SPECIFICATIONS

City of Beverly Hills – City Hall Community Development Remodel

455 N. REXFORD DRIVE
BEVERLY HILLS, CALIFORNIA

AUGUST 30, 2016
RTK PROJECT NO. 15-11704

Prepared by:

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RTK

SECTION 00 00 20

PROJECT DIRECTORY

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SECTION 01 10 00

SUMMARY

PART 1 GENERAL

1.01 PROJECT

A. Project Name: City of Beverly Hills – City Hall Community Development Remodel
B. Owner's Name: City of Beverly Hills

C. Contacts:
Charles Ackerman – Project Manager

D. Design Professional's Name: RTK Architects, Inc.
Contact: Mandana Motahari, AIA.

F. The Project consists of miscellaneous remodel at first floor Community Development Department. Construction shall be performed in two (2) phased as delineated on the drawings – The department will be operational during construction.

1.02 CONTRACT DESCRIPTION

A. Contract Type: A single prime contract based on a Stipulated Price as described in Agreement Document.

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1.03 WORK BY OWNER

A. Items noted NIC (Not in Contract) will be supplied and installed by Owner before Substantial Completion. Some items include:
1. Movable cabinets. (File cabinets, etc.)
2. System furniture.
3. Data / communication cabling.

B. Owner will supply and install the following:
1. System furniture.
2. Security Cameras.
3. Signage (other than required ADA signage)
4. Furnishing
5. Audio Video Equipment **(Except for Ceiling Speakers)**
7. Artwork

1.04 OWNER OCCUPANCY

A. Owner intends to occupy the Project upon Substantial Completion.

B. Schedule the Work to accommodate Owner occupancy.

1.05 CONTRACTOR USE OF SITE AND PREMISES

A. Construction Operations: Limited to areas noted on Drawings.

B. Arrange use of site and premises to allow:
1. Owner occupancy.
2. Work by Others.
3. Work by Owner.
4. Use of site and premises by the public.

C. Provide access to and from site as required by law and by Owner:
   1. Do not obstruct roadways, sidewalks, or other public ways without permit.

D. Time Restrictions:
   1. Refer to General Conditions.

1.06 WORK SEQUENCE

A. Coordinate construction schedule and operations with Owner.

1.07 SPECIFICATION SECTIONS APPLICABLE TO ALL CONTRACTS

A. Unless otherwise noted, all provisions of the sections listed below apply to all contracts. Specific items of work listed under individual contract descriptions constitute exceptions.
B. Section 012100 - Allowances.
C. Section 012300 - Alternatives.
D. Section 012213 – Unit Price Measurements
E. Section 014000 - Quality Requirements.
F. Section 014200 - Reference Standards.
G. Section 015300 - Temporary Facilities and Controls.
H. Section 016000 - Product Requirements.
I. Section 017000 - Execution Requirements.
J. Section 017800 - Closeout Submittals.

PART 2 PRODUCTS - NOT USED

PART 3 EXECUTION - NOT USED

END OF SECTION

SECTION 01 17 00

REQUESTS FOR INFORMATION

PART 1 - GENERAL

1.01 SUMMARY

A. This Section describes procedures for requesting information other than that shown in the Contract Documents, and discusses conditions under which such requests will be considered.

1.02 REQUESTS FOR INFORMATION

A. Assumption of prior knowledge:
   1. Instructions to Bidders for this Work state requirements that, prior to submitting a bid, bidders become thoroughly familiar with the proposed Contract Documents and that they request and secure clarification of all matters on which there may be any question as to design intent.
   2. Reasons for these requirements include the Owner's wish:
      a. That bidders have complete and adequate knowledge of the proposed Work in order to propose a fair and proper bid price;
      b. To avoid unnecessary time-consuming and effort-consuming requests for information during progress of the Work; and
      c. To discourage frivolous requests for information while encouraging acquisition of complete familiarity with the Drawings, Specifications, and other Documents of the Contract.

B. However, the Owner and the Architect recognize that data may inadvertently have been omitted from the Contract Documents or require clarification of alleged conflict of data, and the following procedures are established for requesting such data.

C. Procedures:
   1. Prior to requesting information, conduct a thorough search of the Contract Documents and determine that the information is apparently missing from the Contract Documents or requires clarification of an alleged conflict of data.
   2. Fill out a "Request for Information" form and deliver it to the Architect.
   3. The Architect will conduct the necessary search.
   4. Within five (5) calendar days, the Architect will respond to the Request for Information.
      a. Should the information be missing, or require clarification, the Architect will respond by giving the proper information to the Contractor.

END OF SECTION

SECTION 01 21 00

ALLOWANCES

PART 1 – GENERAL

1.01 SECTION INCLUDES

A. Cash allowances.

B. Contingency allowance.

C. Inspecting and testing allowances.

D. Payment and modification procedures relating to allowances.

1.02 RELATED SECTIONS

A. Section 01 20 00 - Price and Payment Procedures: Additional payment and modification procedures.

1.03 CASH ALLOWANCES

A. Costs Included in Cash Allowances: Cost of product to Contractor or subcontractor, less applicable trade discounts, less cost of delivery to site, less applicable taxes.

B. Costs Not Included in Cash Allowances: Product delivery to site and handling at the site, including unloading, uncrating, and storage; protection of products from elements and from damage; and labor for installation and finishing.

C. Design Professional Responsibilities:
   1. Consult with Contractor for consideration and selection of products, suppliers, and installers.
   2. Select products in consultation with Owner and transmit decision to Contractor.
   3. Prepare Change Order.

D. Contractor Responsibilities:
   1. Assist Design Professional in selection of products, suppliers, and installers.
   2. Obtain proposals from suppliers and installers and offer recommendations.
   3. On notification of which products have been selected, execute purchase agreement with designated supplier and installer.
   4. Arrange for and process shop drawings, product data, and samples. Arrange for delivery.
   5. Promptly inspect products upon delivery for completeness, damage, and defects. Submit claims for transportation damage.

E. Differences in costs will be adjusted by Change Order.

1.04 CONTINGENCY ALLOWANCE – Not Used.

1.05 INSPECTING AND TESTING ALLOWANCES – Not Used.

1.06 ALLOWANCES SCHEDULE

A. **Allowance # 1**
Include an allowance of $7,500.00 for relocation of electronic access control Equipment at designated door locations (Excluding Conduits and raceways)

Installation under this allowance shall be an approved AMAG integrator.

B. **Allowance # 2**
Include an allowance of $10,000.00 to provide Data Cables including installations and terminations.

C. **Allowance # 3**
Include an allowance of $5,000.00 for HVAC Control System modifications.

D. **Allowance # 4**
Include an allowance of $5,000.00 for Fire Alarm modifications.

PART 2 – PRODUCTS - NOT USED

PART 3 – EXECUTION - NOT USED

END OF SECTION

SECTION 01 22 13

UNIT PRICE MEASUREMENT

PART 1 - GENERAL

1.1 SUMMARY

A. To provide adequate budget and bonding to cover items not precisely determined by the Owner prior to bidding, state Unit Costs in the Bid as separate line items and as described in this Section.

B. Related work:
   1. Documents affecting work of this Section include, but are not necessarily limited to, General Conditions, Supplementary Conditions, and Sections in Division l of these Specifications.
   2. Other provisions concerning Unit Costs are stated in the General Conditions.

1.2 SPECIFIC UNIT PRICE

A. Indicate in the contract unit cost allowances for the following items:

   1. This section identifies each Unit Cost and describes basic changes to the Work only when that Unit Cost is made a part of the Work by specific provision in the Agreement.

   2. Schedule of Unit Costs:

      A. Unit Cost #1:
      Provide Unit Cost per Square Foot for material and installation of any additional engineered wood paneling (Parklex) not shown on the drawings (Also, see Section 06 42 30).

      B. Unit Cost #2:
      Provide Unit Cost per (48 X 72 Inches) panel for any additional Acoustic Ceiling Panel 'Type 2' not shown on the drawings (Also, see Section 09 51 00).

   3. Except as otherwise specifically provided by the City, the Work described in Unit Costs shall be completed with no increase in Contract Time.
   4. Coordinate related Work and modify surrounding Work as required to accurately and completely integrate the Unit Costs into the Work.

B. Unit Prices quoted on Bid Forms will be reviewed and accepted or rejected at Owner's-Option. Accepted Unit costs will be identified in the owner-Contractor Agreement.

END OF SECTION

SECTION 01 23 00

ALTERNATIVES

PART 1 GENERAL

1.01 SECTION INCLUDES

A. Alternative submission procedures.
B. Documentation of changes to Contract Sum and Contract Time.

1.02 RELATED SECTIONS

A. Document 00200 - Instructions to Bidders: Instructions for preparation of pricing for alternatives.
B. Document 00433 - Supplement C - Alternatives: List of alternatives as supplement to Bid Form.
C. Document 00500 - Agreement: Incorporating monetary value of accepted alternatives.

1.03 ACCEPTANCE OF ALTERNATIVES

A. Alternatives quoted on Bid Forms will be reviewed and accepted or rejected at Owner's option. Accepted alternatives will be identified in the Owner-Contractor Agreement.
B. Coordinate related work and modify surrounding work to integrate the Work of each alternative.

1.04 SCHEDULE OF ALTERNATIVES

A. **Alternative No. 1:**
Refer to drawings Sheets # A-2.1.1, Sheet # A-3.1, Door and Windows identified as PHASE 2, Sheet # E-2.0 , E-4.0 , Sheet # M-2.1.0. All scope identified as ‘PHASE 2’ shall be an Alternate Bid Item.

PART 2 PRODUCTS - NOT USED

PART 3 EXECUTION - NOT USED

END OF SECTION

SECTION 01 31 19

PROJECT MEETINGS

PART 1 - GENERAL

1.01 DESCRIPTION

A. Work included: To enable orderly review during progress of the Work, and to provide for systematic discussion of problems, the Construction Manager will conduct project meetings throughout the construction period.

B. Related work:
   1. Documents affecting work of this Section include, but are not necessarily limited to, General Conditions, Supplementary Conditions, and Sections in Division 1 of these Specifications.
   2. The Contractor's relations with his subcontractors and materials suppliers, and discussions relative thereto, are the Contractor's responsibility and normally are not part of project meetings content.

1.02 SUBMITTALS

A. Agenda items: To the maximum extent practicable, advise the Architect at least 24 hours in advance of project meetings regarding items to be added to the agenda.

B. Minutes:
   1. The Construction Manager will compile minutes of each project meeting, and will furnish required copies to the Contractor and required copies to the Owner.
   2. Recipients of copies may make and distribute such other copies as they wish.

