

BIDDING DOCUMENTS
FOR THE
VENTURA COUNTY COMMUNITY COLLEGE DISTRICT

ALTERATION OF HSC FOR
THE BIO-MANUFACTURING PROGRAM

AT

MOORPARK COLLEGE
7075 CAMPUS ROAD
MOORPARK CA 93021

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MOORPARK COLLEGE HSC – BIO-MFR PROGRAM
VENTURA COUNTY COMMUNITY COLLEGE DISTRICT

PROJECT TITLE PAGE
00 0101-1

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SECTION 01 1100

SUMMARY OF WORK

PART 1 - GENERAL

1.01 SECTION INCLUDES

- A. The furnishing of all labor, materials, equipment, services, and incidentals necessary for Work of the **Alteration of HSC – Bio-Manufacturing Program**, at **Moorpark College** located at **7075 Camps Road, Moorpark**, California 93021, as set forth in the Construction Documents which include, but are not limited to, the Drawings, Addenda and Specifications.

PART 2 - PRODUCTS (Not used)

PART 3 - EXECUTION

3.01 USE OF PREMISES

- A. CONTRACTOR shall coordinate Work of all trades, Subcontractors, utility service providers, with OWNER and/or Separate Work Contract. CONTRACTOR shall sequence, coordinate, and perform the Work to impose minimum hardship on the operation and use of the existing facilities and/or Project site. CONTRACTOR shall install all necessary protection for existing improvements, Project site, property, and new Work against dust, dirt, weather, damage, vandalism, and maintain and relocate all protection to accommodate progression of the Work.
- B. CONTRACTOR shall confine entrance and exiting to the Project site and/or facilities to routes designated by the OWNER.
- C. Within existing facilities, OWNER will remove portable equipment, furniture, and supplies from Work areas prior to the start of Work. CONTRACTOR shall cover and protect remaining items in areas of the Work.
- D. CONTRACTOR is advised school may be in session during performance of the Work. CONTRACTOR shall utilize all available means to prevent generation of unnecessary noise and maintain noise levels to a minimum. When required by the OWNER, CONTRACTOR shall immediately discontinue noise-generating activities and/or provide alternative methods to minimize noise generation. CONTRACTOR shall install and maintain air compressors, tractors, cranes, hoists, vehicles, and other internal combustion engine equipment with mufflers, including unloading cycle of

compressors. CONTRACTOR shall discontinue operation of equipment producing objectionable noise as required by the OWNER.

- E. CONTRACTOR shall furnish, install, and maintain adequate supports, shoring, and bracing to preserve structural integrity and prevent collapse of existing improvements and/or Work modified and/or altered as part of the Work.
- F. CONTRACTOR shall secure building entrances, exits, and Work areas with locking devices as required by the OWNER.
- G. CONTRACTOR assumes custody and control of OWNER property, both fixed and portable, remaining in existing facilities vacated during the Work.
- H. CONTRACTOR shall cover and protect surfaces of rooms and spaces in existing facilities turned over for the Work, including OWNER property remaining within as required to prevent soiling or damage from dust, dirt, water, and/or fumes. CONTRACTOR shall protect areas adjacent to the Work in a similar manner. Prior to OWNER occupancy, CONTRACTOR shall clean all surfaces including OWNER property.
- I. CONTRACTOR shall not use or allow anyone other than OWNER employees to use facility telephones and/or other equipment, except in an emergency. CONTRACTOR shall reimburse OWNER for telephone toll charges originating from the facility except those arising from emergencies or use by OWNER employees.
- J. CONTRACTOR shall protect all surfaces, coverings, materials, and finished Work from damage. Mobile equipment shall be provided with pneumatic tires.
- K. CONTRACTOR is advised OWNER will award Separate Work Contracts at this Project site.
- L. CONTRACTOR shall not permit the use of portable and/or fixed radio's or other types of sound producing devices including walkmans and similar devices.

3.02 PROPERTY INVENTORY

- A. Property, OWNER intends to remove; will be removed by OWNER before a room or space is vacated for the Work. Before performing Work in each room or space, OWNER and CONTRACTOR shall prepare a detailed initial written inventory of OWNER property remaining within, including equipment and telephone instruments and the condition thereof. OWNER and CONTRACTOR shall retain a signed copy of the inventory dated and signed by both parties. Prior to subsequent OWNER occupancy of each such room or space, OWNER and CONTRACTOR shall perform a final inventory of OWNER property and all discrepancies between the initial inventory and final inventory shall be the responsibility of CONTRACTOR.

END OF SECTION

SECTION 01 3113
PROJECT COORDINATION

PART 1 - GENERAL

1.01 SECTION INCLUDES

- A. This Section specifies administrative and procedural requirements necessary for coordinating Work operations including, but not limited to, the following:

1. General coordination procedures.

1.02. RELATED REQUIREMENTS

- A. Section 01 3300: Submittal Procedures.

PART 2 - PRODUCTS (Not used)

PART 3 - EXECUTION

3.01 COORDINATION

- A. CONTRACTOR shall coordinate operations included in various sections of Contract Documents to assure efficient and orderly installation of each part of Work. Coordinate Work operations included under related sections of Contract Documents that depend on each other for proper installation, connection, and operation of Work, including but not limited to:
1. Schedule construction operations in sequence required where installation of one part of Work depends on installation of other components, before or after its own installation.
 2. Coordinate installation of different components to assure maximum accessibility for required maintenance, service, and repair.
 3. Provide provisions to accommodate items scheduled for later installation.
- B. Where necessary, prepare memoranda for distribution to each party involved, outlining special procedures required for coordination. Include such items as required in notices, reports, attendance at meetings, and:
1. Prepare similar memoranda for OWNER and Separate Work Contract where coordination of their Work is required.
- C. Administrative Procedures: Coordinate scheduling and timing of required administrative procedures with other construction activities to avoid conflicts and assure orderly progress of Work. Such administrative activities include, but are not limited to, following:
1. Preparation of schedules.
 2. Installation, relocation, and removal of temporary facilities.

3. Delivery and processing of submittals.
 4. Progress meetings.
 5. Project closeout activities.
- D. Conservation: Coordinate Work operations to assure operations are carried out with consideration given to conservation of energy, water, materials, and:
1. Salvage materials and equipment involved in performance of, but not actually incorporated into Work.

END OF SECTION

SECTION 01 3300
SUBMITTAL PROCEDURES

PART 1 - GENERAL

1.01 SECTION INCLUDES

- A. Administrative and procedural requirements for submittals required for the Work, including but not limited to; Shop Drawings, Product Data, Samples, material lists, and quality control items.
- B. Throughout the Contract Documents, the minimum acceptable quality of materials, fabrication, and execution have been defined by the name and catalog number of a manufacturer and by reference of recognized industry standards.
- C. To ensure that specified products are furnished and installed in accordance with the design intent, procedures have been established for submittal of design data and for its review by ARCHITECT, OWNER and others.

1.02 RELATED REQUIREMENTS

- A. Section 01 3113: Project Coordination.
- B. Section 01 7329: Cutting and Patching.

PART 2 – PRODUCTS (Not used)

PART 3 - EXECUTION

3.01 PROCEDURES

- A. CONTRACTOR is required to review and approve every submittal and shop drawing prior to transmittal and delivery to ARCHITECT. Should CONTRACTOR determine a submittal contains errors, or does not meet the requirements of the contract, CONTRACTOR shall immediately return the submittals and shop drawings to the producer and expedite the corrections prior to transmitting the submittal to ARCHITECT. Submittals shall not be used by CONTRACTOR to request clarifications or submit questions. CONTRACTOR will affix stamp to each submittal certifying CONTRACTOR has performed, at minimum, the following:
 - 1. Verified the submittal is complete in all respects and follows the requirements of the Contract Documents without variance.

2. Confirmed that no substitutions have been included. If substitutions are included, CONTRACTOR shall eliminate them from the submittal and process them in accordance with General Conditions.
 3. Identified any variances from the requirements of the Contract Documents and confirmed that the identified variance meets, but does not exceed the allowable limitations or tolerances as defined in these specifications.
 4. Verified that all submitted materials, dimensions and tolerances are compatible with existing or planned conditions of the Work in order to erect, fabricate, or install the submitted assembly in conformance with the requirements of the Contract Documents.
 5. Coordinated and verified that the dimensions match CONTRACTOR measured field or installation conditions.
 6. Coordinated and verified that the products of separate manufacturers required within any field produced assembly are compatible in all respects for such assembly.
 7. Packaged together all related submittals or shop drawings where such is necessary for a comprehensive ARCHITECT review.
- B. CONTRACTOR shall package each submittal appropriately for transmittal and handling. Transmittal format shall be as required by OWNER. CONTRACTOR shall transmit each submittal or re-submittal to ARCHITECT electronically in PDF format.
- C. After ARCHITECT'S review, ARCHITECT will transmit submittals to OWNER and CONTRACTOR, INSPECTOR and others as required. Work shall not commence, unless otherwise approved by OWNER, until approved submittals are transmitted to CONTRACTOR.
- D. CONTRACTOR shall clearly identify any deviations from the Contract Documents on each submittal. Any deviation not so noted even though stamped reviewed is not acceptable.
- E. CONTRACTOR shall coordinate each submittal with fabrication, purchasing, testing, delivery, other submittals, and related activities requiring sequential activity.
- F. Timing of Submittals:
1. In accordance with General Conditions, CONTRACTOR shall submit to ARCHITECT, with copy of transmittal to the OWNER, those Shop Drawings, Product Data, diagrams, materials lists, Samples and other submittals required by the Contract Documents.

2. The scheduling of submittals shall be sequenced to support the progress of the Work, and shall be:
 - a. Submitted sufficiently in advance of construction, fabrication or installation in order to allow time for transmittal, review, modification, correction, (and resubmission and re-review when required.)
 - b. Phased with adequate time between submittals in order to allow for proper review by the ARCHITECT without negative impact to the Milestones Schedule.
3. CONTRACTOR shall coordinate submittal of related items and ARCHITECT reserves the right to withhold action on a submittal requiring coordination with other submittals until all related submittals are received by ARCHITECT.
4. CONTRACTOR shall revise, update and submit submittal schedule to ARCHITECT and OWNER on the first of each month, or as required by OWNER.
5. CONTRACTOR shall allow in the Construction Schedule, at least sixteen days for ARCHITECT review following ARCHITECT receipt of submittal. For mechanical, plumbing, electrical, low voltage, fire sprinklers, door and hardware, and other submittals requiring joint review with OWNER, CONTRACTOR shall allow a minimum of eighteen days following ARCHITECT receipt of submittal.
6. No adjustments to the Contract Time or Milestones will be authorized because of a failure to transmit submittals to ARCHITECT sufficiently in advance of the Work to permit review and processing or where CONTRACTOR fails to provide ARCHITECT submittals on related items.
7. In case of product substitution, Shop Drawing preparation shall not commence until such time as OWNER accepts or rejects the proposed substitution in accordance with the procedures described in the General Conditions.
- G. If required, resubmit submittals in a timely manner. Resubmit as specified for initial submittal but identify as such. Review times for re-submitted items shall be as per the time frames for initial submittal review.
- H. Shop Drawing preparation shall not commence until such time as CONTRACTOR receives Product Data acceptance.

I. ARCHITECT will stamp each submittal with a uniform, action stamp. ARCHITECT will mark the stamp appropriately to indicate the action taken, as follows:

1. Final Unrestricted Release: When ARCHITECT marks a submittal “Reviewed” or “Approved” the Work covered by the submittal may proceed provided it complies with requirements of the Contract Documents. Final payment depends on that compliance.
2. Final-But-Restricted Release: When ARCHITECT, or authorized agent, marks a submittal “Reviewed as Noted” or “Furnish as Corrected” the Work covered by the submittal may proceed provided it complies with notations or corrections on the submittal and requirements of the Contract Documents. Final payment depends on that compliance.
3. Returned for Re-submittal: When ARCHITECT, or authorized agent, marks a submittal “Rejected” or “Revise and Resubmit,” do not proceed with Work covered by the submittal, including purchasing, fabrication, delivery, or other activity. Revise or prepare a new submittal according to the notations; resubmit without delay. Repeat as necessary to obtain different action mark. In case of multiple submittals covering same items of Work, CONTRACTOR is responsible for any time delays, schedule disruptions, out of sequence Work, or additional costs due to multiple submissions of the same submittal item. Do not use, or allow others to use, submittals marked “Rejected” or “Revise and Resubmit” at the Project site or elsewhere where Work is in progress.
4. Other Action: Where a submittal is for information or record purposes or special processing or other activity, ARCHITECT, or authorized agent, will return the submittal marked “Action Not Required”.

3.02 SHOP DRAWINGS

- A. Shop Drawings are original drawings prepared by CONTRACTOR, Sub-contractor, supplier, or distributor illustrating some portion of Work by showing fabrication, layout, setting, or erection and shall not be based on reproduced Contract Documents or copied standard information.
- B. Produce Shop Drawings to an accurate scale that is large enough to indicate all pertinent features and methods. Except for templates, patterns, and similar full-size drawings, submit Shop Drawings on sheets at least 8-1/2 by 11 inches but no larger than 24 by 36 inches.
- C. Shop Drawings shall include fabrication and installation drawings, setting diagrams, schedules, patterns, templates, and similar drawings. Include the following information:

1. Dimensions.
2. Identification of products and materials included by sheet and detail number.
3. Compliance with specified standards.
4. Notation of coordination requirements.
5. Notation of dimensions established by field measurement.

3.03 PRODUCT DATA

- A. Collect Product Data into a single submittal for each element of Work or system. Product Data includes printed information, such as manufacturer's installation instructions, catalog cuts, standard color charts, roughing-in diagrams and templates, wiring diagrams, schedules, illustrations, or performance curves.
 1. Mark each copy to show or delineate pertinent materials, products, models, applicable choices, or options. Where Product Data includes information on several products that are not required, clearly mark copies to indicate the applicable information. Include the following information:
 - a. Manufacturer's printed recommendations.
 - b. Compliance with trade association standards.
 - c. Compliance with recognized testing agency standards.
 - d. Application of testing agency labels and seals.
 - e. Notation of dimensions verified by field measurement.
 - f. Notation of coordination requirements.
 - g. Notation of dimensions and required clearances.
 - h. Indicate performance characteristics and capacities.
 - i. Indicate wiring diagrams and controls.

2. Do not submit Product Data until compliance with requirements of the Contract Documents has been confirmed by CONTRACTOR.

3.04 SAMPLES

A. Procedure:

1. Submit Samples of sufficient size, quantity, cured and finished and physically identical to the proposed product or material. Samples include partial or full sections or range of manufactured or fabricated components, cuts or containers of materials, color range sets, and swatches denoting color, texture, and/or pattern.
 - a. Mount or display Samples in the manner to facilitate review of qualities indicated. Include the following:
 - 1) Specification section number and reference.
 - 2) Generic description of the Sample.
 - 3) Sampling source.
 - 4) Product name or name of manufacturer.
 - 5) Compliance with recognized standards.
 - 6) Availability and delivery time.
2. Submit Samples for review of size, kind, color, pattern, and texture. Submit Samples for a final check of these characteristics with other elements and a comparison of these characteristics between the final submittal and the actual component as delivered and installed.
 - a. Where variations in color, pattern, texture, or other characteristic is inherent in the material or product represented, submit at least three (3) multiple units that show the approximate limits of the variations.
 - b. Refer to other Specification sections for requirements for Samples that illustrate materials, fabrication techniques, assembly details, connections, operation, and similar construction characteristics.
 - c. Refer to other sections for Samples to be returned to CONTRACTOR for incorporation into the Work. Such Samples must be undamaged at time of installation. On the transmittal indicate special requests regarding disposition of Sample submittals.

- d. Samples not incorporated into the Work, or otherwise not designated as Owner property, remain the property of CONTRACTOR and shall be removed from the Project site prior to Substantial Completion.
- 3. Color and Pattern: Whenever a choice of color or pattern is available in a specified product, submit accurate color chips and pattern charts to OAR for review and selection.
- B. When specified, erect field Samples and mock-ups at the Project site to illustrate products, materials, fabrications, or execution and to establish standards by which completed Work shall be judged.
- C. Maintain sets of Samples, as returned, at the Project site, for quality comparisons throughout the course of the Work. Sample sets may be used to obtain final acceptance of the Work associated with each set.

3.05 QUALITY CONTROL SUBMITTALS

- A. Submit quality control submittals, including design data, certifications, manufacturer's field reports, and other quality control submittals as required under other sections of the Contract Documents.
- B. When other sections of the Contract Documents require manufacturer's certification of a product, material, or installation complies with specified requirements, submit a notarized certification from the manufacturer certifying compliance with specified requirements.
- C. Certification shall be signed by an officer of the manufacturer or other individual authorized to sign documents on behalf of the represented company.
- D. Requirements for submittal of inspection and test reports are specified in other sections of the Contract Documents.

END OF SECTION

SECTION 01 7329
CUTTING AND PATCHING

PART 1 - GENERAL

1.01 SECTION INCLUDES

- A. This Section specifies procedural requirements for cutting and patching.

1.02 RELATED REQUIREMENTS

- A. Section 01 3113 - Project Coordination.
- B. Section 01 3300 - Submittal Procedures.

1.03 SUBMITTALS

- A. The word “cutting” as used in the Contract Documents includes, but is not limited to, cutting, drilling, chopping, and other similar operations and the word “patching” includes, but is not limited to, patching, rebuilding, reinforcing, repairing, refurbishing, restoring, replacing, or other similar operations.
- B. Cutting and Patching Proposal: CONTRACTOR shall submit a proposal describing procedures well in advance of the time cutting and patching will be performed if the Contract Documents requires approval of these procedures before proceeding. Include the following information, as applicable, in the proposal:
1. Describe the extent of cutting and patching required. Denote how it will be performed and indicate why it cannot be avoided.
 2. Describe anticipated results in terms of changes to existing construction. Include changes to structural elements and operating components as well as changes in the building’s appearance or other significant visual elements.
 3. List products to be used and firms or entities that will perform this Work.
 4. Indicate dates when cutting and patching will be performed.
 5. Utilities: List utilities that cutting and patching operations will disturb or affect. List utilities to be relocated and those that will be temporarily out-of-service. Indicate how long service will be disrupted.
 6. Where cutting and patching involves adding reinforcement to structural elements, submit details and engineering calculations showing integration of reinforcement with the original structure.
 7. Review by ARCHITECT prior to proceeding with cutting and patching does not waive ARCHITECT right to later require complete removal and replacement of defective Work.

1.04 QUALITY ASSURANCE

- A. Requirements for structural Work: Do not cut and patch structural elements in a manner that would change their load-carrying capacity or load-deflection ratio.
 - 1. Obtain approval from ARCHITECT of the cutting and patching proposal before cutting and patching the following structural elements:
 - a. Foundation construction.
 - b. Bearing and retaining walls.
 - c. Structural concrete.
 - d. Structural steel.
 - e. Lintels.
 - f. Timber and primary wood framing.
 - g. Structural decking.
 - h. Stair systems.
 - i. Miscellaneous structural metals.
 - j. Exterior curtain-wall construction.
 - k. Equipment supports.
 - l. Piping, ductwork, vessels, and equipment.
 - m. Structural systems of special construction in Division 13 Sections.
- B. Operational Limitations: Do not cut and patch operating elements or related components in a manner that would result in reducing their capacity to perform as intended. Do not cut and patch operating elements or related components in a manner that would result in increased maintenance or decreased operational life or safety.
 - 1. Obtain review of the cutting and patching proposal before cutting and patching the following operating elements or safety related systems:
 - a. Primary operational systems and equipment.
 - b. Air or smoke barriers.
 - c. Water, moisture, or vapor barriers.
 - d. Membranes and flashings.
 - e. Fire protection systems.
 - f. Noise and vibration control elements and systems.
 - g. Control systems.
 - h. Communication and/or data systems.
 - i. Conveying systems.
 - j. Electrical wiring systems.

- k. Operating systems of special construction in Division 13 Sections.
- C. Visual Requirements: Do not cut and patch construction exposed on the exterior or in occupied spaces in a manner that would, in the opinion of ARCHITECT, reduce the building's aesthetic qualities. Do not cut and patch construction in a manner that would result in visual evidence of cutting and patching. Remove and replace Work cut and patched in a visually unsatisfactory manner.
 - 1. If possible, retain the original installer or fabricator to cut and patch the exposed Work listed below. If it is impossible to engage the original installer or fabricator, engage another recognized experienced and specialized firm.
 - a. Firestopping.
 - b. Acoustical ceilings.
 - c. Acoustical panels.
 - d. Finished wood flooring.
 - e. Synthetic sports flooring.
 - f. Carpeting.
 - g. HVAC enclosures, cabinets, or covers.
 - h. Ceramic and quarry tile.
 - i. Gypsum board.
 - j. Masonry (exterior and interior where exposed).
 - k. Tack boards.
 - l. Casework.
 - m. Finish carpentry.

1.05 WARRANTY

- A. Existing Warranties: Replace, patch, and repair material and surfaces cut or damaged by methods and with materials in such a manner as not to void any warranties required or existing.

PART 2 - PRODUCTS (Not applicable)

PART 3 - EXECUTION

3.01 INSPECTION

- A. Examine surfaces to be cut and patched and conditions under which cutting and patching is to be performed before cutting. If unsafe or unsatisfactory conditions are encountered, take corrective action before proceeding.

1. Before proceeding, meet at the Project site with parties involved in cutting and patching, including mechanical and electrical trades. Review areas of potential interference and conflict. Coordinate procedures and resolve potential conflicts before proceeding.

3.02 PREPARATION

- A. Temporary support: Provide adequate temporary support of existing improvements or Work to be cut.
- B. Protection: Protect existing improvements and Work during cutting and patching to prevent damage. Provide protection from adverse weather conditions for portions of existing improvements or Work that might be exposed during cutting and patching operations.
- C. Avoid interference with use of adjoining areas or interruption of free passage to adjoining areas.
- D. Where the Work requires sandblasting of existing surfaces in order to receive new materials secured by cementitious, adhesive or chemical bond, completely remove existing finishes, stains, oil, grease, bitumen, mastic and adhesives or other substances deleterious to the new bonding or fastening of new Work. Utilize wet sand blasting for interior surfaces and for exterior surfaces where necessary to prevent objectionable production of dust.

3.03 PERFORMANCE

- A. General: Employ skilled workmen to perform cutting and patching. Proceed with cutting and patching at the earliest feasible time and complete without delay. Carefully remove existing Work to be salvaged and/or reinstalled. Protect and store for reuse into the Work. Verify compatibility and suitability of existing substrates before starting the Work.
- B. Cutting: Cut existing construction using methods least likely to damage elements retained or adjoining Work. Where possible, review proposed procedures with the original installer; comply with the original installer's recommendations.
 1. In general, where cutting, use hand or small power tools designed for sawing or grinding, not hammering and chopping. Cut holes and slots as small as possible, neatly to size required, and with minimum disturbance of adjacent surfaces. Temporarily cover openings when not in use.
 2. To avoid marring existing finished surfaces, cut or drill from the exposed or finished side into concealed surfaces.
 3. Cut through concrete and masonry using a cutting machine, such as a carborundum saw or a diamond-core drill. Saw cut reinforcing bars and paint ends with bituminous paint except where bonded into new concrete or masonry.

4. Comply with requirements of applicable Sections of Divisions 31, 32, and 33 where cutting and patching requires excavating, backfill, and recompaction.
 5. Woodwork: Cut and or remove to a panel or joint line.
 6. Sheet Metal: Remove back to joint, lap, or connection. Secure loose or unfastened ends or edges and seal watertight.
 7. Glass: Remove cracked, broken, or damaged glass and clean rebates and stops of setting materials.
 8. Plaster: Cut back to sound plaster on straight lines, and back bevel edges of remaining plaster. Trim existing lath and prepare for new lath.
 9. Gypsum Wallboard: Cut back on straight lines to undamaged surfaces with at least two opposite cut edges centered on supports.
 10. Acoustical ceilings: Remove hanger wires and related appurtenances where ceilings are not scheduled to be installed.
 11. Tile: Cut back to sound tile and backing on joint lines.
 12. Flooring: Completely remove flooring and clean backing of prior adhesive. Carefully remove wood flooring for patching and repairing of existing wood flooring scheduled to remain.
- C. Patching: Patch with durable seams that are as invisible as possible. Comply with required tolerances.
1. Where feasible, inspect and test patched areas to demonstrate integrity of the installation. Verify conditions of existing substrates prior to executing Work.
 2. Restore exposed finishes of patched areas and extend finish restoration into retaining adjoining construction in a manner that will eliminate all evidence of patching and refinishing.
 3. Concrete: Maintain cut edges in a moist condition for twenty four hours prior to the placement of new concrete. In lieu of this an epoxy adhesive may be provided. Finish placed concrete to match existing unless noted otherwise. Concrete shall have a compressive strength of 3,000 psi where installed to repair and match existing improvements, unless noted otherwise.
 4. Metal Fabrications: Items to remain exposed shall have their edges cut and ground smooth and rounded.
 5. Sheet Metal: Replace removed or damaged sheet metal items for new Work.
 6. Glass: Install matching glass and re-seal exterior window assemblies.
 7. Lath and Plaster: Install new lath materials to match existing and fasten to supports at 6-inch centers. Provide a 6-inch lap where new lath to adjoins

existing lath. Fasten new lath as required for new Work. Restore paper backings as required. Apply a bonding agent on cut edges of existing plaster. Apply three coat plaster of the type, thickness, finish, texture, and color to match existing.

8. Gypsum Wallboard: Fasten cut edges of wallboard. Install patches with at least two opposite edges centered on supports and secure at 6-inch centers. Tape and finish joints and fastener heads. Patching shall be non-apparent when painted or finished.
9. Acoustical Ceilings: Comply with the requirements for new Work specified in related sections of the Contract Documents.
10. Resilient Flooring: Completely remove flooring and prepare substrate for new material.
11. Painting: Prepare areas to be patched, patch and paint as specified under related sections of the Contract Documents.

3.04 CLEANING

- A. Clean areas and spaces where cutting and patching are performed. Completely remove paint, mortar, oils, putty, and similar items. Thoroughly clean piping, conduit, and similar features before applying paint or other finishing materials. Restore damaged coverings to their original condition.

END OF SECTION

SECTION 02 4116

DEMOLITION

PART 1 - GENERAL

1.01 SUMMARY

- A. Section Includes: Furnishing labor, materials and equipment necessary for demolition, dismantling, cutting and alterations as indicated, specified, or required for completion of the Work. Includes items such as the following:
 - 1. Protection of existing improvements to remain.
 - 2. Cleaning existing improvements to remain.
 - 3. Disconnecting and capping utilities.
 - 4. Removing debris, waste materials, and equipment.
 - 5. Removal of items for performance of the Work.
 - 6. Salvageable items to be retained by the Owner.
- B. Related Requirements:
 - 1. Division 01 - General Requirements.
 - 2. Section 01 1100 - Summary of Work.
 - 3. Section 01 7329 - Cutting and Patching.
 - 4. Division 22 — Plumbing.
 - 5. Division 26 — Electrical.

1.02 SUBMITTALS

- A. Shop Drawings: Submit Shop Drawings indicating the extent of items and systems to be removed. Indicate items to be salvaged or items to be protected during demolition. Indicate locations of utility terminations and the extent of abandoned lines to be removed. Include details indicating methods and location of utility terminations.

1.03 QUALITY ASSURANCE

- A. Perform the Work of this section by workers skilled in the demolition of buildings and structures. Perform the Work of this section under direct superintendence at all times.
- B. Prior to commencement of Work, schedule a walkthrough with the OWNER, to confirm Owner property items have been removed from scheduled Work areas. Identify and mark remaining property items and schedule their removal.

- C. Coordinate demolition for the correct sequence, limits, and methods. Schedule demolition Work to create least possible inconvenience to the public and facility operations.
- D. Related Standard: ANSI/ASSE A10.6.

1.04 PROJECT CONDITIONS

- A. Drawings may not indicate in detail all demolition Work to be performed. Examine existing conditions to determine the full extent of required demolition.
- B. Repair damage to existing improvements or damage due to excessive demolition.
- C. Provide all measures to avoid excessive damage from inadequate or improper means and methods, improper shoring, bracing or support.
- D. If conditions are encountered that varies from those indicated, promptly notify the ARCHITECT for clarification before proceeding.

PART 2 - PRODUCTS

2.01 HANDLING OF MATERIALS

- A. Items scheduled for salvage by the Owner shall be delivered to a location designated by the OWNER. Items shall be cleaned, packaged and labeled for storage.
- B. Items scheduled for reuse shall be stored on the Project site and protected from damage, theft and other deleterious conditions.

PART 3 - EXECUTION

3.01 GENERAL

- A. Protection:
 - 1. Do not commence demolition until safety partitions, barricades, warning signs and other forms of protection are installed. Refer to Section 01 5000 - Construction Facilities and Temporary Controls.
 - 2. Provide safeguards, including warning signs, lights and barricades, for protection of workers, occupants, and the public.
- B. If safety of existing construction appears to be endangered, take immediate measures to correct such conditions; cease operations and immediately notify the OWNER.

