1.06 PROJECT CONDITIONS

- A. Cooperate with other trades in coordinating their work with the work of this section. Provide wood grounds, blocking and nailer where indicated or as required for work of other trades.

PART 2 - PRODUCTS

2.01 ROUGH CARPENTRY MATERIALS

- A. Lumber: Graded in accordance with WWPA or WCLIB; maximum moisture content of 19 percent at time of loading. Provide Douglas Fir Larch for structural and framing lumber, surfaced four sides to standards of the grading association unless otherwise indicated on Drawings, use the following grades:
 - 1. Joists, rafters, beams, lintels, horizontal framing, posts, studs and vertical framing: No. 1 unless otherwise indicated or noted on drawings.
 - 2. Non-bearing studs and plates, non-structural furring, concealed blocking, stripping and miscellaneous nailers and backing: No.2 unless noted otherwise in the structural drawings.
 - 3. Structural Drawings take precedence for lumber grades.
 - 4. All lumber in contact with concrete shall be pressure treated.
- B. Plywood: Section 2303.1.4 CBC, Douglas Fir 1 Group Species, PS 1, APA Structural I Rated Sheathing. Bond Classification: Exterior. Thickness as indicated, span rating sized for spacing.
 - 1. For natural finished plywood: Panel Grade N veneer on face and B on back side.
 - 2. For painted finish: APA Sanded Plywood Panels, A-C Group 1, Exterior, sanded face, touch sanded back side.
 - 3. Thickness: Minimum 5/8" [3/4 inch] or as indicated on Drawings.
 - 4. Plywood shall be FSC certified; other sustainable forestry certifications will not be acceptable.
- C. Preservative (Preservative (Pressure) Treated Lumber: Section 2303.1.8 Conform to AWPA Manual of Recommended Practice, kiln dry after treatment. Use preservative complying with AWPA C2 lumber and C9 plywood, latest edition. Products NOT containing arsenic or chromium. Conform to AQMD, Local Regulations.
 - 1. Douglas Fir Larch, used as required by Section 2303, CBC, shall conform to the following:
 - a. Lumber shall be WWPA or WCLIB grade stamped.
 - b. Lumber shall be No. 1 grade or better unless indicated otherwise on Drawings

D. Waterproof Membrane: ASTM 04601; Type II, asphalt saturated glass felt.

E. Plywood Backing Panels

1. Telephone and Electrical Equipment, fixed equipment, cabinets, grab bars, door stops and plates: DOC PS 1, Exposure 1, APA A-C, sanded, Veneer Grade, fire- retardant treated, in thickness indicated or, if not indicated, not less than 5/8 inch nominal thickness. Installed "A" side out for paint finish.

F. Nails, Spikes and Staples: Section 2304.9 CBC, Galvanized for exterior applications, high humidity locations and treated wood; plain finish for other interior locations; size and type to suit application. Comply with Table 2304.9.1. Use common nails only.

G. Bolts, Nuts, Washers, Lags, Pins and Screws: Section 2304.9 CBC, sized to suit application, galvanized for exterior locations, high humidity locations and treated wood, plain finish for other interior locations. Full diameter body bolts only per ASME B18.2.1(.2) or B18.2.6 for structural applications.

H. Fasteners: Expansion type or powder actuated type for anchorage to solid masonry or concrete. Refer to Division 01, General Requirements for acceptable types and required testing.

I. Stock Framing Connectors: Section 2304.9 CBC types indicated on Drawings, galvanized, with nails fully driven in all holes in each face of connector. Conform to the following.

1. Manufacturers: Simpson Strong Tie Co., Inc., San Leandro CA, United Steel Products, Montgomery, MN or equal as approved in accordance with Division 01 General Requirements for Substitutions.
2. ICC listed.

J. Non-Stock Framing Connectors: Conform to details.

K. Non-shrink Grout: ASTM C1107, premixed compound consisting of non-metallic aggregate, cement, water reducing and plasticizing agents; capable of developing minimum compressive strength of 5,000 psi in 24 hours and 8,000 psi in 7 days: of consistency for application and a 30 minute working time. Acceptable Manufacturers: Dayton Superior, Miamisburg, OH; Sonnetborn, Shakopee, MN; Novex Systems International, Clifton NJ, or equal.

PART 3 EXECUTION

3.01 FRAMING, FURRING AND STRIPPING

- A. Erect wood framing, furring, stripping and nailing members true to lines and levels. Do not deviate from true alignment more than 1/4" (inch) in 10' (feet), non-cumulative.
- B. Construct members of continuous pieces of longest possible lengths.
- C. Construct and erect required headers and lintels
- D. Double wall framing members at openings over 100 square inches. Space short members above and below openings in same manner as for walls.
- E. Provide double joists headers at joist ends and around openings unless otherwise indicated on Drawings. Bridge joists and rafters to conform Section 2304 CBC and as noted on plans. For pre-manufactured joists, provide bridging in accordance with manufacturer's recommendations.
- F. Construct walls with studs of size and spacing indicated, 16 inches on center unless otherwise indicated on drawings. Install single sill member at bottom and double plate at top. Stagger upper and lower

members of double plate with joints not less than 4 feet o.c. or as indicated on Drawings. Where sill or any wood member contacts concrete or masonry, install preservative-treated lumber.

- G. Provide one row of solid blocking not less than 2 inch nominal thickness and same width of stud at ceiling and floor lines and at spacing not to exceed 8 feet on center vertically. Fit snugly and attach with not less than two 16d nails.
- H. Install three (3) studs at corners.
- I. Cutting and Notching: Conform to Section 2308.9.10, CBC.

3.02 PLYWOOD SHEATHING

- A. Thickness as indicated on the Drawings, *minimum* thickness 1/2 inch.
- B. Boundary Nailing: Not less than 3/8 inch from edge, spaced not more than 6 inches on center, unless noted otherwise on Drawings.
- C. Blocking: Panel edges shall bear on framing members or solid blocking.
- D. Minimum Size Vertical Panel: 16 inches wide.
- E. Minimum Size Horizontal Panel: 24 inches wide.
- F. Oriented Strand Board is not permitted for shear panels unless indicated on structural drawings.

3.03 FOUNDATION FRAMING, PLATES, SILLS AND SLEEPERS

- A. Preservative treated wood required. Set wood sills on a bead of continuous Butyl Sealant on both sides of sill.
- B. End clearance for lumber entering concrete: 1/2 inch minimum.

3.04 HORIZONTAL FRAMING

- A. Bearing: 1-1/2 inch minimum on wood or metal, 3 inches on masonry. Lay framing members with crown up. Members with knots at bottom not permitted.
- B. Lateral Support: Use solid blocking, cross bridging or other approved means.
- C. Lap joists a minimum of 3 inches when framed from opposite sides of a beam. Do not run joists continuous beyond one span unless indicated otherwise on Drawings.
- D. Openings: Double joists required for trimmer and headers for openings 4 ft. or larger unless indicated otherwise on Drawings.
- E. Treat ends of timber beams and posts exposed to weather by dipping in water-repellent preservative for 15 minutes.

3.05 INSTALLATION OF BACKBOARDS

- A. Provide backing panels as indicated on Drawings to support telephone and electrical equipment, fixed equipment, cabinets, grab bars, door stops and plates. Fasten securely to framing. Ensure that the

backing panels are installed with good side out (whose face side is free of blemishes) side by side, no mix of sides allowed.

- B. Install to extent indicated on the drawings or as required for electrical or communication system installation
- C. Install with sheet metal screws, No. 10 minimum, at 12 inches on center minimum. Drywall screws will not be permitted.
- D. Prime paint exposed faces. Do not cover manufacturer's trade stamps indicating fire treatment.
- E. Final finish per section 09 90 00, Painting.

END OF SECTION

**SECTION 06 41 16
CASEWORK**

PART 1 – GENERAL

1.01 SECTION INCLUDES

- A. Fabricated base cabinet units.
- B. Fabricated countertops.

1.02 REFERENCES

- A. ADA – Americans with Disabilities Act of 1990
 - 1. ADA Title II Regulations
- B. CACRM - California Access Compliance Reference Manual, updated based on the 2025 California Building Code.
- C. CBC – 2025 California Building Code
 - 1. CBC-11 – CBC Chapter 11B, Accessibility to Public Buildings, Public Accommodations, Commercial Facilities and Publicly Funded Housing
 - 2. CBC-16 – CBC Chapter 16A, Structural Requirements (for DSA)
- D. NEMA LD 3 - High Pressure Decorative Laminates: National Electrical Manufacturers Association, 2005 Edition.
- E. DOC PS 20 – American Softwood Lumber Standards
- F. DOC PS 1-07 – Department of Commerce Product Standard, U.S. Product Standard for Construction and Industrial Plywood.
- G. WI – Woodwork Institute, Manual of Millwork, Latest Edition.
- H. ANSI A208.1 – Particleboard.
- I. ANSI A208.2 – Medium-Density Fiberboard.
- J. ASTM E84 – Standard Test Method for Surface Burning Characteristics of Building Materials.
- K. California Title 17 Division 3 Subchapter 7.5 – Airborne Toxic Control measures, Section 93120.1 through 93120.12
- L. SCAQMD — South Coast Air Quality Management District Regulations Rule 1168 Adhesive and Sealant Applications.

1.03 SUBMITTALS

- A. Action/Informal
 - 1. Shop drawings including materials, component profiles, fastening methods, assembly methods, joint details, accessory listings and schedule of finishes.
 - 2. Product data.
 - 3. Three hardware sample boards identified with the project name, cabinet manufacturer's name and address and one item of each type of hardware specified for installation.
 - 4. Complete line of plastic laminate chips, in wood grains and solid colors, identified with the manufacturer's name and chip number.

- B. Record
 - 1. Statement of qualifications form fabricator
 - 2. WI Certifications

- C. Closeout
 - 1. Record Documentation

1.04 QUALITY ASSURANCE

- A. Qualifications
 - 1. Fabricator: Company specializing in manufacturing the products specified in this section with minimum five years documented experience.
- B. Cabinets and countertops shall be manufactured in accordance with Sections 15, 16 of the latest edition of the Manual of Millwork of the Woodwork Institute for Grade specified herein or to higher standards as specified herein.
- C. Before delivery to the jobsite, the casework supplier shall submit a WI Certified Compliance Certificate (Certified Compliance Program) indicating the products furnished for this job, and certifying that they will fully meet all the requirements of the grade or grades specified.
- D. Each elevation of casework and countertop shall bear a Certified Compliance Label.
- E. First page of shop drawings shall bear the WI Certified Compliance Label Shop drawings not conforming to this requirement will be rejected.
- F. Statement shall appear prominently on the shop drawings certifying that all casework construction complies with the structural requirements of Table 1607A.1, California Building Code for required horizontal force factor for anchorage of non-structural components.
- G. One (1) copy of the latest issue of the WI Manual of Millwork shall be made available for reference at the jobsite throughout the installation period.
- H. Inspections by Authorized WI inspectors shall be made in accordance with the following schedule:
 - 1. Shop Inspection at place of manufacturer, prior to initial shipment of cabinet components to site.
 - 2. Site inspection immediately following installation of first cabinet component.
 - 3. Site inspection immediately following final installation of all cabinet work.
 - 4. Additional site inspections may be required at the option of the Architect and at no cost to the Owner when certified WI inspection reports indicate unsatisfactory conformance with specified requirements.
 - 5. Provide full written reports to Architect.
- I. Written confirmation of all WI inspections shall be submitted, including a WI Certified Compliance Certificate for installation.
- J. WI Certification costs shall be included.

1.05 DELIVERY STORAGE AND HANDLING

- A. Deliver all materials only when the project is ready for installation and a clean storage has been provided in accordance with the WI Manual of Millwork

PART 2 - PRODUCTS

2.01 ACCEPTABLE MANUFACTURERS

CASEWORK

- A. Products of the following laminate materials manufacturers form the basis for design and quality intended.
1. Formica Corporation, Cincinnati, OH.
 2. Wilsonart International, Temple, TX.
 3. Nevamar Corporation, Odenton, MD.
 4. Pionite Decorative Laminates, maurnee, IL.
 5. Laminart, Elk Grove Village, IL.
 6. Or equal as approved in accordance with Division 01, General Requirements for Substitutions.

2.02 GRADES

- A. Provide plastic covered casework in accordance with WI Manual of Millwork, Section 15 for Premium Grade.
- B. Construction Style: Style A frameless.
- C. Construction Type: Type I multiple self-supporting units rigidly joined together.
- D. Door and Drawer Front Style: Flush Overlay.

2.03 CASEWORK UNITS

- A. Casework indicated on drawings shall conform to model Series described below:
1. Base Cabinets: 100 Series
 2. Drawer Base Cabinets: 200 Series
 - a. File drawers with built-in steel rail system for hanging folders.
 3. Tall Storage Cabinets: 400 Series.
 4. Tall Wardrobe Cabinets: 500 Series
 5. Library Cabinets: 600 Series

2.04 LAMINATE MATERIALS

- A. Plastic Laminate Cabinet Surfaces: NEMA LD 3, ASTM E84, Class B, Decorative High Pressure Laminate, General Purpose type, 0.028 inch thick at vertical surfaces, 0.050 inch thick at horizontal surfaces and 0.042 inch thick for post-formed work. Colors as selected, in wood grains, patterns or solids. Architect shall have option of selecting up to 6 colors and minimum of 3 colors per individual casework unit. Conform to Section 15, WI Manual of Millwork.
- B. Plastic Laminate Countertops: NEMA LD 3, ASTM E84, Class B, Decorative High Pressure Laminate, General Purpose type, 0.042 inch thick when post-formed, 0.050 inch thick when flat. Colors as selected in wood grains, patterns or solids. Architect shall have option of selecting up to 3 colors per individual countertop. Conform to Section 16, WI Manual of Millwork.
- C. Laminate Backing Sheet: NEMA LD 3 BKV Backing Grade, non-decorated high plastic laminate, with face material of 0.028 inch.
- D. Cabinet Liner: NEMA LD 3, CLS grade 0.020 inch thick, high pressure laminate.
- E. Semi-exposed Areas of Cabinets: High Pressure Laminate Cabinet Liner CLS except as specified herein.
1. Apply Decorative High Pressure Laminate, General Purpose, to all surfaces visible from a seated or standing position, including interior surfaces of open casework, shelving, and casework with glass doors, to sloped tops and to tops up to 72 inches above floor or visible from an upper level.
 2. Apply Decorative High Pressure Laminate, General Purpose, to shelving and Horizontal surfaces
- F. Refer to Section 09 06 00 Schedules for Finishes
1. Multiple plastic laminate colors at various horizontal and vertical surfaces as selected by Architect, (no less than 4 colors per cabinet).

2.05 WOOD MATERIALS

- A. Softwood Lumber: PS 20; Graded in accordance with WI Custom Grade, Douglas Fir, Hemlock, Ponderosa Pine or Sugar Pine

2.06 CORE MATERIALS

- A. Core, the following:
 - 1. Medium Density Fiberboard: ANSI A208.2, no added urea formaldehyde binder, minimum 80 percent post-consumer recycled content

2.07 ACCESSORIES

- A. Adhesives: Phenol resin with catalytic agent set under a pressure of not less than 30 lbs/sq/in or any contact adhesive that has been tested in accordance with the PS 1 for Type II Adhesive and Heat Resistance Test set forth in the WI Manual of Millwork and specifically approved by WI for the area in which the Project is located.
 - 1. Adhesives applied on-site shall comply with VOC content limits defined by SCAQMD Rule 1168.
- B. Fasteners: Size and type to suit application.
- C. Bolts, Nuts, Washers, Lags, Pins and Screws: Of size and type to suit application.
- D. Support angle brackets for countertops: 18" brackets, steel angle 1/4" thick, 2" legs, mitered and welded, ground smooth, unless noted otherwise on drawings, install at 16" on center. Finish: baked enamel, off white.
- E. Doorstop Blocks: Nylon type, 1 inch x 1 inch x 2 inches long.
- F. Cable Grommets: Molded-plastic grommets 3 inch diameter and matching plastic caps with slot for wire passage, Hafele 429.99, color: black [Doug Mockett Company, brushed stainless steel, 3" diameter].
- G. Edge Banding: High Pressure Plastic Laminate, Premium Grade at countertops and High Pressure Plastic Laminate at drawer, shelves and cabinet door edges.
- H. Countertop Brackets: Surface-mounted Brackets (EH-1818) for up to 24 inches deep counter, manufactured by Rakks Store, Needham, MA or equal.

2.08 HARDWARE

- A. Conform to Appendix A/Supplement No. 1 to Section 14 and 15, WI Manual of Millwork and CBC Sections 1117B.6 and 1125B.4. Any hardware listed therein may be installed, except where those standards are exceeded as described below: "or equals" as substitutions may be submitted in accordance with Division 01 General Requirements.
 - 1. Drawer Slides: Minimum 100 lb. capacity all drawers. Full extension ball bearing type only, Accuride 3832C for 24 in. wide or less and 3640 full extension 200lbs rated, for 42 in. wide or less.
 - 2. Drawer Slides-Lateral files: Minimum 200 lb. capacity all drawers. Full extension ball bearing type only, Accuride 3640
 - 3. Wall Shelf Standards: Knape & Vogt #87 Heavy duty type. Bracket KV#18Z.
 - 4. Wall Cabinet Shelf Standards and Clips:
 - a. Flush type Brackets: KV#255BR steel:
 - 1. Closed Shelves Clips: KV #256 clips.
 - 2. Open Shelves Clips: KV #243ZC, let-in and screwed in place, for seismic restraint.

5. Hinges: ANSI/BHMA Grade 1, Sizes: to fit door and panel thickness.
 - a. Institutional heavy-duty wrap-around, 5-knuckle, 0.095 inch steel, S2mm boring system on side panel, by RPC-Rockford Process Control, Inc.
6. Wire Pulls: "U" shaped, Trimco/BBW No. 562-4, 4 inch stainless steel.
7. Locks: 6 pin cylinders:
 - a. Schlage CL100 door locks and CL200 drawer locks, Schlage "C" keyway, 6-pin.
 - b. Key to match building keying system. Keying: Each room keyed differently. Each Area keyed differently from other Areas of site. "Area" is defined as like room type.
8. Elbow Catches: EPCO 1018 Nickel, solid brass, at inactive cabinet door leaf.
9. Magnetic Catches: EPCO 591, all cabinet doors, 5 pound holding strength.
10. Coat Hooks: wall mounted, single; Ives IV581AM. Double: Ives IV582AM, mount at 44 inches maximum height AFF.
11. Sliding Door Pulls: Wire Pulls, "U" shaped, Trimco/BBW No. 562-4, 4 inch, stainless steel.
12. Keyboard and pencil Slide: 75 lb. Accuride 2109, fully adjustable.

B. Finish: US-26D, Dull Chrome (Satin Chromium) plated.

2.08 FABRICATION

- A. Shop assemble casework for delivery to site in units easily handled and to permit passage through building openings.
- B. When necessary to cut and fit on site, provide materials with ample allowance for cutting.
- C. Apply plastic laminate finish in full uninterrupted sheets consistent with manufactured sizes. Make corners and joints hairline. Locate counter butt joints minimum 2 feet from sink cutouts. All patterns to run in the same direction.
- D. Install one door stop block screwed on the inside bottom of the inactive leaf to prevent the door from being pushed down to gain entry at all double doors base cabinets. Secure with 2 screws 1-1/2 long at each block.
- E. Provide cutouts for plumbing fixtures, inserts, appliances, outlet boxes, and other fixtures and fittings. Verify locations of cutouts from on-site dimensions. Seal contact surfaces of cut edges.
- F. Countertop Backsplash: Integral coved splash joint, unless otherwise noted on drawings.
- G. High Pressure Plastic Laminate Countertop Edges:
 1. Square edge: Self edge laminate
- H. Edge Banding: High Pressure Laminate with hot melt adhesive applied, prime before application of adhesive at drawers, doors.
- I. Shelf Loading: 50 lbs. per square foot or 50 lbs. per cubic foot of total volume of cabinet whichever is less. In no case shall unsupported shelf exceed 36" wide without mid support. Conform to Table 1607A.1, California Building Code.
- J. Shelf Thickness: 1 inch. All shelf edges to be finished with High Pressure Laminate with hot melt adhesive

- K. Install one grommet per workstation or at every 48 inches of work counter.

PART 3 EXECUTION

3.01 PREPARATION

- A. Verify adequacy of backing and support framing

3.01 INSTALLATION

- A. Set and secure casework in strict accordance with the WI Manual of Millwork.
 - 1. Set shelves on specified clips, secure with wood screws each clip, front only. Confirm shelves spacing with owner, do not proceed without Owners approval.
- B. Casework shall be anchored to walls or floors or both. Conform to Table 1607A.1 CBC anchorage requirements per Section 1604A.8.
- C. Countertop Brackets: Install to support counters that would be supporting computers at Maximum spacing of 48" (inches) on center.

3.03 ADJUSTING AND CLEANING

- A. Adjust doors, drawers, hardware, fixtures and other moving operating parts to function smoothly and correctly.
- B. Clean casework, counters, shelves, hardware, fittings and fixtures.

END OF SECTION

**SECTION 07 21 00
THERMAL INSULATION**

PART 1 – GENERAL

1.01 SECTION INCLUDES

- A. Thermal insulation in exterior wall and roof construction.

1.02 REFERENCES

- A. ASTM - American Society for Testing Materials
 - 1. ASTM C 165 - Test Method for Measuring Compressive Properties of Thermal
 - 2. ASTM C 356 - Test Method for Linear Shrinkage of Preformed High-Temperature Thermal Insulation Subjected to Soaking Heat
 - 3. ASTM C 612 - Mineral Fiber Block and Board Thermal Insulation
 - 4. ASTM C 665 - Mineral Fiber Blanket Thermal Insulation for Light Frame Construction and Manufactured Housing
 - 5. ASTM C 1104 - Test Method for Determining the Water Vapor Sorption of Unfaced Mineral Fiber Insulation
 - 6. ASTM C 1304 - Test Method for Assessing the Odor Emission of Thermal Insulation Materials
 - 7. ASTM C 1338 - Test Method for Determining Fungi Resistance of Insulation Materials and Facings
 - 8. ASTM D 816 - Rubber Cements
 - 9. ASTM E 84 - Surface Burning Characteristics of Building Materials ASTM E96 - Test Methods for Water Vapor Transmission of Materials
 - 10. ASTM E 136 - Test Method for Behavior of Materials in a Vertical Tube Furnace at 750°C
- B. CBC – 2025 California Building Code
 - 1. CBC-7 – CBC Chapter 7, Fire Resistance Rated Construction
- C. Title 24 California Code of Regulations Part 6 Resistance Rated Construction
- D. SCAQMD – South Coast Air Quality Management District Regulations Rule 1168 Adhesive and Sealant Application.

1.03 PERFORMANCE REQUIREMENTS

- A. Materials shall provide continuity of thermal barrier at building enclosure elements.
- B. Materials shall provide continuity of sound barrier at designated room enclosure elements.
- C. Materials shall conform to Section 719, California Building Code and Section 118 California Energy Code.

1.04 SUBMITTALS

- A. Product Data: Provide data on product characteristics, performance criteria and methods of installation.
- B. Three samples of each material specified minimum 12 inches square. Provide fasteners, clips and other accessories.
- C. Certification of Compliance with 2025 California Energy Code, Section 110.8

1.05 QUALITY ASSURANCE

- A. Provide U-Value in accordance with 2025 California Energy Code, Section 120.7.

- B. Adhesives shall comply with VOC content limits defined by SCAQMD Rule 1168.

PART 2 - PRODUCTS**2.01 MANUFACTURERS**

- A. Products of following manufacturers form basis for design and quality intended:
1. John Manville Insulations, Comercial/Industrial Division, Denver, CO.
 2. Certainteed Corporation, Valley Forge, PA.

2.02 MATERIALS – THERMAL

- A. Batt Insulation: ASTM C665, Type III, Class A, Category 1. Preformed, faced, formaldehyde-free glass fiber batt insulation, with tabs, conforming to following:
1. Thermal Resistance - R-values as noted in energy calculation or-prescriptive compliance documents.
 2. Batt Size – As required to fully fill cavity width and height or length.
 3. Thickness – As required to meet specified R-value without compression.
 4. Facing – Faced on one side with flame resistant foil facing.
 5. Flame Spread – Less than 25, ASTM E 84
 6. Smoke Developed Rating – Maximum 50, ASTM E 84
 7. Permeance – 0.05 perms, ASTM E 96
 8. Recycled Content – Minimum 25 percent

2.03 MATERIALS - SOUND

- A. Sound Attenuation Insulation: ASTM C665, Type I; preformed glass fiber, formaldehyde-free, "Sound Control Batts", acoustical fiber glass insulation, by Johns Manville or equal. Conforming to the following:
1. Size – As required to fully fill cavity width and height.
 2. Thickness – 3-5/8" for 4" walls and 6-1/2" for 6" walls, minimum 10" thick between floors
 3. Facing – unfaced
 4. Flame Spread – Less than 25, ASTM E 84
 5. Smoke Developed Rating Maximum 50
 6. Formaldehyde-free
 7. Recycled Content – Minimum 25 percent.