1.03 QUALITY ASSURANCE

A. For those persons designated by the Contractor to attend and participate in project meetings, provide required authority to commit the Contractor to solutions agreed upon in the project meetings.

PART 2 - PRODUCTS

(No products are required in this Section)

PART 3 - EXECUTION

3.01 MEETING SCHEDULE

A. Except as noted below for Preconstruction Meeting, project meetings will be held weekly, or as designated by the Construction manager.

B. Coordinate as necessary to establish mutually acceptable schedule for meetings.

3.02 MEETING LOCATION

A. The Construction manager will establish meeting location. To the maximum extent practicable, meetings will be held at the job site.

3.03 PRECONSTRUCTION MEETING

A. Preconstruction Meeting will be scheduled to be held within -- working days after the Owner has issued the Notice to Proceed.
   1. Provide attendance by authorized representatives of the Contractor and major subcontractors.
   2. The Architect will advise other interested parties, including the Owner, and request their attendance.

B. Minimum agenda: Data will be distributed and discussed on at least the following items:
   1. Organizational arrangement of Contractor's forces and personnel, and those of subcontractors, materials suppliers, Construction manager and Architect.
   2. Channels and procedures for communications.
   3. Construction schedule, including sequence of critical work.
   4. Contract Documents, including distribution of required copies of original Documents and revisions.
   5. Processing of Shop Drawings and other data submitted to the Architect for review.
   6. Processing of Bulletins, field decisions, and Change Orders.
   7. Rules and regulations governing performance of the Work; and
   8. Procedures for safety and first aid, security, quality control, housekeeping, and related matters.
   9. Record drawings and payment schedules.

3.04 PROJECT MEETINGS

A. Attendance:
   1. To the maximum extent practicable, assign the same person or persons to represent the Contractor at project meetings throughout progress of the Work.
   2. Subcontractors, materials suppliers, and others may be invited to attend those project meetings in which their aspect of the Work is involved.

B. Minimum agenda:
   1. Review, revise as necessary, and approve minutes of previous meetings.
   2. Review progress of the Work since last meeting, including status of submittals for approval.
   3. Identify problems which impede planned progress.
   4. Develop corrective measures and procedures to regain planned schedule.
   5. Complete other current business.

C. Revisions to minutes:
   1. Unless published minutes are challenged in writing prior to the next regularly scheduled progress meeting, they will be accepted as properly stating the activities and decisions of the meeting.
   2. Persons challenging published minutes shall reproduce and distribute copies of the challenge to all indicated recipients of the particular set of minutes.
   3. Challenge to minutes shall be settled as priority portions of "old business" at the next regularly scheduled meeting.

SECTION 01 32 16

PROGRESS SCHEDULES

PART 1 - GENERAL

1.01 SUMMARY

A. To assure adequate planning and execution of the Work so that the Work is completed within the number of calendar days allowed in the Contract, and to assist the Architect in appraising the reasonableness of the proposed schedule and in evaluating progress of the Work, prepare and maintain the schedules and reports described in this Section.

B. Related work:
1. Requirements for progress schedule: Bid Package.
2. Construction period: Form of Agreement.

1.02 SUBMITTALS

A. Comply with pertinent provisions of Section 01340.

B. Preliminary analysis: Within ten calendar days after the Contractor has received the Owner's Notice to Proceed, submit one digital file and four prints of a preliminary construction schedule prepared in accordance with Part 3 of this Section.

C. Construction schedule: Within 30 calendar days after the Contractor has received the Owner's Notice to Proceed, submit one reproducible copy and four prints of a construction schedule prepared in accordance with Part 3 of this Section.

D. Periodic reports: On the first working day of each month following the submittal described in Paragraph 1.2-C above, submit four prints of the construction schedule updated as described in Part 3 of this Section.

1.03 QUALITY ASSURANCE

A. Employ a scheduler who is thoroughly trained and experienced in compiling construction schedule data, and in preparing and issuing periodic reports as required below.

B. Reliance upon the approved schedule:
1. The construction schedule as approved by the Architect and the Owner will be an integral part of the Contract and will establish interim completion dates for the various activities under the Contract.
2. Should any activity not be completed within 15 days after the stated scheduled date, the Owner shall have the right to require the Contractor to expedite completion of the activity by whatever means the Owner deems appropriate and necessary, without additional compensation to the Contractor.
3. Should any activity be 30 days or more behind schedule, the Owner shall have the right to perform the activity or have the activity performed by whatever method the Owner deems appropriate.
4. Costs incurred by the Owner and by the Architect in connection with expediting construction activity under this Article shall be reimbursed by the Contractor.
5. It is expressly understood and agreed that failure by the Owner to exercise the option either to order the Contractor to expedite an activity or to expedite the activity by other means shall not be considered to set a precedent for any other activities.

PART 2 - PRODUCTS

2.01 CONSTRUCTION ANALYSIS

A. Graphically show by bar-chart, or other means acceptable to the Architect, the order and interdependence of all activities necessary to complete the Work, and the sequence in which each activity is to be accomplished, as planned by the Contractor and his project field superintendent in coordination with all subcontractors whose work is shown on the diagram.

B. Include, but do not necessarily limit indicated activities to:

1. Project mobilization;
2. Submittal and approval of Shop Drawings and Samples;
3. Procurement of equipment and critical materials;
4. Fabrication of special material and equipment, and its installation and testing.
5. Final cleanup;
6. Final inspecting and testing; and
7. All activities by the Architect that effect progress, required dates for completion, or both, for all and each part of the Work.

PART 3 - EXECUTION

3.01 PRELIMINARY ANALYSIS

A. Contents:

1. Show all activities of the Contractor under this Work for the period between receipt of Notice to Proceed and submittal of construction schedule required under Paragraph 1.2-C above;
2. Show the Contractor's general approach to remainder of the Work;
3. Show cost of all activities scheduled for performance before submittal and approval of the construction schedule.

3.02 CONSTRUCTION SCHEDULE

A. As required under Paragraph 1.2-D above, update the approved construction schedule.

1. Indicate "actual" progress in percent completion for each activity;
2. Provide written narrative summary of revisions causing delay in the program, and an explanation of corrective actions taken or proposed.

3.03 REVISIONS

A. Make only those revisions to approved construction schedule as are approved in advance by the Architect.

END OF SECTION

SUBMITTALS & SUBSTITUTIONS
SCHEDULE FOR SUBMITTALS
01 33 23

		Shop Drawings	Samples	Manufacturer literature	Material List	Tests
Division 6 - Wood and Plastics						
06 40 00	Architectural Wood Casework Cabinets	X	X		X	
06 40 15	Countertops	X	X	X		
06 42 30	Engineered Wood Paneling	X	X	X	X	X
Division 7 - Thermal, Moisture and Acoustical						
07 21 00	Building Insulation			X	X	X
07 92 00	Joint Sealant	X	X	X	X	
Division 8 - Doors and Windows						
08 11 16	Interior Aluminum Doors and Frames	X	X	X	X	X
08 12 14	Trimless Door Frames	X	X	X	X	
08 15 00	Plastic Laminate Face Wood Doors	X	X	X	X	X
08 31 00	Access Doors and Panels	X		X	X	
08 71 00	Door Hardware	X	X	X	X	
08 81 00	Glazing	X	X	X	X	
Division 9 – Finishes						
09 22 16	Non-Structural Metal Stud Framing			X	X	X
09 29 00	Gypsum Board Assemblies	X	X	X	X	X
09 51 00	Acoustical Tile Ceilings and Suspension System		X	X	X	X
09 66 23	Terrazzo Flooring	X	X		X	X
09 68 13	Carpet Tile		X	X	X	X
09 72 00	Wall Covering	X	X	X		
09 90 00	Painting and Coatings	X	X	X	X	X
Division 23 – Mechanical						
23 05 93	Testing, Adjusting, & Balancing for HVAC			X	X	X
23 31 00	HVAC Ducts & Casing	X		X	X	X
23 37 00	Air Outlets & Inlets	X		X	X	X
Division 16 – Electrical						
26 05 00	Electrical	X	X	X	X	X

SECTION 01 40 00

QUALITY REQUIREMENTS

PART 1 GENERAL

1.01 SECTION INCLUDES

A. References and standards.

B. Quality assurance submittals.

C. Mock-ups.

D. Control of installation.

E. Tolerances.

F. Testing and inspection services.

G. Manufacturers' field services.

1.02 RELATED SECTIONS

A. Document 00300 - Information Available to Bidders: Soil investigation data.

B. Document 00700 - General Conditions: Inspections and approvals required by public authorities.

C. Section 01210 - Allowances: Allowance for payment of testing services.

D. Section 01300 - Administrative Requirements: Submittal procedures.

E. Section 01425 - Reference Standards.

F. Section 01600 - Product Requirements: Requirements for material and product quality.

1.03 REFERENCES

A. ASTM C 1021 - Standard Practice for Laboratories Engaged in Testing of Building Sealants; 2001.

B. ASTM C 1077 - Standard Practice for Laboratories Testing Concrete and Concrete Aggregates for Use in Construction and Criteria for Laboratory Evaluation; 2005b.

C. ASTM C 1093 - Standard Practice for Accreditation of Testing Agencies for Unit Masonry; 2006.

D. ASTM D 3740 - Standard Practice for Minimum Requirements for Agencies Engaged in the Testing and/or Inspection of Soil and Rock as Used in Engineering Design and Construction; 2004a.

E. ASTM E 329 - Standard Specification for Agencies Engaged Construction Inspection and/or Testing; 2005b.

F. ASTM E 543 - Standard Practice for Agencies Performing Nondestructive Testing; 2004.

1.04 SUBMITTALS

A. Testing Agency (Services retained by the owner):
   1. Prior to start of Work, agency name, address, and telephone number, and names of full time registered Engineer and responsible officer will be published.

2. Submit copy of report of laboratory facilities inspection made by NIST Construction Materials Reference Laboratory during most recent inspection, with memorandum of remedies of any deficiencies reported by the inspection.

B. Design Data: Submit for Design Professional's knowledge as contract administrator or for the Owner, for information for the limited purpose of assessing conformance with information given and the design concept expressed in the contract documents.

C. Test Reports: After each test/inspection, promptly submit two copies of report to Design Professional and to Contractor.
   1. Include:
      a. Date issued.
      b. Project title and number.
      c. Name of inspector.
      d. Date and time of sampling or inspection.
      e. Identification of product and specifications section.
      f. Location in the Project.
      g. Type of test/inspection.
      h. Date of test/inspection.
      i. Results of test/inspection.
      j. Conformance with Contract Documents.
      k. When requested by Design Professional, provide interpretation of results.
   2. Test reports are submitted for Design Professional's knowledge as contract administrator or for the Owner, for information for the limited purpose of assessing conformance with information given and the design concept expressed in the contract documents.