3.02 DEMOLITION

- A. Do not throw or drop materials. Furnish ramps or chutes as required by the Work.
- B. Remove existing construction only to extent necessary for proper installation of Work and interfacing with existing construction. Cut back finished surfaces to straight, plumb or level lines as required for a smooth transition.

- C. Where openings are cut oversize or in improper locations, replace or repair to required condition.

3.03 CUTTING EXISTING CONCRETE – NOT USED

3.04 REMOVAL OF EXISTING PLUMBING AND ELECTRICAL EQUIPMENT AND SERVICES

- A. Remove existing plumbing and electrical equipment fixtures and services not indicated for reuse and not necessary for completion of the Work. Remove abandoned lines and cap unused portions of existing lines.

3.05 REMOVAL OF OTHER MATERIALS

- A. Sheet Metal: Remove back to joint, lap, or connection. Secure loose and unfastened ends or edges and provide a watertight condition. Re-seal as required.
- B. Glass: Remove broken or damaged glass and clean rebates and stops of glazing channels.
- C. Modular materials such as acoustical ceiling panels, resilient tile, or ceramic tile: Remove to a natural joint without leaving damaged or defective Work where joining new Work. After flooring removal, clean substrates to remove setting materials and adhesives.
- D. Gypsum Board: Remove to a panel joint line on a stud or support line.
- E. Remove existing improvements not specifically indicated or required but necessary to perform Work. Cut to clean lines, allowing for installation of Work.

3.06 PATCHING

- A. Patch or repair materials to remain when damaged by the performance of the Work of this section. Finish material and appearance of patch and/or repair Work shall match existing.

3.07 CLEANING

- A. Clean existing materials to remain with appropriate tools and equipment.
- B. Protect existing improvements during cleaning operations.
- C. Debris shall be dampened by fog water spray prior to transporting by truck.
- D. Debris pick-up area shall be kept broom-clean and shall be washed daily with clean water.
- E. Remove waste and debris, other than items to be salvaged. Turn over salvaged items to Owner, or store and protect for reuse where required. Continuously clean up and remove items as demolition Work progresses.
- F. Remove rubbish, debris, and waste materials and legally dispose of off the Project site.

END OF SECTION

SECTION 07 6000

SHEET METAL

PART 1 - GENERAL

1.01 SUMMARY

- A. Section Includes:
 - 1. Sheet metal assemblies.
- B. Related Requirements:
 - 1. Section 07 9200 - Joint Sealants.
 - 2. Division 22 — Plumbing.

1.02 SUBMITTALS

- A. Shop Drawings: Submit for fabricated sheet metal indicating shapes, details, methods of joining, anchoring and fastening, thicknesses and gages of metals, concealed reinforcement, expansion joint details, sections, and profiles.
- B. Samples: Submit Samples for materials or assemblies as requested.
- C. Product Data: Submit brochures of manufactured items.

1.03 QUALITY ASSURANCE

- A. Drawings and requirements specified govern. Provide the Work of this section in conformance with the Architectural Sheet Metal Manual published by SMACNA for conditions not indicated or specified and for general fabrication of sheet metal items.
- B. Materials shall conform to following standards:
 - 1. ASTM A167 - Stainless and Heat-Resisting Chromium-Nickel Steel Plate, Sheet and Strip.

1.04 DELIVERY, STORAGE AND HANDLING

- A. Do not install bent or otherwise damaged materials.

PART 2 - PRODUCTS

2.01 MATERIALS

- A. Stainless Steel: Plate, sheet and strip shall conform to ASTM A167, Type 304 or Type 316, No. 4 finish on exposed surfaces and No. 2 finish on concealed surfaces unless otherwise specified or indicated. Furnish Type 304 for general applications and Type 316 where exposed to acidic or alkaline conditions.
- B. Fastenings:

1. Stainless Steel: Rivets and other fastenings furnished in connection with stainless steel Work, shall be 300 series alloy to match alloy of stainless steel being fastened.

2.02 FABRICATION

A. General:

1. Accurately form sheet metal Work to dimensions and shapes indicated and required. Cope finish molded and brake metal shapes with true, straight, sharp lines and angles and, where intersecting each other, to a precise fit. Unless otherwise specified, all stainless sheet steel shall be 16 gage. Exposed edges of sheet metal shall have a ½ inch minimum hemmed edge.
2. Form and install sheet metal Work to provide proper allowances for expansion and contraction, without causing undue stresses in any part of completed Work. Installation shall be water and weathertight.

PART 3 - EXECUTION

3.01 PREPARATION

- A. Verify related work has been completed, including painting of wall surfaces prior to installation.

3.02 INSTALLATION

- A. General: Coordinate with installation of plumbing items indicated in the Drawings. Install work true and plumb with no rough or sharp edges. Polish or replace marred or damaged work.

3.04 PROTECTION

- A. Protect the Work of this section until Substantial Completion.

3.05 CLEANING

- A. Remove rubbish, debris, and waste materials and legally dispose of off the Project site.

OF SECTION END

SECTION 07 8413
PENETRATION FIRESTOPPING

PART 1 - GENERAL

1.01 SUMMARY

A. Section Includes:

1. Penetrations for the passage of duct, cable, cable tray, conduit, piping, electrical busways and raceways through fire-rated vertical barriers (walls and partitions).

B. Related Requirements:

1. Division 01 - General Requirements.
2. Section 07 9200 - Joint Sealants.
3. Section 09 2900 - Gypsum Board.
4. Division 22 - Plumbing.
5. Division 26 - Electrical.

1.02 REFERENCES

A. ASTM Standards:

1. ASTM E84 – Standard Test Method for Surface Burning Characteristics of Building Materials.
2. ASTM E119 – Standard Test Methods for Fire Tests of Building Construction and Materials.
3. ASTM E814 - Standard Test Method for Fire Tests of Through-Penetration Fire Stops.
4. ASTM E1399 – Standard Test Method for Cyclic Movement and Measuring Minimum and Maximum Joint Widths on Architectural Joint Systems.
5. ASTM E1966 – Standard Test Methods for Fire-Resistive Joint Systems.
6. ASTM E2174 - Standard Practice for On-Site Inspection of Installed Firestops
7. ASTM E2307 – Standard Test Method for Determining Fire Resistance of Perimeter Fire Barriers Using Intermediate-Scale, Multi-story Test Apparatus.
8. ASTM E2393 - Standard Practice for On-Site Inspection of Installed Fire Resistive Joint Systems and Perimeter Fire Barriers.

- B. Underwriters Laboratories, Inc.
 - 1. UL Fire Resistance Directory.
 - 2. UL 263 – Standard for Fire Tests of Building Construction and Materials.
 - 3. UL 723 – Standard for Test for Surface Burning Characteristics of Building Materials.
 - 4. UL 1479 – Fire Tests of Through Penetration Firestops.
 - 5. UL 2079 – Test for Fire Resistance of Building Joint Systems.
- C. Testing Services:
 - 1. Intertek ES SAT.
 - 2. Southwest Research Institute.
 - 3. Underwriters Laboratories.
- D. International Firestop Council Guidelines for Evaluating Firestop Systems Engineering Judgments.
- E. California Building Code, Chapter 7 Fire Tests of Through-Penetration Fire Stops.
- F. Firestop Contractors International Association (FICA) Manual of Practice.

1.03 SYSTEM DESCRIPTION

- A. Provide fire stops and smoke seals to prevent the passage of fire, smoke, toxic gasses or water from one floor or area to another. Seal openings in floors, fire rated walls and permanent partitions penetrated by pipes, ducts, conduits and other items as shown, specified, and as required for the type of construction.
- B. Mineral fiber insulation installed as fire safing at non-rated penetrations not containing pipes, ducts, conduits, and other items in floor slabs, wall partitions, construction-joint conditions between slabs and adjacent construction and where indicated or required.
- C. Provide damming material, clips, and closures as required for support and containment of dams, and other insulation materials required for tested and rated fire stop systems.

1.04 QUALITY ASSURANCE

- A. Performance Criteria:
 - 1. Provide materials and Work to conform to source quality control criteria specified herein and CBC requirements in fire resistant wall and floor assemblies to prevent the passage of fire, smoke, and toxic gases.
 - 2. Installed fire stops shall be of sufficient thickness, width, and density to provide a fire resistance rating at least equal to the floor, wall, or partition construction into which it is installed.

- B. Comply with CBC requirements for fire rated construction.
- C. Qualifications of Manufacturer: Products furnished for fire stopping and smoke seals shall be manufactured by a firm which has been continuously and regularly employed in the manufacture of these materials for a period of at least 5 years; and which can provide evidence of these materials being satisfactorily installed on at least 5 projects of similar size and type within such period.
- D. Qualifications of Installer: The Work of this section shall be installed by a firm which has been in the business of installing similar materials for at least 5 consecutive years; and can provide evidence of satisfactory completion of 5 projects of similar size and scope. Installer shall have applicators trained and certified by manufacturer for performing this Work. Comply with requirements of FICA Manual of Practice.
- E. For those firestop applications that exist for which no UL tested system is available through a manufacturer, an engineering judgment derived from similar UL system designs or other tests will be submitted to local authorities having jurisdiction for their review and approval prior to installation. Engineering judgment drawings must follow requirements set forth by the International Firestop Council.
- F. Firestopping tests shall be performed by a qualified testing and inspection agency. A qualified testing and inspection agency shall be UL, Intertek or another agency performing testing and follow-up inspection services for firestop systems acceptable to authorities having jurisdiction. Firestopping products shall bear the classification marking of a qualified testing and inspection agency.

1.05 SUBMITTALS

- A. Product Data:
 - 1. Submit manufacturer's Product Data for each type of fire stop and smoke seal material proposed for installation. Indicate product characteristics, typical installations, performance, and limitation criteria and test data.
 - 2. Submit manufacturer's printed installation instructions for each type of product, system, and construction required for the Work. Indicate fire resistance rating of each installation.
 - 3. Submit fire test reports from independent testing agency indicating the following:
 - a. Fire test report of fire stop material installed to substrate and penetration materials similar to the Work of this section. Test to indicate both Fire Resistance (F) and Temperature (T) Ratings.
 - b. Test reports of products to be installed shall indicate conformance to ASTM E814 or UL 1479 for penetrations, ASTM E1966 or UL 2079 for joints, and ASTM E2307 for perimeter fire barrier (edge-of-slab) systems.
- B. Field Samples: No less than 10 days before commencing the Work of this section, provide field installed Samples of fire stop materials and systems.
 - 1. Apply one Sample of fire stop material for each different penetration and related fire rating required for the Work.

2. Sample areas shall comply with thickness, fire resistance ratings, and finished appearance.
- C. Manufacturer's Qualifications: Submit evidence of conformance with qualification requirements specified above.
- D. Installer's Qualifications: Submit evidence of conformance with qualification requirements specified above.

1.06 DELIVERY, STORAGE AND HANDLING

- A. Deliver products to the Project site in manufacturer's original, unopened containers bearing correct UL labeling.
- B. Fire stop material shall be stored above grade in an area protected from detrimental weather and moisture conditions and in compliance with manufacturer's requirements, including temperature restrictions.
- C. Fire stop and seal materials shall be installed before expiration of shelf life.

PART 2 - PRODUCTS

2.01 MANUFACTURERS

- A. Unless otherwise noted, products of this section shall be as manufactured by:
 1. 3M Fire Protection Products.
 2. Hilti, Inc.
 3. Nelson Firestop Products.
 4. Specified Technologies, Inc. (STI).
 5. Tremco, Inc.
 6. Equal.
- B. Provide materials and systems of specified manufacturers to suit penetration and substrate as determined by various conditions of installation.
- C. Provide firestopping composed of components that are compatible with the substrates forming openings and the items penetrating the firestop, under conditions of service and application, as demonstrated by the fire stopping manufacturer based on testing and field experience.

2.02 MATERIALS

- A. Firestop Putty Stick: Intumescent, non-hardening, firestop putty for single or bundled cables and non-combustible pipe penetrations. For use in horizontal or vertical, concrete, masonry or gypsum wall assemblies.

1. 3M: MP + Stix.
 2. Hilti: CP 618 and CP 619T.
 3. Tremco: TREMstop MP Putty Stick.
 4. Nelson Firestop Products: FSP AA445, AA439.
 5. Specified Technologies, Inc. (STI): SSP Firestop Putty.
 6. Equal.
- B. Firestop Putty Pad: Moldable firestop putty for protection of electrical outlet boxes.
1. 3M: MPP+.
 2. Hilti: CP 617.
 3. Tremco: TREMstop MP Putty Pad.
 4. Nelson Firestop Products: FSP AA452, AA439.
 5. Specified Technologies, Inc. (STI): SSP Putty Pads or Electrical Box Insert.
 6. Equal.
- C. Firestop Sealant: Smoke, gas and water resistant. For use in horizontal or vertical, concrete, masonry or gypsum wall assemblies.
1. Single component intumescent sealant for protection of combustible and non-combustible pipe, conduit and cable penetrations.
 - a) 3M: CP-25WB+, IC-15WB+, 3000WT.
 - b) Hilti: FS ONE.
 - c) Tremco: TREMstop IA+ or FyreCaulk.
 - d) Nelson Firestop Products: ES1399.
 - e) Specified Technologies, Inc, (STI): LCI or SSS Intumescent Firestop Sealant.
 - f) Equal.
 2. Silicone based system that provides maximum movement in fire-rated joint applications and pipe penetrations.
 - a) 3M: 2000+, 2000 NS.
 - b) Hilti: CP 601S.
 - c) Tremco: TREMstop Fyre-sil.

- d) Nelson Firestop Products: CLK AA529, AA542, AA492.
 - e) Specified Technologies, Inc. (STI): SIL Silicone Firestop Sealant SIL300 or SIL300SL (self-leveling).
 - f) Equal.
3. Acrylic based system that provides movement capability in fire rated joints and seals through penetration applications.
- a) 3M: FD 150+.
 - b) Hilti: CP 606.
 - c) Tremco: TREMstop Acrylic GG.
 - d) Nelson Firestop Products: FSC3.
 - e) Specified Technologies, Inc. (STI): ES Elastomeric Firestop Sealant.
 - f) Equal.
- D. Supplemental Material: Provide supplementary materials required for complete, fire rated, installation.

2.03 SOURCE QUALITY CONTROL

- A. Fire stop and smoke seal material shall be tested by an independent testing agency for conformance to Flame (F) and Temperature (T) requirements of ASTM E814/UL 1479, ASTM E1966/UL 2079, or ATSM E2307.
- B. Conform to UL Fire Hazard Classification Requirements. Material shall be classified as a fill, void, or cavity material and system for UL through Penetration Firestop System.
- C. Material shall be tested and shall display Flame Spread Index of 25 or less, and Smoke Developed Index of 450 or less when tested in accordance with ASTM E84.

PART 3 - EXECUTION

3.01 APPLICATION REQUIREMENTS

- A. Provide single component fire stop sealant or putty:
 - 1. Within penetrations subject to movement including conduit, cable bundles, buss duct, and noncombustible pipe.
 - 2. As a sealant or caulking for smoke barrier construction, fire, and smoke dampers, mechanical/electrical framed elements in masonry and gypsum board partition systems, and other conditions.

3.02 PREPARATION

- A. Examine the areas and conditions where fire stops and smoke seals are to be installed for conditions detrimental to the proper completion of the Work. Do not proceed with the Work until unsatisfactory conditions have been corrected for rated fire protection.
- B. Surface to receive fire stops or smoke seals shall be free of dirt, dust, grease, form release agents, or other matter that would impair the bond of the fire stop material to the substrate or penetrating items. Substrate shall be frost free and when required, dry.
- C. Voids and cracks in substrate shall be filled and unnecessary projections removed before installation of fire stops.
- D. Assure that all pipes, conduit, cable, and other items, which penetrate fire rated construction, have been permanently installed before installation of fire stops. Schedule and sequence the Work to assure that partitions and other construction, which would conceal penetrations, are not installed before the installation of fire stops and smoke seals.
- E. Comply with manufacturer's recommendations for temperature and humidity conditions before, during, and after installation of fire stops and smoke seals.

3.03 INSTALLATION

- A. General: Provide installation in accordance with manufacturer's installation procedures, as required. Install fire stops in accordance with fire test reports, UL Fire Resistance Directory, Intertek Testing Services Directory or SpecDirect, and reviewed Sample installations.
- B. Installation of Single Component Fire Stop Sealant:
 - 1. Provide noncombustible insulation as required to achieve fire resistance rating.
 - 2. Install with manual or powered sealant gun. For up to four hour rating, install to the thickness required by the Listed System Designs as directed for wall and floor applications.
 - 3. Surface of gun grade fire stop sealant shall be tooled in accordance with manufacturer's recommendations.
 - 4. Remove excess materials from adjacent surfaces within 10 minutes, with either water or other material compatible with sealant and recommended by sealant manufacturer, leaving the Work in a neat, clean condition.

3.04 FIELD QUALITY CONTROL

- A. Examine sealed penetration areas to ensure proper installation before concealing or enclosing areas.
- B. Repair damaged areas and restore integrity of assembly.
- C. Keep areas of work accessible until inspection by authorities having jurisdiction.
- D. OWNER will engage a qualified independent inspection agency to inspect through-penetration firestop systems in accordance with ASTM E2174, or joint systems in

accordance with ASTM E2393. Manufacturer representatives shall not perform inspections of installed firestopping systems.

3.05 PROTECTION

- A. Protect the Work of this section until Substantial Completion.

3.06 CLEANUP

- A. Clean surfaces adjacent to sealed openings and joints and remove excess of firestopping materials.
- B. Remove rubbish, debris, and waste materials and legally dispose of off the Project site.

END OF SECTION

SECTION 07 9200

JOINT SEALANTS

PART 1 - GENERAL

1.01 SUMMARY

A. Section Includes:

1. Joint sealants.
2. Preparation for application of sealants.

B. Related Requirements:

1. Division 01 - General Requirements.
2. Section 07 6000 - Flashing and Sheet Metal.
3. Section 07 8413 - Penetration Firestopping.
4. Division 08 - Openings.
5. Division 09 - Finishes.

1.02 SUBMITTALS

- A. Shop Drawings: Submit Shop Drawings indicating sealant joint locations, with full-size sealant joint details.
- B. Product Data: Submit manufacturer's literature for each sealant material.
- C. Material Samples: Submit Samples indicating color range available for each sealant material intended for installation in exposed locations.
- D. Certifications: Submit manufacturer's certification materials comply with requirements specified.
- E. Site Samples: At locations required, provide a Sample of sealant for each typical installation, approximately 24 inches long, including joint preparation, backing, sealant and tooling. Allow backing to extend 6 inches beyond end of sealant for inspection of substrate.
- F. Test Reports: Submit manufacturer's adhesion compatibility test reports according to ASTM C794 for each substrate.

1.03 QUALITY ASSURANCE

- A. Qualifications of Installer: The Work of this section shall be installed by a firm which has been in the business of installing similar materials for at least five consecutive years; and

can show evidence of satisfactory completion of five projects of similar size and scope. Installer shall have applicators trained and approved by manufacturer for performing this Work.

1.04 DELIVERY, STORAGE AND HANDLING

- A. Store in accordance with manufacturer's recommendations. Provide a uniform ambient temperature between 60 and 80 degrees F.

1.05 WARRANTY

- A. Manufacturer: five year material warranty.
- B. Installer: two year installation/application warranty.

PART 2 - PRODUCTS

2.01 GENERAL

- A. Furnish sealants meeting following in-service requirements:
 - 1. Normal curing schedules are permitted.
 - 2. Non-staining, color fastness (resistance to color change), and durability when subjected to intense actinic (ultraviolet) radiation are required.
- B. Furnish the products of only one manufacturer unless otherwise required, sealant colors as selected to match the adjoining surfaces.

2.02 MATERIALS

- A. Sealants:
 - 1. Sealant 1: Acrylic latex, one-part, non-sag, mildew resistant acrylic emulsion compound complying with ASTM C834, Type S, Grade NS, formulated to be paintable.
 - a. Tremco Inc., Acrylic Latex Caulk.
 - b. Pecora Corporation, AC-20.
 - c. Equal.
 - 2. Sealant 2: Butyl sealant, one-part, non-sag, solvent-release-curing sealant complying with ASTM C1311, gun grade and formulated with a minimum of 75 percent solids.
 - a. Tremco Inc., Tremco Butyl Sealant.
 - b. Pecora Corp., BC-158.
 - c. Equal.

3. Sealant 3: Silicone sealant, one-part non-acid-curing silicone sealant complying with ASTM C920, Type S, Grade NS, Class 25.
 - a. Dow Corning Corp., Dow Corning 790, 791, 795.
 - b. General Electric Co., Silpruf.
 - c. Tremco, Inc., Spectrem 1.
 - d. Pecora Corp., 864.
 - e. Equal.
4. Sealant 4: One-part mildew-resistant silicone sealant, complying with ASTM C920, Type S, Grade NS, Class 25.
 - a. Dow Corning Corp., Dow Corning 786.
 - b. General Electric Co., Sanitary 1700.
 - c. Tremco, Inc., Proglaze White.
 - d. Equal.
5. Sealant 5: One-part non-sag urethane sealant, complying with ASTM C920, Type S, Grade NS, Class 25.
 - a. Sika Corporation, Sikaflex -221e.
 - b. Equal.
6. Sealant 6: Multi-part pouring urethane sealant, complying with ASTM C920, Type M, Grade P, Class 25.
 - a. Sika Corporation, Sikaflex 2C NS/SL.
 - b. Equal.
7. Sealant 7: Acoustical sealant, non-drying, non-hardening permanently flexible conforming to ASTM D217.
 - a. Pecora Corp., BA-98 Acoustical Sealant.
 - b. Equal.
- B. See 07 8413 - Penetration Firestopping for rated sealants.
- C. Joint Backing: ASTM D1056; round, closed cell Polyethylene Foam Rod; oversized 30 to 50 percent larger than joint width, reticulated polyolefin foam.
- D. Primer: Non-Staining Type. Provide primer as required and shall be product of manufacturer of installed sealant.

- E. Bond Breaker: Pressure sensitive tape recommended by sealant manufacturer.
- F. Sealants shall have normal curing schedules, shall be nonstaining, color fast and shall resist deterioration due to ultraviolet radiation.

PART 3 - EXECUTION

3.01 EXAMINATION

- A. Verify that joint openings are ready to receive Work and field tolerances are within the guidelines recommended by sealant manufacturer.

3.02 SURFACE PREPARATION

- A. Joints and spaces to be sealed shall be completely cleaned of all dirt, dust, mortar, oil, and other foreign materials which might adversely affect sealing Work. Where necessary, degrease with a solvent or commercial degreasing agent. Surfaces shall be thoroughly dry before application of sealants.
- B. If recommended by manufacturer, remove paint and other protective coatings from surfaces to be sealed before priming and installation of sealants.
- C. Preparation of surfaces to receive sealant shall conform to the sealant manufacturer's specifications. Provide air pressure or other methods to achieve required results. Provide masking tape to keep sealants off surfaces that will be exposed in finished Work.
- D. Etch concrete or masonry surfaces to remove excess alkalinity, unless sealant manufacturer's printed instructions indicate that alkalinity does not interfere with sealant bond and performance. Etch with 5 percent solution of muriatic acid; neutralize with dilute ammonia solution, rinse thoroughly with water and allow to dry before sealant installation.
- E. Perform preparation in accordance with ASTM C804 for solvent release sealants, and ASTM C962 for elastomeric sealants.
- F. Protect elements surrounding Work of this section from damage or disfiguration.

3.03 SEALANT APPLICATION SCHEDULE

	<u>Location</u>	<u>Type</u>	<u>Color</u>
A.	Exterior and Interior joints in horizontal surfaces of concrete; between metal and concrete masonry and mortar.	Sealant 6	To match adjacent material
B.	Exterior door, entrance and window frames. Exterior and interior vertical joints in concrete and masonry metal flashing.	Sealant 3 or 5	To match adjacent material

C.	Joints within glazed curtain wall system. Skylight framing system. Aluminum entrance system glass and glazing.	Sealant 3	Translucent or Black
D.	Interior joints in ceramic tile and at plumbing fixtures.	Sealant 4	Translucent or White
E.	Under thresholds.	Sealant 2	Black
F.	All interior joints not otherwise scheduled	Sealant 1	To Match Adjacent Surfaces
G.	Heads and sills, perimeters of frames and other openings in insulated partitions	Sealant 7	Match Adjacent Surfaces

3.04

APPLICATION

- A. Provide sealant around all openings in exterior walls, and any other locations indicated or required for structure weatherproofing and/or waterproofing.
- B. Sealants shall be installed by experienced mechanics using specified materials and proper tools. Preparatory Work (cleaning, etc.) and installation of sealant shall be as specified and in accordance with manufacturer's printed instructions and recommendations.
- C. Concrete, masonry, and other porous surfaces, and any other surfaces if recommended by manufacturer, shall be primed before installing sealants. Primer shall be installed with a brush that will reach all parts of joints to be filled with sealant.
- D. Sealants shall be stored and installed at temperatures as recommended by manufacturer. Sealants shall not be installed when they become too jelled to be discharged in a continuous flow from gun. Modification of sealants by addition of liquids, solvents, or powders is not permitted.
- E. Sealants shall be installed with guns furnished with proper size nozzles. Sufficient pressure shall be furnished to fill all voids and joints solid. In sealing around openings, include entire perimeter of each opening, unless indicated or specified otherwise. Where gun installation is impracticable, suitable hand tools shall be provided.
- F. Sealed joints shall be neatly pointed on flush surfaces with beading tool, and internal corners with a special tool. Excess material shall be cleanly removed. Sealant, where exposed, shall be free of wrinkles and uniformly smooth. Sealing shall be complete before final coats of paint are installed.

- G. Comply with sealant manufacturer's printed instructions except where more stringent requirements are indicated on Drawings or specified.
- H. Partially fill joints with joint backing material, furnishing only compatible materials, until joint depth does not exceed 1/2 inch joint width. Minimum joint width for metal to metal joints shall be 1/4 inch. Joint depth, shall be not less than 1/4 inch and not greater than 1/2 inch.
- I. Install sealant under sufficient pressure to completely fill voids. Finish exposed joints smooth, flush with surfaces or recessed as indicated. Install non-tracking sealant to concrete expansion joints subject to foot or vehicular traffic.
- J. Where joint depth prevents installation of standard bond breaker backing rod, furnish non-adhering tape covering to prevent bonding of sealant to back of joint. Under no circumstances shall sealant depth exceed 1/2 inch maximum, unless specifically indicated on Drawings.
- K. Prime porous surfaces after cleaning. Pack joints deeper than 3/4 inch with joint backing to within 3/4 inch of surface. Completely fill joints and spaces with gun applied compound, forming a neat, smooth bead.

3.05 MISCELLANEOUS WORK

- A. Sealing shall be provided wherever required to prevent light leakage as well as moisture leakage. Refer to Drawings for condition and related parts of Work.
- B. Install sealants to depths as indicated or, if not indicated, as recommended by sealant manufacturer but within following general limitations:
 - 1. For joints in concrete walks, slab and paving subject to traffic, fill joints to a depth equal to 75 percent of joint width, but not more than 3/4 inch deep or less than 3/8 inch deep, depending on joint width.
 - 2. For building joints, fill joints to a depth equal to 50 percent of joint width, but not more than 1/2 inch deep or less than 1/4 inch deep.

3.06 CLEANING

- A. Remove rubbish, debris, and waste materials and legally dispose of off the Project site.

3.07 CURING

- A. Sealants shall cure in accordance with manufacturer's printed recommendations. Do not disturb seal until completely cured.

3.08 PROTECTION

- A. Protect the Work of this section until Substantial Completion.

END OF SECTION

SECTION 08 1113

HOLLOW METAL DOOR FRAMES

PART 1 - GENERAL

1.01 SUMMARY

A. Section Includes:

1. Hollow metal door frames as indicated.

B. Related Requirements:

1. Division 01 - General Requirements.
2. Section 07 9200 - Joint Sealants.
3. Section 08 1416 - Flush Wood Doors.
4. Section 09 9000 - Painting and Coating.

1.02 DESIGN REQUIREMENTS

- A. Door-and-frame assemblies or frames shall include reinforcing and provisions for hardware as shown and specified. Drawings indicate profile and general details of steel frame fabrication and installation.

1.03 SUBMITTALS

- A. Shop Drawings: Submit composite Shop Drawings indicating detailed relationships of installation including Work of adjacent construction, finish hardware, security, fire and life safety devices, glazing, sealing, and requirements for field installation. Include elevations of each hollow metal door type, details of each frame type, location schedule of doors and frames indicating same reference for details and openings as indicated on Drawings, conditions of openings of various wall sections and materials, typical and special details of construction, methods of assembling sections, location and installation requirements for hardware, material size, shape, and thickness, and joints and connections.
- B. Product Data: Submit manufacturer's Product Data indicating composition and construction for each fabricated item including louvers, coatings, finishes, and other components demonstrating compliance with referenced standards.
- C. Certification: Submit certification of compliance with referenced standards and specified criteria, including but not limited to fire ratings in accordance with UL 10C,

Physical Endurance in accordance with ANSI A250.4 and Prime Paint performance in accordance with ANSI A250.10.