2.04 ACCESSORIES

- A. Fasteners, type and size to suit application
- B. Tape: Acrylic with Polypropylene backing, Class A, flame spread less than 25, adhering type, 2-1/2 inch wide; No. 8086 CONTRACTOR SHEATHING TAPE, manufactured by 3m Company, St. Paul, MN, or equal as approved in accordance with Division 01, General Requirements for substitutions.
- C. Insulation Fasteners: Steel impale spindle and clinch shield on flat metal base with applied adhesive, length to suit insulation thickness, capable of securely and rigidly fastening insulation in place; INSUL-ANCHORS, manufactured by Gemco, Dansville, OH, or equal as approved in accordance with Division 01, General Requirements for substitutions. Self-adhesive base plates are prohibited.
- D. Adhesive: Tuff Bond Hanger Adhesive manufactured by Gemco, Dansville, OH, or equal as approved in accordance with Division 01, General Requirements for Substitutions.
- E. String wire: minimum 18 gauge galvanized steel wire.
- F. Do not use salvage cut-offs, materials less than space width, or in multiple short lengths to fill-in the gaps

PART 3 EXECUTION

3.01 EXAMINATION

- A. Verify site conditions
- B. Verify that substrate and adjacent materials are satisfactorily installed and in place and ready to receive insulation.

3.02 INSTALLATION

- A. Install insulation in accordance with insulation manufacturer's instructions
- B. Install in cavities designated to receive sound or thermal insulation without gaps or voids. Extend material full height of cavity.
- C. Cut insulation to fit tightly at cavities between studs not standard 16 inches on center spacing.
- D. Trim insulation neatly to fit spaces.
- E. Fit insulation tight in spaces and tight to exterior side of mechanical and electrical services within the plane of insulation. Leave no gaps or voids.
- F. Extend thermal materials full height of cavity to structural above and as otherwise required to produce a completely insulated building envelope.
- G. Extend sound materials full height of cavity to structure above and as otherwise required to produce a completely sound insulated enclosure.
- H. Tape and seal butt ends, lapped flanges, and tears or cuts in foil in thermal batts. Friction fit semi-rigid sound insulation batts in cavities, no gaps voids permitted.
- I. Install material to preclude slipping from place by use of nails, screws, wires or other approved fastening devices.
- J. In wall cavities above ceilings with no finish or finish on one side, retain insulation in place with 16-gauge galvanized annealed wires spaced 12 inches on centers vertically.
- K. At roof insulation, provide minimum of 1 inch air space between insulation and roof sheathing.
- L. Where tight, congested, difficult or otherwise unforeseen conditions are encountered, employ alternate application methods or materials to effect the intended insulation system. Alternate methods or materials will be approved by Architect.

3.03 INSPECTION

- A. Notify Project Inspector before Work is covered. Approval by Project Inspector shall be received before any Work is concealed. Work that has been covered prior to inspection and approval shall be uncovered for inspection and recovered.

END OF SECTION

**SECTION 07 92 00
JOINT SEALANTS**

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes:

1. Silicone joint sealants.
2. Nonstaining silicone joint sealants.
3. Mildew-resistant joint sealants.
4. Butyl joint sealants.
5. Latex joint sealants.

B. Related Requirements:

1. Section 08 41 13 "Aluminum-Framed Entrances and Storefronts" for structural and other glazing sealants.
2. Section 08 80 00 "Glazing" for glazing sealants.
3. Section 32 13 73 "Concrete Paving Joint Sealants" for sealing joints in paved roads, parking lots, walkways, and curbing.

1.2 PREINSTALLATION MEETINGS

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

1.3 ACTION SUBMITTALS

- A. Product Data:** For each joint-sealant product.

B. Samples for Verification: For each kind and color of joint sealant required, provide Samples with joint sealants in 1/2 inch (13 mm) wide joints formed between two 6 inch (150 mm) long strips of material matching the appearance of exposed surfaces adjacent to joint sealants.

- C. Joint-Sealant Schedule:** Include the following information:

1. Joint-sealant application, joint location, and designation.
2. Joint-sealant manufacturer and product name.
3. Joint-sealant formulation.
4. Joint-sealant color.

1.4 INFORMATIONAL SUBMITTALS

- A. Qualification Data:** For Installer and qualified testing agency.

- B. Product Certificates:** For each kind of joint sealant and accessory, from manufacturer.

- C. Product Test Reports:** For each kind of joint sealant, for tests performed by a qualified testing agency.

- D. Preconstruction Laboratory Test Schedule:** Include the following information for each joint sealant and substrate material to be tested:

1. Joint-sealant location and designation.
2. Manufacturer and product name.
3. Type of substrate material.

4. Proposed test.
5. Number of samples required.

E. Preconstruction Laboratory Test Reports: From sealant manufacturer, indicating the following:

1. Materials forming joint substrates and joint-sealant backings have been tested for compatibility and adhesion with joint sealants.
2. Interpretation of test results and written recommendations for primers and substrate preparation are needed for adhesion.

F. Field-Adhesion-Test Reports: For each sealant application tested.

G. Sample Warranties: For special warranties.

1.5 QUALITY ASSURANCE

A. Installer Qualifications: An authorized representative who is trained and approved by manufacturer.

B. Product Testing: Test joint sealants using a qualified testing agency.

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

C. Mockups: Install sealant in mockups of assemblies specified in other Sections that are indicated to receive joint sealants specified in this Section. Use materials and installation methods specified in this Section.

1.6 PRECONSTRUCTION TESTING

A. Preconstruction Laboratory Testing: Submit to joint-sealant manufacturers, for testing indicated below, samples of materials that will contact or affect joint sealants.

1. Adhesion Testing: Use ASTM C 794 to determine whether priming and other specific joint preparation techniques are required to obtain rapid, optimum adhesion of joint sealants to joint substrates.
2. Compatibility Testing: Use ASTM C 1087 to determine sealant compatibility when in contact with glazing and gasket materials.
3. Stain Testing: Use ASTM C 1248 to determine stain potential of sealant when in contact with porous substrates.
4. Submit manufacturer's recommended number of pieces of each type of material, including joint substrates, joint-sealant backings, and miscellaneous materials.
5. Schedule sufficient time for testing and analyzing results to prevent delaying the Work.
6. For materials failing tests, obtain joint-sealant manufacturer's written instructions for corrective measures, including use of specially formulated primers.
7. Testing will not be required if joint-sealant manufacturers submit data that are based on previous testing, not older than 12 months, of sealant products for adhesion to, staining of, and compatibility with joint substrates and other materials matching those submitted.

1.7 FIELD CONDITIONS

A. Do not proceed with installation of joint sealants under the following conditions:

1. When ambient and substrate temperature conditions are outside limits permitted by joint-sealant manufacturer or are below 40 deg F (5 deg C).
2. When joint substrates are wet.

3. Where joint widths are less than those allowed by manufacturer for applications indicated.
4. Where contaminants capable of interfering with adhesion have not yet been removed from joint substrates.

1.8 WARRANTY

A. Special Installer's Warranty: Installer agrees to repair or replace joint sealants that do not comply with performance and other requirements specified in this Section within specified warranty period.

1. Warranty Period: Two years from date of Substantial Completion.

B. Special Manufacturer's Warranty: Manufacturer agrees to furnish joint sealants to repair or replace those joint sealants that do not comply with performance and other requirements specified in this Section within specified warranty period.

1. Warranty Period: Five years from date of Substantial Completion.

C. Special warranties specified in this article exclude deterioration or failure of joint sealants from the following:

1. Movement of the structure caused by stresses on the sealant exceeding sealant manufacturer's written specifications for sealant elongation and compression.
2. Disintegration of joint substrates from causes exceeding design specifications.
3. Mechanical damage caused by individuals, tools, or other outside agents.
4. Changes in sealant appearance caused by accumulation of dirt or other atmospheric contaminants.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

A. Source Limitations: Obtain each kind of joint sealant from single source from single manufacturer.

2.2 SUSTAINABILITY REQUIREMENTS

A. Comply with applicable provisions in the CGBC.

B. Finish Material Pollutant Control: Finish materials shall comply with CGBC Sections 5.504.4.1 through 5.504.4.6 per CGBC Section 5.504.4.

1. Adhesives, Sealants, and Caulks: Adhesives, sealants, and caulks used on the project shall meet the requirements of the following standards per CGBC Section 5.504.4.1:

- a. Adhesives, adhesive bonding primers, adhesive primers, sealants, sealant primers, and caulks shall comply with local or regional air pollution control or air quality management district rules where applicable, or SCAQMD Rule 1168 VOC limits, as shown in CBC Tables 5.504.4.1 and 5.504.4.2. Such products also shall comply with Rule 1168 prohibition on the use of certain toxic compounds (chloroform, ethylene dichloride, methylene chloride, perchloroethylene, and trichloroethylene), except for aerosol products specified in subparagraph below.
- b. Aerosol adhesives, and smaller unit sizes of adhesives, and sealant or caulking compounds (in units of product, less packaging, which do not weigh more than one pound and do not consist of more than 16 fluid ounces) shall comply with statewide VOC standards and other requirements, including prohibitions on use of certain toxic compounds, of California Code of Regulations, Title 17, commencing with Section 94507.

2. Sealants and sealant primers shall comply with maximum VOC limits listed in CGBC Table 5.504.4.2.

C. VOC Content: Sealants and sealant primers shall comply with the following VOC limits when calculated according to 40 CFR 59, Subpart D (EPA Method 24).

1. Architectural Sealants: 250 g/L.
2. Architectural Sealant Primers for Nonporous Substrates: 250 g/L.
3. Architectural Sealant Primers for Porous Substrates: 775 g/L.

D. Low-Emitting Materials: Sealants and sealant primers shall comply with the requirements of authorities having jurisdiction.

2.3 JOINT SEALANTS, GENERAL

A. Compatibility: Provide joint sealants, backings, and other related materials that are compatible with one another and with joint substrates under conditions of service and application, as demonstrated by joint-sealant manufacturer, based on testing and field experience.

B. Liquid-Applied Joint Sealants: Comply with ASTM C 920 and other requirements indicated for each liquid-applied joint sealant specified, including those referencing ASTM C 920 classifications for type, grade, class, and uses related to exposure and joint substrates.

C. Stain-Test-Response Characteristics: Where sealants are specified to be nonstaining to porous substrates, provide products that have undergone testing according to ASTM C 1248 and have not stained porous joint substrates indicated for Project.

D. Suitability for Contact with Food: Where sealants are indicated for joints that will come in repeated contact with food, provide products that comply with 21 CFR 177.2600.

E. Colors of Exposed Joint Sealants: As indicated on Drawings or, if not indicated, as selected by Architect from manufacturer's full range.

2.4 SILICONE JOINT SEALANTS

A. Silicone, S, NS, 100/50, NT: Single-component, nonsag, plus 100 percent and minus 50 percent movement capability, nontraffic-use, neutral-curing silicone joint sealant; ASTM C 920, Type S, Grade NS, Class 100/50, Use NT.

1. Manufacturers: Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:

- a. Dow Corning Corporation.
- b. GE Construction Sealants; Momentive Performance Materials Inc.
- c. May National Associates, Inc.; a subsidiary of Sika Corporation.
- d. Sika Corporation; Joint Sealants.
- e. Tremco Incorporated.

B. Silicone, S, NS, 100/50, T, NT: Single-component, nonsag, plus 100 percent and minus 50 percent movement capability, traffic- and nontraffic-use, neutral-curing silicone joint sealant; ASTM C 920, Type S, Grade NS, Class 100/50, Uses T and NT.

1. Manufacturers: Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:

- a. Dow Corning Corporation.
- b. GE Construction Sealants; Momentive Performance Materials Inc.
- c. May National Associates, Inc.; a subsidiary of Sika Corporation.

- d. Sika Corporation; Joint Sealants.
- e. Tremco Incorporated.

2.5 NONSTAINING SILICONE JOINT SEALANTS

A. Nonstaining Joint Sealants: No staining of substrates when tested according to ASTM C 1248.

B. Silicone, Nonstaining, S, NS, 100/50, NT: Nonstaining, single-component, nonsag, plus 100 percent and minus 50 percent movement capability, nontraffic-use, neutral-curing silicone joint sealant; ASTM C 920, Type S, Grade NS, Class 100/50, Use NT.

1. Manufacturers: Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:

- a. Dow Corning Corporation.
- b. GE Construction Sealants; Momentive Performance Materials Inc.
- c. May National Associates, Inc.; a subsidiary of Sika Corporation.
- d. Sika Corporation; Joint Sealants.
- e. Tremco Incorporated.

C. Silicone, Nonstaining, S, NS, 100/50, T, NT: Nonstaining, single-component, nonsag, plus 100 percent and minus 50 percent movement capability, traffic- and nontraffic-use, neutral-curing silicone joint sealant; ASTM C 920, Type S, Grade NS, Class 100/50, Uses T and NT.

1. Manufacturers: Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:

- a. Dow Corning Corporation.
- b. GE Construction Sealants; Momentive Performance Materials Inc.
- c. May National Associates, Inc.; a subsidiary of Sika Corporation.
- d. Sika Corporation; Joint Sealants.
- e. Tremco Incorporated.

2.6 MILDEW-RESISTANT JOINT SEALANTS

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

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

1. Manufacturers: Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:

- a. Dow Corning Corporation.
- b. GE Construction Sealants; Momentive Performance Materials Inc.
- c. May National Associates, Inc.; a subsidiary of Sika Corporation.
- d. Sika Corporation; Joint Sealants.
- e. Tremco Incorporated.

2.7 BUTYL JOINT SEALANTS

A. Butyl-Rubber-Based Joint Sealants: ASTM C 1311.

1. Manufacturers: Subject to compliance with requirements, available manufacturers offering

products that may be incorporated into the Work include, but are not limited to, the following:

- a. Bostik, Inc.
- b. Pecora Corporation.

2.8 LATEX JOINT SEALANTS

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

1. Manufacturers: Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:

- a. Franklin International.
- b. May National Associates, Inc.; a subsidiary of Sika Corporation.
- c. Pecora Corporation.
- d. Sherwin-Williams Company (The).
- e. Tremco Incorporated.

2.9 JOINT-SEALANT BACKING

A. Sealant Backing Material, General: Nonstaining; compatible with joint substrates, sealants, primers, and other joint fillers; and approved for applications indicated by sealant manufacturer based on field experience and laboratory testing.

B. Cylindrical Sealant Backings: ASTM C 1330, Type C (closed-cell material with a surface skin), Type O (open-cell material), Type B (bicellular material with a surface skin), or any of the preceding types, as approved in writing by joint-sealant manufacturer for joint application indicated, and of size and density to control sealant depth and otherwise contribute to producing optimum sealant performance.

C. Bond-Breaker Tape: Polyethylene tape or other plastic tape recommended by sealant manufacturer for preventing sealant from adhering to rigid, inflexible joint-filler materials or joint surfaces at back of joint. Provide self-adhesive tape where applicable.

2.10 MISCELLANEOUS MATERIALS

A. Primer: Material recommended by joint-sealant manufacturer where required for adhesion of sealant to joint substrates indicated, as determined from preconstruction joint-sealant-substrate tests and field tests.

B. Cleaners for Nonporous Surfaces: Chemical cleaners acceptable to manufacturers of sealants and sealant backing materials, free of oily residues or other substances capable of staining or harming joint substrates and adjacent nonporous surfaces in any way, and formulated to promote optimum adhesion of sealants to joint substrates.

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

PART 3 - EXECUTION

3.1 EXAMINATION

A. Examine joints indicated to receive joint sealants, with Installer present, for compliance with requirements for joint configuration, installation tolerances, and other conditions affecting performance of the Work.

B. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 PREPARATION

A. Surface Cleaning of Joints: Clean out joints immediately before installing joint sealants to comply with joint-sealant manufacturer's written instructions and the following requirements:

1. Remove all foreign material from joint substrates that could interfere with adhesion of joint sealant, including dust, paints (except for permanent, protective coatings tested and approved for sealant adhesion and compatibility by sealant manufacturer), old joint sealants, oil, grease, waterproofing, water repellents, water, surface dirt, and frost.
2. Clean porous joint substrate surfaces by brushing, grinding, mechanical abrading, or a combination of these methods to produce a clean, sound substrate capable of developing optimum bond with joint sealants. Remove loose particles remaining after cleaning operations above by vacuuming or blowing out joints with oil-free compressed air. Porous joint substrates include, but are not limited to, the following:

- a. Concrete.
- b. Masonry.
- c. Unglazed surfaces of ceramic tile.
- d. Exterior insulation and finish systems.

3. Remove laitance and form-release agents from concrete.
4. Clean nonporous joint substrate surfaces with chemical cleaners or other means that do not stain, harm substrates, or leave residues capable of interfering with adhesion of joint sealants. Nonporous joint substrates include, but are not limited to, the following:

- a. Metal.
- b. Glass.
- c. Porcelain enamel.
- d. Glazed surfaces of ceramic tile.

B. Joint Priming: Prime joint substrates where recommended by joint-sealant manufacturer or as indicated by preconstruction joint-sealant-substrate tests or prior experience. Apply primer to comply with joint-sealant manufacturer's written instructions. Confine primers to areas of joint-sealant bond; do not allow spillage or migration onto adjoining surfaces.

C. Masking Tape: Use masking tape where required to prevent contact of sealant or primer with adjoining surfaces that otherwise would be permanently stained or damaged by such contact or by cleaning methods required to remove sealant smears. Remove tape immediately after tooling without disturbing joint seal.

3.3 INSTALLATION OF JOINT SEALANTS

A. General: Comply with joint-sealant manufacturer's written installation instructions for products and applications indicated, unless more stringent requirements apply.

B. Sealant Installation Standard: Comply with recommendations in ASTM C 1193 for use of joint sealants as applicable to materials, applications, and conditions indicated.

C. Install sealant backings of kind indicated to support sealants during application and at position required to produce cross-sectional shapes and depths of installed sealants relative to joint widths that allow optimum sealant movement capability.

1. Do not leave gaps between ends of sealant backings.
2. Do not stretch, twist, puncture, or tear sealant backings.
3. Remove absorbent sealant backings that have become wet before sealant application, and replace them

with dry materials.

D. Install bond-breaker tape behind sealants where sealant backings are not used between sealants and backs of joints.

E. Install sealants using proven techniques that comply with the following and at the same time backings are installed:

1. Place sealants so they directly contact and fully wet joint substrates.
2. Completely fill recesses in each joint configuration.
3. Produce uniform, cross-sectional shapes and depths relative to joint widths that allow optimum sealant movement capability.

F. Tooling of Nonsag Sealants: Immediately after sealant application and before skinning or curing begins, tool sealants according to requirements specified in subparagraphs below to form smooth, uniform beads of configuration indicated; to eliminate air pockets; and to ensure contact and adhesion of sealant with sides of joint.

1. Remove excess sealant from surfaces adjacent to joints.
2. Use tooling agents that are approved in writing by sealant manufacturer and that do not discolor sealants or adjacent surfaces.
3. Provide concave joint profile per Figure 8A in ASTM C 1193 unless otherwise indicated.
4. Provide flush joint profile at locations indicated on Drawings according to Figure 8B in ASTM C 1193.
5. Provide recessed joint configuration of recess depth and at locations indicated on Drawings according to Figure 8C in ASTM C 1193.

a. Use masking tape to protect surfaces adjacent to recessed tooled joints.

3.4 FIELD QUALITY CONTROL

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

1. Extent of Testing: Test completed and cured sealant joints as follows:

- a. Perform not less than 10 tests for the first 1000 feet (300 m) of joint length for each kind of sealant and joint substrate.
- b. Perform not less than one test for each 1000 feet (300 m) of joint length thereafter or one test per each floor per elevation.

2. Test Method: Test joint sealants according to Method A, Field-Applied Sealant Joint Hand Pull Tab, in Appendix X1 in ASTM C 1193 or Method A, Tail Procedure, in ASTM C 1521.

a. For joints with dissimilar substrates, verify adhesion to each substrate separately; extend cut along one side, verifying adhesion to opposite side. Repeat procedure for opposite side.

3. Inspect tested joints and report on the following:

- a. Whether sealants filled joint cavities and are free of voids.
- b. Whether sealant dimensions and configurations comply with specified requirements.
- c. Whether sealants in joints connected to pulled-out portion failed to adhere to joint substrates or tore cohesively. Include data on pull distance used to test each kind of product and joint substrate. Compare these results to determine if adhesion complies with sealant manufacturer's field-adhesion hand-pull test criteria.

4. Record test results in a field-adhesion-test log. Include dates when sealants were installed,

names of persons who installed sealants, test dates, test locations, whether joints were primed, adhesion results and percent elongations, sealant material, sealant configuration, and sealant dimensions.

5. Repair sealants pulled from test area by applying new sealants following same procedures used originally to seal joints. Ensure that original sealant surfaces are clean and that new sealant contacts original sealant.

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

3.5 CLEANING

A. Clean off excess sealant or sealant smears adjacent to joints as the Work progresses by methods and with cleaning materials approved in writing by manufacturers of joint sealants and of products in which joints occur.

3.6 PROTECTION

A. Protect joint sealants during and after curing period from contact with contaminating substances and from damage resulting from construction operations or other causes so sealants are without deterioration or damage at time of Substantial Completion. If, despite such protection, damage or deterioration occurs, cut out, remove, and repair damaged or deteriorated joint sealants immediately so installations with repaired areas are indistinguishable from original work.

3.7 JOINT-SEALANT SCHEDULE

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

1. Joint locations include, but are not limited to, the following:

- a. Control and expansion joints in brick pavers.
- b. Isolation and contraction joints in cast-in-place concrete slabs.
- c. Joints between plant-precast architectural concrete paving units.
- d. Joints in stone paving units, including steps.
- e. Tile control and expansion joints.
- f. Joints between different materials listed above.
- g. Other joints as indicated on Drawings.

2. Joint Sealant:

- a. Silicone, S, NS, 100/50, T, NT unless otherwise indicated.
- b. Silicone, Nonstaining, S, NS, 100/50, T, NT where in contact with porous substances.

3. Joint-Sealant Color: As indicated on Drawings or, if not indicated, as selected by Architect from manufacturer's full range.

B. Joint-Sealant Application: Exterior joints in vertical surfaces and horizontal nontraffic surfaces.

1. Joint locations include, but are not limited to, the following:

- a. Construction joints in cast-in-place concrete.
- b. Joints between plant-precast architectural concrete units.
- c. Control and expansion joints in unit masonry.
- d. Joints in dimension stone cladding.

- e. Joints in glass unit masonry assemblies.
- f. Joints in exterior insulation and finish systems.
- g. Joints between metal panels.
- h. Joints between different materials listed above.
- i. Perimeter joints between materials listed above and frames of doors, windows, and louvers.
- j. Control and expansion joints in ceilings, soffits, and other overhead surfaces.
- k. Other joints as indicated on Drawings.

2. Joint Sealant:

- a. Silicone, S, NS, 100/50, NT unless otherwise indicated.
- b. Silicone, Nonstaining, S, NS, 100/50, NT where in contact with porous substances.

3. Joint-Sealant Color: As indicated on Drawings or, if not indicated, as selected by Architect from manufacturer's full range.

C. Joint-Sealant Application: Interior joints in horizontal traffic surfaces.

1. Joint locations include, but are not limited to, the following:

- a. Isolation joints in cast-in-place concrete slabs.
- b. Control and expansion joints in stone flooring.
- c. Control and expansion joints in brick flooring.
- d. Control and expansion joints in tile flooring.
- e. Other joints as indicated on Drawings.

2. Joint Sealant:

- a. Silicone, S, NS, 100/50, T, NT unless otherwise indicated.
- b. Silicone, Nonstaining, S, NS, 100/50, T, NT where in contact with porous substances.

3. Joint-Sealant Color: As indicated on Drawings or, if not indicated, as selected by Architect from manufacturer's full range.