D. Certificates: When specified in individual specification sections, submit certification by the manufacturer and Contractor or installation/application subcontractor to Design Professional, in quantities specified for Product Data.
   1. Indicate material or product conforms to or exceeds specified requirements. Submit supporting reference data, affidavits, and certifications as appropriate.
   2. Certificates may be recent or previous test results on material or product, but must be acceptable to Design Professional.

E. Manufacturer's Instructions: When specified in individual specification sections, submit printed instructions for delivery, storage, assembly, installation, start-up, adjusting, and finishing, for the Owner's information. Indicate special procedures, perimeter conditions requiring special attention, and special environmental criteria required for application or installation.

F. Manufacturer's Field Reports: Submit reports for Design Professional's benefit as contract administrator or for Owner.
   1. Submit report in duplicate within 30 days of observation to Design Professional for information.
   2. Submit for information for the limited purpose of assessing conformance with information given and the design concept expressed in the contract documents.

G. Erection Drawings: Submit drawings for Design Professional's benefit as contract administrator or for Owner.
   1. Submit for information for the limited purpose of assessing conformance with information given and the design concept expressed in the contract documents.
   2. Data indicating inappropriate or unacceptable Work may be subject to action by Design Professional or Owner.

1.05 REFERENCES AND STANDARDS

A. For products and workmanship specified by reference to a document or documents not included in the Project Manual, also referred to as reference standards, comply with requirements of the standard, except when more rigid requirements are specified or are required by applicable codes.

B. Conform to reference standard of date of issue current on date of Contract Documents, except where a specific date is established by applicable code.

C. Obtain copies of standards where required by product specification sections.

D. Maintain copy at project site during submittals, planning, and progress of the specific work, until Substantial Completion.

E. Should specified reference standards conflict with Contract Documents, request clarification from Design Professional before proceeding.

F. Neither the contractual relationships, duties, or responsibilities of the parties in Contract nor those of Design Professional shall be altered from the Contract Documents by mention or inference otherwise in any reference document.

1.06 TESTING AND INSPECTION AGENCIES

A. Owner will employ and pay for services of an independent testing agency to perform specified and other required testing.

B. Contractor shall employ and pay for services of an independent testing agency to perform other specified testing.

C. As indicated in individual specification sections, Owner or Contractor shall employ and pay for services of an independent testing agency to perform other specified testing.

D. Employment of agency in no way relieves Contractor of obligation to perform Work in accordance with requirements of Contract Documents.

E. Contractor Employed Agency:
   1. Testing agency: Comply with requirements of ASTM E 329, ASTM E 543, ASTM C 1021, ASTM C 1077, and ASTM C 1093.
   2. Inspection agency: Comply with requirements of ASTM D3740 and ASTM E329.
   3. Laboratory: Authorized to operate in Project Location.
   4. Laboratory Staff: Maintain a full time registered Engineer on staff to review services.
   5. Testing Equipment: Calibrated at reasonable intervals either by NIST or using an NIST established Measurement Assurance Program, under a laboratory measurement quality assurance program.

PART 2 PRODUCTS - NOT USED

PART 3 EXECUTION

3.01 CONTROL OF INSTALLATION

A. Monitor quality control over suppliers, manufacturers, products, services, site conditions, and workmanship, to produce Work of specified quality.

B. Comply with manufacturers' instructions, including each step in sequence.

C. Should manufacturers' instructions conflict with Contract Documents, request clarification from Design Professional before proceeding.

D. Comply with specified standards as minimum quality for the Work except where more stringent tolerances, codes, or specified requirements indicate higher standards or more precise workmanship.

E. Have Work performed by persons qualified to produce required and specified quality.

F. Verify that field measurements are as indicated on shop drawings or as instructed by the manufacturer.

G. Secure products in place with positive anchorage devices designed and sized to withstand stresses, vibration, physical distortion, and disfigurement.

3.02 MOCK-UPS

A. Tests will be performed under provisions identified in this section and identified in the respective product specification sections.

B. Assemble and erect specified items with specified attachment and anchorage devices, flashings, seals, and finishes.

C. Accepted mock-ups shall be a comparison standard for the remaining Work.

D. Where mock-up has been accepted by Design Professional and is specified in product specification sections to be removed, remove mock-up and clear area when directed to do so.

3.03 TOLERANCES

A. Monitor fabrication and installation tolerance control of products to produce acceptable Work. Do not permit tolerances to accumulate.

B. Comply with manufacturers' tolerances. Should manufacturers' tolerances conflict with Contract Documents, request clarification from Design Professional before proceeding.

C. Adjust products to appropriate dimensions; position before securing products in place.

3.04 TESTING AND INSPECTION

A. See individual specification sections for testing required.

B. Testing Agency Duties:
   1. Provide qualified personnel at site. Cooperate with Design Professional and Contractor in performance of services.
   2. Perform specified sampling and testing of products in accordance with specified standards.
   3. Ascertain compliance of materials and mixes with requirements of Contract Documents.
   4. Promptly notify Design Professional and Contractor of observed irregularities or non-conformance of Work or products.
   5. Perform additional tests and inspections required by Design Professional.
   6. Submit reports of all tests/inspections specified.

C. Limits on Testing/Inspection Agency Authority:
   1. Agency may not release, revoke, alter, or enlarge on requirements of Contract Documents.
   2. Agency may not approve or accept any portion of the Work.
   3. Agency may not assume any duties of Contractor.
   4. Agency has no authority to stop the Work.

D. Contractor Responsibilities:
   1. Deliver to agency at designated location, adequate samples of materials proposed to be used which require testing, along with proposed mix designs.
   2. Cooperate with laboratory personnel, and provide access to the Work and to manufacturers' facilities.
   3. Provide incidental labor and facilities:
      a. To provide access to Work to be tested/inspected.
      b. To obtain and handle samples at the site or at source of Products to be tested/inspected.
      c. To facilitate tests/inspections.
      d. To provide storage and curing of test samples.
   4. Notify Design Professional and laboratory 24 hours prior to expected time for operations requiring testing/inspection services.

   5. Employ services of an independent qualified testing laboratory and pay for additional samples, tests, and inspections required by Contractor beyond specified requirements.
   6. Arrange with Owner's agency and pay for additional samples, tests, and inspections required by Contractor beyond specified requirements.

E. Re-testing required because of non-conformance to specified requirements shall be performed by the same agency on instructions by Design Professional. Payment for re testing will be charged to the Contractor by deducting testing charges from the Contract Price.

3.05 MANUFACTURERS' FIELD SERVICES

A. When specified in individual specification sections, require material or product suppliers or manufacturers to provide qualified staff personnel to observe site conditions, conditions of surfaces and installation, quality of workmanship, start-up of equipment, test, adjust and balance of equipment, and to initiate instructions when necessary.

B. Submit qualifications of observer to Design Professional 30 days in advance of required observations.
   1. Observer subject to approval of Design Professional.
   2. Observer subject to approval of Owner.

C. Report observations and site decisions or instructions given to applicators or installers that are supplemental or contrary to manufacturers' written instructions.

3.06 DEFECT ASSESSMENT

A. Replace Work or portions of the Work not conforming to specified requirements.

END OF SECTION

SECTION 01 41 00

REGULATORY REQUIREMENTS

PART 1 - GENERAL

1.01 SUMMARY

A. This Section describes testing and inspecting to be provided by the Contractor.

B. Related work:

1. Documents affecting work of this Section include, but are not necessarily limited to, General Conditions, Supplementary Conditions, and Sections in Division 1 of these Specifications.
2. Requirements for testing may be described in various Sections of these Specification.

PART 2 - PRODUCTS

2.01 PAYMENT FOR TESTING

A. The Owner will pay for all testing and inspecting required under this Section of these Specifications, and to cover all testing and inspecting required by governmental agencies having jurisdiction. Testing and inspecting specifically requested by the Architect over and above those described above.

B. When tests requested by the Architect indicate noncompliance with the Contract Documents, all testing and subsequent retesting occasioned by the noncompliance shall be performed by the same testing laboratory and the costs thereof shall be paid by the Contractor.

2.02 SPECIFIC TESTS AND INSPECTIONS

A. Tests and inspections will be performed where required by governmental agencies having jurisdiction, required by provisions of the Contract Documents, and such other tests and inspections as are directed by the Architect. List of special inspection is identified on Structural drawings Sheet #S-0.0.0

B. Tests include, but are not necessarily limited to, those described in detail in Part 3 of this Section.

PART 3 - EXECUTION

3.01 TAKING SPECIMENS

A. Except as may be specifically otherwise approved by the Architect, have the testing laboratory secure and handle all samples and specimens for testing.

3.02 COOPERATION WITH TESTING LABORATORY

A. Provide access to the Work at all times and at all locations where the Work is in progress. Provide facilities for such access to enable the laboratory to perform its functions properly.

3.03 SOIL INSPECTING AND TESTING

A. Make required inspections and tests including, but not necessarily limited to:

1. Visually inspect on-site and imported fill and backfill, making such tests and retests as are necessary to determine compliance with the Contract requirements and suitability for the proposed purpose;

2. Make field density tests on samples from in-place material as required;

3. As pertinent, inspect and test the scarifying and recompacting of cleaned subgrade; inspect the progress of excavating, filling, and grading; make 90% density tests at fills and backfills; and verify compliance with provisions of the Contract Documents and governmental agencies having jurisdiction.

B. Make and distribute necessary reports and certificates.

3.04 CONCRETE INSPECTING AND TESTING

A. Portland cement:

1. Secure from the cement manufacturer Certificates of Compliance delivered directly to the concrete producer for further delivery directly to the testing laboratory.

2. Require the Certificates of Compliance to positively identify the cement as to production lot, bin or silo number, dating and routing of shipment, and compliance with the specified standards.

3. If so required by the Architect, promptly provide such other specific physical and chemical data as requested.

B. Aggregate:

1. Provide one test unless character of material changes, material is substituted, or additional test is requested by the Architect.

2. Sample from conveyor belts or batching gates at the ready-mix plant:

a. Sieve analysis to determine compliance with specified standards and grading;

b. Specific gravity test for compliance with specified standards.

C. Laboratory design mix:

1. After approval of aggregate, and whenever character or source of materials is changed, provide mix design in accordance with ACI 613.