D. Samples:

1. Hollow Metal Frame: Corner section of typical exterior and interior frame, of sufficient composite size to illustrate corner joint construction, hinge reinforcement, closer re-enforcement, floor anchor, dust cover, and jamb anchors, and showing galvanizing and prime coat finishes.

1.04 QUALITY ASSURANCE

- A. Manufacturer Qualifications: Minimum documented experience of more than five years in work of this section.
- B. Installer Qualifications: Minimum documented experience of more than five years in work of this section
- C. Coordinate with hardware supplier for fabrication of doors and frames to receive hardware items.
- D. Coordinate with intrusion alarm supplier for fabrication of doors and frames to receive intrusion detection devices.
- E. References: Work shall comply with physical and performance requirements of following standards, including standards referenced in them, except for more stringent provisions specified herein or required by regulatory agencies:
 1. ANSI/SDI A250.8, SDI 100 Recommended Specifications for Standard Steel Doors and Frames.
 2. ANSI/NFPA 252, Fire Tests of Door Assemblies.
 3. ANSI/UL 10B, Fire Tests of Door Assemblies.
 4. ANSI/UL 10C, Positive-Pressure Fire Tests of Door Assemblies.
 5. ANSI/NFPA 80, Fire Doors and Fire Windows
 6. HMMA, Guide Specifications for Commercial Hollow Metal Doors & Frames (Standard of National Association of Architectural Metal Manufacturers).
 7. ANSI/SDI A250.4, Test Procedure and Acceptance Criteria for Physical Endurance for Steel Doors, Frames, Frame Anchors and Hardware Reinforcings.
 8. ANSI A250.10, Test Procedure and Acceptance Criteria for Prime Painted Steel Doors and Frames.

9. ANSI A250.6, Recommended Practice for Hardware Reinforcing on Standard Steel Doors and Frames.

F. Standards of Fabrication and Installation:

1. Finished Work shall be of uniform profile, accurately fabricated, rigid and strong, square and true, neat in appearance, smooth and free from dents, waves, warps, buckles, open joints, tool marks and/or other defects.
2. Steel sheet shall be clean with smooth surfaces free of scale, pitting or other defects.
3. Construction joints shall be flush, tight and welded their full length, ground flush and smooth on exposed surfaces.
4. Frame and door reinforcing and hardware provisions shall be performed in fabrication shop. Provide cuts, welds, and other fabrications before galvanizing or shop priming.
5. Lines and molded members shall be straight and true with angles as sharp as practical for thickness involved, surfaces flat, and fastenings concealed.

1.05 DELIVERY, STORAGE AND HANDLING

- A. Frames: Before shipment, install temporary spreaders at bottom of bucks and do not remove until frames are installed.
- B. Inspect hollow metal Work upon delivery for damage. Remove and replace damaged items with new Work as required.
- C. Store door frames in an upright position at Project Site under cover and protected from weather-related elements. Store units on minimum 4-inch high wood blocking with ½ inch air spaces between stacked doors to provide circulation. Do not store doors and frames under plastic or canvas shelters that can create a humidity chamber. If shipping packaging becomes wet, immediately remove packaging.

1.06 WARRANTY

- A. Manufacturer shall provide a five year material warranty.
- B. Installer shall provide a two year fabrication and installation warranty.

PART 2 - PRODUCTS

2.01 MANUFACTURERS

- A. Door frames shall be products of a single manufacturer.
- B. The following are acceptable manufacturers, as are others that can demonstrate their products are equivalent in quality, performance and compliance with these specifications.
 - 1. Security Metal Products Corp.
 - 2. Curries Manufacturing, Inc.
 - 3. Steelcraft.
 - 4. Amweld Metal Doors and Frames.
 - 5. Stiles Custom Metal, Inc.
 - 6. Door Components Inc.
 - 7. CECO Door.
 - 8. Equal.
- C. Materials, fabrication and installation must comply with requirements of standards referenced in Section 1.04, Quality Assurance.

2.02 MATERIALS

- A. Steel:
 - 1. Interior Door Frames: Cold-Rolled Steel Sheets, Commercial Quality Carbon Steel, ASTM A1008.
 - 2. Steel shall be free of scale, pitting, coil breaks or other surface blemishes, and free of buckles, waves or other defects.
 - 3. Steel thicknesses expressed in steel gages (MSG) is for reference only. Actual steel thicknesses must meet minimum requirements of ASTM standards and as described in ANSI/SDI A250.8.
- B. Supports and Anchors: Fabricate from a minimum 16 gauge galvanized sheet steel unless noted otherwise.
- C. Fasteners: Provide as shown on Drawings and to suit conditions of secure installations. Furnish 304 Grade stainless steel types at exterior doors.
- D. Shop Paint:
 - 1. Conform to Steel Structures Painting Council (SSPC) for steel components.

2. Pretreatment/priming coatings shall be compatible with Project site finish painting system in accordance with Section 09 9000.

2.03 FABRICATION GENERAL

- A. General: Fabricate hollow metal units to be rigid, neat in appearance, and free from defects including warp or buckle.
 1. Accurately form metal to required sizes and profiles. Fit and assemble units in manufacturer's plant. Where practical, factory or shop fit and assemble units for shipment.
 2. Weld joints continuously; grind, dress, and make smooth, flush, and invisible. Filler to conceal manufacturing defects or damage is not permitted.
 3. Corner Joints: Finish corner joints by mitering, or coping and butting, or a combination of both. Trim and backbend shall be continuous around corner.
 4. Continuously weld joints for full depth and width of frame, trim, and backbends.
 5. Clearances for Fire-Rated Doors: As required by NFPA 80.

2.04 FRAMES

- A. General: Provide fully welded steel frames with integral stops and trim for doors, transoms, sidelights, borrowed lights, and other openings, and with details indicated for type and profile. Use concealed fastenings, unless otherwise indicated.
- B. Metal Thickness of Frames (minimum):
 1. Interior hollow metal frames up to 4-foot wide 16 gage
 2. Interior hollow metal frames wider than 4-foot 14 gage
 3. Exterior hollow metal frames 14 gage
 4. Borrowed lights up to 4-foot wide 16 gage
- C. Supports and Anchors: Fabricate from at least 16-gage, galvanized steel sheet. Frame anchors shall comply with fire rated label requirements of opening.
 1. Floor Anchors:
 - a. Minimum thickness: 12 gage galvanized steel sheet or bent steel plate, securely fastened inside each jamb, with two holes in anchor at each jamb for 3/8 inch floor anchorage fasteners. For preframed wood stud

walls provide and additional wood stud anchor located as close to the bottom of the jamb as is practical.

- b. Where required at sloping and uneven floor conditions, or to coordinate adjustments for trim alignments, provide adjustable floor anchors, providing at least 2-inch height adjustments.

2. Jamb Anchors:

- a. Locate anchors near top and bottom and at intermediate points not to exceed 24 inches on center. Provide two anchors per head for openings up to 48 inches wide; over 48 inches wide provide anchors at 24 inches on center maximum.
- b. Anchors in masonry construction: Provide manufacturers standard jamb anchors. Steel wire complying with ASTM A510, 0.177 inch in diameter, may be furnished.
- c. Anchors in Stud Partitions: Provide steel anchors, 16 gage minimum sheet steel, of design to suit partition construction, securely welded inside each jamb.
- d. Through-Frame Anchors: At frames indicated to be anchored with bolts through frame, provide countersunk holes for bolts with 16 gauge minimum sheet steel stiffeners full thickness of frame, and securely welded inside each frame at each hole.

D. Inserts, Bolts, and Fasteners: Provide manufacturer's standard units. Where zinc-coated items are to be built into exterior walls, comply with ASTM A153 Class C or D as required.

E. Head Reinforcing: Refer to Detail #2 of this section. Reinforcing shall not act as lintel or load-carrying member and shall comply with fire rating requirements. Provide at frames regardless of whether a closer is called for.

F. Hardware Reinforcement and Accessories:

- 1. Butt Hinge: 7 gage minimum.
- 2. Head assemblies: Reinforced internally with, full length, 10 gage angles on each side of frame and bar at bottom of stop for closer reinforcement in frames as shown in Detail #2 of this section.
- 3. Reinforcing for other items of finish hardware shall be accomplished according to ANSI A250.6.
- 4. Plaster Guards: Provide 26 gage galvanized steel plaster guards or dust cover boxes, welded to frame, at back of finish hardware cutouts where mortar or

other materials might obstruct hardware operation and to close off interior of openings.

- G. Door Silencers: Except for exterior doors, drill and punch frames for three silencers at lock jamb of single swing doors or in double doors with astragal and one silencer per leaf in heads of doubled door frames.
- H. Where frames are installed in walls sitting on a concrete curb, provide a closure plate or extend backbends to provide closure where frame abuts concrete curb.

2.06 SHOP PRIMING

- A. Exposed and concealed metal surfaces of hollow metal doors, frames and other hollow metal Work of this Section shall be bonderized and then shop primed.
- B. Exposed surfaces of doors, frames and accessories shall be filled, sanded smooth and cleaned before painting.
- C. Exposed surfaces shall be shop primed after assembly.

PART 3 - EXECUTION

3.01 FRAME INSTALLATION

- A. Install steel frames accurately in location, perfect alignment, plumb, straight and true. Brace frames to prevent displacement.
- B. Anchor frames in concrete and concrete unit masonry with galvanized anchor bolts; 3/8 inch diameter, counter-sunk at 24 inches on center at head and jamb unless noted otherwise.
- C. Anchor frames in steel and wood frame partitions with manufacturer recommended anchors.
- D. Install frame at fire rated openings in accordance with NFPA Standard No. 80.
- E. Furnish filler for anchor attachment screws, and sand smooth.

3.03 PRIME COAT TOUCH-UP

- A. Immediately after installation, remove rust, repair damaged surfaces to new condition, sand smooth, and install touch-up primer.

3.04 CLEAN UP

- A. Remove rubbish, debris and waste materials and legally dispose of off Project site.

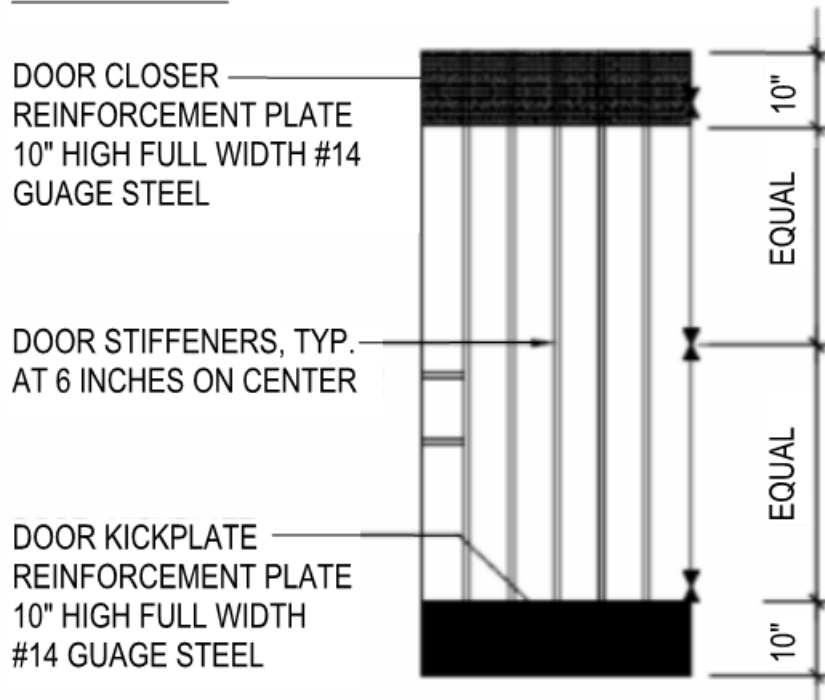
3.05 PROTECTION

- A. Protect Work of this section until Substantial Completion.

END OF SECTION

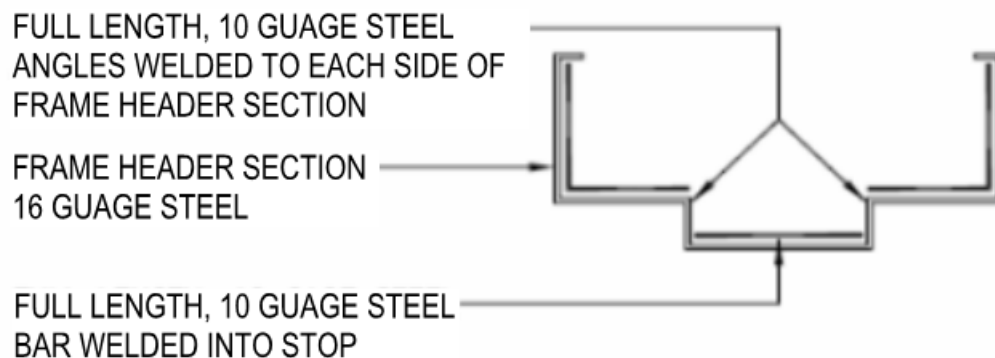
DETAIL #1 - DOOR REINFORCEMENT

ELEVATION



DETAIL #2 - DOOR HARDWARE REINFORCEMENT

DOOR CLOSER REINFORCEMENT FOR ALL STEEL DOOR FRAMES



DETAIL # 3 – CONCRETE WALL CONDITION

DETAIL FOR EXTERIOR DOOR WHERE RAIN DRIP IS REQUIRED.
EXTERIOR SIDE WITH 22 GAGE GLAVANIZED SHEET METAL OR PAINT LOCK
RAIN DRIP WELDED IN PLACE.

SPOT WELD TO FRAME AT 3 INCHES ON CENTER,
WITH WELDS WITHIN ONE INCH OF EACH END.

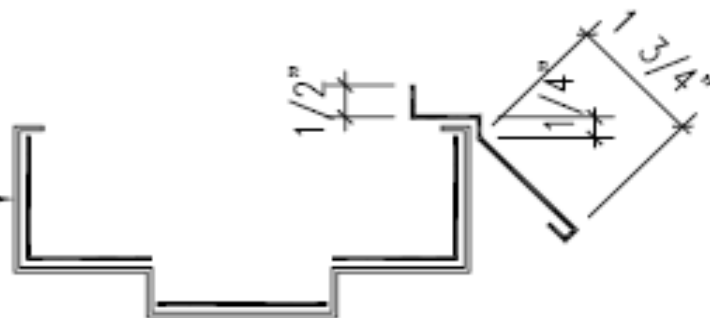
FRAME HEADER SECTION
16 GAGE STEEL

DETAIL # 3A – PLASTER WALL CONDITION

DETAIL FOR EXTERIOR DOOR WHERE RAIN DRIP IS REQUIRED.
EXTERIOR SIDE WITH 22 GAGE GLAVANIZED SHEET METAL OR PAINT LOCK
RAIN DRIP WELDED IN PLACE.

SPOT WELD TO FRAME AT 3 INCHES ON CENTER,
WITH WELDS WITHIN ONE INCH OF EACH END.

FRAME HEADER SECTION
16 GAGE STEEL



SECTION 08 1416
FLUSH WOOD DOORS

PART 1 - GENERAL

1.01 SUMMARY

- A. Section Includes:
 - 1. Wood doors.
- B. Related Requirements:
 - 1. Division 01 - General Requirements.
 - 2. Section 08 1113 - Hollow Metal Door Frames
 - 3. Section 09 9000 - Painting and Coating.

1.02 DESIGN REQUIREMENTS

- A. Drawings indicate sizes, locations and general details of wood door construction and installation.
- B. Regulatory Requirements:
 - 1. Fire rated doors shall be listed by a nationally recognized testing and certification agency in accordance with local building codes and acceptable to the authorities having jurisdiction. The listed doors shall meet or exceed the requirements of UL10B, NFPA 252 and NFPA 80. All door requiring fire-rating shall carry either a UL or ITS (Intertek Testing Services-Warnock Hersey) label.
 - 2. ASTM E2074 – Standard Test Method for Fire Tests of Door Assemblies, Including Positive Pressure on Side-Hinged and Pivoted Swinging Door Assemblies.

1.03 SUBMITTALS

- A. Shop Drawings: Submit schedules, plans, elevations and details indicating door construction details, opening identification symbols, sizes, door type and grade, fire classification, swing, light and louver cutout size and locations, and undercuts.
- B. Product Data: Submit manufacturers technical data for each specified door type, including details of wood species, design and construction, factory finishing specifications and installation instructions.
- C. Construction Samples: Submit samples of not less than 6-inch by 6-inch for each type of door to be furnished, showing face, edge and core construction.

- D. Color/finish Samples: Submit samples of not less than 4-inch by 6-inch on representative door finish and samples of 3-inch by 8-inch for the exposed edges. Each sample shall bear a label identifying the job name, Architect, Contractor and the Woodwork Institute finish system number.
- E. Certificates:
 - 1. Submit Certificate that solid core doors comply with all requirements of ANSI/WDMA I.S. 1-A.
 - 2. Submit certification that fire rated doors comply with CBC Section 715 or UL 10B.

1.04 QUALITY ASSURANCE

- A. Wood doors construction, manufacture, and fabrication shall conform to ANSI/WDMA I.S. 1-A, custom grade, extra heavy duty grade including the latest revisions, and special requirements specified.
- B. Doors shall be fabricated, hardware factory fitted and machined, and factory finished, unless noted otherwise.
- C. Wood Door Finishes shall comply with the North American Architectural Woodwork Standards (NAAWS) latest edition.
- D. Doors shall be products of one manufacturer.
- E. Door modifications are not permitted, unless reviewed by the OAR.

1.05 DELIVERY, STORAGE AND HANDLING

- A. Deliver materials in manufacturers original, unopened, undamaged containers with identification labels intact.
- B. Deliver doors to the Project site only after building has been provided with design temperature and humidity.
- C. Store and handle in accordance with ANSI/WDMA I.S.1-A. Store doors protected from exposure to harmful conditions and at temperature and humidity conditions recommended by the manufacturer.

1.06 PROJECT CONDITIONS

- A. Do not install doors until building is enclosed and ambient conditions are within the temperature and humidity range to be expected during occupancy.

1.07 WARRANTY

- A. Manufacturer shall provide a two year material warranty for exterior doors.
- B. Manufacturer shall provide a life time material warranty for interior doors.

- C. Installer shall provide a two year fabrication and installation warranty for all doors.

PART 2 - PRODUCTS

2.01 MANUFACTURERS

- A. Provide products manufactured by one of the following:

1. Algoma Hardwood Inc.
2. Brentwood Manufacturing.
3. Eggers Industries.
4. Mohawk Flush Door, Inc
5. VT Industries, Inc.
6. Western Oregon Door.
7. Equal.

2.02 DOOR CONSTRUCTION

- A. Interior Flush Doors:

1. Interior doors shall be furnished as follows:
 - a. Opaque Finished (Painted): Custom grade. Solid wood core, 5 ply, MDO hardboard face, fully bonded to core.
2. Edge strips: Kiln-dried birch, maple or other material as indicated.
 - a. Opaque Finished Doors: Close grain hardwood.
3. Full stile edge strip shall be not less than 1 ½ inches wide, two ply stile. Stiles shall be fully bonded to the core. The outer face stile shall be full length ¾ inch birch or maple. The inner back stile shall be ¾ inch of similar species which may have two finger joints fully bonded to core.
4. Top and bottom edge rails shall be full length and may be of glued up stock of similar species as edge strip, white fir or douglas fir, minimum density 24.33 pounds or higher per cubic foot. Top rail shall be minimum of 2 inches. Bottom rail shall be minimum of 5 inches fully bonded to core.
5. Crossbanding: Doors shall be furnished with full width crossbanding of properly dried hardwood or engineered fiber composite material, 1/16 inch thick, with a density of 52 pounds or higher per cubic foot.
6. Opaque Finished Doors: Custom grade medium density overlay hardboard.

7. Adhesive and Bonding: Bonding between veneer plies of wood face panel, and between door faces, frame and core unit shall be fabricated with type I or II waterproof adhesives for interior doors.
8. Openings: Openings for lights, louvers and grilles shall be performed by the manufacturer, or in a certified door service mill in accordance with manufacturer's details, and in compliance with testing agency requirements.
9. Vision Panels: Vision panels in fire labeled doors shall be framed with FGS-75 Fire Glass Stop by Anemostat, Air Louvers Inc. Model VLF, or equal and shall be State Fire Marshall listed. Frame shall be supplied with manufacturer's standard baked-on enamel finish. Install with tamperproof-head through bolts. Existing door vision panels may be reused if not damaged.

B. Fire Rated Doors:

1. Fire doors must meet the requirements of recognized fire door tests and bear certifying labels of an approved independent testing agency.
2. With exception to the requirements that would adversely affect the fire rating, rated doors shall meet the specifications listed in this section.
3. Door shall be constructed that when installed as an assembly and tested it will pass ASTM E2074 "Standard Test Method for Fire Test of Door Assemblies Including Positive Pressure Testing of Side-Hinged and Pivoted Swinging Door Assemblies," and can be rated as required.
4. Reinforcement Blocking: Provide hardware reinforcement blocking of size as required to secure specified hardware. Reinforcement blocking shall be in compliance with the manufacturer's labeling requirements and shall not be of mineral material.

2.03 FINISHING:

A. JOB SITE FINISHING:

1. Doors indicated to be job site finished shall be factory back primed.
 - a. Doors Scheduled for Opaque Paint finish: Prime with one coat of wood primer indicated on Section 09 9000 - Painting and Coating.
2. Door Finish: Per Section 09 9000 - Painting and Coating.

PART 3 - EXECUTION

3.01 INSTALLATION

- A. Install Work of this section as specified in ANSI/WDMA I.S. 1-A. Install fire doors in accordance with NFPA 80.

- B. Provide each door accurately cut, trimmed, and fitted to its frame and hardware. Clearance at lock and hanging stile and at top shall not exceed 1/8 inch, and bottom shall not exceed 1/4 inch except where otherwise indicated. Arises shall be rounded to a 1/16 inch radius, and lock rail edges shall be slightly beveled. Screws for hardware shall not be driven but screwed into pre-drilled holes.
- C. Doors shall operate freely, but not loosely, without sticking or binding, without hinge-bind conditions and with hardware properly adjusted and functioning.
- D. Doors shall receive existing hardware except for new kickplate on each side: Trimco K0050 12" high x 36" wide and 613 finish.

3.02 CLEAN UP

- A. Remove rubbish, waste and debris and legally dispose of off the Project site.

3.03 PROTECTION

- A. Protect the Work of this section until Substantial Completion.

END OF SECTION

SECTION 09 2216
NON-STRUCTURAL METAL FRAMING

PART 1 - GENERAL

1.01 SUMMARY

A. Section Includes:

1. Non-structural metal framing.

B. Related Requirements:

1. Division 01 - General Requirements.
2. Section 07 8413 Penetration Firestopping.
3. Section 07 9200 – Joint Sealants.
4. Section 09 2900 - Gypsum Board.

1.02 PROJECT REQUIREMENTS

A. Regulatory Requirements: Comply with DSA and CBC requirements.

B. Design Requirements:

1. Metal Studs: Studs for interior partitions shall be roll-formed channel or C-shapes.
2. Track: Stud track for floor and ceiling anchorage shall be channel configuration, sized to fit studs. Galvanized steel as manufactured for installation with specified metal studs.
3. Design: Design is based on minimum 5 pounds per square foot load applied perpendicular to walls. Deflection shall not exceed 1/240 under design load.

1.03 SUBMITTALS

- A. Shop Drawings: Submit drawings showing framing, connection details, accessories and anchorage. Indicate location of assemblies and size and spacing of framing components.
- B. Product Data: Submit manufacturer's catalog data for each item proposed for installation.
- C. Certificates: Furnish manufacturer's certification that materials meet or exceed Specification requirements.

1.04 DEFINITIONS

- A. System: The application of the above products in their entirety as tested. There can be no intermixing of components unless specifically outlined in the appropriate test reports.

1.05 QUALITY ASSURANCE

- A. Coordinate with related Work to provide blocking for items mounted on finished surfaces and to provide allowances for pipes and other items inside partitions and walls.
- B. Comply with following as a minimum requirement:
 - 1. American Welding Society (AWS): Structural Welding Code Steel (D1.1); and Structural Welding Code Sheet Steel (D1.3).
 - 2. ASTM Standards:
 - a. ASTM A641 – Standard Specification for Zinc Coated (Galvanized) Carbon Steel Wire.
 - b. ASTM A653 – Standard Specification for Steel Sheet, Zinc-Coated (Galvanized) or Zinc Iron Alloy-Coated (Galvannealed) by Hot-Dip Process.
 - c. ASTM A1003 –Standard Specification for Steel Sheet, Carbon, Metallic- and Nonmetallic-Coated for Cold-Formed Framing Members.
 - d. ASTM C645 – Standard Specification for Non-Structural Steel Framing Members.
 - e. ASTM C754 - Standard Specification for Installation of Steel Framing Members to Receive Screw-Attached Gypsum Panel Products.
 - f. ASTM C954 - Standard Specification for Steel Drill Screws for the Application of Gypsum Panel Products or Metal Plaster Bases to Steel Studs from 0.033 in. (0.84 mm) to 0.112 in. (2.84 mm) in Thickness.
 - g. ASTM E119 – Standard Test Methods for Fire Tests of Building Construction and Materials.
 - h. ASTM E814 - Standard Test Methods for Fire Tests of Penetration Firestop Systems.
 - 3. Underwriter Laboratories (UL):
 - a. UL 94 – Classification and Flame-Retardant Thermoplastics.
 - b. UL 2079 - Standard for Safety Tests for Fire Resistance of Building Joint Systems.

4. American Iron and Steel Institute:
 - a. North American Standard for Cold Formed Steel Framing – Nonstructural Members.
5. Military Specifications (MIL-P):
 - a. Paint High Zinc Dust Content, Galvanizing Repair
- C. Tolerances: Install walls and partitions on straight lines, plumb, free of twists or other defects, and contacting a 10-foot straightedge for its entire length at any location within a 1/8 inch tolerance. Install horizontal framing level within a tolerance of 1/8 inch in 12 feet in any direction.
- D. Manufacturers shall be members of the Steel Framing Industry Association (SFIA) or the Steel Stud Manufacturers Association (SSMA).

1.06 DELIVERY, STORAGE AND HANDLING

- A. Materials shall be delivered in their original unopened packages and stored protected from damage. Do not store material directly on grade. Provide adequate support to prevent bowing of material prior to installation.
- B. Store welding electrodes in accordance with AWS D12.1.

PART 2 – PRODUCTS

2.01 ACCEPTABLE MANUFACTURERS

- A. Non-structural metal framing:
 1. ClarkDietrich.
 2. Marino/Ware.
 3. Cemco.
 4. Equal.

2.02 MATERIALS

- A. Light Gage Metal Framing:
 1. Metal framing shall be formed from corrosion resistant-steel conforming to requirements of ASTM A653, 33 ksi minimum.
 2. Metal framing shall be manufactured in conformance to AISI S220 and zinc coated to G60 per ASTM C645/AISI S220.
 3. Install metal framing according to ASTM C754.

- B. Studs: SFIA , Intertek CCRR - 0204SSMA, ICC-ES ER-3064, minimum yield 33 ksi, hot-dipped galvanized sheet steel, G-60, C Stud type, punched web (except tracks and joists), C-shaped, sizes required to conform to details and scheduled wall thicknesses. Studs shall be rolled from new steel sheet and shall not be produced from re-rolled steel. Stud flanges shall not be less than 1 1/4-inch wide; track legs, not less than 1 1/4-inch wide.
1. Wall Framing and Furring for Plaster and Mortar Beds: Studs and tracks shall be 18 gage (43 mil) minimum, unless otherwise indicated.
 2. Wall Framing and Furring for Gypsum Wallboard: Studs and tracks shall be 20 gage (30 mils) 33 ksi unless otherwise indicated.
 3. Load-Bearing Studs: Studs and members 18 gage (43 mil) and thicker shall conform to requirements of Section 05 4100 - Structural Metal Stud Framing.
 4. Stud gages indicated on Drawings or specified are the minimum. Where required stud height and/or loads exceed code requirements or manufacturer's recommendations, provide heavier gage studs and/or decrease stud spacing as necessary to conform to code requirements.

PART 3 - EXECUTION

3.01 EXAMINATION

- A. Verify that overhead or concealed Work is completed, tested, inspected, and finished as required before starting Work of this section.

3.02 INSTALLATION

A. Walls and Partitions:

1. Fasten floor runners for exterior walls and interior partitions to concrete slab with required power driven fasteners. Spacing of fasteners not to exceed 24 inches on center. Fasten ceiling runners to structure as by top track system manufacturer.
2. Sound insulated walls and partitions: Embed floor runner tracks in two beads of acoustical sealant or two runs of compressible tape seal. Install top track nested into slotted track system, in same manner for full height of walls. Where wall ends abutting concrete, masonry, or steel set end studs in two beads of acoustical sealant or two tape seals and secure at 4-foot centers vertically.
3. Space studs not over 16 inch on center unless indicated otherwise. Studs shall be located approximately 2 inches from door frame jambs, abutting partitions and partition corners, except those providing support for door and window openings.