D. Joint-Sealant Application: Interior joints in vertical surfaces and horizontal nontraffic surfaces.

1. Joint locations include, but are not limited to, the following:

- a. Control and expansion joints on exposed interior surfaces of exterior walls.
- b. Tile control and expansion joints.
- c. Vertical joints on exposed surfaces of unit masonry and concrete walls and partitions.
- d. Joints on underside of plant-precast structural concrete beams and planks.
- e. Other joints as indicated on Drawings.

2. Joint Sealant:

- a. Silicone, S, NS, 100/50, NT unless otherwise indicated.
- b. Silicone, Nonstaining, S, NS, 100/50, NT where in contact with porous substances.

3. Joint-Sealant Color: As indicated on Drawings or, if not indicated, as selected by Architect from manufacturer's full range.

E. Joint-Sealant Application: Interior joints in vertical surfaces and horizontal nontraffic surfaces not subject to significant movement.

1. Joint locations include, but are not limited to, the following:

JOINT SEALANTS

- a. Control joints on exposed interior surfaces of exterior walls.
 - b. Perimeter joints between interior wall surfaces and frames of interior doors, windows, and elevator entrances.
 - c. Other joints as indicated on Drawings.
2. Joint Sealant: Acrylic latex.
 3. Joint-Sealant Color: As indicated on Drawings or, if not indicated, as selected by Architect from manufacturer's full range.
- F. Joint-Sealant Application: Mildew-resistant interior joints in vertical surfaces and horizontal nontraffic surfaces.
1. Joint locations include, but are not limited to, the following:
 - a. Joints between plumbing fixtures and adjoining walls, floors, and counters.
 - b. Tile control and expansion joints where indicated.
 - c. Other joints as indicated on Drawings.
 2. Joint Sealant: Silicone, mildew resistant, acid curing, S, NS, 25, NT.
 3. Joint-Sealant Color: White unless otherwise indicated.
- G. Joint-Sealant Application: Concealed mastics.
1. Joint locations include, but are not limited to, the following:
 - a. Aluminum thresholds.
 - b. Sill plates.
 - c. Other joints as indicated on Drawings.
 2. Joint Sealant: Butyl-rubber based.
 3. Joint-Sealant Color: Black unless otherwise indicated.

END OF SECTION

08 14 16

FLUSH WOOD DOORS

A. QUALITY ASSURANCE

1. Industry Standards: Comply with the following standards.
 - a. NWWDA Quality Standard: National Wood Window and Door Association (NWWDA) I.S.1 - Industry Standard for Wood Flush Doors.
 - b. Architectural Woodwork Institute (AWI): AWI Architectural Woodwork Standards (AWS).

B. REGULATORY REQUIREMENTS

1. Fire-Rated Door Assemblies: Assemblies complying with NFPA 80 that are listed and labeled by a testing and inspecting agency acceptable to authorities having jurisdiction, for fire-protection ratings indicated, based on testing according to UBC Standards 7-2, 2-3 and 7-4.
 - a. Test Pressure: Test at atmospheric pressure.
 - b. Temperature-Rise Rating: Where indicated, provide doors that have a temperature-rise rating of 450 deg F (250 deg C) maximum in 30 minutes of fire exposure.
2. Provide wood doors which are identical in materials and construction to units tested in door and frame assemblies in accordance with ASTM E 152 and which are labeled and listed for ratings indicated by UL, ITS Intertek Testing Services (Warnock Hersey) or other testing and inspection agency acceptable to authorities having jurisdiction.
3. Manufacturer: Obtain doors from a single manufacturer.

C. WARRANTY

1. Door Manufacturer's Warranty: Submit written agreement in door manufacturer's standard form, signed by manufacturer, installer and Contractor, agreeing to repair or replace defective doors that have warped (bow, cup or twist) or that show telegraphing of core construction in face veneers, or do not conform to tolerance limitations of referenced quality standards.
2. Warranty shall also include reinstallation and refinishing which may be required due to repair or replacement of defective doors where defect was not apparent prior to hanging.
3. Warranty, Solid Core Interior Doors: Life of installation.
4. Contractor's Extended Warranty: Contractor shall replace doors, including cost of reinstallation and refinishing, where wood doors exhibit defects in materials or workmanship including warp and delamination, within minimum of two years from date established by Notice of Completion.
 - a. Warp and twist in excess of 3/16-inch shall constitute a defective door installation.
 - b. Where Contractor's actions have contributed to rejection or to voiding of manufacturer's warranty, Contractor shall be responsible for doors for remainder of warranty period or, for lifetime warranty provisions, shall replace door, including reinstallation and refinishing, with new door complying with specified requirements.

D. MANUFACTURERS

1. Specified Manufacturer: Marshfield DoorSystems, Inc. Marshfield, WI (800/869-3667).
2. Acceptable Manufacturers: Equivalent products of other manufacturers, including the manufacturers listed below, will be acceptable in accordance with the "or equal" provision specified in Section 01 6100 - Basic Product Requirements.
3. Algoma Hardwoods, Inc., Algoma, WI (414/487-5221 or 800/558-8032).
4. T.M. Cobb Co., Riverside, CA (909/248-2440).
5. Haley Bros., Inc., Buena Park, CA (714/670-2112).
6. Vancouver Door, Inc., Puyallup, WA (206/845-9581).
7. VT Industries, Inc., Holstein, IA (712/368-4381 or 800/827-1615).

E. WOOD DOORS

1. Wood Doors, General: Conform to AWI Architectural Woodwork Standards (AWS) and National Window and Door Association ANSI/NWDA 1 Series for door type and grade specified or, if not specified, for Custom grade.
2. Particle Board Core: Formed flat panels consisting of wood particles bonded together with synthetic resin or other added binders with a uniform density of 28 to 32 pounds per cubic foot, complying with NWWDA I.S.1-A or ANSI A208.1 Grade LD-1, made with binder containing no ureaformaldehyde resin.
3. Blocking: Provide wood blocking in particleboard-core doors as needed to eliminate throughbolting hardware. Exception: Provide doors with structural-composite-lumber (SCL) cores instead of particleboard cores for doors indicated to receive exit devices.
4. Particleboard Core Doors, Non-Rated: 1-3/4 inch thick, unless otherwise indicated, 5-ply hot press construction.
5. Particleboard Core Doors, Fire-Rated: 1-3/4 inch thick, 5-ply hot press construction, ITS-WH or UL 20-minute fire rating.

F. DOOR OPENINGS

1. Openings, General: Cut and trim openings through doors to comply with applicable requirements of referenced standards for kind(s) of doors required.
2. Glazed Openings: For 1/4-inch glass as specified in Section 08 8100 - Glass Glazing.
3. Non-rated doors: Wood frames, Marshfield Wood Light kit for non-rated doors, hardwood trim to match door faces, shape as indicated on the Drawings or, if not indicated, style W-2, 1-1/16 inch by 3/4-inch.
4. Fire-rated doors: Steel-framed vision lights as specified in Section 08 1213 - Steel Door Frames.

G. FABRICATION

1. Fabrication, General: Fabricate wood doors factory-prefit and premachined to fit frame opening sizes indicated, with uniform clearances and bevels to suit door operation.
2. Fitting clearances for fire-rated doors: Comply with NFPA 80.
3. Non-rated door edges: Bevel lock and hinge edges 1/8-inch in 2-inches.
4. Fire-rated door edges: Bevel lock edge 1/8-inch in 2-inches; trim stiles and rails only to extent permitted by labeling agency.
5. Metal Astragals: Pre-machine astragals and formed steel edges for hardware where required for pairs of fire-rated doors.
6. Fire Labeling: Provide permanent steel labels of rating authority on each rated door. Place label in inconspicuous location.

H. PRE-MACHINING AND PRE-FITTING

1. Pre-Machining: Provide all wood doors pre-machined for installation.
 - a. Coordinate door hardware requirements with Section 08 7100 - Door Hardware and with Door Schedule on the Drawings.
 - b. For fire-rated wood door assemblies, all cutting and fitting for door sizing and hardware preparation shall be done by door manufacturer in accordance with fire labeling requirements.
2. Pre-Fitting: Fit doors to frames for uniform clearance at each edge, as required by reference standards and as specified herein. Doors shall be exact net sizes, including undercuts, for specified installation clearances.
 - a. Fitting clearances for fire-rated doors: Comply with NFPA 80.
 - b. Non-rated doors: Bevel lock and hinge edges 1/8-inch in 2-inches.
 - c. Fire-rated doors: Bevel lock edge 1/8-inch in 2-inches; trim stiles and rails only to extent permitted by labeling agency.
 - d. Metal astragals: Pre-machine astragals and formed steel edges for hardware where required for pairs of fire-rated doors.

3. Openings: Cut and trim openings through doors to comply with applicable requirements of referenced standards for kind(s) of doors required.

I. EXAMINATION

1. Door Frames Examination: Examine installed door frames prior to hanging door. Verify that frames comply with indicated requirements for type, size, location, and swing characteristics and have been installed with plumb jambs and level heads. Examine doors and reject doors with defects.
2. Work Conditions: Verify that field environmental conditions conform to requirements specified herein and as required by door manufacturer.
3. Notification: Report in writing to Owner's Representative and Architect all unsatisfactory conditions and describe proposed remedial measures to be taken. Do not proceed with installation until unsatisfactory conditions have been corrected.

END OF SECTION

**SECTION 09 29 00
GYPSUM BOARD**

PART 1 - GENERAL

1.01 GENERAL

- A. Vertical wall gypsum board application.
- B. Taped and sanded joint treatment.

1.02 REFERENCES

- A. American Society for Testing and Materials (ASTM)
 - 1. ASTM C475- Joint Compound and Joint Tape for Finishing Gypsum Board.
 - 2. ASTM C645 - Specification for Nonstructural Steel Framing Members.
 - 3. ASTM C754- Specification for Installation of Steel Framing Members to Receive Screw-Attached Gypsum Panel Products.
 - 4. ASTM C840 - Application and Finishing of Gypsum Board.
 - 5. ASTM C954 - Specification for Steel Drill Screws for the Application of Gypsum Panel Products or Metal Plaster Bases to Steel Studs from 0.033 in. to 0.112 in. thickness.
 - 6. ASTM C1 002 - Steel Drill Screws for the Application of Gypsum Board or Metal Plaster Bases.
 - 7. ASTM C1177- Glass Mat Gypsum Substrate for Use as Sheathing.
 - 8. ASTM C1179 - Glass Mat Water-Resistant Gypsum Backing Panel.
 - 9. ASTM C1396- Specification for Gypsum Board.
- B. Underwriters Laboratories, Inc. (UL) UL Directory- Fire Resistance Directory, Volume 1, Latest Edition.
- C. Gypsum Association (GA)
 - 1. GA-201 - Gypsum Board for Walls and Ceilings
 - 2. GA-214 - Levels of Gypsum Board Finish
 - 3. GA-216 - Application and Finishing of Gypsum Board
 - 4. GA-600 - Fire Resistance Design Manual
 - 5. GA-226 - Gypsum Board installation on Curved Walls.
- D. 2025 California Building Code (CBC)
 - 1. CBC-7- Chapter 7, Fire Resistant Materials and Construction
 - 2. CBC-19A- Chapter 19A, Concrete (for DSA)
 - 3. CBC-25 - Chapter 25, Gypsum Board and Plaster

1.03 QUALITY ASSURANCE

- A. Applicator: Company specializing in gypsum board systems work with three years experience.

PART 2 - PRODUCTS

2.01 GYPSUM BOARD MANUFACTURERS

- A. Products of following manufacturers form basis for design and quality intended.
 - 1. United States Gypsum Corporation (USG), Chicago, IL. Products shall contain no VOCs.
 - 2. Georgia-Pacific, Atlanta, GA. Products shall contain no VOCs.
 - 3. National Gypsum Co./Gold Bond Building Products, Charlotte, NC. Products shall contain no VOCs.
 - 4. Or approved equal prior to bid opening

2.02 MATERIALS

- A. Taping, Bedding and Finishing Compound: ASTM C475; compatible with tape and substrate.
1. USG SHEETROCK Brand Taping Joint Compound Ready-Mixed, drying-type, non-asbestos, vinyl base.
 2. USG SHEETROCK Brand Topping Joint Compound Ready-Mixed, drying-type non-asbestos, vinyl base.
 3. USG SHEETROCK Powder Joint Compound, drying-type, non-asbestos vinyl base, conventionally drying. For Taping and Topping.
 4. USG SHEETROCK Powder Setting-type Joint Compound, chemical hardening.
 5. Contractor's Option: USG SHEETROCK Lightweight All Purpose Joint Compound (Plus 3) with Dust Control.
 6. USG SHEETROCK Brand All Purpose Joint Compound Ready-Mixed for laminating gypsum panels in multilayer partitions.
 7. USG SHEETROCK Brand Joint Tape, ASTM C475, high strength cross-fibered paper tape.
 8. Drywall Primers: USG First Coat.
- B. Accessories: Corrosive Protective-Coated steel.
1. U-Trims: USG, Dietrich No. 200-A for joint compound or equal.
 2. J-Trim Casings, reveal type: USG, Dietrich No. 401 for 1/2" panels, 402 for 5/8" panels, no finishing compound.
 3. Control Joint: Dietrich 093, USG Control Joint No. 093.
 4. Corner Bead: USG, Dietrich No. 103 for joint compounds or equal.
 5. Corner System, NO-COAT Structural Laminate Drywall Design System By Structus Building Technologies, Inc.

END OF SECTION

**SECTION 09 91 23
INTERIOR PAINTING****PART 1 – GENERAL****1.1 SUMMARY****A. Section Includes:**

1. Surface preparation and application of paint systems on interior substrates.
- a. Surface preparation, priming, and finish coats specified in this Section are in addition to shop priming and surface treatment specified in other Sections.
2. Painting of exposed interior surfaces, except where indicated to remain unpainted or natural.
- a. If an item or surface is not specifically mentioned, paint it to match adjacent similar materials or surfaces.
- b. Where finish color is not indicated, Architect will select from manufacturer's standard colors.
3. Field painting of exposed mechanical and electrical work, including bare and covered pipes and ducts (including color coding), hangers, exposed steel and iron supports, and equipment surfaces lacking factory-applied final finishes.
4. Surfaces not to be painted:
- a. Prefinished items, including but not limited to:
 1. Architectural woodwork
 2. Acoustical wall panels
 3. Metal toilet enclosures
 4. Metal lockers
 5. Unit kitchens
 6. Elevator entrance doors and frames
 7. Elevator equipment
 8. Finished mechanical and electrical equipment
 9. Light fixtures
- b. Concealed surfaces in generally inaccessible spaces, including:
 1. Foundation spaces
 2. Furred areas
 3. Ceiling plenums
 4. Utility tunnels
 5. Pipe spaces
 6. Duct shafts
 7. Elevator shafts
- c. Finished metal surfaces, including:
 1. Anodized aluminum
 2. Stainless steel
 3. Chromium plate
 4. Copper and copper alloys
 5. Bronze and brass
- d. Operating parts, including:
 1. Valve and damper operators
 2. Linkages
 3. Sensing devices
 4. Motor and fan shafts
- e. Labels and plates: Do not paint over UL, FM, or other code-required labels, equipment nameplates, identification plates, or performance ratings.

1.2 DEFINITIONS

- A. Flat: Not more than 5 units at 60 degrees and 10 units at 85 degrees, per ASTM D 523.
- B. Velvet: 5 to 10 units at 60 degrees and 10 to 15 units at 85 degrees.
- C. Eggshell: 10 to 15 units at 60 degrees and 15 to 30 units at 85 degrees.
- D. Low-Luster (Low-Sheen): 20 to 25 units at 60 degrees and not less than 35 units at 85 degrees.
- E. Semigloss: 35 to 70 units at 60 degrees.
- F. Gloss: More than 75 units at 60 degrees.

1.3 ACTION SUBMITTALS

A. Product Data: For each coating product.

1. Surface preparation requirements
2. Application instructions
3. VOC content

B. Samples for Verification: For each paint system, color, and gloss.

1. Rigid backing, 8-1/2 by 11 inches
2. Step-applied coats showing full system
3. Label each coat and sample with product, color, gloss, and location

C. Product Schedule: Comprehensive schedule cross-referencing products, systems, locations, and applications, using same designations as Drawings.

1.4 INFORMATIONAL SUBMITTALS

A. Applicator qualification data.

1.5 CLOSEOUT SUBMITTALS

A. Coating Maintenance Manual, including:

1. Area finish summary
2. Product and color usage by area
3. Product data sheets
4. Safety Data Sheets (SDS)
5. Cleaning and maintenance instructions
6. Touch-up procedures
7. Samples of each color and finish used

1.6 MAINTENANCE MATERIAL SUBMITTALS

A. Furnish extra materials from same product run:

1. Minimum 5 percent, but not less than 1 gallon of each color and material used
2. Provide in unopened, labeled containers

1.7 QUALITY ASSURANCE

A. Applicator Qualifications: Experienced firm with documented successful performance on similar projects.

1.8 MOCKUPS

A. Apply mockups of each paint system and finish for approval.

1. Architect will select representative surfaces.
2. Minimum 100 sq. ft. for wall finishes unless otherwise directed.
3. Approved mockups may remain as part of the Work if undisturbed.

1.9 DELIVERY, STORAGE, AND HANDLING

A. Deliver materials in original, unopened containers bearing manufacturer identification.

B. Store materials at temperatures above 45°F in well-ventilated areas.

1.10 FIELD CONDITIONS

A. Apply coatings only when ambient and surface temperatures are between 50°F and 95°F.

B. Do not apply when relative humidity exceeds 85 percent or when surfaces are damp or wet.

PART 2 – PRODUCTS**2.1 MANUFACTURERS**

A. Acceptable manufacturers include:

1. Behr
2. Dunn-Edwards
3. PPG
4. Sherwin-Williams
5. Vista

B. Obtain primers and finish coats from a single manufacturer per system.

2.2 SUSTAINABILITY REQUIREMENTS

- A. Comply with CGBC requirements.
- B. VOC Limits: Comply with 40 CFR 59 and CGBC Section 5.504.4.
 - 1. Flat: 50 g/L
 - 2. Nonflat: 100 g/L
 - 3. Nonflat High Gloss: 150 g/L

2.3 PAINT PRODUCTS, GENERAL

- A. Provide factory-formulated products compatible within each system and substrate.
- B. Colors as indicated or selected by Architect.

2.4 ZINC-COATED METAL PRETREATMENT

- A. Factory-formulated pretreatment suitable for interior galvanized metal.
(Manufacturers and products retained as submitted.)

2.5 PRIMERS/SEALERS

- A. Interior Gypsum Board Primer.
(Manufacturer list retained; formatting standardized.)

2.6 METAL PRIMERS

- A. Interior Ferrous Metal Primer.
- B. Interior Galvanized Metal Primer.
(Manufacturer lists retained.)

2.7 WATER-BASED PAINTS

- A. Interior Latex Semigloss Paint.

2.8 SOURCE QUALITY CONTROL

- A. Owner may test paint materials for compliance.

PART 3 – EXECUTION

3.1 EXAMINATION

- A. Verify substrate conditions prior to application.
- B. Maximum gypsum board moisture content: 12 percent.

3.2 PREPARATION

- A. Comply with manufacturer instructions.
- B. Remove hardware not to be painted; reinstall after completion.
- C. Clean substrates and remove incompatible coatings.

3.3 APPLICATION

- A. Apply coatings per manufacturer instructions.
- B. Tint undercoats to match finish coats.
- C. Apply additional coats as required for uniform appearance.
- D. Do not paint over labels or nameplates.

3.4 FIELD QUALITY CONTROL

- A. Dry-film thickness testing may be performed by Owner.

3.5 CLEANING AND PROTECTION

- A. Remove debris daily.
- B. Protect adjacent work and repair damage.

3.6 INTERIOR PAINTING SCHEDULE

- A. Gypsum Board:

INTERIOR PAINTING

STUDIO+ ARCHITECTURE

**KINDERGARTEN RESTROOM ADDITION
FAIRMONT ELEMENTARY SCHOOL
PLACENTIA YORBA LINDA SCHOOL DISTRICT**

1. Primer plus two semigloss finish coats.
- B. Ferrous Metal:
 1. Primer plus two semigloss finish coats.
- C. Galvanized Metal:
 1. Pretreatment
 2. Primer
 3. Two semigloss finish coats.

END OF SECTION

**SECTION 10 28 00
TOILET ACCESSORIES**

PART 1 - GENERAL

1.01 REFERENCES

- A. ADA – Americans with Disabilities Act of 1990
 - 1. ADA/Standards – ADA Title II Regulations and the DOJ/Standards for Accessible Design.
- B. CACRM - California Access Compliance Reference Manual latest updates based on the 2025 California Building Code.
- C. ASTM A167 - Stainless and Heat-Resisting Chromium-Nickel Steel Plate, Sheet and Strip.
- D. ASTM A269 - Seamless and Welded Austenitic Stainless-Steel Tubing for General Service.
- E. ASTM A1008/A1008M - Steel, Sheet, Cold-Rolled, Carbon, Structural, High-Strength Low-Alloy and High-Strength Low-Alloy with Improved Formability.

1.02 SUBMITTALS

- A. Product data on accessories describing size, finish, details of function, attachment methods.
- B. Manufacturer's installation instructions.

1.04 REGULATORY REQUIREMENTS

- A. Comply with the California building code (CBC), title 24, part 2, chapter 11b
- B. Comply with the California accessibility regulations manual (CACRM) as published by the division of the state architect (DSA).
- C. Comply with the 2010 ADA standards for accessible design, where applicable.
- D. Where conflicts occur between CDC chapter 11b, CACRM, and federal ADA, requirements, the more stringent requirement shall govern.

1.05 KEYING

- A. Supply two keys for each accessory to Owner.
- B. Master key all accessories.
- C. Accessories shall be from a single manufacturer to facilitate keying.

1.06 SEQUENCING AND SCHEDULING

- A. Coordinate the Work of this Section with the placement of internal wall reinforcement to receive anchor attachments.

PART 2 - PRODUCTS

2.01 MANUFACTURERS

- A. Products of one of the following manufacturers form the basis for design and quality intended.
 - 1. Bobrick Washroom Equipment, Inc., North Hollywood, CA. (www.bobrick.com)
 - 2. Or approved equal prior to bid opening

2.02 MATERIALS - TOILET AND BATH ACCESSORIES

- A. Water closets:
 - vitreous China, floor-mounted, elongated bowl, ADA compliant.

American standard “baby Devora” model no. 2282.001 with manual flush valve model no. 6047.121.002, 1.28 GPF.

B. Lavatories and faucets:

vitreous China, wall-hung, single center hole, ADA compliant.

American standard “lucerne” model no. 0356.421 with deck-mounted metering faucet model no. 1340.119, 0.5 GPM.

C. Cleanouts and floor drains:

cast iron body floor drains and wall cleanouts.

Zurn wall cleanout model no. Co-2412 and floor drain model no. Z415b-p, complete with clamping collar and nickel-bronze top.

D. Trap primers:

brass body, adjustable type.

MIFAB trap primer valve model no. Mr-500, complete with mi-du distribution unit and 1/2-inch type “I” copper pipe.

2.03 MATERIALS - GRAB BARS

TA-03A – GRAB BAR, 42 INCH (BOBRICK B-6806-42)

TA-03B – GRAB BAR, 36 INCH (BOBRICK B-6806X36)

A. Tubing: ASTM A269; Stainless Steel, Mandrel Bent, Uniform Diameter at Curves.

1. Size: 1-1/2 Inch Diameter.

2. Wall Thickness: 18-Gage.

3. Design Strength: Withstand Minimum 250 lbs Point Load In Any Direction at Any Point on The Bar Without Damage or Permanent Set in Accordance With CACRM

4. Wall Clearance: 1-1/2 Inches Clear Between Wall and Grab Bar And 1-1/2 Inches Clear to Any Adjacent Toilet Room Accessory at Accessible Water Closet Locations.

B. Mounting Flange: ASTM A167, Type 304 Stainless Steel Plate, Heliarc Welded.

1. Size: 2-Inch-Wide X 3-1/8 Inch High.

2. Thickness: 1/8 Inch Thick with Minimum Two Mounting Screws for Concealed Anchors.

C. Cover Plate: ASTM A167, Type 304 Stainless Steel, 22-Gage, 3-1/4 Inch Diameter Snap-On Cover Over Mounting Flange.

D. Fasteners: Stainless Steel, Tamperproof, Minimum Two No. 14 Stainless Steel Screws of Length Required for Secure Attachment to Backing Plate.