2. Provide designs for all mixes prepared and signed by a registered California engineer.

D. Molded concrete cylinders:

1. Provide three test cylinders for each 115 cu m (150 cu yds), or fraction thereof, of each class of concrete of each day's placement.

2. Test one cylinder at seven days, one at 28 days, and one when so directed.

3. Report the mix, slump, gage, location of concrete in the structure, and test results.

4. Take specimens and make tests in accordance with the applicable ASTM standard specifications.

E. Core tests:

1. Provide only when specifically so directed by the Architect because of low cylinder test results.

2. Cut from locations directed by the Architect, securing in accordance with ASTM C42, and prepare and test in accordance with ASTM C39.

F. Placement inspections:

1. Provide continuous or other inspection of concrete if required by governmental agencies having jurisdiction.

2. Throughout progress of concrete placement, make slump tests to verify conformance with specified slump.

3. Using all required personnel and equipment, throughout progress of concrete placement verify that finished concrete surfaces will have the level or slope that is required by the Contract Documents.

3.05 CONCRETE REINFORCEMENT INSPECTING AND TESTING

A. Prior to use, test all reinforcement steel bars for compliance with the specified standards.
1. Material identified by mill test reports, and certified by the testing laboratory, does not require additional testing.

2. Require the supplier to furnish mill test reports to the testing laboratory for certification.
3. Tag identified steel at the supplier's shop.
4. When steel arrives at the job site without such tags, test it as unidentified steel.

B. Unidentified steel:
1. Have the testing laboratory select samples consisting of two pieces, each 450 mm (18") long, of each size.
2. Have the testing laboratory make one tensile test and one bend test for each 2250 kg (2-1/2 tons) or fraction thereof of each size of unidentified steel.

C. Provide continuous inspection for all welding of reinforcement steel.

3.06 STRUCTURAL STEEL INSPECTING AND TESTING

A. Prior to use, test all structural steel for compliance with the specified standards.
1. Material identified by mill test reports, and certified by the testing laboratory, does not require additional testing.
2. Require the supplier to furnish mill test reports to the laboratory for certification.
3. Tag identified steel at the supplier's shop.
4. When steel arrives at the job site without such tags, test it as unidentified steel.

B. Unidentified steel:
1. Have testing laboratory make one tensile test and one bend test for each 4500 kg (five tons) or fraction thereof of each shape and size of unidentified structural steel.

C. Shop welding:
1. Provide qualified testing laboratory inspector.
2. On single pass welds, inspect after completion of welding and prior to painting.
3. On multiple pass welds, and on butt welds with cover pass on the back side, provide continuous inspection.

D. Field welding: Continuous inspection will be required.

3.07 ROOFING AND WATERPROOFING INSPECTING AND TESTING

A. Prior to start of membrane waterproofing and membrane roofing installation, conduct a job site meeting attended by representatives of the installing subcontractors, the Contractor's field superintendent, the testing laboratory inspector, the manufacturers representative and the Architect, to agree upon procedures to be followed.

B. Prior to start of installation, verify that materials at the job site comply with the specified standards, that the subcontractor is qualified to the extent specified, and that the installing personnel are fully informed as to procedures to be followed.

C. During installation, verify that materials are installed in strict accordance with the manufacturers' recommendations as approved by the Architect.

D. When so directed by the Architect, make test cuts to verify conformance with the specified requirements.

3.08 WAIVER OF INSPECTION AND/OR TESTS

A. Specified inspections and/or tests may be waived only by the specific approval of the Architect.

END OF SECTION

SECTION 01 42 00

REFERENCE STANDARDS

PART 1 - GENERAL

1.01 SUMMARY

A. Work included:
   1. Throughout the Contract Documents, reference is made to codes and standards which establish qualities and types of workmanship and materials, and which establish methods for testing and reporting on the pertinent characteristics.
   2. Where materials or workmanship are required by these Contract Documents to meet or exceed the specifically named code or standard, it is the Contractor's responsibility to provide materials and workmanship which meet or exceed the specifically named code or standard.
   3. Proof:
      a. It is also the Contractor's responsibility, when so required by the Contract Documents or by written request from the Architect, to deliver to the Architect all required proof that the materials or workmanship, or both, meet or exceed the requirements of the specifically named code or standard.
      b. Such proof shall be in the form requested by the Architect, and generally will be required to be copies of a certified report of tests conducted by a testing agency approved for that purpose by the Architect.

B. Related work:
   1. Documents affecting work of this Section include, but are not necessarily limited to, General Conditions, Supplementary Conditions, and other Sections of Division One of these Specifications.
   2. Specific naming of codes or standards occurs on the Drawings and/or in these Specifications.

1.02 QUALITY ASSURANCE

A. In procuring all items used in this Work, it is the Contractor's responsibility to verify the detailed requirements of the specifically named codes and standards and to verify that the items procured for use in this Work meet or exceed the specified requirements.

B. Rejection of non-complying items:
   1. The Architect reserves the right to reject items incorporated into the Work which fail to meet the specified minimum requirements.
   2. The Architect further reserves the right, and without prejudice to other recourse the Architect may take, to accept non-complying items subject to an adjustment in the Contract Amount as approved by the Architect and the Owner.

C. Applicable reference standards include, but are not necessarily limited to, standards of agencies and associations who may be referred to in the Specifications by the following abbreviations.

   1. "AA" = Aluminum Association
   2. "AABC" = Associated Air Balance Council
   3. "AAMA" = American Architectural Manufacturers' Association
   4. "AASHTO" = American Assoc. of State Highway and Transportation Officials
   5. "ACI" = American Concrete Institute

6.	"ADC"	=	Air Diffusion Council
7.	"AGC"	=	Associated General Contractors of America
8.	"AI"	=	Asphalt Institute
9.	"AIA"	=	American Institute of Architects
10.	"AISC"	=	American Institute of Steel Construction, Inc.
11.	"AISE"	=	Association of Iron and Steel Engineers
12.	"AISI"	=	American Iron and Steel Institute
13.	"AITC"	=	American Institute of Timber Construction
14.	"ANSI"	=	American National Standards Institute
15.	"APA"	=	American Plywood Association
16.	"API"	=	American Petroleum Institute
17.	"ARI"	=	Air Cond. and Refrigeration Institute
18.	"ASCE"	=	American Society of Civil Engineers
19.	"ASHRAE"	=	American Institute of Heating, Refrigerating, and Air Conditioning Engineers
20.	"ASME"	=	American Society of Mechanical Engineers
21.	"ASTM"	=	American Society for Testing and Materials
22.	"AWI"	=	Architectural Woodwork Institute
23.	"AWS"	=	American Welding Society
24.	"AWWA"	=	American Water Works Association
25.	"BIA"	=	Brick Institute of America
26.	"BOCA"	=	Building Officials and Code Administrators, International
27.	"CDA"	=	Copper Development Association
28.	"CRSI"	=	Concrete Reinforcing Steel Institute
29.	"CS"	=	"Commercial Standards" of the U. S. Department of Commerce Office of Industry and Commerce Commodity Standards Division
30.	"CSA/CAN"	=	Canadian Standards Association
31.	"DOE"	=	United States Department of Energy
32.	"DOT"	=	United States Department of Transportation
33.	"FGMA"	=	Flat Glass Marketing Association
34.	"NEMA"	=	National Electrical Manufacturers' Assoc.
35.	"NFPA"	=	National Fire Protection Association
36.	"PCI"	=	Precast/Prestressed Concrete Institute
37.	"SMACNA"	=	Sheet Metal and Air Conditioning Contractors' National Association
38.	"SSPC"	=	Steel Structures Painting Council
39.	"TCA"	=	Tile Council of America, Inc.
40.	"UL"	=	Underwriters Laboratory

END OF SECTION

SECTION 01 53 00

TEMPORARY FACILITIES AND CONTROLS

PART 1 GENERAL

1.01 SECTION INCLUDES

A. Temporary telephone and facsimile service.

B. Temporary Controls: Barriers, enclosures, and fencing.

C. Security requirements.

D. Vehicular access and parking.

E. Project identification sign.

F. Field offices.

1.02 RELATED SECTIONS

A. Section 01525 - Field Offices.

B. Section 01550 - Vehicular Access and Parking.

C. Section 01565 - Security Measures.

D. Section 01585 - Project Signs.

1.03 TEMPROARY UTILITIES – NOT USED

1.04 TEMPORARY SANITARY FACILITIES – Not Used

1.05 BARRIERS

A. Provide barriers to prevent unauthorized entry to construction areas, to allow for owner's use of site and to protect existing facilities and adjacent properties from damage from construction operations and demolition.

B. Provide barricades and covered walkways required by governing authorities for public rights-of-way and for public access to existing building.

C. Provide protection for plants designated to remain. Replace damaged plants.

D. Protect non-owned vehicular traffic, stored materials, site, and structures from damage.

1.06 FENCING

A. Construction: Contractor's option.

B. Construction: Commercial grade chain link fence.

C. Provide 6 foot (1.8 m) high fence around construction site; equip with vehicular and pedestrian gates with locks.

1.07 EXTERIOR ENCLOSURES

A. Contractor to provide barricades and temporary construction in order to provide access to the building during work on the exterior improvements of the building.

1.08 SECURITY - See Section 01 56 50

A. Provide security and facilities to protect Work, existing facilities, and Owner's operations from unauthorized entry, vandalism, or theft.

B. Coordinate with Owner's security program.

1.09 VEHICULAR ACCESS AND PARKING -

A. Coordinate access and haul routes with governing authorities and Owner.

B. For contractor's parking, see ----------

C. Do not allow vehicle parking on existing pavement.

1.10 WASTE REMOVAL

A. See Section 01 74 00 - Waste Management, for additional requirements.

B. Provide waste removal facilities and services as required to maintain the site in clean and orderly condition.

C. Provide containers with lids. Remove trash from site periodically.

D. locate containers holding flammable material outside the structure unless otherwise approved by the authorities having jurisdiction.

1.11 PROJECT SIGNS -

1.12 PROJECT IDENTIFICATION

A. Provide project identification sign of design and construction indicated on Drawings.

B. No other signs are allowed without Owner permission except those required by law.

1.13 FIELD OFFICES –

1.14 REMOVAL OF UTILITIES, FACILITIES, AND CONTROLS

A. Restore existing facilities used during construction to original condition.

B. Restore new permanent facilities used during construction to specified condition.

PART 2 PRODUCTS - NOT USED

PART 3 EXECUTION - NOT USED

END OF SECTION

SECTION 01 65 00

STORAGE AND PROTECTION

PART 1 GENERAL

1.01 SUMMARY

A. Protect products scheduled for use in the Work by means including, but not necessarily limited to, those described in this Section.