4. Furnish and install manufacturer's standard floor track. Fasten track to floor by means of 1/4 inch by 1 1/4-inch Star "Dryvin" hammer drive anchors or 3/16 inch by 1 inch round head, "Rawl-Drives" one-piece expansion bolts spaced not to exceed 3 feet, and installed in drilled holes in slab, or to wood joist with nails as indicated. Track may be fastened to concrete floor slabs with, power-driven fasteners.
5. Studs shall be seated squarely in track with stud web and flanges abutting track web, plumbed and securely fastened with sheet metal screws, to flanges or web of both floor and top tracks. Provide 4 screws per stud.
6. Where there is no suspended ceiling, tops of stud walls shall be provided with track and shoes and be fastened as specified for floors. Welding of studs to ceiling track will not be permitted except where bearing studs are installed.
7. Over metal doorframes, install a cut-to-length section of runner track, with flanges slit and web-bent to allow flanges to overlap adjacent vertical studs, and securely fasten to studs. At doorjambs, extend studs continuous to structure above.
8. Bridging, or horizontal bracing of 1 1/2-inch, cold-rolled channels shall be fastened in a manner to prevent stud rotation. Bridging shall be furnished as follows: walls up to 10 feet high, one row at mid-height; walls exceeding 10 feet high, bridging or bracing rows spaced not to exceed 5 feet on center.
9. Wind bracing shall be fastened where indicated on Drawings. Minimum size of strap shall be as indicated on Drawings. Track where strap terminates shall be anchored as indicated on Drawings.

3.04 CLEANING

- A. Remove debris, rubbish, and waste material and legally dispose of off Project site.

3.03 PROTECTION

- A. Protect Work of this section until Substantial Completion.

END OF SECTION

SECTION 09 2900

GYPSUM BOARD

PART 1 - GENERAL

1.01 SUMMARY

- A. Section Includes:
 - 1. Gypsum board wall and ceiling systems.
- B. Related Requirements:
 - 1. Division 01 - General Requirements.
 - 2. Section 07 9200 - Joint Sealants.
 - 3. Section 09 2216 - Non-Structural Metal Framing.
 - 4. 09 9000 Painting Coating.

1.02 PROJECT REQUIREMENTS

- A. Design Requirements: Provide systems capable of resisting deflection as required by CBC and authorities having jurisdiction.
- B. Regulatory Requirements: Comply with CBC requirements for design and installation.

1.03 SUBMITTALS

- A. Shop Drawings: Submit Shop Drawings indicating complete suspension system including connections, anchorage, and trim features.
- B. Material Samples: Submit 18 inch by 18 inch Samples of the texture coat of gypsum board panels with edges taped.
- C. Product Data: Submit manufacturer's catalog data for each product proposed for installation.

1.04 QUALITY ASSURANCE

- A. Comply with following as a minimum requirement:
 - 1. ASTM C475 – Standard Specification for Joint Compound and Joint Tape for finishing Gypsum Board.
 - 2. ASTM C840 - Standard Specification for Application and Finishing of Gypsum Board.
 - 3. ASTM C919 - Standard Practice for Use of Sealants in Acoustical Applications.

4. ASTM C1002 - Standard Specification for Steel Self-Piercing Tapping Screws for the Application of Gypsum Panel Products or Metal Plaster Bases to Wood Studs or Steel Studs.
 5. ASTM C1047 - Standard Specification for Accessories for Gypsum Wallboard and Gypsum Veneer Base.
 6. ASTM C1325 - Standard Specification for Non-Asbestos Fiber-Mat Reinforced Cementitious Backer Units.
 7. ASTM C1396 - Standard Specification for Gypsum Board.
 8. ASTM C1629 - Standard Classification for Abuse-Resistant Nondecorated Interior Gypsum Panel Products and Fiber-Reinforced Cement Panels.
 9. ASTM D3273 - Standard Test Method for Resistance to Growth of Mold on the Surface of Interior Coatings in an Environmental Chamber.
 10. ASTM D3274 – Standard Test Method for Evaluating Degree of Surface Disfigurement of Paint Films by Microbial (Fungal or Algal) Growth or Soil and Dirt Accumulation.
 11. Underwriters Laboratories (ULI) requirements and listings for fire-rated materials and products classification.
 12. GA 214 - Gypsum wallboard finish shall conform to requirements of GA 214, Application and Finishing of Gypsum Panel Products, published by the Gypsum Association, and as specified herein.
 13. GA 600 - Gypsum wallboard shall conform to requirements of GA 600 Fire Resistance Design Manual, published by the Gypsum Association.
 14. American National Standards for the Installation of Ceramic Tile.
 15. ANSI A118.9 - Specification for Cementitious Backer Units.
- B. Qualifications: Installer shall have a minimum 5 years experience in installing and finishing gypsum board.

1.05 DELIVERY, STORAGE AND HANDLING

- A. Deliver materials in original, factory sealed packages, containers or bundles bearing brand name and name of manufacturer.
- B. Materials shall be kept dry. Gypsum wallboard shall be neatly stacked flat; avoid sagging and damage to edges, ends, and surfaces.
- C. Fire-rated materials shall have fire classifications numbers attached and legible.
- D. Provide all means necessary to protect gypsum board systems before, during, and after installation.

- E. Gypsum wallboard showing any evidence of water damage shall not be installed. Gypsum wallboard showing evidence of water damage after installation shall be removed and replaced.

PART 2 – PRODUCTS

2.01 ACCEPTABLE MANUFACTURERS

- A. Georgia-Pacific.
- B. National Gypsum Co.
- C. U.S. Gypsum Co.
- D. Or equal.

2.02 MATERIALS

- A. Gypsum Board Type X (fire-resistant) or Type C or Type ULIX as required by fire rated design and acoustic requirements: 5/8 inch thick, 4-foot wide and up to 16-foot long conforming to ASTM C1396 with long edges tapered.

2.03 ACCESSORIES

- A. Metal Trim: Paper-faced metal drywall beads and trim meeting ASTM C1047, as manufactured by USG/Beadex, or equal. Trim units shall be of size and type to fit gypsum board construction and shall include corner beads, casings, edge trim and other shapes indicated and required. Provide 30 year warranty against edge cracking.
- B. Joint Compound for gypsum board products: meeting the following requirements:
 - 1. Shall conform to ASTM C475.
 - 2. In areas subject to moisture after installation such as bathrooms and locker areas use setting type joint compound.
 - 3. Interior areas not subject to moisture after installation use drying Type Joint compound.
- C. Joint Tapes for gypsum boards: Shall conform to ASTM C475.
- D. Finishing Materials: Texture coat finish material shall be manufactured by U.S. Gypsum, Hamilton, or Highland Stucco and Lime Products, Inc., or equal.
- E. Acoustical Sealant: Non-hardening, non-shrinking, for use in conjunction with gypsum board, as recommended by Board Manufacturer and conforming to ASTM C919. Sealant shall maintain fire and sound rating assembly.
- F. Fasteners:
 - 1. Self-drilling, self-tapping bugle-head drywall screws; in conformance to ASTM C1002. No. 6 Type S or S12, 1 5/8-inch long for metal framing,

2. Adhesive: as recommended by board manufacturer and in compliance to ASTM C557.

PART 3 - EXECUTION

3.01 INSTALLATION

A. Metal Trim:

1. Provide corner beads at outside corners and angles, metal casing where gypsum board terminates at uncased openings, metal edge trim where board edges abut horizontal and vertical surfaces of other construction.
2. Install trim in accordance with manufacturer's directions with appropriate joint compound. Install trim in longest practical pieces.

B. Gypsum Board:

1. Install gypsum board in conformance with ASTM C840, fire rated design, and sound rating.
2. Gypsum board shall be cut by scoring and breaking or by sawing, working from face side. Where board meets projecting surfaces it shall be scribed and neatly cut. Unless conditions require otherwise, gypsum board shall be installed first to ceilings, then to walls. End joints shall occur over a support. Install panels of maximum practical length so a minimum number of end joints occur.
3. End joints shall be staggered and joints on opposite sides of a partition shall be arranged to occur on different studs. Joint layout at openings shall be installed so no end joints will align with edges of openings.
4. Except where specified otherwise, fasteners shall be spaced not less than 3/8 inch from edges and ends of gypsum board. Do not stagger fasteners at adjoining edges and ends.
5. Install gypsum board vertically or horizontal as permitted by specific UL Design at walls. Fasten board with drywall screws spaced not to exceed 8 inches on centers around perimeter of boards and 8 inches on centers on intermediate studs. Space screws at 8 inches on centers along top and bottom runners. Screws shall be driven to provide screwhead penetration just below gypsum board surface without breaking surface paper. Where electrical outlet and switch boxes are indicated, provide adjustable attachment brackets between studs.
6. Install gypsum board to ceiling framing with long dimension at right angles to furring channels, or wood framing members, and fasten with specified drywall screws or nails spaced 6 inches to 7 inches on centers across board. Screws or nails shall be not less than 1/2 inch from side joints and 3/8 inch from butt end joints. Abutting end joints shall occur over furring channels and end joints of boards shall be staggered. Support cutouts or openings in ceilings with furring channels.

7. Install access doors, furnished under another section, in correct location, plumb, or level, flush with adjacent construction, and securely fastened to framing.

3.02 TOLERANCES

- A. System shall appear flat and monolithic with no exposed joints.

3.03 JOINT TREATMENT AND FINISHING

At completion of specified taping and finishing, install one coat of drywall primer as specified hereafter.

- B. Levels: Install tape bedding compound, tape, and finishing cement on joints in wallboard as required for specified levels of finish.
- C. Levels 5:
 1. Install joint cement and finishing cement over screw heads. Treat all inside corners with joint cement, tape, and finishing cement. Treat outside corners with corner beads and finishing cement.
 2. Provide metal casing beads at all edges of gypsum wallboard, which abut ceiling, wall, or column finish, and elsewhere as required, such as openings, offsets, etc. Install all exposed joints, trims, and attachments non-apparent following installation of paint or other finishes. If joints and fasteners are visibly apparent, correct defects as required.
 3. Seal raw edges of plumbing openings and boards that have been cut to fit with sealing compound brushed on.
 4. When entire installation is completed, correct and repair broken, dented, scratched or damaged wallboard before installation of finish materials by other trades.
 5. Install one coat of skim coat over entire surface, followed by one coat of drywall primer over entire surface prior to painting.

3.04 REQUIRED LEVELS OF FINISH

- A. Finishes shall conform to GA 214
- B. Unless otherwise indicated or specified, levels of finish required shall be as follows:
 1. Level 5: Typical throughout.

3.06 CLEAN-UP

- A. Remove rubbish, debris, and waste materials and legally dispose of off Project site.

3.07 PROTECTION

- A. Protect Work of this section until Substantial Completion.

END OF SECTION

SECTION 09 6513

RUBBER BASE

PART 1 - GENERAL

1.01 SUMMARY

A. Section Includes:

1. Topset coved rubber base for installation with surface flooring.

B. Related Requirements:

1. Division 01 - General Requirements.

1.02 SUBMITTALS

- A. Product Data: Submit manufacturer's published technical data describing materials, construction and recommended installation instructions. Submit technical data and installation instructions for each adhesive material.
- B. Maintenance Instructions: Submit manufacturer's recommendations for maintenance, care and cleaning of base.
- C. Samples: Submit Samples of topset base in each available color. Following color selections, submit Samples, not less than 12 inches long of each selected color and type. Submit pint cans of each type adhesive.
- D. Maintenance Materials: Before Substantial Completion, deliver at least 50 lineal feet and five outside corner units of each color of rubber base installed. Deliver the materials in unopened factory containers or in sealed cartons with labels identifying the contents, matching installed materials. Include unopened cans of adhesives adequate to install the maintenance materials.

1.03 QUALITY ASSURANCE

- A. Qualifications of Installer: Minimum five years experience in successfully installing the same or similar flooring materials.
- B. Comply with the following as a minimum requirement:
 1. ASTM E84: Standard Test Method for Surface Burning Characteristics of Building Materials.
 2. ASTM F1861: Standard Specification for Resilient Wall Base.
 3. Comply with current CHPS requirements, www.chps.net.

4. Each selected color and configuration shall be from same dye lot and color.

1.04 DELIVERY, STORAGE AND HANDLING

- A. Materials shall be delivered to the Project site in original unopened manufacturer's packaging clearly labeled with manufacturer's name. Store materials at room temperature, but not less than 70 degrees F, for a minimum of 48 hours before installation, unless otherwise indicated in manufacturer's printed instructions.

1.05 PROJECT CONDITIONS

- A. Ventilation and Temperature: Verify areas that are to receive rubber base are ventilated to remove fumes from installation materials, and areas are within temperature range recommended by the various material manufactures for site installation conditions.

1.06 WARRANTY

- A. Manufacturer shall provide a five year material warranty.
- B. Installer shall provide a two year fabrication and installation warranty.

PART 2 - PRODUCTS

2.01 ACCEPTABLE MANUFACTURERS

- A. Mannington/Burke Wall Base.
- B. Roppe, Pinnacle Rubber Base.
- C. Flexco Company, Wallflower Premium Rubber Wall Base.
- D. Equal.

2.02 MATERIALS

- A. Rubber base: Conform to ASTM F1861; Group 1, solid (homogeneous); Type 1, TS, (thermoset) vulcanized rubber, Style B (coved), 4-inch high unless otherwise indicated, integral colors as selected, non-shrinking, 1/8 inch thick, with matching molded outside corners.
- B. Base Adhesive: Water based, low odor type, as recommended by manufacturer of rubber base.

PART 3 - EXECUTION

3.01 COORDINATION

- A. Coordinate the Work of this section with other sections to provide a level, smooth and clean finish surfaces to receive rubber base.

3.02 EXAMINATION

- A. Field verify dimensions and other conditions affecting the Work of this section before commencing the Work of this section.
- B. Before Work is started, examine surfaces that are to receive rubber base. Deficiencies shall be corrected before starting the Work of this section.

3.03 PREPARATION

- A. Do not start preparation until adjacent concrete floor slabs are at least 90 days old and finish flooring is installed.
- B. Install rubber base when ambient temperature is 70 degrees F. or higher.

3.04 INSTALLATION

- A. Install topset base at:
 - 1. Hard floors, including resilient flooring, concrete and wood, carpet tile and other soft floors.
 - 2. Along cabinetry base and where flooring extends into open cabinets.
- B. Install all wall base with pre-molded outside corners. Clean and prep existing wall and apply adhesive to the wall or back of base. Ensure that not less than 18-inch-long filler or end pieces are not installed. Roll base to ensure that the top of the base installed is tight against the wall and toe is tight against the floor, all end joints to be tight with no gaps. Install matching factory pre-molded outside corners at all offsets. Should pre-molded outside corners become unavailable and confirmed, corners are to be wrapped tight by slightly gouging the back of the Base and apply adhesive at gauge. Wrap base around the corner, Push base down at the corner to form a consistent toe, ensuring that it is snug to the floor on both sides of the corner, All Inside corners shall be scribed fit tight with no gaps at the top or bottom of the base. Wrapped inside corners are not acceptable.
- C. Use of adhesive gun is prohibited. Apply adhesive directly to substrate using the appropriate notched trowel or spreader according to manufacturer's instructions. Maintain 1/8 inch gap from top of base to prevent adhesive oozing onto adjacent surfaces.
- D. Base and outside corners shall be rolled with a seam roller before adhesive sets.

3.05 CLEANING

- A. Maintain surfaces of base clean as installation progresses. Clean rubber base when sufficiently seated and remove foreign substances.
- B. Clean adjacent surfaces of adhesive or other defacement. Replace damaged and/or defective Work to the specified condition.

3.06 CLEAN UP

- A. Remove rubbish, debris and waste materials and legally dispose of off the Project site.

3.07 PROTECTION

- A. Protect the Work of this section until Substantial Completion.

END OF SECTION

SECTION 09 8100
ACOUSTICAL INSULATION

PART 1 GENERAL

1.01 SUMMARY

- A. Section Includes: Acoustical insulation and sealants.
- B. Related Requirements:
 - 1. Division 01 - General Requirements.
 - 3. Section 09 2216 - Non-Structural Metal Framing.

1.02 SUBMITTALS

- A. Product Data:
 - 1. Provide manufacturer's printed Product Data for each product.
 - 2. Provide manufacturer's printed installation instructions.

1.03 QUALITY ASSURANCE

- A. Fire Ratings: Comply with fire-resistance and flammability ratings specified.
- B. Acoustic Performance: Acoustic Insulation shall be tested in accordance to ASTM C423, Standard Test Method for Sound Absorption and Sound Absorption Coefficients by the Reverberation Room Method, with Type A (#4) mounting.

1.04 PRODUCT DELIVERY, STORAGE, AND HANDLING

- A. Protect insulation from physical damage and from becoming wet or soiled.
- B. Comply with manufacturer's recommendations for handling, storage and protection during installation.

PART 2 PRODUCTS

2.01 ACOUSTICAL INSULATION

- A. Unfaced Mineral/Glass Fiber Blanket/Batt Acoustical Insulation: Acoustical insulation produced by combining mineral/glass fibers with thermosetting resins to comply with ASTM C665, Type I.

1. Surface Burning Characteristics: Maximum flame spread and smoke developed values of 25 and 50 when tested in accordance with ASTM E84.
2. Manufacturers: Johns Manville "Sound Control Batts", Owens Corning "Sound Attenuation Batts", or equal.
3. Thickness: 3-inch unless otherwise indicated.

2.02 ACOUSTICAL JOINT SEALANTS

- A. Acoustical Sealant for Concealed Joints: Non-drying, non-hardening, non-skinning, non-staining, gunnable, synthetic rubber sealant recommended for sealing interior concealed joints to reduce transmission of airborne sound:
 1. Pecora Corp. "BA-98".
 2. Tremco Inc. "Tremco Acoustical Sealant".
 3. Hilti, Inc. "CP 506".
 4. Equal.
- B. Acoustical Sealant for Exposed Joints: Non-oxidizing, skinnable, paintable, gunnable sealant recommended for sealing interior exposed joints to reduce transmission of airborne sound.

PART 3 - EXECUTION

3.01 INSTALLATION

- A. Comply with manufacturer's instructions for installation conditions.
- B. Do not install insulation until building is sufficiently enclosed or protected against absorption of moisture by the insulation, and do not install insulation unless supporting framing and construction is in a thoroughly dry condition.
- C. Install snugly between framing members with ends snugly fitted between units and against adjacent construction.
- D. Carefully cut and fit insulation around pipes, conduit, and other obstructions and penetrations.
- E. Where door and window frames occur in framing; cut additional strips of insulation and hand-pack as required to fill voids in and around such frames.
- F. Acoustical Sealant Application Standard: Comply with recommendations of ASTM C919 for use of joint sealants in acoustical applications as applicable to

materials, applications and conditions indicated. Install sealants in accordance with manufacturer's instructions.

3.02 CLEANUP

- A. Remove rubbish, debris and waste materials and legally dispose off of Project site.

3.03 PROTECTION

- A. Protect the Work of this section until Substantial Completion.

END OF SECTION

SECTION 09 9000
PAINTING AND COATING

PART 1 - GENERAL

1.01 SUMMARY

- A. Section Includes:
 - 1. Interior painting.
- B. Following items shall not be painted:
 - 1. Hardboard covering on tops and backs of counters and benches.
 - 2. Brass, bronze, aluminum, lead, stainless steel and chrome or nickel-plated surfaces.

1.02 REGULATORY REQUIREMENTS

- A. Paint materials shall comply with the Food and Drug Administration's (F.D.A.) Lead Law and the current rules and regulations of local, state and federal agencies governing the use of paint materials.

1.03 SUBMITTALS

- A. List of Materials: Before submittal of samples, submit a complete list of proposed paint materials, identifying each material by distributor's name, manufacturer's name, product name and number, including primers, thinners, and coloring agents, together with manufacturers' catalog data fully describing each material as to contents, recommended installation, and preparation methods. Identify surfaces to receive various paint materials.
- B. Material Samples: Submit manufacturer's standard colors samples for each type of paint specified. Once colors have been selected, submit Samples of each color selected for each type of paint accordingly:
 - 1. Samples of Paint and Enamel must be submitted on standard 8 ½" x 11" Leneta Opacity-Display Charts. Each display chart shall have the color in full coverage. The sample shall be prepared from the material to be installed on the Work. Identify the school on which the paint is to be installed, the batch number, the color number, the type of material, and the name of the manufacturer.
 - 2. Materials and color samples shall be reviewed before starting any painting.

1.04 QUALITY ASSURANCE

- A. Certification of Materials: With every delivery of paint materials, the manufacturer shall provide written certification the materials comply with the requirements of this section.

- B. Coats: The number of coats specified is the minimum number. If full coverage is not obtained with the specified number of coats, install additional coats as required to provide the required finish.
- C. Install coats and undercoats for finishes in strict accordance with the recommendations of the paint manufacturer as reviewed by the Architect.
- D. Paint materials shall comply with the following as a minimum requirement:
 - 1. Materials shall be delivered to Project site in original unbroken containers bearing manufacturer's name, brand number and batch number.
 - 2. Open and mix ingredients on premises in presence of the Project Inspector.

1.05 DELIVERY, STORAGE AND HANDLING

- A. Storage and Mixing of Materials: Store materials and mix only in spaces suitable for such purposes. Maintain spaces clean and provide necessary precautions to prevent fire. Store paint containers so the manufacturer's labels are clearly displayed.

1.06 SITE CONDITIONS

- A. Temperature: Do not install exterior paint in damp, rainy weather or until surface has thoroughly dried from effects of such weather. Do not install paint, interior, or exterior, when temperature is below 50 degrees F, or above 90 degrees F, or dust conditions are unfavorable for installation.

1.07 WARRANTY

- A. Manufacturer shall provide a three year material warranty.
- B. Installer shall provide a three year application warranty.

1.08 MAINTENANCE

- A. Provide at least one gallon of each type, color and sheen of paint coating installed. Label containers with color designation indicated on Drawings.

PART 2 - PRODUCTS

2.01 PAINT MATERIALS

- A. Furnish the products of only one paint manufacturer unless otherwise specified or required. Primers, intermediate and finish coats of each painting system must all be the products of the same manufacturer, including thinners and coloring agents, except for materials furnished with shop prime coat by other trades.
- B. Factory mix paint materials to correct color, gloss, and consistency for installation to the maximum extent feasible.
- C. Paint materials to be minimum "Architectural Grade".

- D. Gloss degree standards shall be as follows:

HIGH GLOSS	70 and above	EGGSHELL	30 to 47
SEMI-GLOSS	48 to 69	SATIN	15 to 29

2.02 MANUFACTURERS

- A. Acceptable manufacturers, unless otherwise noted:

1. Dunn-Edwards Corporation Paints
2. Vista Paints
3. Sherwin Williams
4. ICI Paints
5. Equal.

PART 3 - EXECUTION

3.01 PREPARATION

- A. Examine surfaces to receive paint finish. Surfaces which are not properly prepared and cleaned or which are not in condition to receive the finish specified shall be corrected before prime coat is installed.
- B. New woodwork shall be thoroughly cleaned, hand sandpapered, and dusted off. Nail holes, cracks or defects in Work shall be filled. On stained woodwork, fill shall be colored to match stain. Filling shall be performed after the first coat of paint, shellac or varnish has been installed.
- C. Plaster surfaces except veneer plaster shall be allowed to dry at least 3 weeks before painting. Veneer plaster shall be allowed to dry sufficiently to receive paint as determined by moisture meter tests.
- D. Metal surfaces to be painted shall be thoroughly cleaned of rust, corrosion, oil, foreign materials, blisters, and loose paint.
- E. Do not install painting materials to wet, damp, dusty, dirty, finger marked, rough, unfinished or defective surfaces.
- F. Concrete surfaces shall be dry, cleaned of dirt and foreign materials and in proper condition to receive paint. Neutralize spots demonstrating effects of alkali.
- G. Mask off areas where necessary.

3.02 APPLICATION

- A. Backpainting: Immediately upon delivery to the Project site, finish lumber and millwork shall be backpainted on surfaces that will be concealed after installation. Items to be painted shall be backpainted with priming coat specified under "Priming".
- B. Priming: New wood and metal surfaces specified to receive paint finish shall be primed. Surfaces of miscellaneous metal and steel not embedded in concrete, and surfaces of unprimed plain sheet metal Work shall be primed immediately upon delivery to the Project site. Galvanized metal Work and interior and exterior woodwork shall be primed immediately after installation. Priming of surfaces and priming coat shall be as follows:
 - 1. Knots, Pitch and Sap Pockets: Shellac before priming.
 - 2. Exterior Woodwork and Wood Doors: Prime with one coat of exterior waterborne emulsion wood primer.
 - 3. Interior Woodwork: Where indicated to be painted, prime with one coat of waterborne wood primer.
 - 8. Coats shall be installed evenly and with full coverage. Finished surfaces shall be free of sags, runs and other imperfections.
- C. Allow at least 24 hours between coats of paint.
- D. Rollers shall not be used on wood surfaces.
- E. Each coat of painted woodwork and metal, except last coat, shall be sandpapered smooth when dry. Texture-coated gypsum board shall be sanded lightly to remove surface imperfections after first coat of paint has been installed.
- F. Each coat of paint or enamel shall be a slightly different tint as required. Each coat of paint, enamel, stain, shellac, and varnish will be inspected by the INSPECTOR before next coat is applied. Notify the INSPECTOR that such Work is ready for inspection.
 - 1. Tinting Guideline: The first coat, primer/undercoat(s) to be untinted or tinted up to 50 percent lighter or darker (at the discretion of the installer) than the finish coat. The second coat (or third coat if a seal coat and undercoat have been specified) is to be factory tinted in the range of 10 percent to 15 percent lighter or darker (at the discretion of the installer) than the finish coat. The final coat is to be factory tinted to the required color selected. These tinting guidelines shall be provided on all surfaces receiving paint.
- G. Do not "paint-out" UL labels, fusible links and identification stamps.
- H. Paint Roller, brush and spray.
 - 1. Only Paint rollers shall be used on interior plaster, drywall, masonry/plaster and plywood surfaces, nap shall not exceed one half inch in length.
 - 2. First coat on wood overhang and ceilings shall have material applied by roller and then brushed out in a professional manner to leave surface free of imperfections. Finish coat may be sprayed.
 - 3. Other surfaces shall have all coatings applied with brushes of proper size.

4. Spray work is permitted only on radiators, acoustic plaster, masonry and plaster.

3.03 CLEANING

- A. Remove rubbish, waste, and surplus material and clean woodwork, hardware, floors, and other adjacent Work.
- B. Remove paint, varnish and brush marks from glazing material and, upon completion of painting Work, wash and polish glazing material both sides. Glazing material, which is damaged, shall be removed and replaced with new material.
- C. Clean hardware and other unpainted metal surfaces with recommended cleaner. Do not furnish abrasives or edged tools.

3.04 SCHEDULE

- A. Interior:
 1. Woodwork, Painted: 3 coats.
 - a. First Coat: As specified in this section under Priming.
 - b. Second and Third Coats: Interior enamel, semi-gloss or gloss as indicated.
 2. Gypsum Board: 4 coats.
 - a. First Coat: Drywall sealer.
 - b. Second Coat: Enamel under coater.
 - c. Third and Fourth Coats: Interior enamel, semi-gloss or gloss as indicated.

3.05 PROTECTION

- A. Protect the Work of this section until Substantial Completion.

3.06 CLEANUP

- A. Remove rubbish, debris, and waste materials and legally dispose of off the Project site.

END OF SECTION

SECTION 12 3554

PLASTIC LAMINATE CLAD LABORATORY CASEWORK

PART 1 - GENERAL

1.01 SUMMARY

- A. Section Includes:
 - 1. Modular Laboratory Casework.
- B. Related Requirements:
 - 1. Division 01 - General Requirements.
 - 2. Division 22- Plumbing.
 - 3. Division 26 - Electrical.

1.02 PROJECT REQUIREMENTS

- A. Provide cabinets and casework. Work includes tops, ledges, filler panels, knee space panels supporting structures, and miscellaneous items of equipment as listed in these Specifications, or equipment schedules including delivery to the building, setting in place, leveling, scribing to walls and floors as required.
- B. Provide laboratory sinks, cup sinks or drains, drain troughs, overflows and sink outlets with integral tailpieces, which occur above the floor, and where these items are part of the equipment or listed in the Specifications, equipment schedules or shown on the Drawings. Integral tailpieces shall be in accordance with the manufacturer's standards. Tailpieces shall be furnished less the couplings required to connect them to the drain piping system. Epoxy sinks shall be installed in the countertop.

1.03 SUBMITTALS

- A. Shop Drawings: Submit Shop Drawings indicating materials, details of construction, cut-outs for countertop sinks and fixtures, dimensions, methods of fastening and installation details. Shop Drawings for the casework shall bear the Woodwork Institute (WI) Certified Compliance Grade Stamp indicating the grade or grades specified. Shop Drawings shall indicate grounds, backing, blocking sleepers and other items required for installation of casework, which are to be provided and installed as part of structure.
 - 1. Coordinate Shop Drawings with other Work involved.
 - 2. Provide roughing-in Drawings for mechanical and electrical services when required.
- B. Samples:
 - 1. Material Sample:
 - a. Submit 2-inch by 3-inch finish wood Sample of manufacturer's entire color range.