2.04 FABRICATION

A. Weld and grind smooth joints and miters of fabricated components.

B. Form exposed surfaces from single sheet of stock, free of joints.

C. Form surfaces flat without distortion. Maintain flat surfaces without scratches or dents.

D. Back paint components where contact is made with building finishes to prevent electrolysis.

E. Shop assemble components and package complete with anchors and fittings.

F. Provide steel adapters and anchor components for installation.

2.05 FACTORY FINISHING

A. Stainless Steel: No. 4 satin luster finish.

2.06 GRAB BAR FINISH

A. Type 304 satin luster. Provide slip resistant knurled or peened gripping surface at wet

areas.

PART 3 - EXECUTION

3.01 EXAMINATION

- A. Verify that site conditions are ready to receive Work.
- B. Beginning of installation means acceptance of existing conditions.

3.02 PREPARATION

- A. Deliver inserts and rough-in frames to site at appropriate time for building-in.
- B. Provide templates and rough-in measurements as required.
- C. Verify exact location of accessories for installation.

3.03 INSTALLATION

- A. Install fixtures, accessories and items in accordance with manufacturers' instructions.
- B. Install plumb and level, securely and rigidly anchored to backing. Mounting heights and locations as indicated on the Drawings.
- C. Where ceramic tile wainscot occurs, provide stainless steel closure angles flush to perimeter of all wall-mounted accessories. Seal visible cracks with silicone sealant.
- D. Accessible Compliant toilet accessories: California Building Code Chapter 11B.
 - 1. Mount heights according to CBC Section 1115B.8.
 - a. The following (but not limited to) operable parts (including coin slots) of toilet room accessories (adult ht.) shall be mounted within 40 inches maximum AFF:
 - 1) Towel Dispensers
 - 2) Sanitary napkin dispensers/receptacles.
 - 3) Waste receptacles.
 - 4) Other similar dispensing and disposal fixtures.
 - 2. Toilet tissue and feminine napkin disposals located on grab bar side of accessible toilet room or stall shall not project more than the grab bar. The grab bar cannot project more than 3 inches into the 48 inches minimum clear space in front of the water closet. The accessory shall not be located closer than 1-1/2 inches clear of the tangent point of the grab bar.
 - 3. Toilet tissue dispensers shall be located on the wall within 12 inches, of the front edge of the toilet seat, dispensers that control delivery or that does not permit continuous paper flow shall not be used, Section 1115B.8.4.
 - 4. Bottom of reflective surface of mirrors shall be 40 inches maximum, AFF per CBC 1115B.8.1.
 - 5. Paper Towel Dispensers: If located more than 27" AFF, maximum projection from wall shall not exceed 4" or encroach into 30" x 48" clear space.

3.04 SCHEDULE

TYPE MARK	DESCRIPTION	MANUFACTURER	MODEL NO.
TA-01A	RECESSED TOWEL DISPENSER AND WASTE RECEPTACLE	BOBRICK	B-36903
TA-02A	TOILET PAPER DISPENSER	BOBRICK	B-6697
TA-03A	GRAB BAR – 42 INCH	BOBRICK	B-6806-42
TA-03B	GRAB BAR – 36 INCH	BOBRICK	B-6806X36
TA-04A	SURFACE-MOUNTED SOAP DISPENSER	BOBRICK	B-2111
TA-05A	TOILET SEAT COVER DISPENSER	BOBRICK	B-221
TA-06A	GLASS MIRROR	BOBRICK	B-2908

END OF SECTION

**SECTION 22 00 00
PLUMBING**

1. PART 1 – GENERAL

1.1 WORK INCLUDED

- A. Furnish all labor, materials, services, testing, transportation and equipment necessary for the completion of all plumbing work as indicated on drawings and specified herein. Work materials and equipment not indicated or specified which is necessary for the complete and proper operation of the work of this Section in accordance with the true intent and meaning of the contract documents shall be provided and incorporated at no additional cost to the Owner.

1.2 QUALITY ASSURANCE

- A. Code Requirements: All work covered by this Section shall conform to the latest requirements of the following regulations:
 - 1. C.C.R., Title 24, Part 5 (2025 CPC).
 - 2. 2025 California Plumbing Code.
 - 3. SMACNA Seismic Restraint Manual Guidelines for Mechanical Systems.
 - 4. National Fire Protection Association.
 - 5. California Division of the State Architect.
 - 6. California State Division of Industrial Safety.
 - 7. County Health Department.
 - 8. Any other legally constituted body-having jurisdiction thereof.
- B. Nothing in the specifications or drawings shall be construed to permit deviation from the requirements of governing codes unless approval for said deviation has been obtained from the legally constituted authorities having jurisdiction and from the Owner's representative.

1.3 DRAWINGS

- A. Because of the small-scale drawings, it is not possible to indicate all offsets, fittings and accessories which may be required. The Contractor shall carefully investigate the conditions surrounding installation of his work, furnishing the necessary piping, fittings, valves, traps, and other devices which may be required to complete the installation.
- B. The general arrangement indicated on the drawings shall be followed as closely as possible. Coordinate with the Architectural, Structural, Mechanical and Electrical Drawings and the work of other trades prior to installation of piping fixtures and equipment to verify adequate space available for installation of the work shown. In the event a field condition arises which makes it impossible to install the work as indicated, submit, in writing, the proposed departures to the Architect for his approval. Only when Architect's approval is given, in writing, shall Contractor proceed with installation of the work.
- C. Special Note: Should the Contractor make changes in the installation differing from what is indicated on the contract drawings and not necessitated due to field conditions as indicated hereinabove, the Contractor shall be required to re-install the work to comply with what has been indicated on the contract drawings. Should it be impossible to re-install the work and the installation is in accordance with all governing authorities, the architect may permit the installation to remain. However, all costs incurred to revise the contract drawings

by the engineer for resubmittal to the building department indicating the as-installed condition shall become the responsibility of the Contractor.

- D. In case of a difference in the specifications or between the specifications and the drawings, the Contractor shall figure the most expensive alternate and after award of contract, shall secure direction from the Architect.

1.4 PERMITS, INSPECTIONS AND LICENSES

- A. All permits, inspections and licenses required by the legally constituted authorities for installation of the work according to the plans and specifications shall be obtained and paid as a part of the work of this section.

1.5 EXAMINATION OF PREMISES

- A. Before bidding on this work, Contractors shall make a careful examination of the premises and shall thoroughly familiarize themselves with the requirements of the contract. By the act of submitting a proposal for the work included in this contract, the Contractor shall be deemed to have made such study and examination, and that he is familiar with and accepts all conditions of the site.

1.6 PROTECTION

- A. All work, equipment and materials shall be protected at all times. Contractor shall make good all damage caused either directly or indirectly by his own workmen. Contractor shall also protect his own work from damage. He shall close all pipe openings with caps or plugs during installation. He shall protect all his equipment and materials against dirt, water, chemical and mechanical injury. Upon completion, all work shall be thoroughly cleaned and delivered in a new condition.
- B. Contractor shall be held responsible for all damage to equipment and materials until he has received written notice from the Architect or Engineer that his work has been accepted.

1.7 LOCATIONS

- A. The locations of apparatus, piping and equipment indicated on the drawings are approximate. Piping and equipment shall be installed in such a manner as to avoid all obstruction, preserve headroom, and keep openings and passages clear. The locations of and mounting heights of all fixtures shall be coordinated with the architectural plans and room elevations.
- B. Clearances and Openings: Contractor shall cooperate and coordinate his work with all other trades to avoid conflict and permit for a neat and orderly appearance of the entire installation. The Contractor shall, in advance of the work, furnish instructions to the General Contractor as to his requirements for equipment and material installation of any kind, whether or not specifically mentioned on drawings or in the specifications, and shall include recesses, chases in walls, and all required openings in the structure. Should furnishing this information be neglected, delayed or incorrect and additional cuttings are found to be required, the cost of the same shall be charged to this Contractor.
- C. Contractor shall verify and coordinate pipe routing with location of all electrical rooms, elevator equipment rooms, telecom/data rooms, and other rooms dedicated to the housing of switchgear, panels, or other electrical equipment. In no case shall piping be installed within or above the ceiling of such rooms.

1.8 SUBMITTAL DATA (Also see General Conditions)

- A. Submittal Requirements:
 - 1. Furnish, all at one time, prior to any installation, within the time noted below, six (6) copies of valid submittal data on all fixtures, material, equipment and devices. Each submitted item shall be indexed

and referenced to these specifications and to identification numbers on fixtures and equipment schedules.

2. Manufacturers' submittal literature and shop drawings are required on all items to ensure the latest and most complete manufacturer's data is available for review. Requirements of the submittals and Engineer's submittal notes are a part of the work of this Division except that Engineer's notes may not be used as a means of increasing the scope of work of this Division.
3. Submittals will be checked for general conformance with the design concept of the project but the review does not guarantee quantities shown and does not supersede requirements of this Division to properly install work.
4. To be valid, all submittals must:
 - (a) Be delivered to the Architect's office within thirty-five (35) days of award of the contract. Contractor shall make time allowance for Engineer's review, return of comments, if any, and resubmittal if required. Corrections or changes in submittals returned as inadequate or incomplete shall be accomplished within this time limit.
 - (b) Clearly indicate and label as such any items proposed as substitution for that specified or shown on plans.
 - (c) Include all pertinent construction, installation, performance and technical data.
 - (d) Have all product data sheets clearly labeled to indicate the individual items being submitted. In addition, all required options and accessories shall be clearly marked.
 - (1) Product data sheets corresponding to items indicated on plans shall be clearly labeled with the corresponding fixture or equipment tag number.
 - (2) Product data sheets corresponding to items indicated in specifications shall be clearly labeled with the specification section, page and item numbers.
 - (e) Include, for every item which differs in size, configuration, connections, service, accessibility or any other significant way, a drawing to the same (or larger) scale as to the pertinent portions of the contract drawings. In this drawing show a complete layout of the system except that which is identical to the contract drawings, unless the unchanged portions must be shown to indicate such things as clearances. This drawing, together with the contract design drawings must show the complete system as revised to accommodate the proposed alternate.

B. Substitution Requirements:

1. Any items included in submittals and proposed by the Contractor as substitution for that specified or shown on plans shall be submitted within thirty five (35) days of award of the contract. After such time, proposed substitutions shall not be accepted for review, and the Contractor shall submit all items as specified or shown on plans.
 - (a) For each item proposed as substitution for that specified or shown on plans, copies of product data sheets for the specified item shall be placed side by side with product data sheets for the proposed substitution item within the submittal.
 - (1) In addition to the Submittal Requirements for labeling listed above, product data sheets for the specified item shall be clearly labeled "SPECIFIED ITEM, NOT SUBMITTED". Product data sheets for the corresponding proposed substitution item shall be clearly labeled "PROPOSED SUBSTITUTION".
 - (b) Provide calculations and other detailed data justifying how any items proposed as substitution were selected for proposal. Data must be complete enough to permit detailed comparison of every significant characteristic for which the specified item was analyzed during design.
2. It shall be the Contractor's responsibility to provide sufficient information to allow the Engineer to analyze any proposed alternate. If inadequate information is provided, the proposal will not be approved and resubmittal will not be allowed.

3. The Contractor shall provide or perform tests required by Engineer for purpose of judging acceptability of proposed substitutions.
4. The Contractor assumes full responsibility that alternate items and procedures will meet the job requirements and is responsible for cost of redesign and of modifications to this and other parts of work caused by alternate items furnished under work in this Section. In view of these responsibilities, it is the purpose of these specifications to establish procedures to ensure that the Contractor has considered all the ramifications of proposed alternates before submitting them for review. Submittals which do not comply with the requirements of these specifications or which indicate proposed alternates that were selected without proper regard to the requirements of the job will not be approved. No more than one proposed alternate will be considered for each item.
5. Alternate items installed without Engineer's approval will be replaced with specified items at Contractor's expense.
6. The Architect or his authorized representative shall be the sole judge as to the quality and suitability of proposed alternate equipment, fixtures or materials. Decisions of the Architect or that of his representative shall be final and conclusive.

1.9 UNINSPECTED WORK

- A. The Contractor shall not allow or cause any of his work to be covered up or closed in until it has been inspected, tested, approved by all authorities have jurisdiction, and until Project Record drawings have been properly annotated.
- B. Should any of his work be covered up or closed in before such inspection, he shall, at his own expense, uncover the work to the satisfaction of the inspection party. All related repair work cost shall be borne by the Contractor.

1.10 RECORD DRAWINGS (Also see General Conditions)

- A. Contractor shall provide and keep up-to-date a complete "as-built" record set of blueline prints which shall show every change from the original drawings and the exact "as-built" locations and sizes of the work provided under this Section of the specifications. This set shall include locations, dimensions, depth of buried piping, cleanouts, shut-off valves, sewer invert locations, plugged wyes, tees, etc. where applicable. On completion of the work, the Contractor shall incorporate all as-built information on a set of reproducible tracings provided by the Architect and this set of reproducibles shall be delivered to the Architect.

1.11 GUARANTEES (Also see General Conditions)

- A. Contractor shall guarantee the entire plumbing and piping systems unconditionally for a period of one (1) year after final acceptance. If, during this period, any materials, equipment, or any part of the systems fail to function properly, the Contractor shall make good the defects promptly and without any expense to the Owner.
- B. Contractor shall be responsible for all damage to any part of the premises caused by leaks in pipelines or equipment furnished and installed under this Section for a period of one (1) year after date of acceptance of his work.
- C. All equipment and fixtures shall carry manufacturer's warranty against defective parts or poor workmanship for not less than one (1) year. See specific equipment specifications for extended warranty requirements.

2. PART 2 – PRODUCTS

2.1 MATERIALS AND EQUIPMENT (See Schedules on Drawings)

- A. General: All materials, as specified or required in the work, shall be new, free from defects and imperfections. All manufactured shall comply with California Assembly Bill 1953.
- B. Pipe and Fittings:
 - 1. Soil and Waste Piping:
 - (a) Soil and waste piping within the building itself and outside within five feet (5') of the foundation, shall be no-hub cast iron pipe and fittings, asphaltum coated, free from defects, and shall comply with CISPI. Standard 301, ASTM A-888 or ASTM A-74. Pipe and fittings shall be marked with the collective trademark of the Cast Iron Soil Pipe Institute. Fittings shall be made up with "Husky" SD 4000 series or "Clamp All" HI-TORQ 125 series stainless steel type 304 couplings and shall conform to ASTM C1540 & ASTM C564 except all above ground vent pipe fittings may be made with "Anaco" or "Tyler" stainless steel two band couplings conforming to CISPI Standard 310.
 - 2. Vent Piping:
 - (a) Concealed or underground vent piping shall be cast iron pipe and fittings as specified for soil and waste piping.
 - (b) Exposed vent piping shall be Schedule 40 galvanized steel pipe, ASTM A53, with black cast iron recessed drainage fittings.
 - (c) Vent piping within and passing through fire rated partitions shall be no-hub cast iron service weight pipe and fittings, asphaltum coated, free from defects, and shall comply with C.I.S.P.I. Standard 301-00 or ASTM A888-21a. Fittings shall be made up with "Anaco" or "Tyler" stainless steel two band couplings and shall comply with ASTM C564.
 - (1) All vents through roof shall terminate with vandal proof caps (Refer to "Roof Flashing" herein).
 - 3. Domestic Water Piping:
 - (a) Piping within the building and above grade shall be Type "L" ASTM B88, hard drawn copper tubing with wrought copper sweat fittings ANSI B16.18 and B16.22.
 - 4. All piping on roof shall be supported by pipe supports as manufactured by MAPA Products or Eaton B-Line Dura Blok. Products by Miro Industries and Erico shall be accepted for submittal review.
 - (a) Gravity System Piping 2" and Less: MS-1 single post, adjustable height pipe support.
 - 5. All underground non-metallic piping shall have 14 gauge copper "Tracer Wire" continuous for entire length.
- D. Traps, Strainers and Tailpieces: Every sanitary fixture, unless otherwise specified, shall be provided with a seventeen (17) gauge chromium tailpiece, a Los Angeles pattern chrome plated cast-brass trap and galvanized nipple trap arm and wall flanges. Trap arm shall be provided with chromium plated brass casing between the trap and wall flanges at each fixture. All sanitary waste system floor drains and floor sinks shall have cast iron "P" traps.
- E. Cleanouts: Shall be Jay R. Smith and Zurn.
 - 1. General: Provide cast-iron ferrule and countersunk brass clean-out plug with round cast iron access frame and heavy duty secured top cover.
 - 2. Wall Cleanouts: Jay R. Smith No. 4472 for steel pipe and Jay R. Smith No. 4532 for cast iron pipe.
 - 3. Floor Cleanouts: Jay R. Smith No. 4023 or 4028, bronze plug and non-skid nickel bronze top.
 - 4. Cleanouts to Grade: Jay R. Smith No. 4258 or Jay R. Smith No. 4253 with X-H bronze plug and X-X-H non-skid cover with lifting device set flush with surface for concrete areas. Asphalt or nonsurfaced

areas shall be installed with ring of concrete poured around the bottom flange six inches (6") below surface. Use cast iron soil pipe on cleanout risers. For cleanouts in non-traffic areas, terminate cleanout plug in concrete yard box.

- F. Access Panels: Wall access panels shall be minimum 12" x 12" for concealed valves and other equipment unless otherwise specified or indicated. Ceiling access panels shall be 18" x 18" minimum. Access panels shall be located and positioned for ready access and service of equipment housed within. Where access panels are specified with keyed cylinder locks, all such locks shall be identically keyed.
2. Wall, Non-Fire Rated: Elmdor/Stoneman DW-SS-CL, drywall, stainless steel finish, cylinder lock.
 3. Ceiling, Non-fire Rated: Elmdor/Stoneman DW, drywall, prime coated finish, screwdriver latch.
 4. Wall, Fire Rated: Elmdor/Stoneman FR-SS-CL, fire rated, stainless steel finish, cylinder lock.
 5. Ceiling, Fire rated: Elmdor/Stoneman FRC, Fire rated, prime coated finish, return latch.
- G. Yard Boxes & Vaults: For service shut-off valves on gas and domestic water; for pressure regulator assemblies and for cleanouts, shall be Brooks Products or Fraser Cement Products Co., rectangular concrete type with vandal-proof cast iron cover and name of service clearly marked on cover. Box shall be of size to permit full range of valve operation and to permit easy removal of valve assembly. Vaults shall be sectional type.
- H. Roof Flashing:
1. Sanitary vents thru roof and grease vents thru roof: Stoneman No. 1100-5, one (1) piece, seamless, four (4) pound, series with reinforcing steel boot counterflashed with cast iron flashing sleeve and equipped with vandal-proof hood for all vent piping. Seal joint between flashing and pipe with waterproofing compound per flashing manufacturer's recommendations.
 2. Water, gas, condensate drainage and other metallic piping thru roof: Stoneman No. 1100-4, one (1) piece, seamless, four (4) pound, series with reinforcing steel boot counterflashed with cast iron flashing sleeve. Seal joint between flashing and pipe with waterproofing compound per flashing manufacturer's recommendations
- I. Escutcheons: Shall be chrome plated cast brass with setscrew locking device.
- J. Dielectric Union Isolators: Connection between incompatible materials above grade and inside building shall be made with two (2) dielectric unions separated by a twelve inch (12") section of red brass pipe. Dielectric union isolator for connection piping or non-compatible materials shall be of standard commercial design with threaded connections.
- K. Pipe Supports: Unless otherwise indicated on the drawings, shall be as follows:
1. The Contractor shall furnish and install all miscellaneous iron work including angles, channels, etc., required to appropriately support the various piping systems. Hanger spacing and location shall conform to 2025 California Plumbing Code Table 313.1.
 2. All horizontal runs of piping within the building to be supported from the structural framing with steel rods and split ring hangers, B-Line, Grinnell Company, Tolco, or approved equal. Steel rods shall be secured to overhead framing with side beam connectors. Where necessary, install angle iron between framing to accommodate hanger rods. Where several pipes are running together, Unistrut, B-Line or Powerstrut channels with clamps may be used in lieu of individual pipe hangers, and supported from structure as herein specified. Submit test data for type of hanger supports to be provided. For support conditions other than specified herein, the Contractor shall submit method of support for approval prior to any installation.
 3. Horizontal Piping Hangers and Supports:
 - (a) General: Provide factory fabricated horizontal hangers and supports complying with one of the following MSS types listed to suit horizontal-piping systems, in accordance with MSS SP-69 and manufacturer's published product information. Select size of hangers and supports to

exactly fit pipe size for bare piping, and to exactly fit around piping insulation with saddle or shield for insulated piping. Provide copper-plated hangers and supports for copper-piping systems.

- (1) Adjustable Steel Clevis Hangers: (MSS Type 1.) B-Line B 3100
 - (2) Adjustable Swivel Pipe Rings: (MSS Type 5) B-Line B3690
4. Vertical-Piping Clamps:
- (a) General: Provide factory fabricated vertical-piping clamps complying with the following types listed, to suit vertical piping systems, in accordance with MSS SP-69 and manufacturer's published product information. Select size of vertical piping clamps to exactly fit pipe size of bare pipe. Provide copper-plated clamps for copper-piping systems.
 - (b) Two-Bolt Riser Clamps: (MSS Type 8) B-Line B3373
5. Hanger-Rod Attachments:
- (a) General: Provide factory fabricated hanger-rod attachments B-Line, Tolco or approved equal, selected by Installer to suit horizontal-piping hangers and building attachments, in accordance with MSS SP-58 and manufacturer's published product information. Select size of hanger-rod attachment to suit hanger rods. Provide copper-plated hanger-rod attachments for copper-piping systems.
 - (b) Side beam eye socket, Tolco Fig. #57 for rod sizes 3/8" dia. and Tolco Fig. #25-30-251 for rod sizes 1/2" dia.
6. Building Attachments:
- (a) General: Provide factory fabricated building attachments, selected by Installer to suit building structural framing conditions, in accordance with MSS SP-69 and manufacturer's published product information. Select size of building attachments to suit hanger rods. Provide copper-plated building attachments for copper-piping systems.
7. Hanger Rods and Spacing shall conform to the following table:
- | Pipe Sizes | Spacing | Rods |
|--------------------|---------|----------|
| 2 Inch and Smaller | 6 Feet | 3/8 Inch |
8. Hangers and Supports shall be adequate to maintain alignment and prevent sagging and shall be placed within 18 inches of joint. Support shall be provided at each horizontal branch connection.
9. Provide lateral bracing as manufactured by B-Line or approved equal for all piping to prevent swaying or movement in accordance with SMACNA "Guidelines for Seismic Restraints of Piping Systems (Seismic Hazard Level A)". Piping smaller than indicated in the guidelines shall be provided with bracing as specified for the smallest size indicated. The entire water distribution system shall be properly braced and will not move due to the action of quick closing of valves.
10. Miscellaneous Supports, Wall Brackets, Etc.: Provide where required in accordance with the best standard practices of the trade. Submit shop drawings for all fabricated supports.
11. Isolators. All piping which is not isolated from contact with the building by its insulation shall be installed with a manufactured type isolator. Isolators shall be B-Line vibra clamp and cushion, Super Strut, Stoneman "Trisolator", or approved equal. Piping shall be installed and supported in a manner to provide for expansion without strains. Guides shall be properly installed to ensure this requirement.
12. Shields:
- (a) General: Provide shields at piping hangers and supports, factory-fabricated, for all insulated piping as manufactured by Pipe shields Incorporated or approved equal. Size shields for exact fit to mate with pipe insulation.
 - (b) Protection Shields: MSS Type 40; provide high density insert of same thickness of insulation

or equal 100-psi average compressive strength, waterproofed calcium silicate, encased with a sheet metal shield. Insert and shield shall cover entire circumference of the pipe and shall be of length indicated by manufacturer for pipe size and thickness of insulation.

- (c) Owens Corning fiberglass SSL 11 with ASJ Max with wrap or equal. All condensate drain piping on roof shall have aluminum jacketing.

All hot water pipe insulation shall have a minimum wall thickness of not less than the pipe diameter of the pipe for up to 2" in diameter. Insulation wall thickness shall not be less than 2" for a 2" or more in diameter.