B. Related work:
   1. Documents affecting work of this Section include, but are not necessarily limited to, General Conditions, Supplementary Conditions, and Sections in Division l of these Specifications.
   2. Additional procedures also may be prescribed in other Sections of these Specifications.

1.02 QUALITY ASSURANCE

A. Include within the Contractor's quality assurance program such procedures as are required to assure full protection of work and materials.

1.03 MANUFACTURERS' RECOMMENDATIONS

A. Except as otherwise approved by the Architect, determines and comply with manufacturers' recommendations on product handling, storage, and protection.

1.04 PACKAGING

A. Deliver products to the job site in their manufacturer's original container, with labels intact and legible.
   1. Maintain packaged materials with seals unbroken and labels intact until time of use.
   2. Promptly remove damaged material and unsuitable items from the job site, and promptly replace with material meeting the specified requirements, at no additional cost to the Owner.

B. The Architect may reject as non-complying such material and products that do not bear identification satisfactory to the Architect as to manufacturer, grade, quality, and other pertinent information.

1.05 PROTECTION

A. Protect finished surfaces, including jambs and soffits of openings used as passageways, through which equipment and materials are handled.

B. Provide protection for finished floor surfaces in traffic areas prior to allowing equipment or materials to be moved over such surfaces.

C. Maintain finished surfaces clean, unmarred, and suitably protected until accepted by the Owner.

1.06 REPAIRS AND REPLACEMENTS

A. In event of damage, promptly make replacements and repairs to the approval of the Architect and at no additional cost to the Owner.

B. Additional time required to secure replacements and to make repairs will not be considered by the Architect to justify an extension in the Contract Time of Completion.

END OF SECTION

SECTION 01 70 00

EXECUTION REQUIREMENTS

PART 1 GENERAL

1.01 SECTION INCLUDES

A. Examination, preparation, and general installation procedures.

B. Requirements for alterations work, including selective demolition, except removal, disposal, and/or remediation of hazardous materials and toxic substances.

C. Pre-installation meetings.

D. Cutting and patching.

E. Surveying for laying out the work.

F. Cleaning and protection.

G. Starting of systems and equipment.

H. Demonstration and instruction of Owner personnel.

I. Closeout procedures, except payment procedures.

1.02 RELATED SECTIONS

A. Section 01100 - Summary: Limitations on working in existing building; continued occupancy; work sequence; identification of salvaged and relocated materials.

B. Section 01 30 00 - Administrative Requirements: Submittals procedures.

C. Section 01 40 00 - Quality Requirements: Testing and inspection procedures.

D. Section 01 53 00 - Temporary Facilities and Controls: Temporary exterior enclosures.

E. Section 01 53 00 - Temporary Facilities and Controls: Temporary interior partitions.

F. Section 01 51 00 - Temporary Utilities: Temporary heating, cooling, and ventilating facilities.

G. Section 01 74 00 - Waste Management: Additional procedures for trash/waste removal, recycling, salvage, and reuse.

H. Section 01 78 00 - Closeout Submittals: Project record documents, operation and maintenance data, warranties and bonds.

I. Section 02 41 19 - Demolition: Demolition of whole structures and parts thereof; site utility demolition.

J. Section 07 84 00 - Fire stopping.

K. Individual Product Specification Sections:
   1. Advance notification to other sections of openings required in work of those sections.
   2. Limitations on cutting structural members.

L. Section 13284 - Removal and Disposal of U.S. Federal Toxic Substances: Removal of equipment containing substances regulated under the Federal Toxic Substances Control Act (TSCA), including but not limited to PCB- and mercury-containing equipment.

1.03 SUBMITTALS

A. See Section 01 33 23 - Administrative Requirements, for submittal procedures.

B. Survey work: Submit name, address, and telephone number of Surveyor before starting survey work.

1. On request, submit documentation verifying accuracy of survey work.
2. Submit a copy of site drawing signed by the Land Surveyor, that the elevations and locations of the work are in conformance with Contract Documents.
3. Submit surveys and survey logs for the project record.

C. Demolition Plan: Submit demolition plan as specified by OSHA and local authorities.
1. Indicate extent of demolition, removal sequence, bracing and shoring, and location and construction of barricades and fences.
2. Identify demolition firm and submit qualifications.
3. Include a summary of safety procedures.

D. Cutting and Patching: Submit written request in advance of cutting or alteration which affects:
1. Structural integrity of any element of Project.
2. Integrity of weather exposed or moisture resistant element.
3. Efficiency, maintenance, or safety of any operational element.
4. Visual qualities of sight exposed elements.
5. Work of Owner or separate Contractor.
6. Include in request:
   a. Identification of Project.
   b. Location and description of affected work.
   c. Necessity for cutting or alteration.
   d. Description of proposed work and products to be used.
   e. Alternatives to cutting and patching.
   f. Effect on work of Owner or separate Contractor.
   g. Written permission of affected separate Contractor.
   h. Date and time work will be executed.

E. Project Record Documents: Accurately record actual locations of capped and active utilities.

1.04 QUALIFICATIONS

A. For demolition work, employ a firm specializing in the type of work required.

B. For survey work, employ a land surveyor registered in Project Location and acceptable to Design Professional. Submit evidence of Surveyor's Errors and Omissions insurance coverage in the form of an Insurance Certificate.

C. For field engineering, employ a professional engineer of the discipline required for specific service on Project, licensed in Project Location.

1.05 PROJECT CONDITIONS

A. Grade site to drain. Maintain excavations free of water. Provide, operate, and maintain pumping equipment.

B. Protect site from puddling or running water. Provide water barriers as required to protect site from soil erosion.

C. Ventilate enclosed areas to assist cure of materials, to dissipate humidity, and to prevent accumulation of dust, fumes, vapors, or gases.

D. Dust Control: Execute work by methods to minimize raising dust from construction operations. Provide positive means to prevent air-borne dust from dispersing into atmosphere.

E. Erosion and Sediment Control: Plan and execute work by methods to control surface drainage from cuts and fills, from borrow and waste disposal areas. Prevent erosion and sedimentation.
1. Minimize amount of bare soil exposed at one time.
2. Provide temporary measures such as berms, dikes, and drains, to prevent water flow.
3. Construct fill and waste areas by selective placement to avoid erosive surface silts or clays.
4. Periodically inspect earthwork to detect evidence of erosion and sedimentation; promptly apply corrective measures.

F. Noise Control: Provide methods, means, and facilities to minimize noise produced by

construction operations.

G. Pest Control: Provide methods, means, and facilities to prevent pests and insects from damaging the work.

H. Rodent Control: Provide methods, means, and facilities to prevent rodents from accessing or invading premises.

I. Pollution Control: Provide methods, means, and facilities to prevent contamination of soil, water, and atmosphere from discharge of noxious, toxic substances, and pollutants produced by construction operations.

1.06 COORDINATION

A. See Section 01100 for occupancy-related requirements.

B. Coordinate scheduling, submittals, and work of the various sections of the Project Manual to ensure efficient and orderly sequence of installation of interdependent construction elements, with provisions for accommodating items installed later.

C. Notify affected utility companies and comply with their requirements.

D. Verify that utility requirements and characteristics of new operating equipment are compatible with building utilities. Coordinate work of various sections having interdependent responsibilities for installing, connecting to, and placing in service, such equipment.

E. Coordinate space requirements, supports, and installation of mechanical and electrical work which are indicated diagrammatically on Drawings. Follow routing shown for pipes, ducts, and conduit, as closely as practicable; place runs parallel with lines of building. Utilize spaces efficiently to maximize accessibility for other installations, for maintenance, and for repairs.

F. In finished areas except as otherwise indicated, conceal pipes, ducts, and wiring within the construction. Coordinate locations of fixtures and outlets with finish elements.

G. Coordinate completion and clean-up of work of separate sections.

H. After Owner occupancy of premises, coordinate access to site for correction of defective work and work not in accordance with Contract Documents, to minimize disruption of Owner's activities.

PART 2 PRODUCTS

2.01 PATCHING MATERIALS

A. New Materials: As specified in product sections; match existing products and work for patching and extending work.

B. Type and Quality of Existing Products: Determine by inspecting and testing products where necessary, referring to existing work as a standard.

C. Product Substitution: For any proposed change in materials, submit request for substitution described in Section 01600.

PART 3 EXECUTION

3.01 EXAMINATION

A. Verify that existing site conditions and substrate surfaces are acceptable for subsequent work.

Start of work means acceptance of existing conditions.

B. Verify that existing substrate is capable of structural support or attachment of new work being applied or attached.

C. Examine and verify specific conditions described in individual specification sections.

D. Take field measurements before confirming product orders or beginning fabrication, to minimize waste due to over-ordering or mis-fabrication.

E. Verify that utility services are available, of the correct characteristics, and in the correct locations.

F. Prior to Cutting: Examine existing conditions prior to commencing work, including elements subject to damage or movement during cutting and patching. After uncovering existing work, assess conditions affecting performance of work. Beginning of cutting or patching means acceptance of existing conditions.

3.02 PREPARATION

A. Clean substrate surfaces prior to applying next material or substance.

B. Seal cracks or openings of substrate prior to applying next material or substance.

C. Apply manufacturer required or recommended substrate primer, sealer, or conditioner prior to applying any new material or substance in contact or bond.

3.03 PREINSTALLATION MEETINGS

A. When required in individual specification sections, convene a preinstallation meeting at the site prior to commencing work of the section.

B. Require attendance of parties directly affecting, or affected by, work of the specific section.

C. Notify Design Professional four days in advance of meeting date.

D. Prepare agenda and preside at meeting:
   1. Review conditions of examination, preparation and installation procedures.
   2. Review coordination with related work.

E. Record minutes and distribute copies within two days after meeting to participants, with two copies to Design Professional, Owner, participants, and those affected by decisions made.

3.04 LAYING OUT THE WORK – Not Used

3.05 GENERAL INSTALLATION REQUIREMENTS

A. Install products as specified in individual sections, in accordance with manufacturer's instructions and recommendations, and so as to avoid waste due to necessity for replacement.

B. Make vertical elements plumb and horizontal elements level, unless otherwise indicated.

C. Install equipment and fittings plumb and level, neatly aligned with adjacent vertical and horizontal lines, unless otherwise indicated.

D. Make consistent texture on surfaces, with seamless transitions, unless otherwise indicated.

E. Make neat transitions between different surfaces, maintaining texture and appearance.

3.06 CUTTING AND PATCHING

A. Execute cutting and patching including excavation and fill to complete the work, to uncover work in order to install improperly sequenced work, to remove and replace defective or non-conforming work, to remove samples of installed work for testing when requested, to provide

openings in the work for penetration of mechanical and electrical work, to execute patching to complement adjacent work, and to fit products together to integrate with other work.