- b. Submit Plastic Laminate color chip Samples of manufacturer's entire color range.

C. Certificates: Submit WI Certified Compliance Certificate.

1.04 QUALITY ASSURANCE

A. Comply with the following standards:

1. ASTM D570 - Standard Test Method for Water Absorption of Plastics.
2. ASTM D635 - Standard Test Method for Rate of Burning and/or Extent and Time of Burning of Plastics in a Horizontal Position.
3. ASTM D695 - Standard Test Method for Compressive Properties of Rigid Plastics.
4. ASTM D785 - Standard Test Method for Rockwell Hardness of Plastics and Electrical Insulating Materials.
5. ASTM D790 - Standard Test Methods for Flexural Properties of Unreinforced and Reinforced Plastics and Electrical Insulating Materials.
6. ASTM D792 - Standard Test Methods for Density and Specific Gravity (Relative Density) of Plastics by Displacement.

B. Comply with the following as a minimum requirement:

1. Employ only mechanics skilled in finish carpentry.
2. Millwork shall be manufactured and certified to be in accordance with the performance requirements described in Scientific Equipment Furniture Association SEFA 8 - Casework Recommended Practice.
3. Millwork shall be manufactured in accordance with the standards of the WI North American Architectural Woodwork Standards (NAAWS) for laboratory casework Custom grade or as indicated on Drawings.
4. Before delivery to the Project site, the millwork supplier shall issue a WI Certified Compliance Certificate for millwork products to be furnished as part of the Work, certifying that products will fully meet laboratory casework requirements.
5. Each elevation of casework shall bear the WI Certified Compliance Label.
6. Epoxy resin laboratory tops shall bear the WI Certified Compliance Label.

C. Architect may observe Work in process of manufacture or finished casework before delivery to the Project site.

1.05 DELIVERY, STORAGE AND HANDLING

A. Materials shall be delivered to the Project site in undamaged condition. Refer to North American Architectural Woodwork Standards (NAAWS) latest edition for recommended care and storage.

- B. Store indoors, in ventilated areas with constant but minimum temperature of 60 degrees F. and maximum relative humidity of 25 percent to 55 percent. Do not install casework until building is enclosed and ambient conditions are within the temperature and humidity range to be expected during occupancy. Acclimatize materials to the installation temperature and humidity for at least 72 hours prior to installation. Maintain conditions until Substantial Completion.

1.06 WARRANTY

- A. Manufacturer shall provide a three year material and fabrication warranty.
- B. Installer shall provide a three-year installation warranty.

PART 2 - PRODUCTS

2.01 MATERIALS:

- A. Materials and methods used in construction shall conform to the best practices of the Scientific Laboratory Equipment Industry, including specialized materials required.
- B. Plastic Laminate Laboratory Casework: WI Laboratory Grade. Materials and methods used in construction shall conform to the requirements of the latest edition NAAWS, Custom Grade.

2.02 GENERAL REQUIREMENTS

- A. Particle Board Core Material: 45 pound density, conforming to ANSI A208.1, table 1, Grade 1-M-2.
- B. Exposed Surfaces: Exterior surfaces exposed to view after installation, and the exposed interior ends, top and bottom of open cases, or cases having glazed doors, shall be A-1 Oak, clear birch or maple veneer core. Softwood veneers such as Fir or Pine are not permitted.
- C. Plastic Laminate Faced Casework, where indicated on Drawings:
 - 1. Particle Board Core Material: 45 pound density, conforming to ANSI A208.1, Table 1, Grade 1-M-2.
 - 2. Exposed Surfaces: High pressure plastic laminate conforming to NEMA standard LD-3; 0.050 inches at horizontal surfaces, and 0.028 inches at exposed vertical surfaces and edge bands.
 - 3. Interior Surfaces: Interior surfaces used in cabinets and unexposed surfaces shall be finished with 0.020 inch high-pressure laminate cabinet liner, conforming to NEMA Standard LD-3.
 - 4. Solid Lumber:
 - a. Solid lumber for exposed members, drawers, trays and special details shall be Clear birch or maple.
 - b. Unexposed solid lumber for concealed webs or structural members shall be of Clear Douglas fir.

5. Softwood Plywood: Rotary cut exterior type A-C grade softwood plywood complying with PS1.
 6. Tempered Hardboard: Tempered hardboard shall be a wood fiber/resinous combination formed with heat and pressure into sheets providing a hard, smooth surface. Untempered hardboard is not permitted. Hardboard shall conform to requirements of PS 58. Oil tempered hardboard shall conform to CS 251.
 7. Edge Banding:
 - a. 0.028 inch minimum thickness plastic laminate.
 8. Adhesive: Type II water-resistant, rigid type glue of formula conforming to PS 51.
 9. Base: Cover toe spaces with typical wall base unless otherwise indicated.
- D. Sink Supports: Sink Supports, where required, shall be of a cradle type consisting of two 1 ¼-inch by 1 ¾-inch horizontal cleats and adjustable leveling bolts or glides. The horizontal cleats shall be supported by two ¾ inch by 2 ½-inch hardwood plywood cleats attached to the cabinet end panels, or by four ¼-inch steel rods attached to the cabinet top frame.
- E. Support Struts: Support struts shall consist of two 16 gage channel uprights fastened top and bottom by two adjustable "U" shaped spreaders, each 12 gage, 1 ½-inch by length required. Struts shall be furnished to support drain troughs, and to support worktop at plumbing space under fume hood superstructures or other heavy loads. They shall be fabricated so as to accept industry standard, pipe and conduit hangers.
- F. Glass: Glass used for unframed sliding doors, shall be ¼-inch laminated safety glass.
- G. Hardware and Trim:
1. Hinges: Five-knuckle overlay hinge with hospital tip - Rockford 376, or equal.
 2. Top-hung Hardware Assembly for Sliding Doors: Grant No. 6064, Hafele, Blum, or equal.
 3. Track for Sliding Doors: K & V 455 x or 455.55, Hafele, Blum, or equal.
 4. Cabinet Locks:
 - a. Door Locks (Pin-tumbler Type): CompX National C8173strike, Olympus 100 DRx12-1 strike, CCL Security Products, or equal.
 - b. Lock for Sliding Doors: National Lock Co. C8142 by thimble strike, Olympus 300 SD x thimble strike, CCL Security Products, or equal.
 - c. Drawer Locks: CompX National C8179 brass strike, Olympus 200 DWx12-1 strike, CCL Security Products, or equal.
 - d. Cabinet locks shall be flush with surface of door/drawer and shall not protrude more than 3/16 inch.

5. Pull Flush Ring at Drawers Behind Doors: Safe 6116, BBW 24, Trimco, or equal.
6. Pulls: Hafele - 115.61.601 Handle, stainless steel, Trimco, Doug Mockett, or equal.
7. Catches: Magnetic type - Epcos 592, Lawrence SC1364-AL, or equal.
8. Four-way Tension Catch: Glynn-Johnson GJ21A, or equal.
9. Noiseless Catch: Hardware Specialties 11687-FW7, or equal.
10. Elbow Catch: Ives 2A, Schlage SP2A3, or equal.
11. Bolts: Surface type BBW 97-B6, Quality B6, Trimco 4856-6, or equal.
12. Brackets and Shelf Strip for Glass Shelves: K & V 80 x 180, Garco 604 x 686, Stanley, or equal.
13. Shelf Support Clips: System 32 Shelf Support Sekura 1 nickel-plated die-cast zinc, or equal.
14. Card Holders (for Drawers): Corbin 1913-1/4H, Garco 853, or equal.
15. Drawer and Box Drawer Guides up to 24 inches wide: Accuride 3832E over travel, Blum, Hafele, or equal.
16. Lateral File Drawer Guides, up to 30 inches wide: Accuride 4034 over travel or 4033 equal travel, Blum, Hafele, or equal. Lateral file drawers, more than 30 inches wide: Accuride 3641, Blum, Hafele, or equal.
17. Grommets: 2-inch plastic, color as selected by Architect. Doug Mockett, Alliance Express, Rockler, or equal.
18. Finish: With exception of finish hardware items which have finishes specified, hardware shall be furnished with satin chrome US 26D or satin stainless steel US 32D finish.

H. Keying:

1. Keying schedule shall be furnished after hardware submittals are reviewed. Furnish three keys for each lock keyed separately, and two keys for each lock in keyed alike groups. Master keys shall be tagged and delivered to the Project Inspector. Locks and keys shall be stamped with coded set number/ direct digit.
2. Master keys shall be National GM 2, or equal.

I. Sealer: Thompson Water Seal 101, Watco Oil, Sealwize Zr44, or equal.

J. Epoxy Resin Countertops and Sinks: One inch thick, epoxy resin for countertops and sinks, conforming to the requirements of NAAWS.

1. Epoxy Resin tops and curbs shall be a uniform mixture throughout their full thickness, and shall not depend upon a surface coating that is readily removed by chemical and/or physical abuse. Tops and curbs shall be non-glaring. Tops

shall be 1 inch thick, exposed edges beveled top and bottom, and drip grooves provided on the underside at exposed edges. 4-inch high curbs at the backs and ends of tops shall be 1 inch thick and bonded to the deck to form a square watertight joint. Sink cutouts shall be smooth and uniform without saw marks with the top edge beveled. The bottom edge of the sink opening shall be finished smooth with the edge broken to prevent sharpness. Corners of sink cutouts shall be radiused not less than $\frac{3}{4}$ -inch.

2. Molded Epoxy Resin Sinks shall be non-glaring with inside corners coved and the bottom pitched to the drain outlet. Sinks shall possess a high resistance to mechanical and thermal shock. Sinks to be drop-in type.
3. Sink Tailpieces: Corrosion resistant polypropylene piping

K. Service Fittings:

1. Laboratory Service Fittings: Service fittings shall be laboratory grade, and water faucets and valve bodies shall be cast red brass alloy or bronze forgings, with a minimum content of 85 percent. Fittings shall be chromium plated unless specified otherwise.
2. Plastic Coated Finish (Clear or Sepia Bronze): When specified, laboratory service fittings shall have an acid resistant plastic coating applied over a fine sand-blasted surface. Surfaces shall be sprayed and baked three times with a minimum thickness of .0005 to .0010 mils. (See Performance Ratings).
3. Service Indexes: Fittings shall be identified with service indexes in the following color coding:

Hot Water	Red
Cold Water	Dark Green
Gas	Dark Blue
Air	Orange
Vacuum	Yellow

2.03 FABRICATION

A. Plastic Laminate Casework manufacture shall be in accordance with WI Architectural Woodwork Standards, Laboratory Grade, except as modified by Drawings or Specifications.

1. Drawers: Drawer fronts shall be of $\frac{3}{4}$ inch thick plastic laminate construction, fully edge-banded with PVC or plastic laminate. Banding joint shall occur at center of bottom edge of panel.
2. Doors: Doors shall be overlay type with flush exposed surfaces. Doors shall be fully edge banded with PVC or plastic laminate. Joint in banding shall occur at center of bottom edge. Doors of cabinets within any group of adjacent units shall be in alignment.

a. Banding:

- 1) Exposed edges of interior and exterior laminates shall be edge banded with plastic laminate. Edge banding shall be in longest

practicable lengths. Doors and drawers may be edge-banded with PVC at option of manufacturer.

- 2) Edge banding shall be accurately fitted. Where edge band joins plastic surfaces, there shall be no spaces, voids or chipping of plastic laminate surface.
 - 3) Exposed cabinet surfaces shall be flush, and any protruding edges of banding shall be machined or trimmed to provide a flat smooth corner at intersection of banding and adjoining surfaces. Plastic laminate edge banding shall be furnished on tops, webs, bottoms, ends, and inside partitions. PVC banding may only be furnished on drawer fronts and door edges.
3. Ends: Cabinet ends shall be lock-jointed, glued, and fastened to stretchers or top and bottom of cabinet. Floor mounted cabinets with exposed ends; cabinet ends shall extend to floor, over cabinet base.
 4. Backs shall be 3/8 inch thick plywood or 3/8 inch thick tempered hardboard, and shall be plowed into sides and top (except countertops) glued and nailed on 6-inch centers. Backs shall be braced with horizontal 3/4 inch by 3 1/2-inch backing strips on 36-inch centers maximum.
 5. Shelving: Shall be 3/4 inch thick particleboard for spans up to 35 inches, and one inch thick for spans over 35 inches up to 48 inches. Faces and edges of shelving shall be finished with 0.20 inch thickness cabinet liner. Shelving hardware shall be adjustable with bored holes per WI standard.
 6. Grommets shall be provided to provide access from the Computer CPU to the Monitor and Keyboard.
 7. Hinges shall be routed into edges of door. Doors over 3-foot 4-inch in height shall have three hinges. Hinges shall be fastened with type A Phillips-head sheet metal screws.

B. Epoxy Resin Laboratory Tops and Sinks:

1. Manufacture laboratory tops and sinks in accordance with NAAWS standards, except as modified by Drawings or Specifications.
2. Installation shall include epoxy tops, splashes, shelves, sinks, cutouts for sinks, cup sinks, electrical boxes, columns and drilling of holes for fixtures, as indicated on Drawings.
3. Countertops shall be one inch thick minimum, unless otherwise indicated.
4. Joint between splash and counter shall be square butt joint.
5. Countertops shall be furnished with lipped tops with drip groove, unless indicated otherwise.
6. Sink sizes and types shall be as indicated on Drawings.

7. Epoxy Resin Tops: Material shall be casting type with curing resins specifically chosen for upgrading along with inert fillers, which form a thermosetting material:

a.	Flexural strength	ASTM D790	14,500 psi
b.	Compressive strength	ASTM D695	35,000 psi
c.	Hardness rockwell	ASTM D785	100
d.	Density (gr./cc.)	ASTM D792	1.6
e.	Water absorption	ASTM D570	0.02 percent
f.	Flame test	ASTM D635	self-extinguishing

C. Plumbing Services

1. Water fittings shall be provided with a renewable unit containing operating parts that are subject to wear. The renewable unit shall contain an integral volume control device and faucets shall be capable of being readily converted from compression to self-closing, without disturbing the faucet body proper. Four arm forged brass handles shall contain plastic screw-on type colored service index buttons.
2. Ground Key Valve Hose Cocks: Ground key type valves shall have forged body with 10-serration hose end. Handle plug shall be forged brass, long, tapered type with screw-on colored service index button. Valves shall be individually ground, lapped and sealed.
3. Needle Valve Hose Cocks: Needle type valves shall have a stainless steel replaceable floating cone, precision finished and self-centering. Cone located against a stainless steel seat, easily removable and replaced with a socket wrench. Valve shall have "TEFLON" impregnated packing and designed so unit can be repacked while under pressure.
4. Gooseneck Type Outlets: Gooseneck outlets shall have a separate brazed coupling to provide a full thread attachment of anti-splash, serrated tip or filter pump fittings.
5. Tank Nipples: Tank nipples shall be provided with locking nut and washer for fixtures where fittings are anchored to equipment.
6. Sink Outlets: Unless otherwise specified, sink outlets for other than stainless steel sinks shall be synthetic acid resistant material with integral cross bars, tapered for overflow and be complete with gasket and lock nut with 1 ½-inch I.P.S. male straight thread outlet. Overflows shall not be furnished for sink outlets unless specifically called for.
7. Vacuum Breakers: Vacuum breakers where required shall be "Nidel" or "Watts" unless otherwise specified or identified to be an integral part of the water fixture assembly.

8. Aerator Outlets: Aerator type outlets shall be furnished for gooseneck water faucets not furnished with serrated hose connectors.
9. Waste Lines: See Division 22.
10. Traps: See Division 22.

PART 3 - EXECUTION

3.01 INSTALLATION

A. Cabinets and work surfaces:

1. Install cabinets level, plumb, and fasten to walls. Exposed screws shall be furnished with finish washers.
2. End Panels and Fillers: Furnish to match exposed surfaces and accurately scribe to walls and neatly and securely fit to cabinets.
3. Scribe cabinets directly to substrates or finishes. Do not install trims or fillers.
4. Install hardware items in accordance with manufacturer's installation instructions.
5. Worksurfaces: Tops shall be installed with a nominal one inch overhang on front and end, unless otherwise indicated.
 - a. Only factory prepared field joints, located per shop drawings, shall be permitted. Secure the joints in the field per manufacturer's recommendations.
 - b. Secure worksurfaces to casework and equipment components with materials and procedures recommended by the manufacturer.
6. Field joints in tops shall be shop fabricated and field assembled with dowels, clamping assemblies, and adhesives. Install matching bead of sealant or adhesive to fill hairline field joints.
7. Service Fittings: Comply with requirements of Division 22 and Division 26 for materials and installation of plumbing, gas services, pipes, connections and fittings, and electrical materials and connections, including electrical wiring and devices.
8. Keys: Present labeled keys for each of the cabinet locks or unique equipment locks fully sorted in a lockable, metal, wall hung, key cabinet.

3.02 ADJUSTING AND CLEANUP

- A. Before Substantial Completion, cabinets including drawers and shelves shall be cleaned. Adjust doors and drawers to operate easily and freely.
- B. Remove rubbish, debris, and waste materials and legally dispose of off the Project site.

3.03 PROTECTION

- C. Protect the Work of this section until Substantial Completion.

END OF SECTION

SECTION 220500

COMMON WORK RESULTS FOR PLUMBING

PART 1 - GENERAL

1.1 SECTION INCLUDES

- A. Basic Mechanical Requirements specifically applicable to Division 22 Sections, in addition to the general requirements.
- B. Plumbing work includes the following: furnish and install all piping and plumbing fixtures shown on the plumbing, mechanical, architectural, and civil engineering drawings and described in these specifications. In connection with this work, contractor shall also furnish and install all necessary work, devices, hardware and systems required to make said systems properly and safely operable, including, but not limited to, mounting hardware, framing, insulation, valves, flashing, cleanouts, cutting, concrete coring and cutting, patching, and fixture insulation.

1.2 WORK SEQUENCE

- A. Install work in phases to accommodate District's construction requirements. Refer to Architectural, Structural, Civil, and Electrical Drawings for the construction details and coordinate the work of this division with that of other divisions. Order the work of this division so that progress will harmonize with that of other divisions and all work will proceed expeditiously. During the construction period, coordinate mechanical schedule and operations with General Contractor and any other related subcontractor.

1.3 ALTERNATES

- A. Alternates quoted on Bid Forms will be reviewed and accepted or rejected at the District's option. Accepted Alternates will be identified in District-Contractor Agreement.
- B. Coordinate related work and modify surrounding work as required.

1.4 SUBMITTALS

- A. Submit the following:
- B. Proposed Products List: Include Products specified in the following Sections:
 - 1. Division 22 - Plumbing.
 - 2. Division 23 - Mechanical.
 - 3. Project Drawings.

- C. Submit shop drawings and product data grouped to include complete submittals of related systems, products, and accessories in a single submittal.
- D. Equipment and materials shall be ordered only after satisfactory review by District and Engineer.
- E. The following statement applies to all items reviewed: “Checking is only for general conformance with the design concept of the project and general compliance with the information given in the contract documents. Any action shown is subject to the requirements of the plans and specifications. Contractor is responsible for dimensions which shall be confirmed at the job site; fabrication processes and techniques of construction; coordination of his work with that of other trades; and the satisfactory performance of his work.”
- F. California Division of State Architect (DSA) Interpretation of Regulations.
- G. Contractor shall clearly mark the submittal sheet as to which model number, size, color, etc. when there is more than one choice available.
- H. Maintain a complete set of the most current reviewed submittal and shop drawings on site during construction.
- I. Submittal PDF’s shall have Table of Contents organized by specification section and shall clearly identify electrical characteristics, options provided, color, model number and equipment tag as indicated on the drawings. Provide one comprehensive submittal at the beginning of the project.
- J. College Standards for materials and equipment are available from Moorpark College Facilities Department. Materials listed as District Standards have been chosen in order to match other products already in use within the district as required for maintaining serviceability and spare parts in compliance with the California Public Contract Code.

1.5 REGULATORY REQUIREMENTS

- A. Conform to 2022 California Building Code.
- B. Fire Protection: Conform to 2022 California Fire Code, and California State Fire Marshall Regulations, Title 19, Public Safety.
- C. Plumbing: Conform to 2022 California Plumbing Code.
- D. Mechanical: Conform to 2022 California Mechanical Code.
- E. Electrical: Conform to 2022 California Electrical Code.
- F. Obtain approved inspections from authority having jurisdiction.

- G. Conflicts: Where conflict or variation exists amongst Codes, the most stringent shall govern.
- H. Plumbing Fixtures: accessible plumbing fixtures shall comply with all of the requirements of CBC Section 1115B. Heights and location of all fixtures shall be according to CBC Table 1115B-1. Fixture controls shall comply with CBC section 1118B.

1.6 PROJECT / SITE CONDITIONS

- A. Install work in locations shown on drawings, unless prevented by project conditions.
- B. Prepare drawings showing proposed rearrangement of work to meet project conditions, including changes to work specified in other Sections. Obtain permission of District before proceeding.
- C. Piping Locations: Piping locations shown are diagrammatic only. Contractor shall verify locations of all lateral stubs, offsets, etc. required in the field. The actual locations of lines, cleanouts and connections may vary provided that complete systems are installed in compliance with codes.
- D. Construction Observation: In addition to the requirement for obtaining inspections by DSA and the local jurisdiction, Contractor shall notify Engineer at appropriate times during the construction process so that Engineer can visit site to become generally familiar with the progress and quality of Contractor's work and to determine if the work is proceeding in general accordance with the contract documents.
- E. Scaling of Drawings: In no case shall working dimensions be scaled from plans, sections, or details from the working drawings. If no dimension is shown on the architectural drawings, the prime Contractor shall request in writing that the Architect or the Engineer provide clarification or the specific dimension.

1.7 QUALITY ASSURANCE

- A. Qualification of Manufacturer: Products used in work shall be produced by manufacturers regularly engaged in the manufacture of similar items.
- B. Qualification of Installer: Use adequate number of skilled workmen, thoroughly trained and experienced in the necessary crafts, and completely familiar with the specified requirements contained in the plans and specifications.
- C. Applicable equipment and materials to be listed by Underwriters' Laboratories and manufactured in accordance with ASME, AWWA, or ANSI standards. Power-using equipment shall meet the California energy efficiency standards as defined in the current Title 24 requirements.
- D. Welding procedures and testing shall comply with ANSI Standard B31.1.0 standard code for pressure piping and the American Welding Society – Welding Handbook.

Welding shall also comply with Division of the State Architect and structural plan requirements for materials, procedures, qualifications, and inspections.

1.8 DRAWINGS AND SPECIFICATIONS

- A. Drawings and specifications are intended to complement each other. Where a conflict exists between the requirements of the drawings and/or specifications, the contractor shall immediately and before commencing work, request clarification from Engineer.
- B. The Engineer shall interpret the drawings and the specifications, and the Engineer's decision as to the true intent and meaning thereof and the quality, quantity, and the sufficiency of the materials and workmanship furnished there under shall be accepted as final and conclusive.
- C. In case of conflicts not clarified prior to bidding deadline, use the most costly alternative (better quality, greater quantity, or larger size) in preparing the Bid. A clarification will be issued to the successful Bidder as soon as feasible after the Award, and if appropriate a deductive change order will be issued.
- D. All provisions shall be deemed mandatory except as expressly indicated as optional by the word "may" or "option".
- E. Examine and compare the contract drawings and specifications with the drawings and specifications of other trades. Report any discrepancies to the architect. Install and coordinate the work in cooperation with the other trades.

1.9 DEFINITIONS

- A. Finished Spaces: Spaces other than mechanical and electrical equipment rooms, furred spaces, pipe chases, unheated spaces immediately below roof, spaces above ceilings, unexcavated spaces, crawlspaces, and tunnels.
- B. Exposed, Interior Installations: Exposed to view indoors. Examples include finished occupied spaces and mechanical equipment rooms.
- C. Exposed, Exterior Installations: Exposed to view outdoors or subject to outdoor ambient temperatures and weather conditions. Examples include rooftop locations.
- D. Concealed, Interior Installations: Concealed from view and protected from physical contact by building occupants. Examples include above ceilings and in chases.
- E. Concealed, Exterior Installations: Concealed from view and protected from weather conditions and physical contact by building occupants but subject to outdoor ambient temperatures. Examples include installations within unheated shelters.

PART 2 - PRODUCTS

2.1 PRODUCTS

- A. Maintain uniformity of manufacturer for equipment used in similar applications and sizes.
- B. Provide products and materials that are new, clean, free from defects, damage, and corrosion.
- C. Provide name/data plates on major components with manufacturer's name, model number, serial number, date of manufacturer, capacity data, and electrical characteristics permanently attached in a conspicuous location on the equipment.

Protect materials stored at site and installed from damage. PART 3 - EXECUTION

3.1 INSTALLATION

- A. Install all equipment per the manufacturer's instructions for installing, connecting, and adjusting. A copy of the instructions shall be kept at the equipment during installation and provided to the engineer at his/her request.
- B. Adjust pipes, ducts, panels, equipment, etc., to accommodate the work to prevent interferences. Provide offsets as needed to avoid other trades.
 - 1. Right-of-Way: Lines which pitch have the right-of-way over those which do not pitch. Lines whose elevations cannot change have right-of-way over lines whose elevations can be changed.
 - 2. Provide offsets, transitions, and changes in directions of pipes as required to maintain proper head room and pitch on sloping lines. Provide traps, air vents, drains, etc., as required. It is the intent of this paragraph that all cost associated with compliance be borne by the contractor.
 - 3. All equipment shall be firmly anchored to building structural elements per DSA approved plans.
 - 4. Carefully check space requirements with other trades and existing conditions to ensure material, fixtures or equipment can be installed in the spaces allotted. Coordination is required and essential.

END OF SECTION 220500

SECTION 220510

PLUMBING PIPING

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

- A. Drawings, notes, and general provisions of the Contract, including General and Supplemental Conditions and Division 01 specification sections, apply to this section.

1.2 SUMMARY

- A. Section Includes:

1. Pipe and fittings for domestic water, condensate drains, filtered water, natural gas, rainwater, waste and vent, vacuum, and filtered cold water.
2. Escutcheons.
3. Cleanouts.
4. Vandal-proof vent caps.
5. Supply tubes.

1.3 REFERENCES

- A. ANSI B31.9 - Building Service Piping.
- B. ASME B16.22 - Wrought Copper and Bronze Solder-Joint Pressure Fittings.
- C. ASTM A53 - Pipe, Steel, Black and Hot-Dipped Zinc Coated, Welded and Seamless.
- D. ASTM A74 - Cast Iron Soil Pipe and Fittings.
- E. ASTM B32 - Solder Metal.
- F. ASTM B88 - Seamless Copper Water Tube.
- G. ASTM C564 - Rubber Gaskets for Cast Iron Soil Pipe and Fittings.
- H. ASTM A269 – Seamless Stainless Steel Tubing
- I. ASME B1.1 – Tubing Fittings

1.4 SUBMITTALS

- A. Product Data: For the following products:

1. Piping and fittings.
2. Escutcheons.
3. Cleanouts.
4. Vandal-proof vent caps.
5. Supply tubes.

B. Project Record Documents

1. Submit the following:
2. Record actual locations of valves and piping.

C. Operation and Maintenance Data

1. Submit the following:
2. Maintenance Data: Include installation instructions, spare parts lists, exploded assembly views.

1.5 REGULATORY REQUIREMENTS

- A. Perform Work in accordance with 2001 California plumbing code.

1.6 DELIVERY, STORAGE, AND HANDLING

- A. Deliver, store, protect and handle products to site under provisions of the general requirements.
- B. Accept valves on site in shipping containers with labeling in place. Inspect for damage.
- C. Provide temporary protective coating on cast iron and steel valves.
- D. Provide temporary end caps and closures on piping and fittings. Maintain in place until installation.
- E. Protect piping systems from entry of foreign materials by temporary covers, completing sections of the work, and isolating parts of completed system.

1.7 ENVIRONMENTAL REQUIREMENTS

- A. Do not install underground piping when bedding is wet or frozen.

PART 2 - PRODUCTS

2.1 DOMESTIC WATER PIPING, ABOVE GROUND

- A. Hard Copper Tube: ASTM B88, Type L water tube, drawn temper.

1. Wrought-copper solder-joint fittings: ASME B16.22, wrought-copper pressure fittings.
2. Bronze Flanges: ASME B16.24, class 150, with solder-joint ends.
3. Copper Unions: MSS SP-123, cast-copper-alloy, hexagonal-stock body, with ball-and-socket, metal-to-metal seating surfaces, and solder-joint or threaded ends.

2.2 COMPRESSED GAS PIPING

- A. Stainless Steel Type 316 tubing
- B. Wall Thickness – 0.035”
- C. Swagelok or Parker Hannifin fittings
- D. McMaster Carr Stainless Steel Hose – 300 PSIG Type 316
- E. Vibrasorb Clamps

2.3 FILTERED WATER PIPING (DI WATER)

- F. Cross-linked Polyethylene (PEX)
 1. Piping – ASTM F876.
 2. Fittings – ASTM F1960.
 3. Support per CPC requirements.