3. PART 3 – EXECUTION

3.1 INSTALLATION - GENERAL

- A. Locations and Accessibility: Install equipment for ease of maintenance and repair. If changes in the indicated locations or arrangements are made by the Contractor, they shall be made without additional charges.
- B. Openings: Furnish information to the other trades on size and location of openings which are required in walls, slabs, roof, for piping and equipment at the proper times.
- C. Closing-In of Uninspected Work: Do not allow or cause any of the work to be covered up or enclosed until it has been inspected, tested, and approved by the Architect. Any work enclosed or covered prior to such inspection and test shall be uncovered and, after it has been inspected, tested, and approved, make all repairs with such materials as may be necessary to restore all work, including that of other trades, to its original and proper condition.
- D. Before laying of any pipe or digging of any trenches, Contractor shall determine by actual excavation and measurement exact locations and depth of existing utility and service lines to which he is going to connect. In event depth of existing sewer main or storm drain is not sufficient to permit installation of piping as detailed on drawings or to make connection in manner indicated, Contractor shall confer with the Architect, Owner's representative and Engineer for Direction.
- E. Excavation, Trenching and Backfill: Perform all necessary trench excavation, shoring, backfilling and compaction required for the proper laying of the pipe lines.
 - 1. The Contractor shall coordinate the layout of all below grade piping and components with the General Contractor prior to bid to determine the extent of required sawcutting, excavation, alterations, and subsequent repair/restoration of all affected hardscape and softscape surfaces. All such items shall be included in bid.
 - 2. Backfill shall be clean soil free from rocks and debris. Compact to ninety percent (90%) of surrounding soil. All piping shall be installed in a minimum 6" sand bed and covered with 6" of sand prior to backfill. Continue backfill with materials free of rocks and debris, properly moistened and mechanically tapered and compacted to 90% of surrounding soil.
 - 3. Water, soil and waste piping shall have twenty-four (24") of cover minimum, except all PVC pipe material and all gas piping shall have eighteen (18") of cover minimum. All other pipe shall have not less than eighteen inches (18") of cover, unless otherwise noted on the drawings. Offset gas and water piping as required to permit crossover of underground piping systems, and electrical conduit systems.
 - 4. Bottoms of Trenches: Cut to grade and excavate bell holes to ensure the pipes bearing for their entire length upon the outside periphery of the lower third of the pipe.
 - 5. Water piping shall not be run in the same trench with sewer or drainage piping unless separated as required by the CPC.

6. All horizontal soil and waste piping 3" and smaller shall be installed to a uniform grade of not less than one-fourth inch (1/4") per foot. All horizontal soil and waste piping 4" and larger shall be installed to a uniform grade of not less than one-eighth inch (1/8") per foot, unless otherwise indicated or directed.

F. Piping Installation:

1. All piping shall be concealed in finished portion of the building except where otherwise indicated or directed at the time the work is done. All piping shall be installed to clear all framing members and beams, even if drawings do not indicate same. Contractor shall constantly check the work of other trades so as to prevent any interference with the installation of this work.
2. All piping into stem walls and footings shall be double half lap wrapped with 1/8" thick "Armaflex" insulation. The Contractor shall also provide blocked out areas in stem wall and footing as required for the installation of the piping. All piping shall avoid the lower 9" of the footing and the Contractor shall coordinate and provide dropped footings as required for the installation of the underground piping.
3. Unions shall be installed on one side of all screwed shut-off valves, at both sides of screwed automatic valves and on all by-passes, at all equipment connections and elsewhere as indicated or required for ease of installation and dismantling.
4. Connections between copper tubing and equipment shall be with Mueller Brass Company, or approved equal, brass stream line copper to P.P.S. ground joint unions.
5. Cleanouts shall be installed on all condensate drain piping at each aggregate horizontal and vertical change in direction exceeding 135 degrees.
6. All condensate drain piping shall be installed with a minimum slope of 1/8"/FT.
7. All condensate piping on roof shall be painted with UV protection paint.
8. Corrosion Protection:
 - (a) General.
 - (1) Corrosion protection shall be provided for all below grade cast iron and copper piping and associated valves and fittings. Such piping shall be protected from corrosion by encasement in a polyethylene protective wrapping, referred to hereafter as polywrap. Although not intended to be a completely air and water tight enclosure, the polywrap shall provide a continuous barrier between the pipe and surrounding bedding and backfill.
 - (d) Materials.
 - (1) Cast iron piping encasement.
 - a) The polywrap shall be minimum 8 mil. in thickness, group 2, linear low density, flat tube, natural (clear) virgin polyethylene film formed into tubes or sheets as required. Material shall meet or exceed the requirements of AWWA C105, ANSI A21.5 and ASTM A674.
 - b) The polywrap shall be as manufactured by Northtown Company or approved equal.
 - (2) Copper piping encasement.
 - a) The polywrap shall be minimum 6 mil. in thickness, group 2, linear low density, flat tube, natural (clear) virgin polyethylene film formed into tubes or sheets as required. Material shall conform to the requirements of ASTM D1248.
 - b) The polywrap shall be as manufactured by Northtown Company or approved equal.
 - (3) The minimum Polywrap flat tube width for each pipe diameter shall be as follows:

Pipe Size / Type	Polywrap Flat Tube Width
1/2" to 3/4" copper	2"

1" to 1-½ copper	3"
4" cast iron	16"

- (4) The polywrap shall be secured as specified with 2 inch wide pressure sensitive plastic tape not less than 10 mils thick.
 - a) Tape shall be Scotchwrap No. 50, Polyken No. 900, Tapecoat CT, Johns-Manville No. V-10 Trantex or approved equal.
 - b) Piping through exterior walls shall be sealed using Link Seal modular seal with nitrile seal elements and stainless steel bolts.
- (e) Installation.
 - (1) The polyethylene tubing shall be cut into lengths approximately 2 feet longer than the pipe sections. Slip the tube around the pipe, centering it to provide a 1-ft overlap on each adjacent pipe section, and bunching it accordion fashion lengthwise until it clears the pipe ends. Lower the pipe into the trench and make up the pipe joint with the preceding section of pipe. A shallow bell hole must be made at each joint to facilitate installation of the polywrap. The bunched-up polywrap shall be pulled from the preceding length of pipe, slipped over the end of the new length of pipe, and secured in place with one circumferential turn of tape plus enough overlap to assure firm adhesion. The end of the polywrap shall be slipped from the new pipe section over the end of the first wrap until it overlaps the joint at the end of the preceding length of pipe and tape it in place. The loose wrapping on the barrel of the pipe shall be pulled snugly around the barrel of the pipe and excess material folded over the top of the pipe and the folds held in place by means of short strips of adhesive tape, at about 3 foot intervals along the pipe.
 - (2) Rips, punctures or other damage to the tube shall be repaired with the adhesive tape or pieces of tube material secured with tape. Bends and reducers in the line shall be covered with polyethylene in the same manner as pipe.
 - (3) Valves, tees, crosses and outlets shall be wrapped with flat sheets of the same material. The sheets shall be passed under valves and brought up around the body to the stem. Edges shall be brought together, folded twice and secured with the adhesive tape.
- L. Sleeves: Shall be plastic or galvanized steel where pipes pass through concrete walls or floor slabs.
 - 1. Isolate pipes through ground floor slabs with Kraft paper, plastic tape or similar materials unless conduit is specified or indicated.
 - 2. Sleeves for pipes through exterior walls shall be non-metallic with minimum 2" weep ring as manufactured by Link Seal. Pipe shall be sealed with Link Seal modular seal with EPDM seal elements.
 - 3. Sleeves in or through fire rated walls shall be per U.L. Fire Resistance System No. WL1146 for drywall construction, and U.L. Fire Resistance System No. CAJ1044 for concrete construction. See architectural plans for all locations of rated walls.
 - 4. Below-grade piping through exterior walls shall be sealed using Link Seal modular seal with nitrile seal elements and stainless steel bolts and sleeves as manufactured by Century Line.
- M. Contraction and Expansion: Install all work in such a manner that its contraction and expansion will not do any damage to the pipes, the connected equipment, or the building. Install offsets, swing joints, expansion joints, seismic joints, anchors, etc., as required to prevent excessive strains in the pipe work. All supports shall be installed to permit the materials to contract and expand freely without putting any strain or stress on any part of the system. Provide anchors as necessary.
- N. Pipe Joints and Connections:

1. Copper Tubing and Brass Pipe with Threadless Fittings:
 - (a) Solder joints for copper shall be made with 95/5 lead free solder in accordance with manufacturer's recommendations for the service intended.
 - (b) Use threaded adapters on copper tubing where threaded connections are required.
- O. All closet bends shall be adequately blocked and secured. Trap arms and similar connections installed below the floor level or under concrete slabs shall be adequately supported and anchored to prevent motion in any direction. All piping installed above grade within buildings shall be secured to structural framing with Unistrut or pipe clamps to provide a rigid installation. Piping utilizing gaskets as a seal shall be given prime consideration to providing adequate stability through proper supports and anchors because of its flexible nature.
- P. Each pipe penetration of the roof shall be separated from other piping and any roof equipment by a minimum of 18" to insure a proper pipe flashing installation.
- Q. Floor, Wall and Ceiling Plates: Where pipes pierce finished surfaces, C.P. brass split flanges with setscrew lock shall be provided.
- R. Completion of Installation:
 1. Cleaning and Flushing: Clean all equipment and materials thoroughly. Leave surface to be painted smooth and clean, ready for painting.
 2. Flush each unit of water supply and distribution system thoroughly with clean water at the highest velocities attainable.
 3. Clean all piping, valves, traps, water heaters, fixtures and other devices thoroughly and flush or blow out until free of scale, oil silt, sand, sediment, pipe dope and foreign matter of any kind.

1.12 OPERATION INSTRUCTION

- A. Prior to occupancy or prior to the date of final inspection, whichever may occur first, the Contractor shall prepare two (2) sets of typewritten instructions for the operation of all equipment, valves, etc., specified and furnished as a part of the work under this section, and shall assign a competent person, thoroughly familiar with the job, to demonstrate and instruct a representative of the Owner in the operation of the equipment. The time of said demonstration and instructions shall be arranged with the Owner's representative approximately one (1) week in advance. Verbal instructions shall include shut-off location of gas and water. The Contractor shall assemble all operation and maintenance data supplied by the manufacturers of the various pieces of equipment, all keys and special wrenches required to operate and service the equipment (including keys for yard boxes, gas stops and fixture stops), and all equipment warranties and deliver same to the representative of the Owner on date of said instructions.

1.13 PIPE AND EQUIPMENT IDENTIFICATION

- A. Each operating and service line shut-off valve shall be identified by a 19 ga. brass tag with stamped, engraved type of service identified and area served, complete with hole and brass chain mounted on valve stem or handle. Tag shall be a minimum of one and one-half inch (1-1/2") in diameter.
- B. All piping systems shall be readily identifiable by appropriate labeling with the name of the piping contained. Such labeling shall be by means of metal tags, stenciling, stamping, or with adhesive markers, in a manner that is not readily removable. Labeling shall appear on the piping at intervals of not more than 20 ft and at least once in each room and each story traversed by the piping system.
- C. Provide on exterior wall of each building opposite the building's main gas service a sign reading "Gas Shut Off". Sign shall be metal with minimum 1-1/2" high-embossed letters.

- D. All equipment shall be provided with name plate indicating all pertinent information on it.

END OF SECTION

**SECTION 23 30 00
HEATING, VENTILATING AND AIR CONDITIONING**

PART 1 - GENERAL

1.1 DESCRIPTION

- A. Work under this section includes all labor, equipment, material, services, transportation, etc. required for and reasonably incidental to the complete and satisfactory installation of all the HVAC Systems as indicated on the Drawings or specified herein.

1.2 WORK INCLUDED IN THIS SECTION

- A. Exhaust Fan Units
- B. Ductwork and Accessories
- C. Test and Balance
- D. Record Drawings
- E. Operation and Maintenance Manuals
- F. Guarantee

1.3 RELATED WORK SPECIFIED ELSEWHERE

- A. Electrical supply to units. See Electrical Drawings.

1.4 GENERAL REQUIREMENTS

- A. This section of the specification shall be considered as a part of the entire specification, and all applicable portions of General Conditions, Special Conditions, and Division 1 shall apply.
- B. Erection: The Contractor shall furnish the services of an experienced superintendent, who shall be constantly in charge of the erection of the work, together with all necessary journeymen, helpers, and laborers required to properly unload, erect, connect, adjust, start of operate and test the work involved.

1.5 REFERENCES

- A. AABC - National Standards for Field Measurement and Instrumentation, Total System Balance.
- B. AMCA 210 - Laboratory Methods of Testing Fans for Rating Purposes.
- C. AMCA 300 - Test code for sound rating air-moving devices.

OPTIMUM ENERGY DESIGN

KINDERGARTEN RESTROOM ADDITION FAIRMONT ELEMENTARY SCHOOL PLACENTIA YORBA LINDA SCHOOL DISTRICT

- D. ANSI/NFPA 90A - Installation of Air Conditioning and Ventilation System.
- E. ARI 270 - Sound rating of Outdoor Unitary Equipment.
- F. ASHRAE 52.2-2017 - Method of Testing General Ventilation Air Cleaning Devices for Removal Efficiency By Particle Size
- G. ASTM A90 - Weight of Coating on Zinc - Coated (Galvanized) Iron or Steel Articles
- H. ASTM A120 - Black and Galvanized Steel Pipe
- I. ASTM B88 - Seamless Copper Water Tube
- J. ASTM C518 - Steady State Heat Flux Measurements and Thermal Transmission Properties by Means of the Heat Flow Meter Apparatus
- K. ASTM C553 - Mineral Fiber Blanket and Felt Insulation
- L. ASTM C612 - Mineral Fiber Block and Board Thermal Insulation
- M. ASTM E84 - Surface Burning Characteristics of Building Materials
- N. ASTM E96 - Water vapor Transmission of Materials
- O. NFPA 90B - Installation of Warm Air Heating and Air Conditioning Systems
- P. NFPA 255 - Surface Burning Characteristics of Building Materials
- Q. SMACNA - Low Pressure Duct Construction Standards
- R. UL 181 - Factory Made Air Ducts and Connectors
- S. UL 723 - Surface Burning Characteristics of Building Materials
- T. California Mechanical Code - 2025 Edition
- U. California Building Code - 2025 Edition
- V. CEC Title-24 – 2025 Edition

1.6 SUBMITTALS AND SHOP DRAWINGS

- A. Contractor agrees that shop drawings submittals processed by the District do not become Contract Documents and are not Change Orders; that the purpose of the shop drawing review is to establish a reporting procedure and is intended for the Contractor's convenience in organizing his work and to permit the District to monitor the Contractor's progress and understanding of the design. The process of review of the Contractor's submittals is not of testing the District's perception. If deviations, discrepancies or conflicts between shop drawings submittals and the Contract Documents are discovered either prior to or after the shop drawing submittals are processed by the District, the Contractor agrees that the Contract Documents shall control and shall be followed.

OPTIMUM ENERGY DESIGN

KINDERGARTEN RESTROOM ADDITION FAIRMONT ELEMENTARY SCHOOL PLACENTIA YORBA LINDA SCHOOL DISTRICT

- B. Prepare and furnish fully coordinated shop drawings showing ductwork and piping on separate drawings.
 - 1. The drawings shall be minimum $1/4" = 1'-0"$ scale and shall show dimensioning of piping and ductwork from gridlines, bottom of elevation marks for ductwork and piping and fittings, valves, dampers, devices, etc. with labels.
 - 2. In addition, coordinate with related work and reference on the same drawings major plumbing piping, structural steel, fire protection piping, conduit runs and cable trays.
 - 3. Review and sign these drawings to verify coordination of related equipment.
 - 4. Conflicts, which occur, shall be brought to the attention of the District Representative prior to issuance of the drawings.
- C. Materials and Equipment:
 - 1. As soon as possible and within 14 days after award of the contract, and before their purchase, the Contractor shall submit to the District electronic format submittals for approval containing a complete list of materials, specialties and equipment he is to furnish for the installation.
 - 2. Literature shall be standard manufacturer's catalog cuts and items to be installed shall be clearly indicated.
 - 3. All submittals shall be made at one time.
- D. Each item shall be identified by manufacturer, brand and trade name, number, size, rating and whatever other data is necessary to properly identify and check the materials and equipment. The words: "as specified" will not be considered sufficient identification.
- E. Accessories, controls, finish, etc., not submitted or identified with the submitted equipment shall be furnished and installed as specified.
- F. 1 Sets of complete electronic format shop drawings shall be submitted for approval indicating all piping, equipment and ductwork. These drawings shall indicate sizes, locations and elevations of ductwork, equipment and equipment pads, piping and controls including transitions, valves etc.
- G. Shop drawings shall be approved only to extent of information indicated. Approval of an item of equipment shall not be construed to mean approval for components for that item for which Contractor has provided no information.
- H. Approval of shop drawings shall not relieve Contractor of responsibility for providing all controls, wiring, components, etc. which are shown or specified, or all additional controls, wiring, components, etc. required to provide complete and correctly operating mechanical systems.
- I. Submit product data for the following manufactured products, assemblies, personnel and testing agencies required for this project.
 - 1. Exhaust Fan Units
 - 2. Diffusers, registers and grilles
 - 3. Ductwork and Accessories

1.7 SUBSTITUTIONS

- A. Should the Contractor desire to substitute any material, equipment or other items for those specified, he shall submit a complete list, including detailed equipment layouts and performance characteristics within 14 calendar days after the scheduled Start of Construction. Said data shall be submitted in 1 electronic format set, assembled in individual brochures.
- B. The entire cost of all changes of any type due to substitution for materials specified shall be born by the Contractor at no extra cost to the District.

HEATING, VENTILATING AND AIR CONDITIONING

OPTIMUM ENERGY DESIGN

KINDERGARTEN RESTROOM ADDITION FAIRMONT ELEMENTARY SCHOOL PLACENTIA YORBA LINDA SCHOOL DISTRICT

- C. Unsolicited and voluntary deducts, on the part of the Contractor for substituting unapproved systems and/or equipment, shall not be considered for the purpose of awarding the Contract.
- D. The contractor shall submit the amount of cost credit to the Contract in the event the proposed substitution is accepted.
- E. In all cases where substitutions are proposed after bids are received, the Contractor shall bear the cost of evaluation on the basis of 2-1/2 times technical salaries of engineering personnel involved.

1.8 AVAILABILITY OF SPECIFIED EQUIPMENT

- A. Verify prior to bidding that all specified equipment is available and can be obtained in time for installation during orderly and timely progress of the work.
- B. In the event that specified items will not be so available, notify the District prior to receipt of bids.
- C. Costs of delays because of non-availability of specified items, when such delays could have been avoided by proper investigation on the part of the Contractor, will be back-charged as necessary and shall not be born by the District.

1.9 RECORD DRAWINGS

- A. The contractor shall arrange and pay for one set of white prints of the HVAC drawings, which he shall alter in red to show all changes made to the original layout. These drawings shall be kept current.
- B. The contractor shall deliver these completed to the District when the job is finished and accepted prior to final payment, and provide copies of approved shop drawings in ACAD format to MEOR.
- C. Contractor shall provide 1 complete set of electronic format drawings to District.

1.10 OPERATION AND MAINTENANCE DATA

- A. Submit one (1) electronic format set prior to final inspection including cover sheet and table of contents. Prepare submittal with printed title "OPERATION AND MAINTENANCE INSTRUCTIONS", and title of project. Internally subdivide the section contents with permanent page dividers, logically organized as described below; with tab titling clearly printed under reinforced laminated plastic tabs.
- B. Contents: Prepare a Table of Contents with each Product or system description identified.
 - 1. Part 1:
 - a. Directory listing names, addresses, and telephone numbers of District, Contractor, Subcontractors, and major equipment suppliers.
 - 2. Part 2:
 - a. Operation and maintenance instructions, arranged by system.
 - b. Identify the following:
 - 1) Significant design criteria
 - 2) List of equipment
 - 3) Parts list for each component
 - 4) Operating instructions
 - 5) Maintenance instructions for equipment and systems

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- 6) Maintenance instructions for special finishes, including recommended cleaning methods and materials and special precautions identifying detrimental agents.
- C. Submit one copy of completed volumes in final form seven (7) days prior to final inspection. This copy will be returned after final inspection, with District comments. Revise content of documents as required prior to final submittal.
- D. Submit final volumes (revised) within seven (7) days after final inspection.

1.11 GUARANTEES

- A. The Contractor, in accepting this contract, binds himself to replace or repair at his own expense any defect in workmanship or material which may appear within a period of one year from the date of the final acceptance of the building, and to pay for all resulting damage which shall appear within the said period; provided always that the Contractor shall not be liable for anything attributable to acts of the agents of the District, or for ordinary wear. Also, given date of work performed by the Contractor be accepted as complete, he shall agree to correct any deficiencies or omissions in respect to the plans or specifications which may appear in the afore-mentioned twenty-four month period.
- B. The Contractor guarantees that all piping as provided in this specification will be free from all obstructions, and that all piping will be tight and drip free.

1.12 LOCAL CONDITIONS

- A. The Contractor and trade submitting tenders on this work shall visit and will be deemed to have visited the site to ensure that they are familiar with all conditions relating to the work. Failure to visit the site will in no way relieve the successful Contractor of the necessity of furnishing any material or performing any work that may be required to complete the work in accordance with the drawings and specifications without additional cost to the District.

1.13 RULES, REGULATIONS AND CODES

- A. All work and materials shall be in full accordance with the latest California Mechanical Code, California Plumbing Code, California Building Code and local rules and regulations, State Fire Marshal regulations, the safety orders of the Division of Industrial Safety; the California Electric Code; the standards of the National Fire Protection Association; American Gas Association; Occupation and Safety Act; American National Standards Institute; American Society of Mechanical Engineers; American Society for Testing and Materials; Installation Standards published by the International Association of Plumbing And Mechanical officials (IAPMO) and other applicable laws, codes, or regulations. Nothing in these specifications shall be construed to permit work not conforming to these codes.
- B. Electrical Work: Motors, electrical apparatus and wiring specified in this section shall conform to the National Electrical Manufacturer's Standards and the California Electric Code and bear the Underwriter's label of approval.
- C. The Contractor shall furnish, without extra charge, any additional material and labor when and where required to comply with these rules and regulations, though the work be not mentioned in these Specifications or shown on the Drawings. When these Specifications or Drawings call for or describe materials or construction of a better quality or larger sizes than required by the above mentioned rules

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and regulations, the provisions of these specifications and accompanying drawings shall take precedence.

1.14 FEES AND PERMITS

- A. The Contractor must obtain and pay all fees for permits, licenses, inspections, etc., which are required by any legally constituted authority. Coordinate exact requirements with the District prior to bid.

1.15 COORDINATION

- A. Following the general arrangement indicated on the Drawings as closely as possible, the Contractor shall coordinate with the architectural, structural, plumbing, electrical and all other trades prior to installation of the materials and equipment to verify adequate space available for installation of the work shown. The District shall be immediately notified if an area of conflict occurs between trades.
- B. The Contractor shall bear all costs incurred for work that must be relocated due to conflicts between trades.
- C. The Mechanical Contractor shall coordinate all requirements for all points of connection with the General Contractor and other trades prior to bid.

1.16 DRAWINGS

- A. The work shall be installed as indicated on Drawings, however, changes to accommodate installation of this work with other work, or in order to meet Architectural or structural conditions, shall be made without additional cost to the District.
- B. For the purpose of clarity and legibility, the Drawings are essentially diagrammatic to the extent that many offsets, bonds, unions, special fittings and exact locations are not indicated. The Contractor shall make use of all data in all of the Contract Documents, and shall verify this information at the site.

1.17 INSPECTION

- A. The Contractor shall not allow or cause any of his work to be covered up or closed in until it has been inspected, tested, approved by all authorities have jurisdiction, and until Project Record drawings have been properly annotated.
- B. Should any of his work be covered up or closed in before such inspection, he shall, at his own expense, uncover the work to the satisfaction of the inspection party. All related repair work cost shall be borne by the Contractor.

1.18 DELIVERY, STORAGE AND PROTECTION OF PROPERTY

- A. Place orders for all equipment in time to prevent any delay in construction schedule or completion of project. If any materials or equipment are not ordered in time, additional charges made by equipment manufacturers to complete their equipment in time to meet construction schedule, together with any special handling charges, shall be borne by the contractor.

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- B. Materials shall be delivered in ample quantities from time to time as may be necessary for the uninterrupted progress of the work. They shall be stored as to cause the least obstruction to the premises and distributed so as to prevent overloading to any portion of the structure.
- C. The Contractor shall provide temporary storage and shop areas that are required at the site for the safe and proper storage of materials, tools, and other items used in the performance of this work. These areas shall be constructed only in approved locations and shall not interfere with the work of any other Contractor.
- D. All work, equipment and materials shall be protected at all times. The Contractor shall make good all damage caused either directly or indirectly by his own workmen. The Contractor shall also protect his own work from damage. He shall close all pipe and duct openings with caps or plugs during installation. He shall protect all of his equipment and materials against dirt, water, chemical, and mechanical injury. Upon completion, all work shall be thoroughly cleaned and delivered in a new condition.