B. Execute work by methods to avoid damage to other work, and which will provide appropriate surfaces to receive patching and finishing. In existing work, minimize damage and restore to original condition.

C. Employ original installer to perform cutting for weather exposed and moisture resistant elements, and sight exposed surfaces.

D. Cut rigid materials using masonry saw or core drill. Pneumatic tools not allowed without prior approval.

E. Restore work with new products in accordance with requirements of Contract Documents.

F. Fit work air tight to pipes, sleeves, ducts, conduit, and other penetrations through surfaces.

G. At penetrations of fire rated walls, partitions, ceiling, or floor construction, completely seal voids with fire rated material in accordance with Section 07840, to full thickness of the penetrated element.

H. Refinish surfaces to match adjacent finish. For continuous surfaces, refinish to nearest intersection or natural break. For an assembly, refinish entire unit.

I. Make neat transitions. Patch work to match adjacent work in texture and appearance. Where new work abuts or aligns with existing, perform a smooth and even transition.

J. Patch or replace surfaces that are damaged, lifted, discolored, or showing other imperfections due to patching work. Repair substrate prior to patching finish. Finish patches to produce uniform finish and texture over entire area. When finish cannot be matched, refinish entire surface to nearest intersections.

3.07 PROGRESS CLEANING

A. Maintain areas free of waste materials, debris, and rubbish. Maintain site in a clean and orderly condition.

B. Remove debris and rubbish from pipe chases, plenums, attics, crawl spaces, and other closed or remote spaces, prior to enclosing the space.

C. Broom and vacuum clean interior areas prior to start of surface finishing, and continue cleaning to eliminate dust.

D. Collect and remove waste materials, debris, and trash/rubbish from site periodically and dispose off-site; do not burn or bury.

3.08 PROTECTION OF INSTALLED WORK

A. Protect installed work from damage by construction operations.

B. Provide special protection where specified in individual specification sections.

C. Provide temporary and removable protection for installed products. Control activity in immediate work area to prevent damage.

D. Provide protective coverings at walls, projections, jambs, sills, and soffits of openings.

E. Protect finished floors, stairs, and other surfaces from traffic, dirt, wear, damage, or movement of heavy objects, by protecting with durable sheet materials.

F. Prohibit traffic or storage upon waterproofed or roofed surfaces. If traffic or activity is necessary, obtain recommendations for protection from waterproofing or roofing material manufacturer.

G. Prohibit traffic from landscaped areas.

H. Remove protective coverings when no longer needed; reuse or recycle plastic coverings if

possible.

3.09 STARTING SYSTEMS

A. Coordinate schedule for start-up of various equipment and systems.

B. Notify Design Professional and owner seven days prior to start-up of each item.

C. Verify that each piece of equipment or system has been checked for proper lubrication, drive rotation, belt tension, control sequence, and for conditions which may cause damage.

D. Verify tests, meter readings, and specified electrical characteristics agree with those required by the equipment or system manufacturer.

E. Verify that wiring and support components for equipment are complete and tested.

F. Execute start-up under supervision of applicable Contractor personnel and manufacturer's representative in accordance with manufacturers' instructions.

G. When specified in individual specification Sections, require manufacturer to provide authorized representative to be present at site to inspect, check, and approve equipment or system installation prior to start-up, and to supervise placing equipment or system in operation.

H. Submit a written report that equipment or system has been properly installed and is functioning correctly.

3.10 DEMONSTRATION AND INSTRUCTION

A. Demonstrate operation and maintenance of products to Owner's personnel two weeks prior to date of Substantial Completion.

B. Demonstrate start-up, operation, control, adjustment, trouble-shooting, servicing, maintenance, and shutdown of each item of equipment at scheduled time, at equipment location.

C. For equipment or systems requiring seasonal operation, perform demonstration for other season within six months.

D. Provide a qualified person who is knowledgeable about the Project to perform demonstration and instruction of owner personnel.

E. Utilize operation and maintenance manuals as basis for instruction. Review contents of manual with Owner's personnel in detail to explain all aspects of operation and maintenance.

F. Prepare and insert additional data in operations and maintenance manuals when need for additional data becomes apparent during instruction.

G. The amount of time required for instruction on each item of equipment and system is that specified in individual sections.

3.11 ADJUSTING

A. Adjust operating products and equipment to ensure smooth and unhindered operation.

B. Testing, adjusting, and balancing HVAC systems: See Section 15950 and 01400.

3.12 FINAL CLEANING

A. Owner will provide comprehensive cleaning after final acceptance.

B. Execute final cleaning prior to final project assessment.
   1. Clean areas to be occupied by Owner prior to final completion before Owner occupancy.

C. Use cleaning materials that are nonhazardous.

D. Clean interior and exterior glass, surfaces exposed to view; remove temporary labels, stains and foreign substances, polish transparent and glossy surfaces, vacuum carpeted and soft surfaces.

E. Clean equipment and fixtures to a sanitary condition with cleaning materials appropriate to the surface and material being cleaned.

F. Clean filters of operating equipment.

G. Clean debris from roofs, gutters, downspouts, and drainage systems.

H. Clean site; sweep paved areas, rake clean landscaped surfaces.

I. Remove waste, surplus materials, trash/rubbish, and construction facilities from the site; dispose of in legal manner; do not burn or bury.

J. Clean Owner-occupied areas of work.

END OF SECTION

SECTION 01 71 23

FIELD ENGINEERING

PART 1 - GENERAL

1.01 SUMMARY

A. Provide such field engineering services as are required for proper completion of the Work including, but not necessarily limited to:
   1. Establishing and maintaining lines and levels;
   2. Structural design of shores, forms, and similar items provided by the Contractor as part of his means and methods of construction.

1.02 SUBMITTALS

A. Comply with pertinent provisions of Section 01 33 23.

B. Upon request of the Architect, submit:
   1. Data demonstrating qualifications of persons proposed to be engaged for field engineering services.
   2. Documentation verifying accuracy of field engineering work.
   3. Certification, signed by the Contractor's retained field engineer, certifying that elevations and locations of improvements are in conformance or nonconformance with requirements of the Contract Documents.

1.03 QUALITY ASSURANCE

A. Use adequate numbers of skilled workmen thoroughly trained and experienced in the necessary crafts and completely familiar with the specified requirements and methods needed for proper performance of the work of this Section.

1.04 PROCEDURES

A. In addition to procedures directed by the Contractor for proper performance of the Contractor's responsibilities:

   1. Locate and protect control points before starting work on the site.
   2. Preserve permanent reference points during progress of the Work.
   3. Do not change or relocate reference points or items of the Work without specific approval from the Architect.
   4. Promptly advise the Architect when a reference point is lost or destroyed, or requires relocation because of other changes in the Work.
      a. Upon direction of the Architect, require the field engineer to replace reference stakes or markers.
      b. Locate such replacements according to the original survey control.

END OF SECTION

SECTION 01 74 00

WASTE MANAGEMENT

PART 1 GENERAL

1.01 WASTE MANAGEMENT REQUIREMENTS

A. Owner requires that this project generate the least amount of trash and waste possible.

B. Employ processes that ensure the generation of as little waste as possible due to error, poor planning, breakage, mishandling, contamination, or other factors.

C. Minimize trash/waste disposal in landfills; reuse, salvage, or recycle as much waste as economically feasible.

D. Owner may decide to pay for additional recycling, salvage, and/or reuse based on Landfill Alternatives Proposal specified below.

E. Required Recycling, Salvage, and Reuse: The following may not be disposed of in landfills or by incineration:
   1. Aluminum and plastic beverage containers.
   2. Corrugated cardboard.
   3. Wood pallets.
   4. Clean dimensional wood: May be used as blocking or furring.
   5. Land clearing debris, including brush, branches, logs, and stumps: See Section 02230 for use options.
   6. Concrete: May be crushed and used as riprap, aggregate, sub-base material, or fill.
   7. Bricks: May be used on project if whole, or crushed and used as landscape cover, sub-base material, or fill.
   8. Concrete masonry units: May be used on project if whole, or crushed and used as sub-base material or fill.
   9. Precast concrete panels: May be used for erosion control or landscape features.
   10. Asphalt paving: May be recycled into paving for project.
   11. Metals, including packaging banding, metal studs, sheet metal, structural steel, piping, reinforcing bars, door frames, and other items made of steel, iron, galvanized steel, stainless steel, aluminum, copper, zinc, lead, brass, and bronze.
   12. Glass.
   13. Gypsum drywall and plaster.
   14. Plastic buckets.
   15. Carpet, carpet cushion, carpet tile, and carpet remnants, both new and removed: DuPont (http://flooring.dupont.com) and Interface (www.interfaceinc.com) conduct reclamation programs.
   16. Asphalt roofing shingles.
   17. Paint.
   18. Plastic sheeting.
   19. Rigid foam insulation.
   20. Vinyl siding.
   21. Windows, doors, and door hardware.
   22. Plumbing fixtures.
   23. Mechanical and electrical equipment.
   24. Fluorescent lamps (light bulbs).
   25. Acoustical ceiling tile and panels.

F. Owner has authorized a waste-management firm to deal with waste generated from this project. The contractor shall contract with selected firm for bins' provisions and disposal. Subject firm will manage all recyclable materials.

G. Methods of trash/waste disposal that are not acceptable are:
   1. Burning on the project site.
   2. Burying on the project site.
   3. Dumping or burying on other property, public or private.
   4. Other illegal dumping or burying.
   5. Incineration, either on- or off-site.

H. Regulatory Requirements: Contractor is responsible for knowing and complying with regulatory requirements, including but not limited to Federal, State and local requirements, pertaining to legal disposal of all construction and demolition waste materials.

1.02 RELATED SECTIONS

A. Section 01100 - Summary: List of items to be salvaged from the existing building for relocation in project or for Owner.

B. Section 01300 - Administrative Requirements: Additional requirements for project meetings, reports, submittal procedures, and project documentation.

C. Section 01500 - Temporary Facilities and Controls: Additional requirements related to trash/waste collection and removal facilities and services.

D. Section 01600 - Product Requirements: Waste prevention requirements related to delivery, storage, and handling.

E. Section 01700 - Execution Requirements: Trash/waste prevention procedures related to demolition, cutting and patching, installation, protection, and cleaning.