2.4 ESCUTCHEONS

- A. Escutcheons for water and waste piping penetrations.
 1. Manufacturers: subject to compliance with requirements, provide products by the following: Brasscraft.
 2. Description: chrome-plated cast brass with set screws.

2.5 CLEANOUTS

- A. Cleanouts for waste piping.
 1. Manufacturers: subject to compliance with requirements, provide products by one of the following:
 - a. J.R. Smith
 - b. Zurn.
 2. Description: cast-iron with threaded bronze plug. 18 gage stainless cover with vandal-proof screws for wall cleanout. Polished brass non-slip cover for floor cleanout.

2.6 SUPPLY TUBES

- A. Supply tubes:

1. Manufacturers: subject to compliance with requirements, provide products by the following:
 - a. Brasscraft.
 - b. No-Burst.
2. Description: braided stainless steel, ½” FIP x ½” compression.

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Verify that excavations are to required grade, dry, and not over-excavated.

3.2 PREPARATION

- A. Ream pipe and tube ends. Remove burrs.
- B. Remove scale and dirt, on inside and outside, before assembly.
- C. Prepare piping connections to equipment with flanges or unions.

3.3 INSTALLATION

- A. Install in accordance with Manufacturer's instructions.
- B. Provide non-conducting dielectric connections wherever jointing dissimilar metals.
- C. Route piping in orderly manner and maintain gradient.
- D. Install piping to conserve building space and not interfere with use of space.
- E. Group piping whenever practical at common elevations.
- F. Install piping to allow for expansion and contraction without stressing pipe, joints, or connected equipment.
- G. Provide clearance for installation of insulation and access to valves and fittings.
- H. Provide access where valves and fittings are not exposed. Coordinate size and location of access doors.
- I. Establish elevations of buried piping outside the building to ensure not less than 30 inch of cover. Exception: Localized areas may be 18” deep to accommodate existing conditions.

- J. Where pipe support members are welded to structural building framing, scrape, brush clean, and apply one coat of zinc rich primer to welding.
- K. Provide support for utility meters in accordance with requirements of utility companies.
- L. Prepare pipe, fittings, supports, and accessories not pre-finished, ready for finish painting.
- M. Install valves with stems upright or horizontal, not inverted.
- N. Piping shall be installed neat, true, level, or plumb.

3.4 APPLICATION

- A. Install unions downstream of valves and at equipment or apparatus connections.
- B. Install brass male adapters each side of valves in copper piped system. Sweat solder adapters to pipe.
- C. Install gate valves for shut-off and to isolate equipment, part of systems, or vertical risers.

3.5 ERECTION TOLERANCES

- A. Establish invert elevations, slopes for drainage to 1/4 inch per foot minimum. Maintain gradients.

END OF SECTION 220510

SECTION 220523

VALVES FOR PLUMBING PIPING

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

- A. Section Includes:
 - 1. Brass angle stops.
 - 2. Needle Valves
- B. Related Sections:
 - 1. Division 22 plumbing piping Sections for specialty valves applicable to those Sections only.
 - 2. Division 22 Section "Identification for Plumbing Piping and Equipment" for valve tags and schedules.

1.3 DEFINITIONS

- A. CWP: Cold working pressure.
- B. EPDM: Ethylene propylene copolymer rubber.
- C. NBR: Acrylonitrile-butadiene, Buna-N, or nitrile rubber.
- D. NRS: Nonrising stem.
- E. OS&Y: Outside screw and yoke.
- F. RS: Rising stem.
- G. SWP: Steam working pressure.

1.4 SUBMITTALS

- A. Product Data: For each type of valve indicated.

1.5 QUALITY ASSURANCE

- A. Source Limitations for Valves: Obtain each type of valve from single source from single manufacturer.

1.6 DELIVERY, STORAGE, AND HANDLING

- A. Prepare valves for shipping as follows:

1. Protect internal parts against rust and corrosion.
2. Protect threads, flange faces, grooves, and weld ends.
3. Set angle, gate, and globe valves closed to prevent rattling.

PART 2 - PRODUCTS

2.1 GENERAL REQUIREMENTS FOR VALVES

- A. Refer to valve schedule articles for applications of valves.
- B. Valve Pressure and Temperature Ratings: Not less than indicated and as required for system pressures and temperatures.
- C. Valve Sizes: Same as upstream piping unless otherwise indicated.
- D. Valves in Insulated Piping: With 2-inch (50-mm) stem extensions and the following features:
 1. Ball Valves: With extended operating handle of non-thermal-conductive material, and protective sleeve that allows operation of valve without breaking the vapor seal or disturbing insulation.
- E. Valve-End Connections:
 1. Flanged: With flanges according to ASME B16.1 for iron valves.
 2. Grooved: With grooves according to AWWA C606.
 3. Solder Joint: With sockets according to ASME B16.18.
 4. Threaded: With threads according to ASME B1.20.1.
 - 5.

2.2 FILTERED WATER VALVE SCHEDULE

- A. Polyethylene Valves
 1. Manufacturers: subject to compliance with requirements, provide products by one of the following:
 - a. George Fisher.
 2. Description:
 - a. Quarter-turn ball valve.

2.3 BRASS ANGLE STOPS

- A. Brass angle stops, heavy pattern.
 1. Subject to compliance with requirements, provide products by the following:
 - a. Brasscraft.
 2. Description: heavy pattern, angle, ½" FIP inlet x ½" compression, loose key.

2.4 NEEDLE VALVE

A. Stainless steel needle valve

1. Subject to compliance with requirements, provide products by the following:
 - a. Chicago Faucet
2. Single needle valve, full flow nozzle
3. 125 PSI
4. 3/8" Male threads
- 5.

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Examine valve interior for cleanliness, freedom from foreign matter, and corrosion. Remove special packing materials, such as blocks, used to prevent disc movement during shipping and handling.
- B. Operate valves in positions from fully open to fully closed. Examine guides and seats made accessible by such operations.
- C. Examine threads on valve and mating pipe for form and cleanliness.
- D. Examine mating flange faces for conditions that might cause leakage. Check bolting for proper size, length, and material. Verify that gasket is of proper size, that its material composition is suitable for service, and that it is free from defects and damage.
- E. Do not attempt to repair defective valves; replace with new valves.

3.2 VALVE INSTALLATION

- A. Install valves with unions or flanges at each piece of equipment arranged to allow service, maintenance, and equipment removal without system shutdown.
- B. Locate valves for easy access and provide separate support where necessary.
- C. Install valves in horizontal piping with stem at or above center of pipe.
- D. Install valves in position to allow full stem movement.

3.3 ADJUSTING

- A. Adjust or replace valve packing after piping systems have been tested and put into service but before final adjusting and balancing. Replace valves if persistent leaking occurs.

SECTION 220523

SECTION 220529

HANGERS AND SUPPORTS FOR PLUMBING PIPING AND EQUIPMENT

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

- A. This Section includes the following hangers and supports for plumbing system piping and equipment:

1. Steel pipe hangers and supports.
2. Trapeze pipe hangers.
3. Metal framing systems.
4. Fastener systems.

- B. Related Sections include the following:

1. Division 05 Section "Metal Fabrications" for structural-steel shapes and plates for trapeze hangers for pipe and equipment supports.

1.3 DEFINITIONS

- A. MSS: Manufacturers Standardization Society for The Valve and Fittings Industry Inc.
- B. Terminology: As defined in MSS SP-90, "Guidelines on Terminology for Pipe Hangers and Supports."

1.4 PERFORMANCE REQUIREMENTS

- A. Equipment supports shall be capable of supporting combined operating weight of supported equipment and connected systems and components.
- B. Seismic-restraint hangers and supports for piping and equipment shall be per 1998 SMACNA Seismic Restraint Manual – Guidelines for Mechanical Systems with September 2000 Addendum #1.
- C. All exterior steel support components shall be hot-dipped galvanized. All welds shall be ground smooth and painted with three coats of zinc-rich paint.

1.5 SUBMITTALS

- A. Product Data: For the following:

1. Steel pipe hangers and supports.
2. Mechanical fastener systems.

3. Pipe positioning systems.
4. Trapeze pipe hangers. Include Product Data for components.
5. Metal framing systems. Include Product Data for components.

B. Welding certificates.

1.6 QUALITY ASSURANCE

A. Welding: Qualify procedures and personnel according to AWS D1.1, "Structural Welding Code--Steel." Welding: Qualify procedures and personnel according to the following:

1. AWS D1.1, "Structural Welding Code--Steel."
2. AWS D1.2, "Structural Welding Code--Aluminum."
3. AWS D1.4, "Structural Welding Code--Reinforcing Steel."
4. ASME Boiler and Pressure Vessel Code: Section IX.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

A. In other Part 2 articles where titles below introduce lists, the following requirements apply to product selection:

1. Manufacturers: Subject to compliance with requirements, provide products by one of the manufacturers specified.

2.2 STEEL PIPE HANGERS AND SUPPORTS

A. Description: MSS SP-58, Types 1 through 58, factory-fabricated components. Refer to Part 3 "Hanger and Support Applications" Article for where to use specific hanger and support types.

B. Manufacturers:

1. B-Line Systems, Inc.; a division of Cooper Industries.
2. ERICO/Michigan Hanger Co.
3. Tolco Inc.
4. Unistrut
5. Superstrut

C. Galvanized, Metallic Coatings: Eletro.

2.3 TRAPEZE PIPE HANGERS

A. Description: MSS SP-69, Type 59, shop- or field-fabricated pipe-support assembly made from structural-steel shapes with MSS SP-58 hanger rods, nuts, saddles, and U-bolts.

1. Manufacturers:

- a. B-Line Systems, Inc.; a division of Cooper Industries.
- b. Unistrut Corp.; Tyco International, Ltd.
- c. Tolco

2.4 METAL FRAMING SYSTEMS

A. Description: MFMA-3, shop- or field-fabricated pipe-support assembly made of steel channels and other components.

B. Manufacturers:

- 1. B-Line Systems, Inc.; a division of Cooper Industries.
- 2. ERICO/Michigan Hanger Co.; ERISTRUT Div.
- 3. Power-Strut Div.; Tyco International, Ltd.
- 4. Tolco Inc.
- 5. Unistrut Corp.; Tyco International, Ltd.

C. Coatings: Manufacturer's standard finish unless bare metal surfaces are indicated. Exterior components shall be hot-dipped galvanized.

D. Nonmetallic Coatings: Plastic coating, jacket, or liner.

2.5 PIPE ISOLATOR

A. Vibrasorb.

2.6 FASTENER SYSTEMS

A. Mechanical-Expansion Anchors: Insert-wedge-type zinc-coated (interior use) Type 304 stainless steel (exterior use), for use in hardened portland cement concrete with pull-out, tension, and shear capacities appropriate for supported loads and building materials where used.

B. Anchor must have ICC report. Provide report with submittal and one copy to the inspector. See State Architect Requirements for testing.

1. Manufacturers:

- a. Hilti, Inc.
- b. ITW Ramset/Red Head.
- c. Or equal.

C. Pre-placed concrete inserts

2. Manufacturers:

- a. Tolco
- b. or equal.

PART 3 - EXECUTION

3.1 HANGER AND SUPPORT APPLICATIONS

- A. Specific hanger and support requirements are specified in Sections specifying piping systems and equipment.
- B. Comply with MSS SP-69 for pipe hanger selections and applications that are not specified in piping system Sections.
- C. Use hangers and supports with galvanized, metallic coatings for piping and equipment that will not have field-applied finish.
- D. Use nonmetallic coatings on attachments for electrolytic protection where attachments are in direct contact with copper tubing.
- E. Use padded hangers for piping that is subject to scratching.
- F. Horizontal-Piping Hangers and Supports: Unless otherwise indicated and except as specified in piping system Sections, install the following types:
- G. Use pipe positioning systems in pipe spaces behind plumbing fixtures to support supply and waste piping for plumbing fixtures.
- H. At stainless steel tubing and Pex piping use Vibrasorb clamps.

3.2 HANGER AND SUPPORT INSTALLATION

- A. Steel Pipe Hanger Installation: Comply with MSS SP-69 and MSS SP-89. Install hangers, supports, clamps, and attachments as required to properly support piping from building structure.
- B. Trapeze Pipe Hanger Installation: Comply with MSS SP-69 and MSS SP-89. Arrange for grouping of parallel runs of horizontal piping and support together on field-fabricated trapeze pipe hangers.
 - 1. Pipes of Various Sizes: Support together and space trapezes for smallest pipe size or install intermediate supports for smaller diameter pipes as specified above for individual pipe hangers.
 - 2. Field fabricate from ASTM A 36/A 36M, steel shapes selected for loads being supported. Weld steel according to AWS D1.1.
- C. Metal Framing System Installation: Arrange for grouping of parallel runs of piping and support together on field-assembled metal framing systems.
- D. Thermal-Hanger Shield Installation: Install in pipe hanger or shield for insulated piping.
- E. Fastener System Installation:
 - 1. Install concrete inserts prior to concrete placement per manufacturer's listing.

2. Install mechanical-expansion anchors in concrete after concrete is placed and completely cured. Install fasteners according to manufacturer's written instructions.
- F. Install hangers and supports to allow controlled thermal and seismic movement of piping systems, to permit freedom of movement between pipe anchors, and to facilitate action of expansion joints, expansion loops, expansion bends, and similar units.
- G. Install lateral bracing with pipe hangers and supports to prevent swaying.
- H. Install building attachments within concrete slabs or attach to structural steel. Install additional attachments at concentrated loads, including valves, flanges, and strainers, and at changes in direction of piping. Install concrete inserts before concrete is placed; fasten inserts to forms and install reinforcing bars through openings at top of inserts.
- I. Load Distribution: Install hangers and supports so piping live and dead loads and stresses from movement will not be transmitted to connected equipment.

3.3 METAL FABRICATIONS

- A. Cut, drill, and fit miscellaneous metal fabrications for trapeze pipe hangers and equipment supports.
 1. shows after finishing and contours of welded surfaces match adjacent contours.

3.4 ADJUSTING & PERSONNEL PROTECTION

- A. Hanger Adjustments: Adjust hangers to distribute loads equally on attachments and to achieve indicated slope of pipe.
- B. Trim excess length of continuous-thread hanger and support rods to 1/2 inches below nut.
- C. Provide personnel protection at mechanical rooms, equipment areas and any equipment maintenance area from strut and threaded rods ends. Install soft protective materials to prevent skin and skull injuries. Install protection as soon as practicable after installation.

3.5 PAINTING

- A. Touch Up: Cleaning and touchup painting of field welds, bolted connections, and abraded areas of shop paint on miscellaneous metal are specified in Division 09
- B. Galvanized Surfaces: Clean welds, bolted connections, and abraded areas and apply galvanizing-repair paint to comply with ASTM A 780.

END OF SECTION 220529

SECTION 220553

IDENTIFICATION FOR PLUMBING PIPING AND EQUIPMENT

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

- A. Section Includes:
 - 1. Pipe labels.

1.3 SUBMITTALS

- A. Product Data: For each type of product indicated.
- B. Samples: For color, letter style, and graphic representation required for each identification material and device.
- C. Equipment Label Schedule: Include a listing of all equipment to be labeled with the proposed content for each label.
- D. Valve numbering scheme.
- E. Valve Schedules: For each piping system to include in maintenance manuals.

1.4 COORDINATION

- A. Coordinate installation of identifying devices with completion of covering and painting of surfaces where devices are to be applied.
- B. Coordinate installation of identifying devices with locations of access panels and doors.
- C. Install identifying devices before installing acoustical ceilings and similar concealment.

PART 2 - PRODUCTS

2.1 PIPE LABELS

- A. Paint compressed gas piping with automotive touch up paint. One 2" long strip every 3 feet

Oxygen – Blue, Compressed Air – Green, Carbon Dioxide - Red

PART 3 - EXECUTION

3.1 PREPARATION

- A. Clean piping and equipment surfaces of substances that could impair bond of identification devices, including dirt, oil, grease, release agents, and incompatible primers, paints, and encapsulants.

END OF SECTION 220553

SECTION 224000

PLUMBING FIXTURES AND EQUIPMENT

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

- A. This Section includes the following plumbing fixtures, equipment, and related components:
 - 1. Faucets for lavatories and sinks.
 - 2. Commercial sinks, including District-supplied.

1.3 DEFINITIONS

- A. ABS: Acrylonitrile-butadiene-styrene plastic.
- B. Accessible Fixture: Plumbing fixture that can be approached, entered, and used by people with disabilities.
- C. Cast Polymer: Cast-filled-polymer-plastic material. This material includes cultured-marble and solid-surface materials.
- D. Cultured Marble: Cast-filled-polymer-plastic material with surface coating.
- E. Fitting: Device that controls the flow of water into or out of the plumbing fixture. Fittings specified in this Section include supplies and stops, faucets and spouts, shower heads and tub spouts, drains and tailpieces, and traps and waste pipes. Piping and general-duty valves are included where indicated.
- F. FRP: Fiberglass-reinforced plastic.
- G. PMMA: Polymethyl methacrylate (acrylic) plastic.
- H. PVC: Polyvinyl chloride plastic.
- I. Solid Surface: Nonporous, homogeneous, cast-polymer-plastic material with heat-, impact-, scratch-, and stain-resistance qualities.

1.4 SUBMITTALS

- A. Product Data: For each type of plumbing fixture indicated. Include selected fixture and trim, fittings, accessories, appliances, appurtenances, equipment, and supports. Indicate materials and finishes, dimensions, construction details, and flow-control rates.

- B. Operation and Maintenance Data: For plumbing fixtures to include in emergency, operation, and maintenance manuals.
- C. Warranty: Special warranty specified in this Section.

1.5 QUALITY ASSURANCE

- A. Accessible Plumbing Fixture Regulatory Requirements: Accessible plumbing fixtures shall comply with all of the requirements of CBC Section 1115B. Height and locations of all fixtures shall be according to CBC Table 1115B-1. Fixture controls shall comply with CBC Section 1118B.
- B. Source Limitations: Obtain plumbing fixtures, faucets, and other components of each category through one source from a single manufacturer.
 - 1. Exception: If fixtures, faucets, or other components are not available from a single manufacturer, obtain similar products from other manufacturers specified for that category.
- C. Electrical Components, Devices, and Accessories: Listed and labeled as defined in 2004 CEC, by a testing agency acceptable to authorities having jurisdiction, and marked for intended use.
- D. Regulatory Requirements: Comply with requirements in ICC A117.1, "Accessible and Usable Buildings and Facilities" "Americans with Disabilities Act"; for plumbing fixtures for people with disabilities.
- E. Regulatory Requirements: Comply with requirements in Public Law 102-486, "Energy Policy Act," about water flow and consumption rates for plumbing fixtures.
- F. NSF Standard: Comply with NSF 61, "Drinking Water System Components--Health Effects," for fixture materials that will be in contact with potable water.
- G. Select combinations of fixtures and trim, faucets, fittings, and other components that are compatible.
- H. Comply with the following applicable standards and other requirements specified for plumbing fixtures:
 - 1. Stainless-Steel Commercial, Handwash Sinks: NSF 2 construction.
- I. Comply with the following applicable standards and other requirements specified for lavatory and sink faucets:
 - 1. .
 - 2. Supply Fittings: ASME A112.18.1.
 - 3. Brass Waste Fittings: ASME A112.18.2.

1.6 WARRANTY

- A. Special Warranties: Manufacturer's standard form in which manufacturer agrees to repair or replace components of whirlpools that fail in materials or workmanship within specified warranty period.

1. Failures include, but are not limited to, the following:
 - a. Structural failures of unit shell.
 - b. Faulty operation of controls, blowers, pumps, heaters, and timers.
 - c. Deterioration of metals, metal finishes, and other materials beyond normal use.
2. Warranty Period for Commercial Applications: One year from date of Substantial Completion.

PART 2 - PRODUCTS

2.1 SINK FAUCETS

A. Sink Faucets:

1. Manufacturers: Subject to compliance with requirements, provide products by one the following:
 - a. Chicago Faucets.

2.2 SINKS

A. Sinks:

1. Manufacturers: Subject to compliance with requirements, provide products by the following:
 - a. Just Manufacturing Company.
2. Description: Counter-mounting or free-standing, stainless-steel sink.
 - a. With strainers, tailpieces, traps and insulation.
3. Install District-furnished fixtures. Provide and install new strainers, tailpieces, traps, angle stops, & supply tubes.

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Examine roughing-in of water supply and sanitary drainage and vent piping systems to verify actual locations of piping connections before plumbing fixture installation.
- B. Examine cabinets, counters, floors, and walls for suitable conditions where fixtures will be installed.
- C. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 INSTALLATION

- A. Assemble plumbing fixtures, trim, fittings, and other components according to manufacturers' written instructions.
- B. Install fixtures level and plumb according to roughing-in drawings.

- C. Install water-supply piping with stop on each supply to each fixture to be connected to water distribution piping. Attach supplies to supports or substrate within pipe spaces behind fixtures. Install stops in locations where they can be easily reached for operation.
- D. Install trap and tubular waste piping on drain outlet of each fixture to be directly connected to sanitary drainage system.
- E. Install tubular waste piping on drain outlet of each fixture to be indirectly connected to drainage system.
- F. Install traps on fixture outlets.
 - 1. Exception: Omit trap on fixtures with integral traps.
- G. Install escutcheons at piping wall ceiling penetrations in exposed, finished locations and within cabinets and millwork. Use deep-pattern escutcheons if required to conceal protruding fittings. Escutcheons are specified in Division 22 Section "Common Work Results for Plumbing."
- H. Set service basins in leveling bed of cement grout. Grout is specified in Division 22 Section "Common Work Results for Plumbing."
- I. Seal joints between fixtures and walls, floors, and countertops using sanitary-type, one-part, mildew-resistant silicone sealant. Match sealant color to fixture color. Sealants are specified in Division 07 Section "Joint Sealants."

3.3 CONNECTIONS

- A. Piping installation requirements are specified in other Division 22 Sections. Drawings indicate general arrangement of piping, fittings, and specialties.
- B. Connect fixtures with water supplies, stops, and risers, and with traps, soil, waste, and vent piping. Use size fittings required to match fixtures.
- C. 26 Section "Low-Voltage Electrical Power Conductors and Cables."

3.4 FIELD QUALITY CONTROL

- A. Verify that installed plumbing fixtures are categories and types specified for locations where installed.
- B. Check that plumbing fixtures are complete with trim, faucets, fittings, and other specified components.
- C. Inspect installed plumbing fixtures for damage. Replace damaged fixtures and components.
- D. Test installed fixtures after water systems are pressurized for proper operation. Replace malfunctioning fixtures and components, then retest. Repeat procedure until units operate properly.

3.5 ADJUSTING

- A. Operate and adjust faucets and controls. Replace damaged and malfunctioning fixtures, fittings, and controls.
- B. Adjust water pressure at faucets and flushometer valves to produce proper flow and stream.
- C. Replace washers and seals of leaking and dripping faucets and stops.

3.6 CLEANING

- A. Clean fixtures, faucets, and other fittings with manufacturers' recommended cleaning methods and materials. Do the following:
 - 1. Remove faucet spouts and strainers, remove sediment and debris, and reinstall strainers and spouts.
 - 2. Remove sediment and debris from drains.
- B. After completing installation of exposed, factory-finished fixtures, faucets, and fittings, inspect exposed finishes and repair damaged finishes.

3.7 PROTECTION

- A. Provide protective covering for installed fixtures and fittings.
- B. Do not allow use of plumbing fixtures for temporary facilities unless approved in writing by Owner.

END OF SECTION 224000

SECTION 26 0000

GENERAL PROVISIONS

PART 1 - GENERAL

- A. The general contract provisions apply to this section and take precedent over this section in case of conflict.

1.01 GENERAL PROVISIONS

- A. This division supplements the applicable requirements of other divisions.

1.02 DEFINITIONS

- A. For the purposes of Division 260000, the following definitions apply:
 - 1. Provide: Furnish and install.
 - 2. Indicated: As shown on the drawings or specified herein.
 - 3. Circuit Designation: Panel designation and circuit number, i.e., LA-13.
 - 4. Approved equal: Approved by the engineer of record as equal in his sole determination.

1.03 SCOPE OF WORK

- A. The Specifications for Work of Division 260000 include, but are not limited to the following sections:
 - 26 0000–General Provisions
 - 26 0030–Tests and Identification
 - 26 0050–Basic Electrical Materials and Methods
 - 26 0060–Minor Electrical Demolition for Remodeling
 - 26 0111–Conduits
 - 26 0120–Conductors
 - 26 0130–Electrical Boxes
 - 26 0140–Wiring Devices
 - 26 0190–Support Devices
 - 26 2510–Lighting Fixtures
- B. Work Included: All labor, materials, appliances, tools, equipment, facilities, transportation and services necessary for and incidental to performing all operations in connection with furnishing, delivery and installation of the work of this division, complete, as shown on the drawings and/or specified herein. Work includes, but is not necessarily limited to the following:

1. Examine all divisions for related work required to be included as work under this division.
 2. General provisions for electrical work.
 3. Site observation including existing conditions.
- C. Related Work Specified Elsewhere but included in the scope of work:
1. Motors and their installation.
 2. Control wiring and conduit for heating, ventilating and air conditioning.
- D. Work Not In Contract (N.I.C.):
1. Telephone instruments.
- E. Coordination
1. The following supplements are additional General Requirements pertaining to work of this Division. Provisions of Division 1 - General Requirements shall remain in effect.
 - a) Coordinate work of various sections of Division 26 and 27.
 - b) Coordinate work of this Division 26 with work of Divisions 2 through 25.

1.04 REFERENCE STANDARDS

- A. American National Standards Institute (ANSI).
- B. Association of Edison Illuminating Companies (AEIC).
- C. Electrical Testing Laboratories (ETL).
- D. Illuminating Engineering Society (IES).
- E. Institute of Electrical and Electronic Engineers (IEEE).
- F. Insulated Cable Engineers Association (ICEA).
- G. National Electrical Manufacturers Association (NEMA).
- H. National Fire Protection Association (NFPA).
- I. Underwriters Laboratories, Inc. (UL).
- J. California State Fire Marshal (CSFM).

- K. California Energy Commission (CEC) Title 24.

1.05 QUALITY ASSURANCE

- A. Regulations: All the electrical equipment and materials, including their installations, shall conform to the following applicable latest codes and standards:
 - 1. California Electric Code, Latest Adopted Edition (NEC), 2020 unless a more current version has been adopted.
 - 2. Local and State Fire Marshal.
 - 3. Occupational Safety and Health Act (OSHA).
 - 5. Local Codes and Ordinances.
 - 6. Requirements of the Office of the California State Architect (OSA).
 - 7. California Administrative Code, Title 8, Chapter 4, Industrial Safety Orders.
 - 8. California Administrative Code, Title 24.
 - 9. Division of State Architect - California.
- B. Variances: In instances where two or more codes are at variance, the most restrictive requirement shall apply. In instances where plans and specifications are at variance or conflict the most restrictive requirement shall apply. Contractor shall be responsible for all his associated work and materials and also the work and materials of related or affected trades.
- C. Contractor's Expense: Obtain and pay for all required bonds, insurance, licenses, and pay for all taxes, fees and utility charges required for the electrical work.
- D. Testing and Adjustment:
 - 1. Perform all necessary tests required to ascertain that the electrical system has been properly installed, that the power supply to each item of equipment is correct, and that the system is free of grounds, ground faults, and open circuits, that all motors are rotating in the proper directions, and such other tests and adjustments as may be required for the proper completion and operation of the electrical system. Contractor shall provide a copy of all test reports to prove these tests have been performed.
 - 2. If, during the course of testing, it is found that system imbalance is in excess of 20%, rearrange single-pole branch circuit in lighting and receptacle panels to bring system balance to within 20% on all phases. Record all such changes on the typewritten panelboard schedule and submit a summary of changes to the Engineer on the record drawings.

1.06 SUBMITTALS

- A. Procedure: In accord with the Submittal Section.
- B. Shop drawings: Detailed shop drawings for the following equipment:
 - 1. Distribution panelboards.
 - 2. Branch circuit panelboards.
 - 3. Circuit breaker.
 - 4. Switchboards.
 - 5. Motor control centers.
 - 6. Contactors and cabinet.
- C. Product data: Detailed manufacturer's data for:
 - 1. Cabinets.
 - 2. Disconnects.
 - 3. Lighting fixtures and associated equipment including control.
- D. Test results for the following:
 - 1. Grounding systems.
 - 2. Cables.
- E. Include sufficient information to indicate complete compliance with Contract Documents. Include illustrations, catalog cuts, installation instructions, drawings, and certifications. On each sheet show manufacturer's name or trademark.
- F. Operating, maintenance, and instruction data for:
 - 1. EM inverter
- G. Instruction materials:
 - 1. Provide at the time of personnel instruction period three bound copies of instruction manuals for the systems as listed in Subparagraph 1.04.A.4.f.
 - 2. Include the following (minimum) information in each copy of instruction manual:
 - a) Manufacturers' names and addresses including phone numbers.

- b) Serial numbers of items furnished.
- c) Catalog information, exploded views and brochures, complete with technical and performance data for all equipment, marked to indicate actual items furnished and intended use.
- d) Recommended spare parts.