1.19 DAMAGE BY LEAKS, ETC.

- A. The Contractor shall be responsible for all damage to any part of the premises or work of other Contractors, caused by leaks or breaks in the piping or equipment furnished and/or installed under this section, during the construction and guarantee period.

1.20 ACCESS TO EQUIPMENT FOR MAINTENANCE

- A. Install all equipment, piping, etc. to permit access for normal maintenance. Maintain easy access to filters, motors, etc. Install all such equipment and accessories to facilitate maintenance. Perform any relocation of pipes, etc. required to permit access at request of District at no additional cost to District.
- B. Furnish and install access doors or panels in walls, floors, and ceilings to permit access to equipment, dampers, and all other items requiring service. Coordinate location of access doors with other trades as required.
- C. Size access panels to allow inspection and removal of all items served.
- D. Use Milcor style as required for material in which door is installed. Where door is installed in fire rated construction, provide door bearing UL label required for condition.

1.21 QUALITY ASSURANCE

- A. Abbreviations:

- 1. AABC - Associate Air Balance Council
- 2. ADC - Air Diffusion Council - Test Code
- 3. AGA - American Gas Association
- 4. AMCA - Air Moving and Conditioning Association
- 5. ANSI - American National Standards Institute
- 6. ARI - Air Conditioning and Refrigeration Institute
- 7. ASA - American Standards Association
- 8. ASC - Adhesive and Sealant Council
- 9. ASHRAE - American Society of Heating, Refrigerating and Air Conditioning Engineers

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10. ASME - American Society of Mechanical Engineers
 11. ASTN - American Society for Nondestructive Testing
 12. ASSE - American Society of Sanitary Engineering
 13. ASTM - American Society for Testing and Materials
 14. AWS - American Welding Society
 15. AWWA - American Water Works Association
 16. CAC - California Administration Code
 17. 2025 CBC - California Building Code
 18. 2025 CEC - California Electrical Code
 19. 2025 CMC - California Mechanical Code
 20. California Fire Code with California Amendments.
 21. MSS - Manufacturers' Standardization Society
 22. NBS - National Bureau of Standards
 23. NCWB - National Certified Piping Welding Bureau
 24. NEMA - National Electrical Manufacturer's Association
 25. NFPA - National Fire Protection Association
 26. PDI - Plumbing and Drainage Institute
 27. SMACNA - Sheet Metal and Air Conditioning Contractor's National Association, Inc.
 28. UL - Underwriters Laboratories, Inc.
- B. Rulings and interpretations of authorities shall be considered a part of the regulations.
- C. Nothing in this document is to be construed to permit Work not conforming to these codes and regulations.
- D. Should there be any direct conflict between the above rules, the most stringent shall govern.
- E. The Contractor shall recognize that the design is based upon the equipment and material specified by name or construction and accept full responsibility for assuring that the quality, utility and performance of a substitution equals or exceeds that of the specified item.
- F. Testing: Provide the services of a qualified testing laboratory/agency to perform the specified field tests. Notify the District Representative 48 hours in advance of performance of Work requiring testing. Provide all materials required for testing.
- G. Factory and Field Testing:
1. See each Section for the required testing and their procedures.
 2. Test reports shall include description of equipment tested, description of test procedures, test results, and names and signatures of witnesses of tests.

PART 2 - PRODUCTS

2.1 GENERAL

- A. All materials and equipment shall be new and of the best of their respective grades, free from all defects and of the make, brand or quality herein specified or as accepted by the District.
- B. All materials and equipment shall be identified by manufacturer's name or nameplate data. Unidentified material or equipment shall be removed from the site.

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- C. Equipment specified by manufacturer's number shall include all accessories, controls, etc., listed in the catalog as standard with the equipment. Optional or additional accessories shall be furnished as specified.
- D. Where no specific make of material or equipment is mentioned, any first class product of a reputable manufacturer may be used, provided it conforms to the requirements of the system and meets with the approval of the District.
- E. Equipment and materials damaged during transportation, installation and operation shall be considered as "totally damaged" and shall be replaced with new. Any variance from this clause shall be made only with written approval of the District.

2.2 MANUFACTURER

- A. Exhaust Fan Units:
 - 1. GreenHeck
 - 2. Loren Cook
 - 3. Approved Equal

2.3 GREENHECK EXHAUST FAN

- A. MANUFACTURER
 - 1. Greenheck, PO Box 410, Schofield, Wisconsin 54476. Phone (715) 359-6171 Fax (715) 355-2399. Website: www.greenheck.com
 - 2. See equipment schedule sheet per plans for more details.

2.4 DUCTWORK AND ACCESSORIES

- A. General:
 - 1. Non-combustible or conforming to requirements for Class 1 air duct materials, or UL 181.
- B. Steel Ducts:
 - 1. ASTM A653 galvanized steel sheet, lock-forming quality, having zinc coating of 1.25 oz per sq ft for each side in conformance with ASTM A90.
 - 2. Round duct shall be spiral seam construction.
- C. Flexible Ducts:
 - 1. Interlocking spiral of galvanized steel or aluminum construction; rated to (2 inches WG positive and 1.5 inches WG negative for low pressure ducts) (and 15 inches WG positive or negative for medium high pressure ducts.)
- D. Insulated Flexible Ducts:
 - 1. Flexible duct wrapped with flexible glass fiber insulation, enclosed by Pressure Ductwork: seamless aluminum pigmented plastic vapor barrier jacket; maximum 0.23 K value at 75 degrees F w/metal connectors.
- E. Fasteners:
 - 1. Rivets, bolts, or sheet metal screws.
- F. Sealant:

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1. Non-hardening, water resistant, fire resistive, compatible with mating materials; liquid used alone or with tape, or heavy mastic.

G. Hanger Rod:

1. Steel, galvanized; threaded both ends, threaded one end, or continuously threaded.

H. Low Pressure Ducts:

1. Fabricate and support in accordance with 2025 CMC, SMACNA Low Pressure Duct Construction Standards and ASHRAE handbooks, except as indicated. Gages for galvanized steel ducts for low pressure systems where velocities do not exceed 2000 FPM shall be as follows:

a.

RECTANGULAR DUCT Dimension of Largest Side (L) in Inches	Gage	ROUND DUCT Diameter (D) in Inches	Ga.
L<12	26	D<9	26
12<L<30	24	9<D<14	24
30<L<54	22	14<D<23	22
54<L<84	20	23<D<37	20
84<L	18	37<D<51	18
		51<D<61	16
		61<D<84	14

- b. All joints and seams as indicated in the 2025 CMC are acceptable.
2. Size round ducts installed in place of rectangular ducts in accordance with ASHRAE table of equivalent rectangular and round ducts. No variation of duct configuration or sizes permitted except by written permission.
3. Construct T's, bends, and elbows with radius of not less than 1-1/2 times width of duct on centerline. Where not possible and where rectangular elbows are used, provide turning vanes.
4. Increase duct sizes gradually, not exceeding 15 degrees divergence wherever possible. Divergence upstream of equipment shall not exceed 30 degrees; convergence downstream shall not exceed 45 degrees.
5. Use double nuts and lock washers on threaded rod supports.

I. Volume Control Dampers:

1. Fabricate in accordance with SMACNA Low Pressure Duct Construction Standards, and as indicated.
2. Opposed blade dampers shall have factory-fabricated blades, with factory assembled linkages, mounted in frames.
 - a. Blades shall have interlocking edges and ends.
 - b. Rectangular dampers 6" or more wide shall be the multi-blade type.
 - c. Blades on multi-blade type dampers must not be over 6" wide.
 - d. Dampers shall be of the opposed blade type.
 - e. Dampers shall have bar or channel frames and corner bracing.
 - f. All blade and linkage bearings shall be self-lubricating plastic.
 - g. Damper assembly leakage not to exceed 1% with 4.0 W.C. static pressure.
3. Provide locking, indicating quadrant regulators on single and multi-blade dampers.

4. On insulated ducts mount quadrant regulators on stand-off mounting brackets, bases, or adapters.

J. Duct Test Holes:

1. Cut or drill temporary test holes in ducts as required. Cap with neat patches, neoprene plugs, threaded plugs, or threaded or twist-on metal caps.

2.5 CONTROLS

- A. The Mechanical Contractor shall be responsible for the proper coordination of all control work and electrical work in connection therewith. He shall also be responsible for the proper operation of the entire system.
- B. The Electrical Contractor shall furnish and install all line voltage control wiring, and in conduit. Wire sizing and length of run shall be coordinated with the manufacturer and Electrical Engineer. All Energy Management Controls, wiring, and conduit shall be by Controls Contractor.
- C. Electrical Work: All electric relays, hand off automatic switches and all electrical wiring and all conduits will be provided under the Electrical Section, except as otherwise specified. Furnish and install additional conduit, wiring, relays, hand off automatic switches made necessary by the use of approved substituted equipment under this Section with no additional cost to the Owner.
- D. Refer to drawings for control diagrams and additional requirements.
- E. Calibration of Controls: The Controls Contractor shall carefully calibrate and adjust all controls as required to maintain comfort conditions and maximum energy conservation.
- F. Where stand-alone controls are indicated, mechanical contractor shall be responsible for low voltage controls conduit, wiring, and thermostat.

PART 3 - EXECUTION

3.1 INSTALLATION

A. Equipment Installation:

1. All equipment provided under this section of the specifications shall be installed in strict accordance with the manufacturer's recommendations.
2. Should the drawings or specifications indicate the equipment is to be installed in a manner not in accordance with the manufacturer's recommendations; the Contractor shall obtain direction from the Engineer prior to proceeding with the installation. If the Contractor proceeds with the installation without obtaining direction from the Engineer, the Contractor shall be required to make all required corrections to the installation at no additional cost to the contract.
3. Space Consideration:
 - a. Certain equipment and ductwork will have to be installed within the limited space available as indicated on the drawings.
 - b. Exact field measurements of existing conditions will be the responsibility of this Contractor to assure that the equipment and ductwork to be installed under this Section of the specifications can be installed as indicated.
 - c. Contractor shall submit shop drawings for approval prior to installation.
 - d. These field verified dimensions shall be made prior to purchase of equipment or fabrication of ductwork.

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4. Line all duct as indicated on mechanical sheets. Line ductwork as per General Notes, including but not limited to all ductwork at Bypass Damper connection locations.
- B. Roof and Wall Flashings:
1. Ducts penetrating roof shall have twenty-two (22) gauge sheet metal flashing with a minimum of ten inches (10") of the base extended on to the roof, or roof curb, as indicated on the drawings.
 2. Ducts through walls shall be sealed with galvanized angle iron on all sides.
 3. Where required or indicated, a weather hood constructed of galvanized sheet metal with galvanized birdscreen shall be provided.
 4. Refrigerant piping penetrating roof shall be provided with 4 pound lead flashing and counter flashing.
- C. Openings through Walls and Roof:
1. Framed openings in walls and roof for ductwork to be coordinated in advance of the work. Installer shall furnish shop drawings showing the correct dimensions and locations of the required openings.
 2. The Contractor shall provide and install "line-seals" where pipes pass through masonry walls or floors.
 3. All pipes passing through walls, floors, ceilings, and partitions in finished portions of the buildings shall be provided with chromium plated, cast brass, set screw plates.
 4. Where sleeves and plates are installed around insulated pipes, they shall be of sufficient size to allow the insulation to go through them, presenting a neat finish.
- D. Sleeves and Seals: (Provide for pipes passing through walls or floor slabs).
1. Sheet-Metal Sleeves (above grade): 10 gauge, galvanized sheet metal, round tube closed with welded longitudinal joint.
 2. Steel Sleeves (below grade): 10 gauge, galvanized sheet metal, round tube closed with welded longitudinal joint.
 3. Polyethylene Sleeves (above grade): Manufacturer's standard product.
 4. Mechanical Sleeve Seals (install where indicated on drawings): Modular mechanical type, consisting of interlocking synthetic rubber links shaped to continuously fill annular space between pipe and sleeve, connected with bolts and pressure plates which cause rubber sealing elements to expand when tightened, providing watertight seal and electrical insulation.
 5. Isolate pipes through ground floor sleeves with Kraft paper, plastic tape or similar materials.
 6. Pack space between pipe and sleeve with ceramic fiber and Dow Fire Stop No. UL827U sealant so as to absolutely fireproof and watertight.
- E. Ductwork and Accessories:
1. Provide openings in ductwork where required to accommodate thermometers and controllers. Provide pilot tube openings where required for testing of systems, complete with metal can with spring device or screw to ensure against air leakage. Where openings are provided in insulated ductwork, install insulation material inside a metal ring.
 2. Locate ducts with sufficient space around equipment to allow normal operating and maintenance activities.
 3. Install accessories in accordance with manufacturer's instructions and per seismic note on mechanical sheet M-0.1.
 4. Provide balancing dampers at points on low-pressure supply, return, and exhaust systems where branches are taken from larger ducts as required for air balancing. Use splitter dampers only where indicated.
 5. Provide flexible connections immediately adjacent to equipment in ducts associated with fans and motorized equipment.
 6. Provide duct access doors for inspection and cleaning before and after filters, coils, fans, automatic dampers, at fire dampers, and elsewhere as indicated. Provide minimum 8 x 8 inch size for hand access, 18 x 18 inch size for shoulder access, and as indicated.

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7. Provide duct test holes where indicated and required for testing and balancing purposes.
 8. Check location of outlets and inlets and make necessary adjustments in position to conform to Architectural features, symmetry, and lighting arrangement.
 9. Install diffusers or exhaust fan to ductwork with airtight connection.
 10. Provide balancing dampers on duct take-off to diffusers and registers, exhaust fan regardless of whether dampers are specified as part of the diffuser, or register assembly.
 11. Paint ductwork visible behind air outlets and inlets matte black.
 12. Flexible Duct Connections: Shall be provided where indicated as required and shall be "Vent-glass", "Ventbestos", or Duro-Dyne Durolan super metal-fab.
 13. Duct Tape and Sealer:
 - a. All longitudinal snap lock joints shall be made airtight with high pressure duct sealant TREMCO J.S. 773, GREY A.F., and transverse joints sealed with Hardcast AFG No. 1402 foil grip instant tape sealant for rectangular ducts and round ducts, all U.L. classified. At contractor's option, all round duct transverse joints may be made with MIRACLE D-619 water based, duct sealant U.L. classified 309U as manufactured by MIRACLE ADHESIVES CORP.
 - b. Exposed outdoor ductwork shall be sealed as described herein and, in addition, all transverse joints shall be covered with Glenkote "Seal-Flex".
- F. Thermostats and over-ride switches:
1. Install at 48" above finished floor unless otherwise stated.
 2. Coordinate with other trades.
 3. All thermostats and over-ride switches shall be equipment schedule.
 4. Controls Contractor shall be responsible for verifying, furnishing all controls and wiring for tie-in of thermostats to new building energy management system and shall co-ordinate all requirements with other trades including notifying electrical contractor of necessary conduit and power requirements.
 5. All costs for scope of work shall be submitted for final bid.
 6. All control conduits shall be by Controls Contractor.
- G. Insulation:
1. Duct Insulation:
 - a. Unless specifically indicated on the drawings the Contractor may line or wrap ductwork to meet insulation requirements.
 - b. Fiberglass duct wrap:
 - 1) Secure insulation with vapor barrier with wires and seal jacket joints with vapor barrier adhesive or tape to match jacket.
 - 2) Secure insulation without vapor barrier with staples, tape, or wires.
 - 3) Install without sag on underside of ductwork. Use adhesive or mechanical fasteners where necessary to prevent sagging. Lift ductwork off trapeze hangers and insert spacers.
 - 4) Seal vapor barrier penetrations by mechanical fasteners with vapor barrier adhesive.
 - 5) Stop and point insulation around access doors and damper operators to allow operation without disturbing wrapping.
 - c. Duct (and Plenum) liner Application:
 - 1) Install as indicated (sound lining) on the drawings.
 - 2) Adhere insulation with adhesive for 100 percent coverage. Secure insulation with mechanical liner fasteners. Refer to SMACNA Standards for spacing. Seal and smooth joints. Seal liner surface penetrations with adhesive.
 - 3) Duct dimensions indicated are outside dimensions required for airflow.

3.2 AIR SYSTEM TEST AND BALANCE

- A. Perform all tests to the entire satisfaction of the owner. Air balancing contractor shall notify owner one

week prior to scheduling air balance at the site.

B. Regulating and Adjusting Air Systems:

1. The Contractor shall have an experienced independent testing company certified member of the Associated Air Balance Council (A.A.B.C.) specializing in air conditioning system testing completely balance the air systems so that the volume of air indicated on the drawings is being delivered to the outlets. He shall adjust and re-adjust this part of the work until the operation complies with the requirements of the drawings and specifications.
2. Testing Procedure: Procedures shall conform to A.A.B.C. standards. Provide reports in sort cover, letter size, 3-ring binder manuals, complete with index page and indexing tabs, with cover identification at front and side. Include set of reduced drawings with air outlets and equipment identified to correspond with data sheets, and indicating thermostat locations.
3. The following test data shall be taken and three (3) copies submitted in tabulated form to the Architect for each system:
 - a. Test and adjust all supply, return & exhaust blower RPM to design requirements.
 - b. Test and record all motor full load amperes.
 - c. Test and record system static pressures, suction and discharge.
 - d. Test and adjust system for design re-circulated air, CFM.
 - e. Test and adjust system for design CFM outside air.
 - f. Adjust all supply and return outlets to within 5% of design CFM.

3.3 JOB COMPLETION

A. Equipment Identification:

1. All equipment furnished under this section shall be provided with the manufacturer's metal identification labels securely attached and showing all pertinent data, including performance characteristics, size, model, and serial number. Labels shall not be obscured in any manner.
2. Identification name plates shall be provided on all equipment and control components, including room thermostat numbers coded to their respective automatic zone damper, valve, or air conditioning unit. Name plates shall be constructed of black bakelite with white center engraved letters three-sixteenth inch (3/16") high and shall be cemented to equipment with an epoxy resin. The Contractor shall submit to the Architect, a complete list of name plate titles for approval prior to installation.
3. Each valve shall be identified by a number brass tag with hole and brass chain mounted on valve stem or handle. Tag shall be a minimum of one and one-half inch (1-1/2") in diameter and numbers shall be at least one-fourth inch (1/4") high stamped into the tag.

B. Identification:

1. Provide equipment labels.

C. Final Operation: Upon completion of the installation of the equipment and after all systems have been tested, cleaned, the Contractor shall place a competent person in charge who shall operate the equipment for a period of three eight-hour days. During this period of operation, all safety and operating controls shall be actuated to demonstrate proper operation. During this operating period, the Owner's representative shall be instructed in all details of operation and maintenance. All required instructions from the equipment manufacturer's representative shall be given during the period.

D. Operation Instructions:

1. Prepare a diagram of the entire control system with a full description of the heating, ventilating and air conditioning systems.

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2. After approval by the Engineer, the control diagram and complete operating instructions shall be mounted under glass and installed where directed.
 3. Prepare electronic format for maintenance manuals which shall include all the necessary or pertinent data, such as:
 - a. Names, addresses and emergency phone numbers of all suppliers and manufacturers.
 - b. Part numbers of all replaceable items.
 - c. Oiling and lubrication instructions.
 - d. Air balance report.
 - e. Control diagram and operation sequence, together with labeling of controls and instruments to match the diagram.
 - f. A maintenance schedule which shall list all required maintenance on all equipment furnished under this section of the specifications and the intervals of which the items are to be performed.
 4. An identification chart indicating valve operating in the piping system shall be installed as located by the Owner. Identification charts shall be mounted behind glass in a frame.
- E. Clean-Up:
1. After all heating, ventilating and air conditioning work has been tested and approved, the Contractor shall thoroughly clean all parts of the equipment installation. Exposed parts which are to be painted are to be thoroughly cleaned of cement plaster and other materials and all greases and oil spots removed with solvent. Exposed rough metal work to be carefully brushed down with steel brushes to remove rust and other spots and left in proper condition to receive painter's finish.
 2. Remove all debris from the job site, all cartons, boxes, packing crates, excess materials not used occasioned by the work and to the satisfaction of the Owner.
 3. If the above requirements of clean-up are not to the satisfaction of the Owner, the Owner reserves the right to order the work done and the cost of which shall be borne by the Contractor.
 4. The Contractor shall remove on a daily basis all debris from the job site, to the satisfaction of the Owner.
 5. If the above requirements of clean-up are not to the satisfaction of the Owner, the Owner reserves the right to order the work done by a third party and the cost of which shall be borne by the Contractor.

END OF SECTION

SECTION 26 05 10**ELECTRICAL GENERAL PROVISIONS****PART 1 GENERAL****1.01 SECTION INCLUDES**

- A. Furnish all labor, materials, apparatus, tools, equipment, transportation, temporary construction and special or occasional services as required to make a complete working electrical installation, as shown on the drawings or described in these specifications.

1.02 REFERENCES

- A. Reference to codes, standards, specifications and recommendations of technical societies, trade organizations and governmental agencies shall mean the latest edition of such publications adopted and published prior to submittal of the bid proposed. Such codes or standards shall be considered a part of this specification as though fully repeated herein.
- B. When codes, standards, regulations, etc., allow work of lesser quality or extent than is specified under this Division, nothing in said codes shall be construed or inferred as reducing the quality, requirements or extent of the drawings and specifications.
- C. California Code of Regulations (CCR) Title 24, Part 3, Basic Electrical Requirements, State Building Standards Electrical Code
- D. National Fire Protection Association (NFPA).
- E. Equipment and materials specified under this Division shall conform to the following standards where applicable:
 - 1. UL Underwriters' Laboratories
 - 2. ASTM American Society for Testing Materials
 - 3. CMB Certified Ballast Manufacturers
 - 4. IPCEA Insulated Power Cable Engineer Assoc.
 - 5. NEMA National Electrical Manufacturer's Assn.
 - 6. ANSI American National Standards Institute
 - 7. ETL Electrical Testing Laboratories
- F. All base material shall be ASTM and/or ANSI standards.
- G. All electrical apparatus furnished under this Section shall conform to National Electrical Manufacturers Association (NEMA) standards and the NEC and bear the Underwriters' Laboratories (UL) label where such label is applicable.

1.03 SUBMITTALS

- A. See Division 1 for submittal procedures.
- B. Where items are noted as "or equal" a product of equal design, construction and performance will be considered. Contractor must submit all pertinent test data, catalog cuts and product information required to substantiate that the product is in fact equal. Refer to Division 1, General Requirement for additional requirements. Only one substitution will be considered for each product specified.
- C. Submittals shall consist of detailed shop drawings, specifications, "catalog cuts" and data sheets containing physical and dimensioned information, performance data, electrical characteristics, material used in fabrication, material finish and shall clearly indicate those optional accessories which are included and those which are excluded. Furnish one reproducible and 4 prints of each shop drawing.

1.04 CUTTING, PAINTING AND PATCHING

- A. Structural members shall in no case be drilled, bored or notched in such a manner that will impair their structural value. Cutting of holes, if required, shall be done with core drill and only with the approval of the Engineer.
- B. Cutting and digging shall be under the direct supervision of the General Contractor. Include as necessary for the work in this section.

- C. The contractor shall be responsible for returning any surface from which he has removed equipment or devices to the condition and finish of the adjacent surfaces.

1.05 SUPERVISION

- A. Contractor shall personally or through an authorized and competent representative constantly supervise the work from beginning to completion and, within reason, keep the same workmen and foreman on the project throughout the project duration.

1.06 PROTECTION

- A. Keep conduits, junction boxes, and outlet boxes, and other openings closed to prevent entry of foreign matter: cover fixtures, equipment, and apparatus and protect against dirt, paint, water, chemical, or mechanical damage, before and during construction period. Restore to original condition any fixture, apparatus, or equipment damaged prior to final acceptance, including restoration of damaged shop coats of paint, before final acceptance. Protect bright finished surfaces and similar items until in service. No rust or damage will be permitted.

1.07 EXAMINATION OF SITE

- A. The Contractor shall visit the site and determine the locale, working conditions, conflicting utilities, and the conditions in which the electrical work will take place. No allowances will be made subsequently for any costs which may be incurred because of any error or omission due to failure to examine the site and to notify the Engineer of any discrepancies between drawings and specifications and actual site conditions. Schedule visits at least 1 week in advance with Owner's Maintenance staff.