F. Section 02230 - Site Clearing: Handling and disposal of land clearing debris.

1.03 DEFINITIONS

A. Clean: Untreated and unpainted; not contaminated with oils, solvents, caulk, or the like.

B. Construction and Demolition Waste: Solid wastes typically including building materials, packaging, trash, debris, and rubble resulting from construction, remodeling, repair and demolition operations.

C. Hazardous: Exhibiting the characteristics of hazardous substances, i.e., ignitibility, corrosivity, toxicity or reactivity.

D. Nonhazardous: Exhibiting none of the characteristics of hazardous substances, i.e., ignitibility, corrosivity, toxicity, or reactivity.

E. Nontoxic: Neither immediately poisonous to humans nor poisonous after a long period of exposure.

F. Recyclable: The ability of a product or material to be recovered at the end of its life cycle and remanufactured into a new product for reuse by others.

G. Recycle: To remove a waste material from the project site to another site for remanufacture into a new product for reuse by others.

H. Recycling: The process of sorting, cleansing, treating and reconstituting solid waste and other discarded materials for the purpose of using the altered form. Recycling does not include burning, incinerating, or thermally destroying waste.

I. Return: To give back reusable items or unused products to vendors for credit.

J. Reuse: To reuse a construction waste material in some manner on the project site.

K. Salvage: To remove a waste material from the project site to another site for resale or reuse by others.

L. Sediment: Soil and other debris that has been eroded and transported by storm or well production run-off water.

M. Source Separation: The act of keeping different types of waste materials separate beginning from the first time they become waste.

N. Toxic: Poisonous to humans either immediately or after a long period of exposure.

O. Trash: Any product or material unable to be reused, returned, recycled, or salvaged.

P. Waste: Extra material or material that has reached the end of its useful life in its intended use. Waste includes salvageable, returnable, recyclable, and reusable material.

1.04 SUBMITTALS

A. See Section 01300 - Administrative Requirements, for submittal procedures.

B. Once Owner has determined which of the landfill alternatives addressed in the Proposal above are acceptable, prepare and submit Waste Management Plan; submit within 10 calendar days after notification by Design Professional.

C. Submit Waste Management Plan within 10 calendar days after receipt of Notice of Award of Bid, or prior to any trash or waste removal, whichever occurs sooner; submit projection of all trash and waste that will require disposal and alternatives to landfilling.

D. Waste Management Plan: Include the following information:
   1. Analysis of the trash and waste projected to be generated during the entire project construction cycle, including types and quantities.
   2. Landfill Options: The name, address, and telephone number of the landfill(s) where trash/waste will be disposed of, the applicable landfill tipping fee(s), and the projected cost of disposing of all project trash/waste in the landfill(s).
   3. Landfill Alternatives: List all waste materials that will be diverted from landfills by reuse, salvage, or recycling.
      a. List each material proposed to be salvaged, reused, or recycled.
      b. List the local market for each material.
      c. State the estimated net cost, versus landfill disposal.
   4. Meetings: Describe regular meetings to be held to address waste prevention, reduction, recycling, salvage, reuse, and disposal.
   5. Materials Handling Procedures: Describe the means by which materials to be diverted from landfills will be protected from contamination and prepared for acceptance by designated facilities; include separation procedures for recyclables, storage, and packaging.
   6. Transportation: Identify the destination and means of transportation of materials to be recycled; i.e. whether materials will be site-separated and self-hauled to designated centers, or whether mixed materials will be collected by a waste hauler.
   7. Recycling Incentives: Describe procedures required to obtain credits, rebates, or similar incentives.

E. Waste Disposal Reports: Submit at specified intervals, with details of quantities of trash and waste, means of disposal or reuse, and costs; show both totals to date and since last report.
   1. Submit updated Report with each Application for Progress Payment; failure to submit Report will delay payment.
   2. Submit Report on a form acceptable to Owner.
   3. Landfill Disposal: Include the following information:
      a. Identification of material.
      b. Amount, in tons or cubic yards (cubic meters), of trash/waste material from the project disposed of in landfills.
      c. State the identity of landfills, total amount of tipping fees paid to landfill, and total disposal cost.
      d. Include manifests, weight tickets, receipts, and invoices as evidence of quantity and cost.

4. Incinerator Disposal: Include the following information:
    a. Identification of material.
    b. Amount, in tons or cubic yards (cubic meters), of trash/waste material from the project delivered to incinerators.
    c. State the identity of incinerators, total amount of fees paid to incinerator, and total disposal cost.
    d. Include manifests, weight tickets, receipts, and invoices as evidence of quantity and cost.
5. Recycled and Salvaged Materials: Include the following information for each:
    a. Identification of material, including those retrieved by installer for use on other projects.
    b. Amount, in tons or cubic yards (cubic meters), date removed from the project site, and receiving party.
    c. Transportation cost, amount paid or received for the material, and the net total cost or savings of salvage or recycling each material.
    d. Include manifests, weight tickets, receipts, and invoices as evidence of quantity and cost.
    e. Certification by receiving party that materials will not be disposed of in landfills or by incineration.
6. Material Reused on Project: Include the following information for each:
    a. Identification of material and how it was used in the project.
    b. Amount, in tons or cubic yards (cubic meters).
    c. Include weight tickets as evidence of quantity.
7. Other Disposal Methods: Include information similar to that described above, as appropriate to disposal method.

F. Recycling Incentive Programs:
    1. Where revenue accrues to Contractor, submit copies of documentation required to qualify for incentive.
    2. Where revenue accrues to Owner, submit any additional documentation required by Owner in addition to information provided in periodic Waste Disposal Report.

PART 2 PRODUCTS

2.01 PRODUCT SUBSTITUTIONS

A. See Section 01 60 00 - Product Requirements for substitution submission procedures.

B. For each proposed product substitution, submit the following information in addition to requirements specified in Section 01600:
    1. Relative amount of waste produced, compared to specified product.
    2. Cost savings on waste disposal, compared to specified product, to be deducted from the Contract Sum.
    3. Proposed disposal method for waste product.
    4. Markets for recycled waste product.

PART 3 EXECUTION

3.01 WASTE MANAGEMENT PROCEDURES

A. See Section 01 10 00 for list of items to be salvaged from the existing building for relocation in project or for Owner.

B. See Section 01 30 00 for additional requirements for project meetings, reports, submittal procedures, and project documentation.

C. See Section 01 50 00 for additional requirements related to trash/waste collection and removal facilities and services.

D. See Section 01 60 00 for waste prevention requirements related to delivery, storage, and handling.

E. See Section 01 70 00 for trash/waste prevention procedures related to demolition, cutting and patching, installation, protection, and cleaning.

3.02 WASTE MANAGEMENT PLAN IMPLEMENTATION

A. Manager: Designate an on-site person or persons responsible for instructing workers and overseeing and documenting results of the Waste Management Plan.

B. Communication: Distribute copies of the Waste Management Plan to job site foreman, each subcontractor, Owner, and Design Professional.

C. Instruction: Provide on-site instruction of appropriate separation, handling, and recycling, salvage, reuse, and return methods to be used by all parties at the appropriate stages of the project.

D. Meetings: Discuss trash/waste management goals and issues at project meetings.
   1. Pre-bid meeting.
   2. Pre-construction meeting.
   3. Regular job-site meetings.
   4. Job safety meetings.

E. Facilities: Provide specific facilities for separation and storage of materials for recycling, salvage, reuse, return, and trash disposal, for use by all contractors and installers.
   1. As a minimum, provide:
      a. Separate area for storage of materials to be reused on-site, such as wood cut-offs for blocking.
      b. Separate dumpsters for each category of recyclable.
      c. Recycling bins at worker lunch area.
   2. Provide containers as required.
   3. Provide temporary enclosures around piles of separated materials to be recycled or salvaged.
   4. Provide materials for barriers and enclosures that are nonhazardous, recyclable, or reusable to the maximum extent possible; reuse project construction waste materials if possible.
   5. Locate enclosures out of the way of construction traffic.
   6. Provide adequate space for pick-up and delivery and convenience to subcontractors.
   7. If an enclosed area is not provided, clearly lay out and label a specific area on-site.
   8. Keep recycling and trash/waste bin areas neat and clean and clearly marked in order to avoid contamination of materials.

F. Hazardous Wastes: Separate, store, and dispose of hazardous wastes according to applicable regulations.

G. Recycling: Separate, store, protect, and handle at the site identified recyclable waste products in order to prevent contamination of materials and to maximize recyclability of identified materials. Arrange for timely pickups from the site or deliveries to recycling facility in order to prevent contamination of recyclable materials.

H. Reuse of Materials On-Site: Set aside, sort, and protect separated products in preparation for reuse.

I. Salvage: Set aside, sort, and protect products to be salvaged for reuse off-site.

END OF SECTION

SECTION 01 78 00

CLOSEOUT SUBMITTALS

PART 1 GENERAL

1.01 SECTION INCLUDES

A. Project Record Documents.

B. Operation and Maintenance Data.

C. Warranties and bonds.

1.02 RELATED SECTIONS

A. Section 00 72 00 - General Conditions: Performance bond and labor and material payment bonds, warranty, and correction of work.

B. Section 01 30 00 - Administrative Requirements: Submittals procedures, shop drawings, product data, and samples.

C. Section 01 70 00 - Execution Requirements: Contract closeout procedures.

D. Individual Product Sections: Specific requirements for operation and maintenance data.

E. Individual Product Sections: Warranties required for specific products or Work.

1.03 SUBMITTALS

A. Project Record Documents: Submit documents to Design Professional with claim for final Application for Payment.

B. Operation and Maintenance Data:
   1. Submit two copies of preliminary draft or proposed formats and outlines of contents before start of Work. Design Professional will review draft and return one copy with comments.
   2. For equipment, or component parts of equipment put into service during construction and operated by Owner, submit completed documents within ten days after acceptance.
   3. Submit 1 copy of completed documents 15 days prior to final inspection. This copy will be reviewed and returned after final inspection, with Design Professional comments. Revise content of all document sets as required prior to final submission.
   4. Submit two sets of revised final documents in final form within 10 days after final inspection.

C. Warranties and Bonds:
   1. For equipment or component parts of equipment put into service during construction with Owner's permission, submit documents within ten days after acceptance.
   2. Make other submittals within ten days after Date of Substantial Completion, prior to final Application for Payment.
   3. For items of Work for which acceptance is delayed beyond Date of Substantial Completion, submit within ten days after acceptance, listing the date of acceptance as the beginning of the warranty period.

PART 2 PRODUCTS - NOT USED

PART 3 EXECUTION

3.01 PROJECT RECORD DOCUMENTS

A. Maintain on site one set of the following record documents; record actual revisions to the Work:
   1. Drawings.
   2. Specifications.
   3. Addenda.