1.07 OWNER'S PERSONNEL INSTRUCTIONS

- A. Prior to completion of the contract, and at the Owner's convenience, instruct verbally and demonstrate to the Owner's personnel, the operation of the systems as listed under operating, maintenance, and instructional data and/or emergency generator, automatic transfer switch and fire alarm annunciator panel.

1.08 CLEANING

- A. Clean exterior surfaces and interiors of equipment and remove all dirt, cement, plaster and other debris. Protect interior of equipment from dirt during construction and clean thoroughly before energizing.
- B. Clean out cracks, corners and surfaces on equipment to be painted. Remove grease and oil spots so that paint may be applied without further preparation.

1.09 PROJECT RECORD DOCUMENTS - Prepare the following and submit to the engineer before final acceptance:

- A. Mark Project Record Documents daily to indicate all changes made in the field.
 - 1. In addition to general requirements of Project Record Drawings, indicate on drawings, changes of equipment locations and ratings, trip sizes, and settings on circuit breakers, alterations in raceway runs and sizes, changes in wire sizes, circuit designations, installation details, one-line diagrams, control diagrams and schedules.
- B. Use green to indicate deletions and red to indicate additions.
 - 1. Use the same symbols and follow the same drafting procedures used on the Contract Drawings.
- C. Locate dimensionally off of contract drawings all underground conduit stubbed-out for future use, underground feeder conduits, and feeder pull box locations using building lines by indicating on the Project Record Drawings.
- D. At the completion of underground conduit installation provide underground conduit record documents to owner's representative.
- E. Two copies, in binder form, of all test results as required by these specifications

- F. Two copies of local and/or state code enforcing authority final inspection certificates.
- G. Two copies, in binder form, of electrical equipment cut sheets, manufacturer's installation instructions, warranty certificates, and product literature for all products utilized on project.

1.10 SERVICE INTERRUPTIONS AND UTILITY

- A. Coordinate with the Owner the interruption of services necessary to accomplish the work.
- B. Coordinate with the campus maintenance department all work associated with power and communications distribution systems and service entrance equipment.
- C. Electrical contractor shall supply temporary power for all trades.

1.11 MINIMUM SPECIFICATION REQUIREMENTS (ALL WORK OF DIVISION 260000)

- A. As a minimum Specification requirement, all materials and methods shall comply with applicable governing codes.

1.12 PENETRATION SEALING

- A. Seal penetration through exterior walls and fire rated walls, floors, ceilings, and roofs with 3M Firestopping materials of fire rating capacity rated per architectural plans and UBC or prevailing building code requirements.

1.13 PLACING EQUIPMENT IN SERVICE

- A. Do not energize or place electrical equipment in service until all interested parties have been duly notified and are present or have waived their rights to be present. Where equipment to be placed in service involves service or connection from another contractor of the owner, notify the owner in writing when the equipment will be ready for final testing/connection and schedule to the owner's satisfaction of this service connection. Notify the owner two weeks in advance of the date the various items of equipment will be complete.

1.14 OWNER-FURNISHED ITEMS

- A. Pick up Owner-furnished items and handle, deliver, install, and make all final connections.
 - 1. Assume responsibility for the items when consigned at the storage facility or in the field in accord with requirements of the Contract Documents.

1.15 ELECTRIC ITEM LOCATION

- A. Electrical drawings are generally diagrammatic. Verify equipment sizes with shop drawings and manufacturers' data and coordinate location layout with other trades. Notify owner and engineer of any changes of location requirements prior to installation and obtain engineer's written acceptance for all changes/revisions.

1.16 DEMOLITION

- A. Scope: Provide and perform demolition, preparatory and miscellaneous work as indicated and specified, complete.
- B. Principal Items of Work:
 - 1. Demolition and removal of existing electrical conduit, wiring and equipment required to complete the project.
 - 2. Preparation of the existing building to receive or connect the new work.
 - 3. Miscellaneous demolition, cutting, alteration, and repair work in and around the existing building necessary for the completion of the entire project.
 - 4. Disconnecting and reconnection of electrical equipment as required by the construction modifications.
- C. Existing Conditions: Make a detailed survey of the existing conditions pertaining to the work. Check the locations of all existing structures, equipment and wiring (branch circuiting and controls). Provide at bid time any exclusions for existing conditions work.
- D. Salvage and Disposal: All removed material other than items to be reused shall be returned to the owner or disposed of in accordance with instructions from the owner's representative. Disposal shall be done in accordance with EPA and governing body requirements and regulations. Contractor shall pay all fees and charges for disposal.

1.17 ELECTRICAL WORKMANSHIP REQUIREMENTS

- A. It is required that all electrical construction of this Contract be performed by journeyman electricians. All journeyman electricians shall have a minimum of 4 years of apprenticeship training and hold a valid Certificate of Completion from an apprenticeship training course approved by the State of California Department of Industrial Relations, Division of Apprenticeship Standards. This is intended to mean that a person who does not hold a valid Certificate of Completion from an apprenticeship training course approved by the State of California Department of Industrial Relations, Division of Apprenticeship Standards will not be permitted to do electrical work of any kind that involves new construction, nor make repairs, alterations, additions, or changes of any kind to any existing system of electrical wiring, apparatus, equipment, light, heat, or power.

- B. Contractor may employ electrical helpers or apprentices on any job of electrical construction, new or existing, when the work of such helpers or apprentices is performed under direct and constant personal supervision of a journeyman electrician holding a valid Certificate of Completion from an apprenticeship training course approved by the State of California Department of Industrial Relations, Division of Apprenticeship Standards.
 - 1. Each journeyman electrician will be permitted to be responsible for quality of workmanship for a maximum of eight helpers or apprentices during any same time period, provided the nature of work is such that good supervision can be maintained and quality of workmanship achieved is the best, as expected by Owner and as implied by the latest edition of the California Electrical Code (National Electrical Code with State of California amendments).
 - 2. Before each journeyman electrician commences work, deliver to Owner at project site a photocopy of journeyman's valid Certificate of Completion from an apprenticeship training course approved by the State of California Department of Industrial Relations, Division of Apprenticeship Standards.
- C. All electrical systems shall be installed in a neat and workmanlike manner per National Electrical Code requirements and ANSI approved NEIS National Electrical Installation Standards.

1.18 DESIGN CHANGES AFTER AWARD OF BID

- A. When a change in the quantity or size of conductors is made, the conduit size will remain in accordance with that indicated in the original contract drawings rather than the drawing symbol conduit table. When code permits, provide conductor insulation 'THWN' where required to maintain conduit fill conformance with the National Electrical Code.

1.19 MATERIAL AND EQUIPMENT SUBSTITUTION

- A. Where two or more trade names or manufacturers are mentioned, selection shall be made from the group listed for use in the base bid. The order in which names are listed is not intended to be any indication of preference.
- B. Where a single manufacturer, product or trade name is stated, that manufacturer, product or trade name shall be used in the base bid. The use of other manufacturers, products or trade names will be considered by the engineer of record (unless that product is indicated for no substitution) only if submitted as alternate items at the time of bidding, with evidence of equality and a statement of net price difference as compared to the specified item. After approval by the engineer of record, the architect and owner reserve the right to review such submittals and to determine the acceptability for use.

- C. Equipment other than that specified will be accepted only when written approval is given by the engineer of record and architect, in accordance with Division 1.
- D. The contractor shall be held responsible for all physical changes in piping, equipment, etc. resulting from equipment substitution and likewise bear any increased cost of other trades in making said substitution. Approval by the architect of equipment other than that specified does not relieve this contractor of this responsibility.

1.20 REQUESTS FOR INFORMATION

- A. The contractor shall submit all requests for information (RFI's) typewritten on the attached form.

PART 2 - PRODUCTS

Not Used.

PART 3 - EXECUTION

Not Used.

END OF SECTION

SECTION 26 0050

BASIC ELECTRICAL MATERIALS & METHODS

PART 1 - GENERAL

- 1.01 DESCRIPTION: Division 1 applies to this Section. This Section contains general requirements for the Sections in Division 26.
- A. Related Work Not in Division 26: Refer to individual Division 26 Sections.
- 1.02 QUALITY ASSURANCE:
- A. Codes: Entire installation shall comply with requirements of authorities having jurisdiction.
- B. Permits: Contractor shall pay for all permits required by work under this Division.
- C. Inspections: Contractor shall arrange for all inspections and correct non-complying installations.
- 1.03 SUBMITTALS: Refer to Division 1 for procedures.
- A. Material and Equipment: Prior to start of work, 6 copies of a list of all materials and equipment covered by Division 26 shall be submitted for approval. Contractor shall allow ample time for checking and processing and shall assume responsibility for delays incurred due to rejected items. No installation of material concerned shall be made until such written approval has been obtained. Approval of materials and equipment shall in no way obviate compliance with the Contract Documents. Each item proposed shall be referenced to the applicable Section, Page, and Paragraph of Division 26. For each item proposed, give name of manufacturer, trade name, catalog data, and performance data.
- B. Equipment Layout Drawings: Submit "Equipment Layout Drawings" for each equipment room or area containing equipment items furnished under this Division. Layout Drawings shall consist of plan view of room, to scale, showing projected outlines of all equipment, complete with dotted line indication of all required clearances including all those needed for removal or service. Location of all conduit and pull boxes shall be indicated.
- C. Service Manuals: Refer to Submittal Section. Indexed Service Manuals shall be submitted which shall include test reports, service instructions, and renewal parts lists of all equipment.
1. Submission and Information: Service Manuals shall be submitted for approval at least 30 days before final inspection. The following information together with any pertinent data, shall be included in Service Manual:
- Renewal part numbers of all replaceable items.
 - Manufacturer's cuts and rating data.
 - Serial numbers of all principal pieces of equipment.
 - Supplier's name, address, and phone number.

- e. Final settings for all breakers, relays, and control devices
 - f. Copies: Four (4) copies of approved Service Manual shall be delivered on or before date required.
- D. Record Drawings: Prepare and submit in accordance with requirements. Contractor shall make notations, neat and legible, daily as the work proceeds. Drawings shall be available for inspection at all times and kept at the job site. All buried conduit and/or indicated future connections outside any building shall be located both by depth and by accurate measurement from a permanently established landmark such as a building or structure.
- E. Seismic Calculation: Refer to Article 3.01 herein.
- F. Spare Parts: Conform to the Submittal Section. Deliver following spare parts to Owner and obtain receipts. Submit at same time as Operating Instructions:
 - 1. Spare fuses; 1 set for each combination fuse breaker.
 - 2. Spare pilot light lamps of each type used on project, in quantity of 10%, but not less than 2%.
 - 3. Overload heater elements; 2 sets for each size used on project.
- G. Special Tools: If any part of the equipment furnished under Division 26 requires a special tool for assembly, adjustment, resetting, or maintenance thereof and such tool is not readily available on the commercial tool market, it shall be furnished with the equipment as a standard accessory and delivered to the Owner.
- H. Maintenance Paint: One (1) can of touch-up paint shall be delivered to Owner for each different color factory finish which is to be the final finished surfaces of the product.

1.04 DRAWINGS:

- A. Diagrammatic Drawings: For purposes of clarity and legibility, drawings are essentially diagrammatic although size and location of equipment is drawn to scale wherever possible, Contractor shall make use of data in all the Contract Documents and verify information at building site.
- B. Routing of Conduit and Piping: The drawings indicate required size and termination of conduits and raceways. It is not intent to indicate all necessary offsets and it shall be the responsibility under this Division to install conduit in such a manner as to conform to structure, avoid obstructions, preserve headroom, keep openings and passageways clear, and make all equipment requiring inspection, maintenance and repair accessible without extra cost to the Owner.
- C. Coordination with Other Trades: Check with other Divisions of the Specifications so that no interference shall occur and in order that elevations may be established for the work. Installed work which interferes with the work of other trades shall be removed and rerouted at the discretion of the Architect.

1.05 DAMAGE AND REPAIRS:

- A. Emergency Repairs: Owner reserves the right to make temporary repairs as necessary to keep equipment in operating condition without voiding Contractor's warranty or relieving Contractor of his responsibility during warranty period.
- B. Responsibility for Damage: Contractor shall be responsible for damage to grounds, buildings, or equipment due to work furnished or installed under this Division 26.

1.06 PROTECTION, CARE, AND CLEANING:

- A. Protection: Provide adequate protection for finished parts of materials and equipment against physical damage from any cause during progress of work and until final completion. Sensitive electrical equipment shall not be installed until major construction is completed.
- B. Care: During entire construction, properly cap all lines and equipment to prevent entrance of sand and dirt. Protect equipment against moisture, plaster, cement, paint or work of other trades by covering with polyethylene sheets.
- C. Cleaning: After installation is completed, clean all systems as follows in addition to requirements specified:
 - 1. Field Painted Items: Clean exterior of conduits, raceways, piping and equipment exposed in completed structure; removing all rust, plaster, cement and dirt by wire brushing. Remove grease oil and similar materials by wiping with clean rags and suitable solvents.
 - 2. Factory Finished Items: Remove grease and oil on all factory finished items such as cabinets and controllers, and leave surfaces clean and polished.
- D. Connection: Prior to energizing, check all electrical connection hardware and torque where necessary.

PART 2- PRODUCTS

- 2.01 PRODUCTS: Products and materials shall be as specified in the pertinent Sections of Division 26.
- 2.02 MATERIALS AND EQUIPMENT: Wherever possible, all materials and equipment used in installation of this work shall be of same manufacturer throughout for each class of material or equipment. Materials shall be new and bear UL label, wherever subject to such approval. Comply with ANSI, IEEE and NEMA standards, where applicable.

PART 3 - EXECUTION

- 3.01 SEISMIC REQUIREMENTS: Electrical equipment for emergency systems shall be braced to withstand the lateral forces that result from earthquakes. Under Work of Division 26, submit seismic calculations stamped and signed by a registered California structural engineer confirming size, number, and location of required anchoring hardware. Electrical equipment vendors shall furnish weights together with dimensions and the center of gravity location for all emergency electrical equipment for this purpose.

- 3.02 GENERAL LATERAL BRACING REQUIREMENTS: As shown on Drawings. Additional bracing requirements shall conform to specific requirements shown on Drawings or in other Sections of Division 26. Anchorages for equipment subject to thermal expansion and movement shall conform to manufacturer's recommendation and intent of general bracing requirements. When general and specific bracing requirements enumerated above are in conflict with referenced standards, the most stringent requirements shall govern.
- 3.03 EXCAVATION AND BACKFILL: Perform all excavation and back fill required to install Work of Division 26, both inside and outside. Perform all excavation and backfilling in accordance with Division 2.
- A. Excavation: Bury conduits outside building to a depth of not less than 24" (or as required by National Electrical Code) below finish grade, unless noted otherwise.
 - B. Backfilling: Do not backfill until after final inspection and approval of conduit installation by all legally constituted authorities and recording of the buried items on the Record Drawings.
- 3.04 CUTTING AND PATCHING:
- A. Cutting of Existing Structural Work: Holes in existing slabs and concrete walls shall be cored to the minimum size required. The Contractor shall submit Drawings showing dimensioned sizes and locations for all such holes to Architect for approval before cutting. Where required for conduit installation, slabs on grade shall be saw-cut to minimum required width; submit cutting Drawings to the Architect for approval before cutting.
 - B. Patching: Holes or chases shall be patched to match adjacent surfaces.
- 3.05 CONCRETE WORK: Concrete construction required for the Work of Division 26 shall be provided under the Work of Division 26.
- 3.06 PAINTING: Finish painting of electrical equipment will be as specified in Division 9, unless equipment is herein specified to be furnished with factory applied finish coats. Equipment to be field painted shall be furnished with a factory applied prime coat.
- A. Touch-Up: If factory finish on any equipment furnished under Division 26 is damaged in shipment or during construction of building, the equipment shall be refinished by Contractor to satisfaction of Architect.
 - B. Concealed Equipment: Uncoated cast-iron or steel that will be concealed, or will not be accessible when installations are completed, shall be given one heavy coat of black asphalt before installation.
- 3.07 OPERATING INSTRUCTIONS: Contractor to provide services of an experienced Engineer to instruct Owner in operation of entire installation. Instructional period shall be during normal work day hours. This instruction period may be simultaneous with compliance tests.
- 3.08 COMPLIANCE TESTS: Conduct such tests of all portions of installation as may be necessary to ensure full compliance with the Drawings and Specifications. Tests shall be made in the presence of the Owner. Costs of test shall be borne by Contractor and Contractor shall provide all instruments, equipment, labor and materials to complete

all the tests. Tests may be required on any item between installation of Work and the end of 1 year warranty period. Should these tests develop any defective materials, poor workmanship or variance with requirements of Specifications, Contractor shall make any changes necessary and remedy any defects at his expense.

A. All Feeders: Measure and record as follows:

1. 600-volt conductors shall be tested with 500-volt megger to ground on each phase. megger to be on test for one minute before any readings are taken. The minimum values on all feeders shall be 100,000 OHMS.
2. Copies of the certified test readings shall be transmitted to Owner.

3.09 SYSTEM ACCEPTANCE:

A. Final Review: The Contractor shall request a final review prior to system acceptance after:

1. Completion of installation of all systems required under the Contract Documents.
2. Submission and acceptance of operating and maintenance data.
3. Completion of identification program.

B. Acceptance: Is contingent on:

1. Completion of final review and correction of all deficiencies.
2. Satisfactory completion of acceptance tests demonstrating compliance with all performance and technical requirements of Contract Documents.
3. Satisfactory completion of training program and submission of manuals and Drawings required by Contract Documents.

3.10 PRELIMINARY OPERATION: The Owner reserves the right to operate portions of the electrical system on a preliminary basis without voiding the warranty or relieving the Contractor of his responsibilities.

3.11 CLEAN-UP: Conform to the Submittal Section. Upon completion and at other times during progress or Work, when required, remove all surplus materials, rubbish, and debris resulting from Work of Division 26.

END OF SECTION

SECTION 26 0060

MINOR ELECTRICAL DEMOLITION FOR REMODELING

PART 1 - GENERAL

1.01 SECTION INCLUDES

- A. Electrical demolition.

PART 2 - PRODUCTS

2.01 MATERIALS AND EQUIPMENT

- A. Materials and equipment for patching and extending work: As specified in individual Sections.

PART 3 - EXECUTION

3.01 EXAMINATION

- A. Verify field measurements and circuiting arrangements are as shown on Drawings.
- B. Verify that abandoned wiring and equipment serve only abandoned facilities.
- C. Demolition Drawings are based on casual field observation and existing record documents. Report discrepancies to Owner and Architect/Engineer before disturbing existing installation.
- D. Beginning of demolition means installer accepts existing conditions.

3.02 PREPARATION

- A. Disconnect and make safe all electrical systems in walls, floors, and ceilings scheduled for removal.
- B. Coordinate utility service outages with Utility Company and Owner's representative.
- C. Provide temporary wiring and connections to maintain required existing systems in service during construction. When work must be performed on energized equipment or circuits, use personnel experienced in such operations.
- D. Existing Electrical Service: Maintain existing system in service until new system is complete and ready for service. Disable system only to make switchovers and connections. Obtain permission from Owner at least 72 hours before partially or

completely disabling system. Minimize outage duration. Make temporary connections to maintain service in areas adjacent to work area when outage affects business operation.

- E. Existing Fire Alarm System: Maintain existing system in service until new system is accepted. Disable system only to make switchovers and connections. Notify Owner and local fire service at least 72 hours before partially or completely disabling system. Minimize outage duration. Make temporary connections to maintain service in areas adjacent to work area.
- F. Existing Telephone System: Maintain existing system in service until new system is complete and ready for service and new system is accepted. Disable system only to make switchovers and connections. Notify Owner and Telephone Utility Company at least 72 hours before partially or completely disabling system. Minimize outage duration. Make temporary connections to maintain service in areas adjacent to work area.
- G. Existing Security System: Maintain existing system in service until new system is complete and ready for service and new system is accepted. Disable system only to make switchovers and connections. Obtain permission from the Owner and security company at least 72 hours before partially or completely disabling system. Minimize outage duration. Make temporary connections to maintain service in areas adjacent to work area.

3.03 DEMOLITION AND EXTENSION OF EXISTING ELECTRICAL WORK

- A. Demolish and extend existing electrical work under provisions of this Section.
- B. Remove, relocate, and extend existing installations to accommodate new construction.
- C. Remove abandoned wiring to source of supply and re-label devices as spares.
- D. Remove exposed abandoned conduit, including abandoned conduit above accessible ceiling finishes. Cut conduit flush with walls and floors, and patch surfaces.
- E. Disconnect abandoned outlets and remove devices. Remove abandoned outlets if conduit servicing them is abandoned and removed. Provide blank cover for abandoned outlets which are not removed.
- F. Disconnect and remove abandoned panelboards and distribution equipment.
- G. Disconnect and remove electrical devices and equipment serving utilization equipment that has been removed.
- H. Disconnect and remove abandoned luminaires. Remove brackets, stems, hangers, and other accessories.
- I. Disconnect and remove abandoned conduit.
- J. Repair adjacent construction and finishes damaged during demolition and extension work.
- K. Maintain access to existing electrical installations which remain active. Modify installation or provide access panel as appropriate.

- L. Extend existing installations using materials and methods compatible with existing electrical installations, and in compliance with new project specifications.
- M. Modify existing as-built drawings to note changes.

3.04 CLEANING AND REPAIR

- A. Clean and repair existing materials and equipment which remain or are to be reused.
- B. Panelboards: Clean exposed surfaces and check tightness of electrical connections. Replace damaged circuit breakers and provide closure plates for vacant positions. Provide typed circuit directory showing revised circuiting arrangement.
- C. Luminaires: Remove existing luminaires for cleaning. Use mild detergent to clean all exterior and interior surfaces; rinse with clean water and wipe dry. Replace lamps, ballasts, and broken electrical parts.

3.05 INSTALLATION

- A. Install relocated materials and as required by this section and Owner's representative.

END OF SECTION

SECTION 26 0111

CONDUITS

PART 1 - GENERAL

- A. The general provisions apply to this section.

1.1 WORK INCLUDED

- A. Conduits; including:
1. Rigid steel conduit.
 2. Intermediate metal conduit (IMC).
 3. Electrical metallic tubing (EMT).
 4. Rigid aluminum conduit.
 5. Polyvinyl chloride conduit (PVC).
 6. Flexible metal conduit.
 7. Liquid-tight flexible metal conduit.

1.2 DEFINITION

- A. Conduit: This term shall be construed to mean conduit and conduit fittings; and tubing and tubing fittings.

1.3 RELATED WORK SPECIFIED ELSEWHERE

- B. Support material: Section 260190.

PART 2 - PRODUCTS

2.1 MATERIAL AND FABRICATION - ALL MATERIALS SHALL BE MANUFACTURED IN THE USA.

- A. Rigid Steel Conduit: Hot-dipped galvanized or sherardized including the threads, manufactured in accordance with ANSI C80.1 and UL6.

1. Threaded, hot-dipped galvanized or sherardized fittings manufactured in accordance with ANSI C80.4.
- B. Intermediate Metal Conduit: Hot-dipped galvanized including the threads, manufactured in accordance with UL 1242.
- C. Electrical Metallic Tubing: Manufactured in accordance with ANSI C80.3 and UL 797.
 1. Provide compression fittings in walls, ceiling spaces or exposed construction areas.
 2. Provide compression (water tight) fittings in damp areas or areas exposed to weather.
- D. Rigid Aluminum Conduit: Manufactured in accordance with ANSI C80.5.
 1. Threaded fittings, manufactured in accordance with ANSI C80.4.
- E. Polyvinyl Chloride Conduit: Schedule 40 and schedule 80, manufactured in accordance with ANSI C33.91, UL 651, and NEMA TC-2.
 1. Cemented type fittings of the same manufacturer as the conduit.
- F. Polyvinyl Chloride Conduit: Type EB, heavy wall, manufactured in accordance with ANSI C33.91, UL651, and NEMA TC-8.
 1. Cemented fittings of the same manufacturer as the conduit.
- G. Flexible Metal Conduit: Hot-dipped galvanized steel, manufacturer in accordance with UL 1.
 1. Squeeze type, malleable iron, cadmium plated, straight and angle connectors for all sizes and twist-in connectors for 1/2-inch and 3/4-inch flexible metal conduit.
- H. Liquid-Tight Flexible Conduit: Hot-dipped galvanized with liquid-tight vinyl jacket.
 1. Liquid-tight fittings.

PART 3 - EXECUTION

3.1 USE

- A. EMT for all exposed and concealed work except as indicated in Paragraphs B, C, D, E, F, and G.

- B. Rigid steel, IMC, or rigid aluminum conduit in areas where exposed conduit could be subject to physical damage or where conduit is exposed and conductor phase to ground voltage exceeds 300 volts.
- C. Rigid aluminum conduit may be used for all feeder runs exposed or concealed in stud walls and spaces above suspended ceilings.
- D. PVC Conduit:
 - 1. Schedule 40 for runs below grade in direct contact with earth.
 - 2. Schedule 40 in concrete floors, walls or roofs.
- E. Flexible Conduit (steel only permitted):
 - 1. For connection to equipment subject to vibration, maximum length 18 inches. In wet locations use liquid-tight flexible conduit.
 - 2. For connection to lighting fixtures above suspended ceilings. Lengths limited to 72 inches.
 - 3. Install ground conductors in all flexible conduits.
- F. Where 3/4-inch conduit runs are concealed in walls or ceilings and these runs are through wood studs and wood joists, flexible steel conduit may be used up to a maximum length of 6'0".
- G. All risers shall be PVC coated RGS with bushings.
- H. In concrete or below grade use conduit not smaller than 1 inch. Maximum size in concrete slab: 1 inch. Run larger sizes under slab.
- I. Use long sweep elbows with minimum radius 10 times nominal conduit diameter for all telephone and communication runs.

3.2 INSTALLATION

- A. Provide conduit support and bracing in accordance with the latest published SMACNA guidelines.
- B. Perform excavating, trenching, backfilling, and compacting as specified in Division 2.
- C. Minimum cover for runs below finished grade outside buildings: 24 inches except where noted or required by the serving utility. Minimum cover for conduit in concrete floors, walls or roof: 1/3 thickness of slab. Minimum cover under building slabs is 12-inches.
- D. Minimum separation from uninsulated hot water pipes, steam pipes, heater flues or vents: 6 inches. Avoid running conduit directly under water lines.

- E. Protect inside of conduit from dirt and rubbish during construction by capping all openings with plastic caps intended for the purpose.
- F. Provide conduit bodies for exposed conduit runs at junctions, bends or offsets where required. Do not use elbows or bends around outside corners of beams, walls or equipment. Make conduit body covers accessible.
- G. Make conduit field cuts square with saw and ream out to full size. Shoulder conduits in couplings.
- H. Run a minimum of one 3/4-inch empty conduit for every three single pole spare circuit breakers, spaces or fraction thereof and not less than two 3/4-inch conduits from every flush mounted panel to an accessible space above the ceiling and below the floor.
- I. Make conduit projections from covered areas to areas exposed to the weather watertight by proper flashing. Extend flashing a minimum of 6 inches in all directions from conduit.
- J. Where conduit is to remain empty, install polypropylene or nylon pull-line 3/16" minimum diameter from end to end with tag at each end designating opposite terminations.
- K. Run conduit parallel and at right angle to building lines, when visible in finished construction.
- L. Cap conduits indicated to be stubbed-out underground using glued-on PVC caps intended for this purpose.
- M. Install a coupling flush with the floor on all conduits stubbed up through floors on grade.
- N. Make no bends with a radius less than 12 times the diameter of the cable it contains nor more than 90 degrees. Make field bends with tools designed for conduit bending. Heating of metallic conduit to facilitate bending is not permitted.
- O. Where conduit installed in concrete or masonry extends across building construction joints, provide expansion fittings as manufactured by O.Z.; Crouse-Hinds; Appleton; or equal, with approved ground straps and clamps.
- P. Concrete Wall or Slab Penetrations: All core drilling, sleeves, blockouts or other penetrations must be approved by the Structural Engineer prior to installation.
 - 1. Space sleeves and core drills to insure a minimum dimension of 3 times the nominal trade diameter of the largest adjacent conduit between sleeves or core drills.
 - 2. Use block outs for concentrations of conduits in a confined area.
- Q. Do not penetrate walls with flexible conduit where subject to physical damage. Use recessed box with extension ring for transition from interior to exterior of wall.

- R. All homeruns shown shall be run to the panel indicated independently of all other homeruns. Provide pull points so as not to exceed total bends of 360 degrees between them unless otherwise indicated.
- S. At switchboards, manholes and floor standing distribution panelboards, provide insulated throat bushings or bell ends on all non-metallic conduit entries and bushings on all metallic conduit entries.
- T. Provide bushings on all conduit terminations sized 1" and larger.
- U. Provide weatherproof boxes and connectors for all exposed parking structure raceways and boxes.
- V. Provide bell ends on all conduits into pullboxes and manholes, seal all conduits after conductors are pulled.
- W. Cap all unused conduits with end cap. Do not tape.
- X. All Fire Alarm Conduits shall be painted red.