1.08 ENVIRONMENTAL REQUIREMENTS

- A. After other work such as sanding, painting etc. has been completed, clean lighting fixtures, panelboards, switchboards, and other electrical equipment to remove dust, dirt, and grease, or other marks, and leave work in clean condition.

1.09 VOLTAGE CHECK

- A. At completion of job, check voltage at several points of utilization on the system which has been installed under this contract. During test, energize all loads installed. Measure 3-Phase voltages and note percentage differences. Submit report to Engineer. Include copy in O&M Manual.

1.10 TESTS

- A. Perform tests as specified to prove installation is in accordance with contract requirements. Perform tests in the presence of the Engineer and furnish test equipment, facilities, and technical personnel required to perform tests. Tests shall be conducted during the construction period and at completion to determine conformity with applicable codes and with these Specifications. Tests, in addition to specific system test described elsewhere, shall include:
 - 1. Insulation Resistance: All 600 volt insulation shall be tested at 1,000 volts D.C for one minute on all feeder and branch circuit conductors including the neutral, and make a typed record of all readings to be included in the maintenance instructions. The direct current amperes shall be recorded at start and at one minute. The value shall be declining and not more than one microampere.
 - 2. Circuit Continuity: Test all feeder and branch circuits for continuity. Test all neutrals for improper ground.
- B. Equipment Operations: Test motors for correct operation and rotation.
- C. Product Failure: Any products which fail during the tests or are ruled unsatisfactory by the Engineer shall be replaced, repaired, or corrected as prescribed by the Engineer at the expense of the Contractor. Tests shall be performed after repairs, replacements, or corrections until satisfactory performance is demonstrated.
- D. Miscellaneous: Include all test results in the maintenance manual. Cost, if any, for all tests shall be paid by the Contractor.

1.11 DRAWINGS

- A. Layout: General layout shown on the drawing shall be followed except where other work may conflict with the drawings.

- B. Accuracy:
1. Drawings for the work under this section are diagrammatic.
 2. Contractor shall verify lines, levels, and dimensions shown on the drawings and shall be responsible for the accuracy of the setting out of work and for its strict conformance with existing conditions at the site.
 3. Contractor shall insure reconnection of existing equipment and circuits affected by contract demolition whether or not reconnection is specifically shown on the contract documents.

1.12 PROJECT RECORD DRAWINGS

- A. Refer to General Conditions for contractual requirements. Provide project record drawings as required by the General Provisions of the specifications and as required herein. Such drawings shall fully represent installed conditions including actual locations of outlets, true panelboard connections following phase balancing routines, correct conduit and wire sizing as well as routing, revised fixture schedule listing the manufacturer and products actually installed and revised panel schedule. All changes to drawings shall be made by qualified draftspersons to match existing linework and lettering as close as possible. When all the changes have been made to the trade drawings, contractor shall produce one (1) full size (E-Size) updated set of trade drawing(s) utilizing AutoCad 2008 or newer and supply one (1) set of Compact Discs (CD's) reflecting same.

1.13 MAINTENANCE AND OPERATING INSTRUCTIONS

- A. Furnish to the Engineer four (4) hard back 3-ring binders containing all bulletins, operating and maintenance instructions and part lists and other pertinent information for each and every piece of equipment furnished under this specification. Include service telephone numbers. Each binder shall be indexed into sections and labeled for easy reference. Bulletins containing more information than the equipment concerned shall be properly stripped and assembled.
- B. At the time of completion, a period of not less than eight hours shall be allotted by the Contractor for instruction of building operating and maintenance personnel in the use of all systems. All personnel shall be instructed at one time, the Contractor making all necessary arrangements with manufacturer's representative. The equipment manufacturer shall be requested to provide product literature and application guides for the user's reference. Costs, if any for the above services shall be paid by the Contractor.

1.14 WARRANTIES

- A. Furnish to the Engineer four (4) hard back 3-ring binders containing all warranties of every piece of equipment furnished under this specification. Include terms and limitations of warranties, contact names, addresses, and telephone numbers of manufacturer. Each binder shall be indexed into sections and labeled for easy reference for each equipment warranty.

1.15 EXTRA MATERIALS

- A. See Division 1 - Product Requirements, for additional provisions.
- B. All special tools for proper operation and maintenance of the equipment provided under this Section shall be delivered to the District's representative

PART 2 PRODUCTS - NOT USED**PART 3 EXECUTION****3.01 WORKMANSHIP**

- A. Preparation, handling, and installation shall be in accordance with manufacturer's written instructions and technical data particular to the product specified and/or accepted equal except as otherwise specified. Coordinate work and cooperate with others in furnishing and placing this work. Work to reviewed shop drawings for work done by others and to field measurements as necessary to properly fit the work.
- B. Conform to the National Electrical Contractor's Association "Standard of Installation" for general installation practice.

3.02 INSTALLATION

- A. Install in accordance with manufacturer's instructions.

END OF SECTION

SECTION 26 05 12

BASIC MATERIAL AND METHODS

PART 1 GENERAL

1.01 SECTION INCLUDES

- A. Conduit, raceways and fittings.
- B. Wires and Cables for 600 Volts and less.
- C. Wire connections.
- D. Wire devices.
- E. Outlet boxes.
- F. Pull and junction boxes.
- G. Disconnect Switches.
- H. Fuses.
- I. Supporting Devices.
- J. Identifying Devices.
- K. Grounding and Bonding

1.02 SUBMITTALS

- A. Submit in accordance with the requirements of Division 1 the following items:
 - 1. A list of conduit types indicating where each type of conduit will be used. Indicate conduit manufacturers and fittings to be used.
 - 2. Wires and Cables.
 - 3. Wiring Devices and Plates
 - 4. Nameplates, including engraving schedules where engraved plates are specified.
 - 5. Fused disconnect switches.

1.03 QUALITY ASSURANCE

- A. Conform to requirements of NFPA 70.
- B. Products: Listed and classified by Underwriters Laboratories, Inc. as suitable for the purpose specified and indicated.

1.04 REFERENCES

- A. NFPA 70-2017 - National Electrical Code; 2017.
- B. ANSI C80.1 - Rigid Steel Conduit, Zinc Coated - latest edition.
- C. ANSI C80.3 - Electrical Metallic Tubing, Zinc Coated - latest edition.
- D. NECA (INST) - Standard of Installation; National Electrical Contractors Association - latest edition.
- E. NEMA FB 1 - Fittings, Cast Metal Boxes, and Conduit Bodies for Conduit and Cable Assemblies; latest edition.
- F. NEMA RN 1 - Polyvinyl Chloride (PVC) Externally Coated Galvanized Rigid Steel Conduit and Intermediate Metal Conduit - latest edition.
- G. NEMA TC 2 - Electrical Plastic Tubing (EPT) and Conduit (EPC-40 and EPC-80) - latest edition.
- H. NEMA TC 3 - PVC Fittings for Use with Rigid PVC Conduit and Tubing - latest edition.
- I. NFPA 70 - National Electrical Code - latest edition.

PART 2 PRODUCTS**2.01 CONDUIT, RACEWAYS AND FITTINGS**

- A. Rigid Steel Conduit
 - 1. Rigid steel conduit shall be full weight, pipe size, finished inside and out by hot-dip galvanizing after fabrication, and shall conform with ANSI C80.1 and UL.
 - 2. Couplings shall be electroplated steel.
 - 3. Insulating Bushings: Threaded polypropylene or thermo-setting phenolic rated 150°C minimum.
 - 4. Insulated grounding Bushings: Threaded cast malleable iron body with insulated throat and steel "lay-in" ground lug with compression screw.
 - 5. Insulated Metallic Bushings: Threaded cast malleable iron body with plastic insulated throat rated 150°C.
 - 6. Running threads are not acceptable.
- B. Electrical Metallic Tubing (EMT):
 - 1. Conduit: Conduit shall be formed of cold rolled strip steel, and shall comply with ANSI C80.3 and UL requirements.
 - 2. Couplings: Electroplated steel, UL listed rain and concrete tight through 1-1/4" trade size. All EMT fittings shall be compression type.
 - 3. Connectors: Steel, gland compression type with insulated plastic throat, 150°C temperature rated. All EMT fittings shall be compression type.
- C. Liquid Tight Flexible Metal Conduit:
 - 1. Conduit: Conduit shall be fabricated in continuous lengths from galvanized steel strip, spirally wound. Flexible conduit, except where installed in concealed dry locations, shall be liquid tight with plastic jacket extruded over the outer zinc coating. No aluminum substitute will be accepted.
 - 2. Fittings: Connectors shall be the screw clamp on screw-in (Jake) variety with cast malleable iron bodies and threaded male hubs with insulated throat or insulated bushings. Set screw type connectors are not acceptable. Liquid tight fittings shall be of cadmium plated cast malleable iron, with insulated throat.
- D. Rigid Non-Metallic Conduit:
 - 1. Conduit and fittings shall be homogeneous plastic material free from visible cracks, holes or foreign inclusions. The conduit bore shall be smooth and free of blisters, nicks or other imperfections which could damage conductors or cables.
 - 2. Materials: Polyvinyl Chloride (PVC) schedule 40. Material shall comply with NEMA TC-2 for conduit and NEMA TC-3 for fittings.

2.02 WIRING AND CABLES

- A. Acceptable manufacturers: Southwire, or approved equal.
- B. Conductor material: All wire and cable shall be insulated, stranded copper conductors. Soft drawn annealed copper wire 98% conductivity, bearing the UL label.
- C. Minimum conductor size: AWG No. 12 for all power and lighting branch circuits. AWG No. 14 for all signal and control circuits.
- D. Color Coding: System conductors shall be identified as to voltage and phase connections by means of color impregnated insulation or approved colored marking tape as follows:
- E. For 120/240 volt, single phase, 3 wire system.
 - 1. Phase A - Black
 - 2. Phase B - Red
 - 3. Phase C - Orange for High Leg (208v to neutral)
 - 4. Neutral - White
 - 5. Ground - Green
- F. For 120/208 volt, 3 phase, 4 wire systems.
 - 1. Phase A - Black

2. Phase B - Red
 3. Phase C - Blue
 4. Neutral - White
 5. Ground - Green
- G. for 277/480 Volt, 3 phase, 4 wire system
1. Phase A - Brown
 2. Phase B - Orange
 3. Phase C - Yellow
 4. Neutral - Grey
 5. Ground - Green
- H. Secondary Wire and Cable, 0 to 600 Volts;
1. NEC Type THWN, or Type XHHW for feeders and branch circuits in wet or dry locations. NEC type THHN for branch circuits in dry locations.

2.03 WIRE CONNECTION

- A. Wire Joints: Wires in sizes from #18 to #8 AWG, stranded conductor, with insulation rated 105 degrees C. or less shall be joined with electrical spring connectors of three part construction incorporating a non-restricted, zinc coated steel spring enclosed in a steel shell with an outer jacket of vinyl plastic with a flexible insulating skirt.
- B. Mechanical Compression Connectors and Taps: Stranded conductors from #6 AWG to 750 Kcmil shall be joined or tapped using bolted pressure connectors having cast bronze compression bolts. Fittings shall be wide range-taking and designed to facilitate the making of parallel taps, tees, crosses or end-to-end connections. Split-bolt connectors will not be acceptable.
- C. Fixture Connections: Splice fixture wire to circuit wiring with solderless connectors as specified above in paragraph A.
- D. Terminating Lugs: Conductors from size No. 6 AWG to 750 Kcmil, copper, shall be terminated using tin plated hydraulically operated crimping tools and dies as stipulated by the lug manufacturer. Lugs shall be 3M "Scotchlok" series 30000, Burndy Type Ya-L series, or equal.
- E. Splicing and Insulating Tape (600 volts and below): General purpose electrical tape shall be suitable for temperatures from minus 18 degrees C to 105 degrees C, shall be black, ultraviolet proof, self-extinguishing, 7 mil thick vinyl with a dielectric strength of 10,000 volts. Apply 4 layers half-lap with 2" over-lap on each conductor.
- F. Insulating Putty (600 volts and below): Pads or rolls of non-corrosive, self-fusing, one eight inch thick rubber putty with PVC backing sheet. Putty shall be suitable for temperatures from minus 17.8 degrees C to 37.8 degrees C and shall have a dielectric strength of 570 volts/mil minimum.
- G. Insulating Resin: Two Part liquid epoxy resin with resin and catalyst in pre measured, sealed mixing pouch. Resin shall have a set up time of approximately 30 minutes at 21.1 degrees C, and shall have thermal and dielectric properties equal to the insulation properties of the cables immersed in the resin.
- H. Terminal Strip Connectors: Terminate wire in locking tongue style, pressure type, solderless lug where applicable.

2.04 WIRING DEVICES

- A. Switches: Specification grade, flush mounting, quiet operating AC type, with toggle operator, heat resistant plastic housing and self grounding metal strap. Silver or silver alloy contact. Rated 20A at 120-277V and capable of full capacity on tungsten or fluorescent lamp load. Design for up to #10 wire. Use single pole, double pole, three-way, four-way, lighted, pilot, or keyed type, as indicated on drawings or required. Provide white color unless otherwise noted. Manufacturer: Leviton, Arrow Hart, or Hubbell.
- B. Receptacles: Specification grade, flush mounting receptacles with nylon face. High grade brass allow triple wipe contacts. Provide 2 pole, 3 wire grounding type with a green colored brass hexagonal equipment grounding screw. Grounding shall be rivetless, single piece brass with no mechanical connections in the primary path between point of ground wire termination and ground blades. Use 20A rated receptacles, white in color, unless otherwise noted. Manufacturer: Leviton, Arrow Hart, or Hubbell.

1. Isolated Ground - Provide separate path to ground, with orange faceplate or triangle to indicated isolated ground
 2. GFCI - Equipped with diagnostic indicator for miswiring.
 3. Weatherproof - GFCI type, outdoor rated, with metal lockable while in use cover
- C. Faceplates: Provide nylon cover faceplates for wall receptacles, outlets, and switches. Include thermal mounting screws that match plate and device color. Manufacturer: Leviton, Arrow Hart, or Hubbell.

2.05 OUTLET BOXES

- A. Standard outlet boxes: Galvanized, die formed or drawn steel, knock-out type of size and configuration best suited to the application indicated on the plans. Minimum box size, 4 inch square by 1-1/2 inch deep, indoor use. FS cast boxes are required for outdoor use.
- B. Cast Metal Outlet Boxes: FS/FD cast boxes are required for outdoor use. Malleable iron alloy with threaded hubs and mounting lugs as required. Boxes shall be furnished with cast cover plates of the same material as the box and neoprene cover gaskets. Thomas and Betts, Crouse-Hinds, Appleton or equal.
- C. Conduit Outlet Bodies: Cadmium plated, cast iron alloy. Obround conduit outlet bodies with threaded conduit hubs and neoprene gasketed, cast iron covers. Outlet bodies shall be used to facilitate pulling of conductors or to make changes in conduit direction only. Splices are not permitted in conduit outlet bodies. Thomas and Betts, Crouse Hinds Form 8 Condulets, Appleton form 35 Unilets, or equal.

2.06 PULL AND JUNCTION

- A. Sheet Metal Boxes: Use standard outlet or concrete ring boxes wherever possible; otherwise use minimum 15 gauge galvanized metal, NEMA 1 boxes, sized to code requirements with covers secured by cadmium plated machine screws located 6 inches on centers. Circle AW Products, Hoffman Engineering Co., or equal.
- B. Cast Metal Boxes: Use standard cast malleable iron outlet or device boxes wherever possible; otherwise use cadmium plated, cast malleable iron junction boxes with bolt-on, interchangeable conduit hub plates with neoprene gaskets. Appleton FS/FD series; Crouse Hinds FS/FD series, or equal.

2.07 DISCONNECT SWITCHES

- A. All disconnect switches shall be heavy-duty type and have the number of poles, voltage rating, and horsepower rating as required by the motor or equipment. Disconnect switches shall be in enclosures to suit conditions, NEMA 3R for outdoor and NEMA 1 for indoor. Disconnect switches shall be fused unless otherwise noted on the drawings. As manufactured by: Square D - Class 3110, ITE Siemens, or equal.

2.08 FUSES

- A. Dual Element, Time Delay, UL Class RK5. Rejection type. Size and Voltage as indicated on equipment. Bussman, Little Fuse, or approved equal.

2.09 ELECTRICAL SUPPORTING DEVICES

- A. Concrete Fasteners: Hilti Kwik Bolt TZ or equal, self drilling expansion type concrete anchor.
- B. Conduit Straps: Hot-dip galvanized, cast malleable iron, two hole type strap with cast clamp-backs and spacers as required. OZ/Gedney, Thomas & Betts, or equal.
- C. Construction Channel: 1-1/2 inch by 1-1/2 inch 12 gauge galvanized steel channel with 17/32 inch diameter bolt holes, 1-1/2 inch on center, in the base of the channel. Kindorf 905 series, Unistrut P-1000-HS or equal.
- D. Cable Ties and Clamps: Thomas and Betts Co. "Ty-Raps" Panduit "Pan-Ty" or equal one piece, nylon, reusable type lashing ties.
- E. Fasteners (General) : Wood screws for fastening to wood. Machine screws for fastening to steel. Toggle bolts for fastening to hollow concrete block, gypsum board, or plaster walls. Expansion anchors for attachments to pre-poured concrete.

2.10 IDENTIFYING DEVICES

- A. Nameplates: Type NP: Engraved black bakelite, 1 inch by 3-1/2 inch, 1/8 inch high white letters, machine screw retained. For permanent identification of all switchboards, panelboards, circuit breakers in separate enclosures, motor starters, relays, time switches, disconnect switches and other cabinet-enclosed apparatus including terminal cabinets or match existing as closely as possible.
- B. Legend Plates: Type LP: Die-stamped metal legend plate with mounting hole and positioning key for attachment to panel mounted operators' devices. Engraved paint-filled characters as specified.
- C. Wire & Terminal Markers: Self-adhering, pre-printed vinyl with self-laminating wrap around strip. Markers shall be legible after termination. Brady B191 series, Thomas & Betts WSL series or equal.
- D. Conductor Phase Markers: Thomas & Betts WCPHAS series or similar in addition to colored marking as specified under this section of the specifications.

2.11 GROUNDING AND BONDING

- A. Ground Rods
 - 1. Manufacturer: Blackburn, Erico, or approved Equal
 - 2. Size: 3/4" x 10' Ground Rods
- B. Grounding Electrode Conductor, 2/0 for foundation foots, and per NEC.
- C. Grounding Well - Christy Box, G5 Traffic Valve Box.

PART 3 EXECUTION**3.01 CONDUIT AND RACEWAY APPLICATIONS**

- A. Rigid Steel Conduit: Use rigid steel conduit for the following locations or conditions:
 - 1. All exterior applications
 - 2. All conduits larger than 2" trade diameter.
 - 3. All conduits indoor below eight (8) feet above finished floor.
- B. Electrical Metallic Tubing (EMT): EMT is allowed for the following conditions:
 - 1. Interior only and above eight (8) feet from finished floor.
 - 2. Interior only and when entering a panel from above.
- C. Liquidtight Flexible Metallic Conduit: Use Liquidtight for the following conditions:
 - 1. In damp and wet locations for connections to motors, transformers, vibrating equipment and machinery.
 - 2. Connections to all pump motors, flow switches, and similar devices.
- D. Rigid Non-Metallic Conduit, Polyvinyl Chloride (PVC) Schedule 40:
 - 1. Underground installation.

3.02 CONDUIT INSTALLATION

- A. General
 - 1. All conduit runs shown on the plans are sized based on the use of rigid steel conduit and THWN copper conductors. If conductor type is changed the contractor shall be responsible for resizing conduits to meet code. In no case is conduit to be sized smaller than 3/4" trade diameter.
 - 2. Low voltage wiring shall be installed in conduit, minimum 3/4" trade diameter.
 - 3. Conduits shall be tightly covered and well protected during construction using metallic bushings and bushing "pennies" to seal open ends.
 - 4. In making joints in rigid steel conduit, ream conduit smooth after cutting and threading.
 - 5. Clean any conduit in which moisture or any foreign matter has collected before pulling in conductors. Paint all field threaded joints to prevent corrosion.
 - 6. In all empty conduits or ducts, install an 1100 pound tensile strength polyethylene pulling rope.
 - 7. Conduit systems shall be electrically continuous throughout. Install code size, uninsulated, copper grounding conductors in all conduit runs, grounding conductor shall be bonded to conduit, equipment frames and properly grounded.
- B. Layout:

1. All new conduits shall be concealed. Any field conditions that does not allow concealment of conduits shall be reviewed with the Engineer prior to rough-in.
 2. Locations of conduit runs shall be planned in advance of the installation and coordinated with concrete work, plumbing and framing.
 3. Where practical install conduits in groups in parallel vertical or horizontal runs and at elevations that avoid unnecessary off-sets.
 4. Low voltage conduit shall be grouped separately and labelled every 10 ft interval as to system (i.e. fire, control, etc)
 5. Exposed conduit shall be run parallel or at right angles to the centerlines of the columns and beams.
 6. Conduits shall not be placed closer than 12 inches from a parallel hot water or steam line or three inches from such lines crossing perpendicular to the runs.
 7. In long runs of conduit, provide sufficient pull boxes per NEC inside buildings to facilitate pulling wires and cables. Support pull boxes from structure independent of conduit supports. These pull boxes are not shown on the plans.
- C. Supports:
1. All raceway systems shall be secured to building structures using specified fasteners, clamps and hangers spaced according to Code.
 2. Support single runs of conduit using two hole pipe straps. Where run horizontally on walls in damp or wet locations, install "clamp blocks" to space conduit off the surface.
 3. Multiple conduit runs shall be supported using "trapeze" hangers fabricated from 3/8 inch diameter, threaded steel rods secured to building structures. Fasten conduit to construction channel with standard two hole pipe clamps. Provide lateral seismic bracing for hangers.
 4. Installation
 - a. Locate and install anchors, fasteners, and supports in accordance with NECA "Standard of Installation".
 - 1) Do not fasten supports to pipes, ducts, mechanical equipment, or conduit.
 - 2) Do not drill or cut structural members.
 - b. Rigidly weld support members or use hexagon-head bolts to present neat appearance with adequate strength and rigidity. Use spring lock washers under all nuts.
 - c. Install surface-mounted cabinets and panelboards with minimum of four anchors.
 - d. In wet and damp locations use steel channel supports to stand cabinets and panelboards 1 inch off wall.
 - e. Use sheet metal channel to bridge studs above and below cabinets and panelboards recessed in hollow partitions.
- D. Terminations and Joints:
1. Raceways shall be joined using specified couplings or transition couplings where dissimilar raceway systems are joined.
 2. Rigid conduit connection to enclosures shall be made by Myers type grounding hubs only. EMT connections to enclosures shall be made with compression connector with grounding lock-nuts or bushings.
 3. Conduit terminations exposed at weatherproof enclosures and cast outlet boxes shall be made watertight using appropriate connectors and hubs.
 4. Install expansion couplings where any conduit crosses a building separation or expansion joint.
 5. Install cable sealing bushings on all conduits originating outside the building walls and terminating in switchgear, cabinets or gutters inside the building. Install cable sealing bushings or caulk conduit terminations in all grade level or below grade exterior pull, junction or outlet boxes.
- E. Penetrations:
1. Furnish and install metal sleeves for all exposed interior conduit runs passing through concrete floors or walls. Following conduit installation, seal all penetrations using non-iron bearing, chloride free, non-shrinking, dry-pack, grouting compound.
 2. Install specified watertight conduit entrance seals and membrane clamps at all below grade wall and floor penetrations. Conduits penetrating exterior building walls and building floor slab shall be insulated rigid steel.

3. Conduits penetrating rated walls, floors, etc. shall be fireproofed.

3.03 CABLE AND WIRE INSTALLATION**A. Examination**

1. Verify that interior of building has been protected from weather.
2. Verify that mechanical work likely to damage wire and cable has been completed.
3. Verify that raceway installation is complete and supported.
4. Verify that field measurements are as indicated.

B. Preparation

1. In existing conduits that will be reused, pull out existing conductors.
2. Completely and thoroughly swab raceway before installing wire.
3. Use 50/50 solution of Simple Green. Use CO2 to blow water and soap into conduit - let soak to break up dried out pulling compounds, then pull conductors. Pull one conductor at a time if will not pull all out together.

C. General:

1. Conductors shall not be in conduit until all work of any nature that may cause injury is completed. Care should be taken in pulling conductors that insulation is not damaged. U.L. approved non-petroleum base and insulating type pulling compound shall be used as needed.
2. All cables shall be installed and tested in accordance with manufacturer's requirements and warranty.
3. Block and tackle, power driven winch or other mechanical means shall not be used in pulling conductors of size smaller than AWG # 1.

D. Splicing and Terminating:

1. All aspects of splicing and terminating shall be in accordance with cable manufacturer's published procedures.
2. Make up all splices in outlet boxes with connectors as specified herein with separate tails of correct color to be made up to splice. Provide at least six (6) inches of tails packed in box after splice is made up.
3. All wire and cable in panels, control centers and equipment enclosures shall be bundled and clamped.
4. Encapsulate splices in exterior outlet, junction and pull boxes using insulating resin kits. All splices for exterior equipment in pump rooms shall be made up watertight.
5. Insulate mechanical compression taps AWG #1/0 and larger using pre-molded heat shrink tubing ITCSN Heaving Wall rated to 600V. Heating process should start from the middle of the heat shrink tubing and move to its ends.

E. Identification:

1. Securely tag all branch circuits, noting the purpose of each. Mark conductors with vinyl wrap-around markers. Where more than two conductors run through a single outlet, mark each circuit with the corresponding circuit number at the panelboard.
2. Color code conductors size #6 and larger using specified phase color markers and identification tags.
3. All terminal strips are to have each individual terminal identified with specified vinyl markers.
4. All identification shall be legible and readable after completion of installation.
5. Provide labeling for all switches and receptacle outlets. Self-adhering machine clear tape with black letters.

3.04 INSTALLATION:**A. Route wire and cable as required to meet project conditions.**

1. Wire and cable routing indicated is approximate unless dimensioned.
2. Where wire and cable destination is indicated and routing is not shown, determine exact routing and lengths required.
3. Include wire and cable of lengths required to install connected devices within 10 ft of location shown.

B. Install wire and cable in accordance with the NECA "Standard of Installation."

- C. Use wiring methods indicated.
- D. Pull all conductors into raceway at same time.
- E. Use suitable wire pulling lubricant for building wire 4 AWG and larger.
- F. Protect exposed cable from damage.
- G. Support cables above accessible ceiling, using spring metal clips or metal cable ties to support cables from structure or ceiling suspension system. Do not rest cable on ceiling panels.
- H. Use suitable cable fittings and connectors.
- I. Neatly train and lace wiring inside boxes, equipment, and panelboards.
- J. Clean conductor surfaces before installing lugs and connectors.
- K. Make splices, taps, and terminations to carry full ampacity of conductors with no perceptible temperature rise.
- L. Use split bolt connectors for copper conductor splices and taps, 6 AWG and larger. Tape uninsulated conductors and connector with electrical tape to 150 percent of insulation rating of conductor.
- M. Use solderless pressure connectors with insulating covers for copper conductor splices and taps, 8 AWG and smaller.
- N. Use insulated spring wire connectors with plastic caps for copper conductor splices and taps, 10 AWG and smaller.
- O. Trench and backfill for direct burial cable installation as specified in Underground Structure Section. Install warning tape along entire length of direct burial cable.
- P. Identify and color code wire and cable. Identify each conductor with its circuit number or other designation indicated.

3.05 ELECTRICAL CONNECTIONS

- A. Make electrical connections in accordance with equipment manufacturer's instructions.
- B. Make conduit connections to equipment using flexible conduit. Use liquidtight flexible conduit with watertight connectors in damp or wet locations.
- C. Connect heat producing equipment using wire and cable with insulation suitable for temperatures encountered.
- D. Provide receptacle outlet to accommodate connection with attachment plug.
- E. Provide cord and cap where field-supplied attachment plug is required.
- F. Install suitable strain-relief clamps and fittings for cord connections at outlet boxes and equipment connection boxes.
- G. Install disconnect switches, controllers, control stations, and control devices to complete equipment wiring requirements.
- H. Install terminal block jumpers to complete equipment wiring requirements.
- I. Install interconnecting conduit and wiring between devices and equipment to complete equipment wiring requirements.

3.06 INSTALLATION OF BOXES

- A. General:
 - 1. Leave no un-used openings in any box. Install close-up plugs as required to seal openings.
 - 2. Exposed outlet boxes and boxes in damp or wet locations shall be cast metal with gasketed cast metal cover plates.
- B. Box Layout:
 - 1. Outlet boxes shall be installed at the locations and elevations shown on the drawings or specified herein. Make adjustments to locations as required by structural conditions and to suit coordination requirements of other trades.

2. Install junction or pullboxes where required to limit bends in conduit runs to not more than 360 degrees or where pulling tension achieved would exceed the maximum allowable for the cable to be installed. Consult wire and cable manufacturer.

3.07 INSTALLATION OF WIRING DEVICES

A. General

1. Install all devices flushmounted unless otherwise noted on the drawings. Comply with layout drawings for general locations. Consult Engineer or Owner's Representative for locations that have conflict with other devices or manner not suitable for installation. Avoid placing devices behind open doors.
2. Align devices horizontally and vertically. Device plates shall be aligned vertically with tolerance of 1/16". All four edges of device plates shall be in contact with the wall surface.
3. Mounting height as indicated on the drawings and according to ADA requirements.
4. Install device plates on all outlet boxes. Provide blank plates for all empty, spare, and boxes for future use.
5. Securely fasten devices into boxes and attach appropriate cover plates.
6. Caulk around edges of outdoor device plates and boxes when rough wall surfaces prevent raintight seal. Use caulking materials approved by Engineer. Fireproof around opening of devices located or penetrating fire-rated construction assemblies.
7. Fireproof around opening of devices located or penetrating fire-rated construction assemblies.

B. Switches

1. Where switches are indicated to be installed near doors, corner walls, etc. mount not less than 2 inches and not more than 18" from trim. Verify exact location with Architect or Engineer prior to rough-in.
2. Coordinate the location of switches to insure locations at the strike side of doors.
3. Furnish and install engraved legend of each switch that controls exhaust fans, motors, equipment systems, etc. not located within sight of the controlling switch.
4. Ganging of Switches - provide barriers for switches of different phases and voltages. Otherwise switches shall be gauged in one faceplate.

C. Receptacles

1. Mount receptacles vertically with U-shaped ground position on bottom.
2. Do not combine GFCI protected circuits with other circuits in the same raceway. Limit number of GFI protect circuits in any one raceway to a maximum of one (1) circuit.

D. Identification

1. Label all outlets and switches. Mark each wiring device where circuits and panel supply is derived from.
2. All identification shall be legible and readable after completion of installation

3.08 INSTALLATION OF FUSES AND DISCONNECT SWITCHES

- A. Fuses shall be installed where noted on plans. Sizes are based on design data provided by equipment mfg. Listed or labeled equipment must be in accordance with instructions included in the listing or labeling. Be sure to observe maximum branch circuit fuse size labels.
- B. Disconnect switches shall be mounted on the equipment, where possible. Coordinate with mechanical contractor to ensure switches are not mounted on a removable access panel.
- C. Label each disconnect fuse with equipment tag as indicated in the single line diagram, or as directed.

3.09 ELECTRICAL EQUIPMENT GROUNDING

- A. Ground non-current carrying metal parts of electrical equipment enclosures, frames, conductor raceways or cable trays to provide a low impedance path for line-to-ground fault current and to bond all non-current carrying metal parts together. Install a ground conductor in each raceway system in addition to conductors shown. Equipment ground conductor shall be electrically and mechanically continuous from the electrical circuit source to the equipment to be grounded. Size ground conductors per NEC 250 unless larger conductors are shown on the drawings.

- B. Grounding conductors shall be identified with green insulation, except where a bare ground conductor is specified. Where green insulation is not available, on larger sizes, black insulation shall be used and suitably identified with green tape at each junction box or device enclosure.
- C. Install metal raceway couplings, fittings and terminations secure and tight to insure good ground continuity. Provide insulated grounding bushing and bonding jumper where metal raceway is not directly attached to equipment metal enclosure and at concentric knock-outs.
- D. Motors shall be connected to equipment ground conductors with a conduit grounding bushing and with a bolted solderless lug connection on the metal frame.
- E. Conduit terminating in concentric knockouts at panelboards, cabinets and gutters shall have insulated grounding bushings and bonding jumpers installed interconnecting all such conduits and the panelboard cabinet, gutter, etc.
- F. Performance:
 - 1. Measure the resistance to ground of each ground rod before connection to the other ground rods. The resistance shall not exceed 25 ohms.
 - a. A single electrode which does not have a resistance to ground of 25 ohms or less shall be augmented by additional electrode(s).
 - 2. Measure the resistance to ground of the total ground system with all connections completed. The resistance shall not exceed 2 ohms for primary services or 5 ohms for secondary services.
 - 3. Tests of the resistance to ground shall be made using either the three point method or the fall-of-potential method.
 - 4. Perform a continuity check from equipment ground bus bars and ground lugs to the ground system.

3.10 BONDING

- A. Bonding shall be provided to assure electrical continuity and the capacity to conduct safely any fault current likely to be imposed.
- B. Bonding shall be in accordance with NEC Article 250, Part V.

3.11 INSTALLATION

- A. Install in accordance with manufacturer's instructions.

END OF SECTION

SECTION 26 05 53

ELECTRICAL EQUIPMENT AND WIRING IDENTIFICATION

PART 1 — GENERAL

1.1 RELATED DOCUMENTS

- A. Conduit, wire, cable and bus identification
- B. Related work:
 - 1. Section 26 05 10 – Electrical General Provisions.
 - 2. Section 26 05 12 – Basic Material and Methods.

1.2 DESCRIPTION

- A. Work includes but is not limited to the following:
 - 1. Conduits in miscellaneous pull boxes in runs where the system identity cannot be clearly seen shall have identifying tags indicating the name of the system. Such tags shall be installed as described above. Miscellaneous systems shall include but not be limited to telephones, lighting, etc.
 - 2. Conduits terminating at lighting fixtures, wall switches, telephones, terminal cabinets, lighting panelboards, receptacle outlets and similar items need not be tagged where their system identification is obvious, except as noted above for clarity.
 - 3. Exterior installed conduits, except branch lighting circuit conduits, shall be tagged at the ends and in intermediate boxes, chambers, manholes, handholes, and other enclosures in accordance with the same inscriptions as shown on the contract drawings.
 - 4. Tags shall be fastened to conduits with number 12 AWG bare copper wire, except that where this method is not practical, they shall be fastened to the adjacent masonry by means of expansion bolts.

1.3 QUALITY ASSURANCE

- A. Phase identification letters, in readily visible locations, shall be stamped into the main bus bars of switchboards and panel boards.

1.4 ROOM IDENTIFICATION

- A. Comply with:
 - 1. Provide room identification on the exterior door of every electrical room, and telecommunication room.
 - 2. ANSI A13.1, Identification of Piping Systems.
 - 3. In the case of an exterior mounted/surface mounted panel, the panel designation label should be placed at the top of each electrical panel.
 - a. National Electrical Code.
- B. On each interior wall of each electrical room or electrical panel, provide a enamel, metal, or plastic sign, red on white, reading the panel designation, or the equipment room designation.
 - 1. Local rules and regulations.

- C. For all equipment rooms and panel locations signs shall be placed stating "electrical equipment room - no storage permitted." signs shall be mounted at clearly visible locations within the rooms or on the inside of doors where wall space within the room is not available.

1. ANSI / TIA / EIA - 606

1.5 REFERENCES

- A. Specified references, or cited portions thereof, current at date of bidding documents unless otherwise specified, govern the work. In there is a conflict between the referenced standards and the contract documents, notify the engineer, and/or owner's representative to confirm notification in writing. Do not proceed with the work until the approved.

1. American national standards institute: (ANSI): ANSI A13.1 - Identification of Piping Systems.
2. National Fire Protection Association (NFPA): NFPA 70 - National Electrical Code.
3. Underwriters Laboratories, Inc. (UL): all products UL listed and labeled.
4. Manufacturers' catalogs: specification manufacturers' catalogs are incorporated by reference to same force and effect as if repeated herein in full.

1.6 SUBMITTALS

- A. In accordance with 01 33 00, provide schedule of proposed identification plate for the engineer's review and approval.

PART 2 — PRODUCTS

2.1 MATERIALS

- A. Use materials as specified in Section 26 05 12 Basic Material and Methods.

PART 3 — EXECUTION

3.1 EQUIPMENT IDENTIFICATION

- A. After finish painting is completed, provide white with black core laminated phenolic nameplates with 3/8 inch lettering etched through the outer covering. Each nameplate shall be fastened with stainless steel screws to each piece of equipment.

1. All major electrical equipment shall be identified which shall include switchboard, disconnect switches, transformers, panels, circuit breakers, etc.
2. Disconnect switches serving feeders and overcurrent protective devices mounted in a switchboard shall also be identified.
3. Embossed self-adhering plastic tape labels will not be accepted.

3.2 WIRE IDENTIFICATION

- A. Wire markers shall be installed on both ends of all conductors.
- B. All wire and feeder cables shall be labeled with wire markers in all junction boxes, pull boxes, control panels, panelboards, switchboards, transformers, etc.
- C. Wire and cable markers shall be self-adhesive, self-laminating mechanically printed with a clear protective laminating over wrap or mechanically printed with a clear protective laminating over wrap or mechanically printed heat shrink tubing. Wire markers shall be approved by the engineer and shall be attached to all wire where entering or leaving the conduit run. The cable designation and circuit use shall appear on the tag.

- D. Acceptable manufacturers are Brady, Panduit, 3M and Thomas and Betts or approved, equal.

3.3 CONDUIT IDENTIFICATION

- A. Conduit label shall be written in black permanent marker, legibly printed within six (6) inches from enclosure and repeated every 10 feet.
- B. Markers shall be wrap around, self-adhesive rolls, 8"-12" in length.
- C. Size, type, and quantity of conductors within conduit or raceway will be identified on project information form (located under cad drawings) conduit schedule format and forms.
- D. Identify conduits as follows:
1. Normal power - "ELEC"
 2. Isolated ground - "IG - ELEC"
 3. Emergency power - "EMERGENCY - ELEC"
 4. Dedicated power - "ELEC - DEDICATED"
 5. Fire alarm wiring - "FIRE ALARM"
 6. Low voltage telephone - "LV- TELEPHONE"
 7. Low voltage data - "LV - DATA"
 8. Low voltage CATV - "CATV"
 9. Low voltage controls - "CONTROLS"

3.4 EQUIPMENT IDENTIFICATION

- A. Each nameplate shall include the equipment designation as shown on the contract drawings, as approved by the engineer, and other information as required in the contract specifications.
- B. Provide the following identification markings on each switchboard, panelboard, circuit breaker, disconnect switch, contactor, and motor starter:
1. Feeder name, number, voltage and phase.
 2. Item of equipment controlled.
- C. Provide the following identification markings on each motor and other utilization equipment, except lighting fixtures:
1. Feeder name.
 2. Feeder number.
 3. Voltage and phase.
- D. Provide the following identification markings on each transformer:
1. Feeder name.
 2. Feeder number.
 3. Voltage and phase.
 4. Name of lighting and/or power panels supplied by the secondary of the transformer.

5. Transformer identification will be located in contract documents
- E. Provide a typewritten directory of circuits in a metal frame under clear acrylic sheet in each lighting and power panel. Provide panel identification in black alkyd paint stenciled inscriptions on the inside of the door, directly above the centerline of directory frame, or on vertical and horizontal centerline of doors without directory frames.
- F. On device plates for local toggle switches, toggle switch type manual starters, pilot lights, and other electrical items whose function is not readily apparent, provide engraved suitable inscriptions on laminated phenolic nameplates describing the equipment controlled or indicated.
- G. Each nameplate shall be fastened with a minimum of two stainless steel screws pop rivets or drive screws. This shall not change the NEMA or UL rating of the enclosure.
- H. Provide the following alkyd paint stenciled inscription markings on the outside face and on the inside face of each feeder splice box, feeder junction box, and feeder pull box cover plate:
 1. Designation shown on the contract drawings.
 2. Feeder name.
 3. Feeder number.
 4. Voltage and phase.

3.5 ELECTRICAL PANEL IDENTIFICATION

- A. Each nameplate shall include the equipment designation as referenced in the specifications in this and associated sections.
 1. Main switchboard (MSB)
 2. Distribution panels (DP1 to DP...)
 3. Branch panel (PNL1 to PNL...)
 4. Receptacle locations (CKT1 to CKT...)
 5. Transformer location (XFMR1 to XFMR...)
 6. In the event of a transformer placed in a run between panels, the run will designate the panel of origin as the panel prior to the transformer and the panel destination as the panel after the transformer.
 7. Provide a type written directory of electrical panel types and room numbers.
 8. Provide information on 8 ½ x 11 inch paper placed in a print pocket on the inside of the panel door or on the circuit identification chart if provided by electrical panel manufacturer.
 9. Provide photographs of the completed panels with the typewritten directories of electrical panels. Photographs shall be included with documents at the electrical panels and also in a binder at the MSB. Binder shall include pictures of all electrical panels and MSB for future reference.
 - a. Approved manufacturers of print pockets
 - (i) Milbank #Alppocket
 - (ii) Hoffman #A-DP1
 - (iii) Approved equal

- b. Faceplate label shall be fastened on the top center of the plate of the panel and at one point interior of cover in panel.
 - c. Acceptable manufacturer: Brady, 3M, or approved manufacturers
 - B. Label each main switchboard, distribution panel, computer panels, and receptacle locations with a $\frac{3}{4}$ inch adhesive label
 - 1. Letters shall be 5/16 inches high.
 - 2. Label shall reference the numerical designation and equipment designation.
 - 3. Labels shall be placed on the front of electrical panels centered at the top of the panel and also at the top of the cover on the inside of the panel door.
 - 4. For receptacle locations labels will be centered above the receptacle.

3.6 Electrical room identification

- A. Electrical room shall be provided with the 12" x 4" acrylic engraved sign with 2" (min) letter.
 - 1. "ELECTRICAL ROOM"
 - 2. "AUTHORIZED PERSONNEL ONLY"
- B. Room identification tags shall be permanent mounted on the exterior door.
- C. Clearances in front of electrical equipment in electrical room shall be identified with graphic barricade tape, and stenciled sprayed on wording on the floor "ELECTRICAL EQUIPMENT CLEARANCE, KEEP CLEAR".

END OF SECTION

SECTION 26 08 02**ELECTRICAL ACCEPTANCE TESTING****PART 1 - GENERAL****1.01 OVERVIEW**

- A. The purpose of these specifications is to assure that all tested electrical equipment and systems are operational and within applicable standards and manufacturer's tolerances and that the equipment and systems are installed in accordance with design specifications.
- B. The work specified in these specifications may involve hazardous voltages, materials, operations, and equipment. These specifications do not purport to address all of the safety problems associated with their use. It is the responsibility of the independent testing agency to review all applicable regulatory limitations prior to the use of these specifications.
- C. Perform the visual inspections, manual operations and tests on systems and equipment as described in Part 3, "Execution".
- D. Tests shall be performed and documented by an independent testing agency.
- E. Perform these tests in addition to other electrical tests delineated in other Sections.

1.02 REFERENCES

- A. All inspections and field tests shall be in accordance with the latest edition of the following codes, standards, and specifications except as provided otherwise herein.
 - 1. American National Standards Institute - ANSI
 - 2. American Society for Testing and Materials - ASTM
 - 3. Institute of Electrical and Electronic Engineers - IEEE
 - 4. Insulated Cable Engineers Association - ICEA
 - 5. InterNational Electrical Testing Association - NETA
 - 6. National Electrical Manufacturer's Association - NEMA
 - 7. National Fire Protection Association - NFPA
 - 8. Occupational Safety and Health Administration - OSHA
 - 9. State and local codes and ordinances
 - 10. Underwriters Laboratories, Inc. - UL

1.03 SUBMITTAL

- A. The testing organization shall submit appropriate documentation to demonstrate that it satisfactorily complies with the following. An organization having a "Full Membership" classification issued by the InterNational Electrical Testing Association meets this criteria.
 - 1. The testing organization shall be an independent, third party, testing organization which can function as an unbiased testing authority, professionally independent of the manufacturers, suppliers, and installers of equipment or systems evaluated by the testing organization.
 - 2. The testing organization shall be regularly engaged in the testing of electrical equipment devices, installations, and systems.
- B. The testing organization shall utilize technicians who are regularly employed for testing services.
- C. Each on-site crew leader shall hold a current registered certification in electrical testing applicable to each type of apparatus to be inspected or tested. The certification in electrical testing shall be issued by an independent, nationally-recognized, technician certification agency. The following entities shall qualify as independent, nationally-recognized, technician certification agencies:
 - 1. InterNational Electrical Testing Association (NETA)
 - 2. Accepted certifications:
 - 3. Certified Technician/Level III
 - 4. Certified Senior Technician/Level IV

1.04 TEST REPORTS

- A. Provide written test reports, signed and dated, for all tests prior to acceptance of the tested equipment by the Owner. Test reports on megger, dielectric absorption and high potential tests shall include the ambient temperature and relative humidity existing at the time of the tests.

PART 2 - PART 2 -PRODUCTS (NOT APPLICABLE)**PART 3 - EXECUTION****3.01 VISUAL INSPECTIONS**

- A. Prior to any testing, perform visual inspections to verify the following:
 - 1. The equipment is completely and properly installed
 - 2. The equipment is free from damage and defects
 - 3. Shipping blocks and restraints have been removed
 - 4. Electrical terminations have been properly tightened
 - 5. The equipment has been properly aligned
 - 6. The equipment has been properly lubricated
 - 7. The ventilation louvers are open and unobstructed
 - 8. The equipment is ready to be tested

3.02 MANUAL OPERATION

- A. Prior to any testing, mechanical devices shall be exercised or rotated manually to verify that they operate properly and freely.

3.03 PRIMARY CABLE TESTS

- A. Perform a continuity test, 2,500-volt DC megger test, AC high potential test, and a second 2,500-volt DC megger test on primary cables. The high potential test shall be performed at 45kV for new cable installations, and at 30kV when new cable has been spliced to existing cable.

3.04 POWER CABLE TESTS

- A. Perform a continuity check and a 1,000 volt DC megger test on 600 volt power cables No. 4 AWG and larger.
 - 1. The megger test shall be performed between each pair of conductors and from each conductor to ground.
 - 2. The megger test shall be performed for 15 seconds or until the insulation resistance value stabilizes.
 - 3. The insulation resistance between conductors and from each conductor to ground shall be 100 megohms minimum in one minute or less. In addition, the lowest insulation resistance value shall not differ from the highest value by more than 20 percent.

3.05 CONTROL CABLE TESTS

- A. Perform a continuity check on control and instrumentation wiring.

3.06 SECONDARY SWITCHGEAR AND SWITCHBOARD TESTS

- A. Perform a continuity check and 1,000 volt DC megger test on buses, and on main and feeder breakers.
- B. Perform a primary current injection test and a 'Ducter' (contact resistance) test on main breakers.
- C. Perform a 1,000-volt DC megger test and a turns-ratio test on CT's and PT's.
- D. Calibrate the metering.

3.07 SERVICE, DISTRIBUTION AND MOTOR CONTROL EQUIPMENT TESTS

- A. Perform a 1,000-volt megger test on buses, motor starters and disconnect switches. This test may be combined with the feeder cable megger test by testing the devices and terminated cables together.
- B. Perform a continuity check on motor control circuits and control panel internal wiring.
- C. Perform an operational test on the controls.

- D. Perform a continuity check and a 1,000-volt DC megger test on 3 phase distribution and isolation transformers.

3.08 MOTOR TESTS

- A. Perform a 1,000-volt megger test on 460 volt, 3 phase motors, and a 500 volt megger test on 200 volt, 3 phase motors.
- B. "Bump" motors to verify proper direction of rotation.
- C. Run motors and check for vibration.

3.09 GROUNDING TESTS

- A. Measure the resistance to ground of each ground rod before connection to the other ground rods. The resistance shall not exceed 25 ohms.
 - 1. A single electrode which does not have a resistance to ground of 25 ohms or less shall be augmented by additional electrode(s).
- B. Measure the resistance to ground of the total ground system with all connections completed. The resistance shall not exceed 2 ohms for primary services or 5 ohms for secondary services.
- C. Tests of the resistance to ground shall be made using either the three point method or the fall-of-potential method.
- D. Perform a continuity check from equipment ground bus bars and ground lugs to the ground system.

END OF SECTION