END OF SECTION

SECTION 26 0120

CONDUCTORS

PART 1 - GENERAL

1.01 WORK INCLUDED

- A. Conductors; for power, lighting, sound, communication and control, including conductors for general wiring, flexible cords and cables, and ground conductors.

1.02 RELATED WORK SPECIFIED ELSEWHERE

- A. Submittals: Section 260000.

PART 2 - PRODUCTS

2.01 MATERIAL AND FABRICATION

- A. Conductors for General Wiring: Thermoplastic insulated rated for 600V manufactured in accordance with UL 83.
 - 1. Provide 3/4 hard drawn copper conductors. Provide solid conductor for #12 AWG and smaller. Provide stranded conductors for #10 AWG and larger.
- B. Conductor Connectors for General Wiring:
 - 1. Sizes No. 14 to No. 8: Splice with insulated spring wire connectors.
 - a) Ideal No. 451, 455 and 453.
 - b) Minnesota Mining: Types Y, R, G, and B.
 - c) Buchanan No. B1, B2 and B4.
 - 2. Size No. 6 or Larger, Copper: Splice and terminate with compression or pressure type connectors and terminal lugs.
- C. Provide connector sealing packs for all area lighting and exterior box splices which require complete protection from dampness and water.
 - 1. Scotch Lok No.'s 3576, 3577 and 3578, by 3M Company.

PART 3 - EXECUTION

3.01 USE

MOORPARK COLLEGE HSC – BIO-MFR PROGRAM
 VENTURA COUNTY COMMUNITY COLLEGE DISTRICT

Conductors
 26 0120-1

- A. Conductors for General Wiring:
 - 1. Minimum 75 degrees C temperature rated insulation on conductors, except use minimum 90 degrees C temperature rated insulation on conductors in conduits exposed on roof, or where required due to ambient temperature.
 - 2. Stranded conductors at motors, audio video and other applications where subject to vibration.
 - 3. Minimum size conductors for power and lighting #12 AWG, except where noted.
 - 4. Minimum size conductors for control circuits #14 AWG stranded with THHN/THWN insulation.
- B. Use flexible cords and cables for connection of special equipment as indicated. Length not to exceed 72 inches.
- C. Ground Conductors:
 - 1. Provide an insulated green ground conductor for all branch circuit wiring where indicated.
 - 2. Bare copper conductor may be used.
 - a) Install ground conductors in all non-metallic conduits as required by code. Install ground conductors in all motor branch circuits and all feeders. Where ground conductor size is not indicated, provide size as required for an equipment ground conductor by the National Electrical Code.
 - b) Install ground conductors in all flexible metal conduits.
- D. Install XHHW – 2, 90°C copper conductors for all underground installations unless noted otherwise on the plans.
- E. Install for all dimmers, stranded THHN/THWN – 2 copper 90°C conductors with dedicated neutrals.

3.02 INSPECTION

- A. Check conduit system for damage and loose connections, replace damaged sections.
- B. Check for caps at conduit openings. Make sure that inside of conduit is free of dirt and moisture.
- C. Pull mandrel, one size smaller than the conduit, through entire length of all underground conduits prior to conductor installation.

3.03 INSTALLATION

A. Conductors for General Wiring:

1. Color code conductors insulation as follows:

CONDUCTOR	SYSTEM 208Y/120	VOLTAGE 480Y/277
Phase A	Black	Brown
Phase B	Red	Orange
Phase C	Blue	Yellow

2. For conductors #6 AWG or larger, permanent plastic colored tape may be used to mark conductor in lieu of coded insulation. Tape shall cover not less than 2 inches of conductor insulation within enclosure.

- a) Provide color tape on each end and at all terminal points and splices on wire enclosed in conduit.
- b) Provide color tape every 3 feet on wire not enclosed in a listed wireway.

3. When pulling conductors, do not exceed manufacturer's recommended values.

4. Use polypropylene or nylon ropes for pulling conductors.

B. Insulate splices with plastic electrical tape: Scotch No. 33+, Tomic No. 1T, or equal.

C. Terminate all control wires with terminal lugs on terminal boards not designed with pressure plates. If splices are needed, use same procedure, installing a terminal board in a junction box for protection.

D. All splices or connections shall be compression type Thomas & Betts or Burndy, no split bolt connections are allowed.

3.04 IDENTIFICATION

A. Feeders: Identify with the corresponding circuit designation at over-current device and load ends, at all splices and in pull boxes.

B. Branch Circuits: Identify with the corresponding circuit designation at the over-current device and at all splices and devices.

C. Control Wires: Identify with the indicated number and/or letter designation at all terminal points and connections.

D. Alarm and Detection Wires: Identify with the indicated wire and zone numbers at all connections, terminal points, and coiled conductors within cabinets.

E. Conductors Terminated By Others: Indicate location of opposite end of conductor, i.e., Pull Box-Room 101.

- F. For identification of conductors, use heat shrinkable white marking sleeves such as Brady Permasleeve with type written identification.
- G. Circuit designation is construed to mean panel designation and circuit number, i.e., LA-13.

END OF SECTION

SECTION 26 0130

ELECTRICAL BOXES

PART 1 - GENERAL

1.01 WORK INCLUDED

- A. Boxes; including:
 - 1. Outlet boxes.
 - 2. Pull and junction boxes.
 - 3. Cabinets.

1.02 RELATED WORK SPECIFIED ELSEWHERE

- A. Submittals: Section 260000.

PART 2 - PRODUCTS

2.01 MATERIAL AND FABRICATION

- A. Outlet Boxes:
 - 1. Pressed Steel Boxes: Knockout type, hot-dipped or electro-plate galvanized.
 - 2. Cast Iron Boxes: Hot-dipped or electro-plate galvanized with threaded hubs.
 - 3. Cast Iron Conduit Bodies: Hot-dipped or electro-plate galvanized with threaded hubs.
 - 4. Cast copper free aluminum conduit bodies with threaded hubs.
 - 5. Covers for Pressed Steel Boxes: Hot dipped or electro-plate galvanized.
 - 6. Outlet boxes manufactured in accordance with UL 514.
- B. Pull and Junction Boxes:
 - 1. Sheet steel, hot-dipped or electro-plate galvanized, or prime coated and a final coat of manufacturer's standard enamel or lacquer finish. Manufactured in accordance with UL 50.
 - a) Where exposed to weather, provide raintight hubs for conduits entering the boxes, top and sides only.

2. Floor Boxes:
 - a) Single gang, similar to Hubbell #B-2536.
 - b) Covers:
 - 1) Combination, similar to Hubbell #S-2525.
 - 2) Duplex receptacle, similar to Hubbell #S-3925.
 - c) Carpet flange, similar to Hubbell #S-3075 thru #S-3079.
 - d) Hubs: Provide hubs as required to suit the conduit arrangement.
 3. Pre-Cast Concrete Pull Boxes: As manufactured by Jensen Pre-Cast or Utility Vault and shown on drawings.
 4. High impact resistant PVC boxes: As manufactured by Carlon, Sedco, or R & G Sloan.
- C. Cabinets: Sheet metal, prime coat and final coat of manufacturer's standard enamel or lacquer finish. Manufactured in accordance with UL 50.
1. Control Cabinet: NEMA 1 enclosure, door with butt hinges and flush handle latches.
 - a) Provide with removable steel back panel.
 2. Terminal Cabinets: NEMA 1 enclosure, door with concealed hinges and spring catch type flush cylinder locks. Key locks alike, provide two keys with each lock.
 3. Provide engraved plastic nameplates with 1/2" minimum height letters indicating designation of control and terminal cabinets as shown on the drawings.
 - a) Secure nameplates with at least two screws or rivets. Cementing and adhesive installation not acceptable.

PART 3 - EXECUTION

3.01 USE

A. Outlet Boxes:

1. Ceiling Outlet Boxes: Not less than 4" octagonal by 2" deep.
2. FDD cast iron or cast aluminum device boxes and conduit bodies with metal covers for exposed conduit installation. Provide gasket for covers in wet areas.

3. Intercom, Microphone and TV Outlet Boxes: Not less than 4-11/16" square x 2-1/8" deep.
4. Provide floor boxes with quantity of gangs as required for power, communication or control as indicated. Use boxes with barriers where required. Provide carpet flanges in carpeted areas.

B. Pull and Junction Boxes:

1. Use sheet steel boxes NEMA Type 1 for indoor and NEMA Type 3R for outdoor installation, except as follows.
2. Use pre-cast concrete boxes for boxes flush in finish grade where requiring a nominal capacity greater than 144 cubic inches, where located in vehicular traffic areas, or where indicated.
3. Use polyvinyl chloride (PVC) boxes flush in finish grade when the nominal internal volume is less than or equal to 144 cubic inches or where indicated.
4. Use cast iron boxes for boxes flush in slab on grade.

3.02 INSTALLATION

- A. Provide 3/8" fixture studs in wall bracket and ceiling boxes.
- B. Provide covers suitable for the fixtures or devices used.
- C. Make outlet box covers flush with finished surfaces.
- D. Close unused open knockouts with knockout seals.
- E. Provide 1" deep plaster rings on recessed outlet boxes installed in areas where concrete will be exposed after construction is complete.
- F. Where boxes are concealed in exposed concrete unit masonry, use square cornered types or boxes fitted with rings of sufficient depth for the box to be recessed completely within cavity of block or tile. Install box to insure that ring fits an opening sawed out of the masonry, so that no mortar is required to fill between ring and construction.
- G. Provide a 6" base of compacted crushed rock under pre-cast concrete pull boxes.
- H. Adjust floor boxes so they are level with top of finished floors.
- I. Provide pull boxes and junction boxes in all branch circuit and feeder runs as indicated. Do not provide pull boxes unless they are indicated or required by the Electrical Code.

3.03 IDENTIFICATION

- A. Junction Boxes: Use permanent black marker, 2" high lettering, and on each cover plate indicate the power source and circuits contained within that junction box.

END OF SECTION

SECTION 26 0140

WIRING DEVICES

PART 1 - GENERAL

1.01 SECTION INCLUDES:

- A. Wiring devices.

1.02 RELATED WORK SPECIFIED ELSEWHERE

- A. Identification: Section 260030.
- B. Boxes: Section 260130.

1.03 SUBMITTALS

- A. In accord with Section 260010.

1.04 DEFINITION

- A. Wiring devices: This term includes all wall switches, pushbuttons, receptacles, and plates used for general purpose installation.

PART 2 - PRODUCTS

2.01 MATERIAL AND FABRICATION

- A. Wall switches:

Quiet toggle type, 20A – 120/277 VAC rated, with terminal screws to take up to No. 10 AWG conductors:

	SPST	DPST	3-WAY	SPST KEY SWITCH LOCK	4-WAY
Arrow-Hart	1991-I	1992-I	1993-I	1991-L	1994-I
Bryant	4901-I	4902-I	4903-I	4901-L	4904-I
General Electric	GE5951-2	GE5952-2	GE5953-2	GE5951-OL	GE5954-2
Hubbell	1221-I	1222-I	1223-I	1221-L	1224-I
Pass & Seymour/ Legrand	20AC1-I	20AC2-I	20AC3-I	20AC1-L	20AC4-I

Momentary contact type, 20A-120/277V, two-circuit, three-position, center off:

Arrow-Hart	1995-I
Bryant	4921-I
General Electric	GE5935-2
Hubbell	1557-I
Pass & Seymour/Legrand	1250-I

Passive infrared wall switch sensors: Ivory, 180° field of view, adjustable time out and ambient light, 1200 sq. ft. Coverage, 120 VAC, 60 Hz, 1500W. Maximum load, incandescent and fluorescent. As manufactured by Hubbell No. AT1201 or Owner- approved equivalent by Leviton or Pass & Seymour.

Fan speed controllers: AC unit rated 15A - 120V used to control up to twelve 56 in./52 in./48 in. ceiling fans or up to twenty 42 in. fans on a single circuit. Rinaudo's Reproductions No. 22394.

B. Passive infrared motion switching system:

1. Ceiling mount sensor, white, 500 sq. ft. coverage, requires control unit. Hubbell No. ATD500CRP.
2. Ceiling mount sensor, white, 2000 sq. ft. coverage, ceiling height dependent, requires control unit. Hubbell No. ATD2000CRP.
3. Ceiling or wall mount sensor, white, 1000 sq. ft. coverage, requires control unit. Hubbell No. ATD1000CRP.
4. Ceiling or wall mount hallway sensor, white, covers area 75 ft. long by 20 ft. wide, requires control unit. Hubbell No. PIR90HW1.
5. Low-voltage control unit, 120VAC, controls one to four sensors. Mount in 4 in. x 4in. enclosure. Hubbell No. CU120A.
6. Relay, 120VAC coil, used when load to be controlled exceeds capacity of a single circuit. Hubbell No. AAR

C. Receptacles, caps, and connectors:

1. 15A-125V, NEMA 5-15, parallel slot type with grounding pin:

	DUPLEX	SINGLE	GFI
Arrow-Hart	5252-I	5261-I	GF5242-I
Bryant	5252-I	5261-I	GFR52FT
General Electric	5252-2	5261-2	TGTR115F
Hubbell	5252-I	5251-I	GF5252-I
Pass & Seymour/Legrand	5252-I	5261-I	1591-SHG

2. 15A-250V, NEMA 6-15, straight blade grounding type:

	RECEPTACLE	CAP
Arrow-Hart	5661-I	6666
Bryant	5661-I	5666-N
General Electric	GE4069-2	GED0611
Hubbell	5661-I	5666-C
Pass & Seymour/Legrand	5662-I	5666-X

3. 15A-125V, NEMA L5-15, locking type with ground:

	RECEPTACLE	CAP	CONNECTOR
Arrow-Hart	4700	4721	4731
Bryant	4700	4721-NSY	4732-NSY
General Electric	GL4700	GLD0511	GLD0513
Hubbell	4700	4720-C	4729-C
Pass & Seymour/Legrand	4700	L515-P	L515-C

4. 20A-125V, NEMA 5-20, straight blade grounding type:

	RECEPTACLE	CAP
Arrow-Hart	5361-I	5362-I
Bryant	5361-I	5362-I
General Electric	GE4102-2	GE4108-2
Hubbell	5361-I	5362-I
Pass & Seymour/Legrand	5361-I	5362-I

5. 20A-125V, NEMA L5-20, two-pole, three-wire locking type, with ground:

	RECEPTACLE	CAP	CONNECTOR
Arrow-Hart	6200	6202	6204
Bryant	70520-FR	70520-NP	70520-NC
General Electric	GL0520	GLD0521	GLD0523
Hubbell	2310-A	2311	2313
Pass & Seymour/Legrand	L520-R	L520-P	L520-C

6. 20A-125V, NEMA 5-20, two-pole, three-wire, straight blade isolated grounding type receptacle:

	DUPLEX	SINGLE
Arrow-Hart	IG5362	IG5361
Bryant	5362-IG	5361-IG
General Electric	GE8300-IG	GE8310-IG
Hubbell	IG-5362	IG-5361
Pass & Seymour/Legrand	IG-6300	IG-5361

7. 20A-125 VAC, two-pole, three-wire, NEMA 5-20, straight blade, specification grade, ivory color, ground fault circuit interrupter receptacle (GFCI), rated for feed-through wiring, with LED indicator light:

	GFCI RECEPTACLE
Hubbell	GF-5362I
Pass & Seymour	2091-S-L-I
Leviton	6898-I

8. 20A-125/250V, NEMA 14-20, three-pole, four-wire straight blade grounding type:

	RECEPTACLE	CAP
Arrow-Hart	5759	5757
Bryant	-	-
General Electric	GE1420	GED1421
Hubbell	8410	8411-C
Pass & Seymour/Legrand	L1420-R	L1420-P

9. 20A-250V, NEMA 6-20, two-pole, three-wire straight blade grounding type:

	RECEPTACLE	CAP	CONNECTOR
Arrow-Hart	8510	6866	6869
Bryant	5461	5466N	5469N
General Electric	GE4182	GED0621	GED0623
Hubbell	5461	HBL5466-C	HBL5469-C
Pass & Seymour/Legrand	5871	5466-X	5469-X

10. 20A-120/208V, NEMA L21-20, four-pole, five-wire locking and grounding type:

	RECEPTACLE	CAP	CONNECTOR
Arrow-Hart	6470	6472	6474
Bryant	72120-FR	72120-NP	72120-NC
General Electric	GL2120	GLD2121	GLD2123
Hubbell	2510A	2511	2513
Pass & Seymour/Legrand	L2120R	L2120P	L2120C

11. 20A-250V, NEMA L6-20, two-pole, three-wire locking and grounding type:

	RECEPTACLE	CAP	CONNECTOR
Arrow-Hart	6210	6212	6214
Bryant	70620FR	70620NP	70620NC
General Electric	GL0620	GLD0621	GLD0623
Hubbell	2320A	2321	2323
Pass & Seymour/Legrand	L620-R	L620-P	L620-C

12. 20A-480V, NEMA L16-20, three-pole, four-wire locking type:

	RECEPTACLE	CAP	CONNECTOR
Arrow-Hart	6430	6432	6434
Bryant	71620-FR	71620-NP	71620-NC
General Electric	GL1620	GLD1621	GLD1623
Hubbell	2430A	2431	2433
Pass & Seymour/Legrand	L1620-R	L1620-P	L1620-C

13. 30A-125V, NEMA 5-30, two-pole, three-wire straight blade grounding type:

	RECEPTACLE	CAP	CONNECTOR
Arrow-Hart	5716N	5717N	6716N
Bryant	9530-FR	9630-RP	-
General Electric	GE4138-3	GED0531	GED0533
Hubbell	9308	9309	-
Pass & Seymour/Legrand	3802	5921	-

14. 30A-125V, NEMA L5-30, two-pole, three-wire grounding and locking type:

	RECEPTACLE	CAP	CONNECTOR
Arrow-Hart	6330	6332	6334
Bryant	70530-FR	70530-NP	70530-NC
General Electric	GL0530	GLD0531	GLD0533
Hubbell	2610	2611	2613
Pass & Seymour/Legrand	L530-R	L530-P	L530-C

15. 30A-125/250V, NEMA 14-30, three-pole, four-wire straight blade grounding type:

	RECEPTACLE	CAP
Arrow-Hart	5744N	5746N
Bryant	9430-FR	5746
General Electric	GE4191-3	GED1431
Hubbell	9430	9431
Pass & Seymour/Legrand	5740	5741-AN

16. 30A-125/250V, NEMA L14-30, three-pole, four-wire grounding and locking type:

	RECEPTACLE	CAP	CONNECTOR
Arrow-Hart	6510	6512	6514
Bryant	71430-FR	71430-NP	71430-NC
General Electric	GL1430	GLD1431	GLD1433
Hubbell	2710-A	2711	2713
Pass & Seymour/Legrand	L1430-R	L1430-P	L1430-C

17. 30A-250V, NEMA L6-30, two-pole, three-wire locking blade grounding type:

	RECEPTACLE	CAP	CONNECTOR
Arrow-Hart	6340	6342	6344
Bryant	70630-FR	70630-NP	70630-NC
General Electric	GL0630	GLD0631	GLD0633
Hubbell	2620-A	2621	2623
Pass & Seymour/Legrand	L630-R	L630-P	L630-C

18. 30A-250V, NEMA 6-30, two-pole, three-wire straight blade grounding type:

	RECEPTACLE	CAP	CONNECTOR
Arrow-Hart	5700N	5701N	6700N
Bryant	9630-FR	9630-ANP	-
General Electric	GE4139-3	GE4328-9	GE4373-9
Hubbell	9330	9331	-
Pass & Seymour/Legrand	3801	5931	-

19. 50A-208V (50A-600V), three-pole, four-wire locking type with ground:

	RECEPTACLE	CAP	CONNECTOR
Arrow-Hart	3769	3765	3764
Bryant	3769	3765	3764
General Electric	LD3769	LD3765	LD3764
Hubbell	3769	3765-C	3764-C
Pass & Seymour/Legrand	3769	3765	3764

20. 50A-125/250V, NEMA 15-50, three-pole, four-wire grounding straight blade type:

	RECEPTACLE	CAP
Arrow-Hart	5754N	5745N
Bryant	9450-FR	5745
General Electric	GE4181-3	GE4180-3
Hubbell	9450	9451
Pass & Seymour/Legrand	5750	5751-AN

21. 50A-125/250V, three-pole, four-wire grounding locking blade type:

	RECEPTACLE	CAP	CONNECTOR
Arrow-Hart	CS6369	CS6365	CS6364
Bryant	CS6369	CS6365	CS6364
General Electric	-	-	-
Hubbell	CS6369	CS6365	CS6364
Pass & Seymour/Legrand	-	-	-

22. 50A-250V, NEMA 6-50, two-pole, three-wire grounding straight blade type:

	RECEPTACLE	CAP	CONNECTOR
Arrow-Hart	5709N	5710N	6709N
Bryant	9650-FR	9650-RP	-
General Electric	GE4141-3	GED0651	GED0653
Hubbell	9367	9368	-
Pass & Seymour/Legrand	3804	3869	-

23. 60A-120/208V, three-phase, 60 Hz, five-pole, five-wire, watertight, with threaded cap:

	BOX	ANGLE ADAPTER	RECEPTACLE BODY	COMPLETE ASSEMBLY
Hubbell	26401	26404	26520	-
Crouse-Hinds	-	-	-	Area-6575
Russell Stoll	-	-	-	DS6516-FRAB-

24. 60A-480V, NEMA L16-20, three-pole, four-wire locking type:

	RECEPTACLE	CAP	CONNECTOR
Arrow-Hart	-	-	-
Bryant	-	-	-
General Electric	-	-	-
Hubbell	HBL 26410	HBL 26402	HBL 26418
Pass & Seymour/Legrand	-	-	-

D. Safety receptacle: 15A-125V, NEMA 5-15, straight blade grounding safety receptacle, Hubbell No. SG-62H-1.

E. Door monitoring switches:

1. General: Provide magnetic door switches (one per leaf) and key switches at specific door locations as indicated on Drawings. Refer to Electrical Drawings details for schematic installation details of door switches.
2. Magnetic contact switches: Provide concealed magnetic SPDT switches with minimum 6-ft. wire leads, Sentrol No. 1076W-06 for hollow metal doors and frames. Where necessary, provide other similar Sentrol types to suit concealed installation conditions, as approved by Owner and compatible with Owner's ride control and/or existing security system equipment. Color of switches to closely match finish or paint color of door frame.
3. Key switches: Arrow-Hart No. 1191L.

F. Device cover plates:

1. Interior plates: Specification grade plastic, 0.1 in. thick, ivory in color, UL listed.
 - a) Plates in kitchens and restrooms to be polished stainless steel, 0.040 in. thick except in kitchens use double lift lid weatherproof gasketed plates for convenience receptacles.
 - b) MATV plate: RMS No. CA-4028.
2. Exterior plates: Choose type of exterior cover plate in accord with the device location and/or manner in which device will be used. Device cover plates shall be die-cast aluminum with hinged cover, rated for respective type of use specified below, or as indicated on Drawings.

- a) Outlet box weatherproof hoods: NEMA 3R rating, gasketed, for unattended use with cover closed, padlockable latching cover to meet OSHA lockout/tagout requirements, large cord opening and UL listed. As manufactured by Hubbell, Intermatic or Leviton.
- b) Low profile weatherproof cover: Gasketed, approved for use with cover open, self-closing hinged covers (two independent self-closing lids for duplex receptacles which are horizontally mounted), UL listed. As manufactured by Hubbell, Leviton or Pass & Seymour.
- c) Communication outlet weatherproof hoods: NEMA 3R rating for unattended use with cover closed, two-cord openings and UL listed. As manufactured by Red Dot.

PART 3 - EXECUTION

3.1 INSTALLATION

- A. Mount switches and receptacles in vertical position in building interiors.
- B. Mount receptacles with weatherproof plates in horizontal position.
- C. Install receptacles mounted vertically so that the ground contact falls on the top position, and horizontally-mounted receptacles with neutral pole in top position.
- D. Use plastic blank plates on J-boxes in public areas.
- E. Use mechanical type door switches for load control.
- F. Install receptacles for plug in lighting fixtures within 36 in. of fixture location.
- G. Use safety type receptacles with low profile weatherproof metal covers for all convenience outlets in guest accessible areas (i.e., queue lines, waiting areas, etc.).
- H. All GFI type exterior receptacles shall be provided with weatherproof metal hoods.
- I. GFI type receptacles shall not be fed-through wire.

END OF SECTION

SECTION 26 0190

SUPPORT DEVICES

PART 1 - GENERAL

1.01 WORK INCLUDED

- A. Support devices for conduit, boxes, lighting fixtures and equipment.

PART 2 - PRODUCTS

2.01

2.02 MATERIAL AND FABRICATION

- A. Hangers: Steel cadmium plated.
- B. Straps: One-hole and two-hole malleable iron, hot-dipped galvanized or steel, cadmium or zinc plated.
- C. Beam Clamps: Malleable iron, hot-dipped galvanized or cadmium plated.
- D. Channels and Fittings:
 - 1. Channels: Hot-dipped galvanized.
 - 2. Fittings: Galvanized.
- E. Anchors: Self drilling and expansion bolt types. No wood or fiber plugs or concrete nails are acceptable.

PART 3 - EXECUTION

3.01 USE

- A. Use one-hole or two-hole straps for single conduit runs on walls or ceilings.
- B. Use hangers with solid steel rods for hanging single conduits.
- C. Use formed channel trapezes for groups of two or more conduits.
- D. To fasten boxes and supports to:
 - 1. Wood: Use wood screws or screw type nails of equal holding power.

- 2. Brick and Concrete: Use bolts and expansion shields.
- 3. Hollow Masonry Units: Use toggle bolts.
- E. Support sheet metal boxes from building structure directly or by bar hangers.
- F. Do not penetrate reinforced concrete beams with fastenings more than 1-1/2" or reinforced concrete joints with more than 3/4" fastenings to prevent contact with reinforcing steel.

END OF SECTION

SECTION 26 2510

LIGHTING FIXTURES

PART 1 - GENERAL

1.01 SUMMARY

- A. Section includes:
 - 1. Lighting fixtures, including lamps, accessories and support materials.
- B. Related work:
 - 1. Submittals: Section 26 0000.

PART 2 - PRODUCTS

2.01 MATERIAL AND FABRICATION

- A. Fixtures schedule lists one or more acceptable manufacturers for each fixture type.
- B. Provide all lighting fixtures of each type from the same manufacturer.
- C. Provide sockets for screw base lamps of plated steel, brass or bronze.
- D. All fixtures shall be LED.
- E. Flexible metal conduit systems connecting individual tandem wired lighting fixtures.
 - 1. Conductors carrying line voltage and current shall be sized in accordance with the overcurrent device protecting the circuit indicated.
 - 2. Provide a #12 AWG minimum size ground conductor.
- F. Provide electronic dimming drivers/ballasts for all fixtures.

PART 3 - EXECUTION

3.01 INSTALLATION

- A. Provide a lighting fixture for each lighting outlet indicated.
- B. Provide recessed and semi recessed fixtures with mounting frames compatible with the ceiling and wall systems employed and secure fixture mechanically to frame.

- C. Align rows of suspended and surface mounted fluorescent fixtures to form straight lines at uniform elevations.
- D. Provide swivel ball type hangers which will allow a minimum of 45 degrees angle for fixtures indicated as pendant mounted.
- E. Make recessed fixture fit snugly against ceiling to prevent light leakage.
- F. Support suspended and surface mounted LED fixtures as follows:
 - 1. Fixtures not over 12 inches wide and not over 50 inches long, a minimum of two fastenings.
 - 2. Fixtures not over 12 inches wide and over 50 inches long, a minimum of three fastenings.
 - 3. Fixtures over 12 inches wide and not over 50 inches long, a minimum of four fastenings.
- G. Support pendant mounted LED fixtures as follows:
 - 1. Single fixtures not over 12 inches wide, a minimum of two single pendants.
 - 2. Single fixtures over 12 inches wide, a minimum of two single pendants at each end or one double pendant at each end.
 - 3. Continuous rows of fixtures not over 12 inches wide, a minimum of one single pendant for each fixture plus one for each row.
 - 4. Continuous rows of fixtures over 12 inches wide, a minimum of two single pendants or one double pendant for each fixture plus one for each row.
 - 5. Locate pendants for continuous row fixtures at each joint and each end of row.
 - 6. Rigidly fasten continuous row fixtures together with fixtures manufacturer supplied joiner.
- H. Clean existing fixtures to be reused.
- I. EMT shall not be used to support suspended fixtures of any type. Suspension shall be by means of standard hangers, where available and applicable, by rigid threaded conduit and fittings, or by rods.
- J. Where fixtures are to be mounted on, or suspended from concrete ceiling, provide cast in place inserts.
- K. Fixtures shall not be supported by outlet box cover screws alone; provide a fixture stud or "hickey" for added support.

- L. Provide a junction box at each exit light fixture indicated.
- M. Provide weatherproof boxes and connectors and liquid tight flexible conduit to each light fixture.
- N. All suspended fixtures will be installed with 1/8-inch safety cable and four Crosby clamps (two top and two bottom) to be used as a fixture support backup.

END OF SECTION