4. Change Orders and other modifications to the Contract.
5. Reviewed shop drawings, product data, and samples.
6. Manufacturer's instruction for assembly, installation, and adjusting.

B. Ensure entries are complete and accurate, enabling future reference by Owner.

C. Conversion of schematic layouts:
   1. In some cases on the Drawings, arrangements of conduits, circuits, piping, ducts, and similar items, are shown schematically and are not intended to portray precise physical layout.
      a. Final physical arrangement is determined by the Contractor, subject to the Architect's approval.
      b. However, design of future modifications of the facility may require accurate information as to the final physical layout of items that are shown only schematically on the Drawings.

D. Store record documents separate from documents used for construction.

E. Record information concurrent with construction progress.

F. Specifications: Legibly mark and record at each product section description of actual products installed, including the following:
   1. Manufacturer's name and product model and number.
   2. Product substitutions or alternates utilized.
   3. Changes made by Addenda and modifications.

G. Final project record documents.
   1. The purpose of the final Project Record Documents is to provide factual information regarding all aspects of the Work, both concealed and visible, to enable future modification of the Work to proceed without lengthy and expensive site measurement, investigation, and examination.
   2. Approval of recorded data prior to transfer:
      a. Following receipt of the electronic file (CADD – latest version), and prior to start of transfer of recorded data thereto, secure the Architect's approval of all recorded data.
      b. Make required revisions.
   3. Transfer of data to Drawings:
      a. Carefully transfer change data shown on the job set of Record Drawings to the corresponding transparencies, coordinating the changes as required.
      b. Clearly indicate at each affected detail and other Drawings a full description of changes made during construction, and the actual location of items in 3.01-C above.
      d. Call attention to each entry by drawing a "cloud" around the area or areas affected.
      d. Make changes neatly, consistently, and with the proper media to assure longevity and clear reproduction.
   4. Transfer of data to other Documents:
      a. If the Documents other than Drawings have been kept clean during progress of the Work, and if entries thereon have been orderly to the approval of the Architect, the job set of these Documents other than Drawings will be accepted as final Record Documents.
      b. If any such Document is not so approved by the Architect, secure a new copy of that Document from the Architect at the Architect's usual charge for reproduction and handling, and carefully transfer the change data to the new copy to the approval of the Architect.

   5. Review and submittal:
      a. Submit the completed set of Project Record Documents to the Architect.
      b. Participate in review meetings as required.
      c. make required changes and promptly deliver the final Project Record Documents to the Architect.

H. Changes subsequent to acceptance:
   1. The Contractor ahs no responsibility for recording changes in the Work subsequent to Final Completion, except for changes resulting from work performed under Warranty.

3.02 OPERATION AND MAINTENANCE DATA

A. For Each Product or System: List names, addresses and telephone numbers of Subcontractors and suppliers, including local source of supplies and replacement parts.

B. Product Data: Mark each sheet to clearly identify specific products and component parts, and data applicable to installation. Delete inapplicable information.

C. Drawings: Supplement product data to illustrate relations of component parts of equipment and systems, to show control and flow diagrams. Do not use Project Record Documents as maintenance drawings.

D. Typed Text: As required to supplement product data. Provide logical sequence of instructions for each procedure, incorporating manufacturer's instructions.

3.03 OPERATION AND MAINTENANCE DATA FOR MATERIALS AND FINISHES

A. For Each Product, Applied Material, and Finish:
   1. Product data, with catalog number, size, composition, and color and texture designations.
   2. Information for re-ordering custom manufactured products.

B. Instructions for Care and Maintenance: Manufacturer's recommendations for cleaning agents and methods, precautions against detrimental cleaning agents and methods, and recommended schedule for cleaning and maintenance.

C. Moisture protection and weather-exposed products: Include product data listing applicable reference standards, chemical composition, and details of installation. Provide recommendations for inspections, maintenance, and repair.

D. Additional information as specified in individual product specification sections.

E. Provide a listing in Table of Contents for design data, with tabbed fly sheet and space for insertion of data.

3.04 OPERATION AND MAINTENANCE DATA FOR EQUIPMENT AND SYSTEMS

A. For Each Item of Equipment and Each System:
   1. Description of unit or system, and component parts.
   2. Identify function, normal operating characteristics, and limiting conditions.
   3. Include performance curves, with engineering data and tests.
   4. Complete nomenclature and model number of replaceable parts.

B. Panelboard Circuit Directories: Provide electrical service characteristics, controls, and communications; typed.

C. Include color coded wiring diagrams as installed.

D. Operating Procedures: Include start-up, break-in, and routine normal operating instructions and sequences. Include regulation, control, stopping, shut-down, and emergency instructions. Include summer, winter, and any special operating instructions.

E. Maintenance Requirements: Include routine procedures and guide for preventative maintenance and trouble shooting; disassembly, repair, and reassembly instructions; and alignment, adjusting, balancing, and checking instructions.

F. Provide servicing and lubrication schedule, and list of lubricants required.

G. Include manufacturer's printed operation and maintenance instructions.

H. Include sequence of operation by controls manufacturer.

I. Provide original manufacturer's parts list, illustrations, assembly drawings, and diagrams required for maintenance.

J. Provide control diagrams by controls manufacturer as installed.

K. Provide Contractor's coordination drawings, with color coded piping diagrams as installed.

L. Provide charts of valve tag numbers, with location and function of each valve, keyed to flow and control diagrams.

M. Provide list of original manufacturer's spare parts, current prices, and recommended quantities to be maintained in storage.

N. Include test and balancing reports.

O. Additional Requirements: As specified in individual product specification sections.

3.05 OPERATION AND MAINTENANCE MANUALS

A. Prepare instructions and data by personnel experienced in maintenance and operation of described products.

B. Prepare data in the form of an instructional manual.

C. Binders: Commercial quality, 8-1/2 x 11 inch (216 x 280 mm) three D side ring binders with durable plastic covers; 2 inch (50 mm) maximum ring size. When multiple binders are used, correlate data into related consistent groupings.

D. Cover: Identify each binder with typed or printed title OPERATION AND MAINTENANCE INSTRUCTIONS; identify title of Project; identify subject matter of contents.

E. Provide tabbed dividers for each separate product and system, with typed description of product and major component parts of equipment.

F. Text: Manufacturer's printed data, or typewritten data on 24 pound paper.

G. Drawings: Provide with reinforced punched binder tab. Bind in with text; fold larger drawings to size of text pages.

H. Arrange content by systems under section numbers and sequence of Table of Contents of this Project Manual.

I. Contents: Prepare a Table of Contents for each volume, with each product or system description identified, in three parts as follows:
   1. Part 1: Directory, listing names, addresses, and telephone numbers of Design Professional, Contractor, Subcontractors, and major equipment suppliers.
   2. Part 2: Operation and maintenance instructions, arranged by system and subdivided by specification section. For each category, identify names, addresses, and telephone numbers of Subcontractors and suppliers. Identify the following:
      a. Significant design criteria.
      b. List of equipment.
      c. Parts list for each component.
      d. Operating instructions.
      e. Maintenance instructions for equipment and systems.
      f. Maintenance instructions for special finishes, including recommended cleaning methods and materials, and special precautions identifying detrimental agents.
   3. Part 3: Project documents and certificates, including the following:
      a. Shop drawings and product data.
      b. Air and water balance reports.
      c. Certificates.
      d. Photocopies of warranties and bonds.

J. Provide a listing in Table of Contents for design data, with tabbed dividers and space for insertion of data.

K. Table of Contents: Provide title of Project; names, addresses, and telephone numbers of Design Professional, Consultants, and Contractor with name of responsible parties; schedule of products and systems, indexed to content of the volume.

3.06 WARRANTIES AND BONDS

A. Obtain warranties and bonds, executed in duplicate by responsible Subcontractors, suppliers, and manufacturers, within ten days after completion of the applicable item of work. Except for items put into use with Owner's permission, leave date of beginning of time of warranty until the Date of Substantial completion is determined.

B. Verify that documents are in proper form, contain full information, and are notarized.

C. Co-execute submittals when required.

D. Retain warranties and bonds until time specified for submittal.

E. Include originals of each in operation and maintenance manuals, indexed separately on Table of Contents.

F. Manual: Bind in commercial quality 8-1/2 x 11 inch (216 x 279 mm) three D side ring binders with durable plastic covers.

G. Cover: Identify each binder with typed or printed title WARRANTIES AND BONDS, with title of Project; name, address and telephone number of Contractor and equipment supplier; and name of responsible company principal.

H. Table of Contents: Neatly typed, in the sequence of the Table of Contents of the Project Manual, with each item identified with the number and title of the specification section in which specified, and the name of product or work item.

I. Separate each warranty or bond with index tab sheets keyed to the Table of Contents listing. Provide full information, using separate typed sheets as necessary. List Subcontractor, supplier, and manufacturer, with name, address, and telephone number of responsible principal.

END OF SECTION

SECTION 01 78 36

WARRANTIES AND BONDS

PART 1 - GENERAL

1.01 SECTION INCLUDES:

A. Summary
B. Form of Warranty
C. Submittal Requirements
D. Form of Submittal
E. Time of Submittals
F. Submittals Required

1.02 RELATED REQUIREMENTS:

Section 01700 - Contract Closeout
Sections 02000 through 16000

1.03 INCLUDED:

A. Summary

1. Warranties between Contractor and manufacturers and between Contractor and suppliers shall not affect warranties between Contractor and the Owner.

2. In addition to other requirements specified:
   a. Compile specified service and maintenance contracts.
   b. Co-execute submittals when so specified.
   c. Review submittals to verify compliance with Contract Documents.
   d. Submit to the Architect for review and transmittal to the Owner.

B. Form of Warranty

1. Submit two (2) originals of the warranty form provided as Attachment “A”, typed on the Contractor’s letterhead, for the entire Work or special warranties, typed on Subcontractor’s letterhead and notarized, when required by a Specification Section. All work in place shall be guaranteed, at a minimum for one (1) year <u>after</u> date of Substantial Completion.

C. Submittal Requirements

1. Assemble warranties, bonds, and service and maintenance contracts executed by each of the respective manufacturers, suppliers, and Contractors.

2. Number of Original Signed Copies Required: Two (2) each.

3. Table of Contents: Neatly typed; in orderly sequence. Provide complete information for each item; include:
   a. Product or work item.
   b. Firm (Subcontractor or supplier) name with name of principal, address, and telephone number.
   c. Scope of work or service covered.

d. Date of beginning of warranty, bond, or service and maintenance contract.]
e. Duration of warranty, bond, or service and maintenance contract.

f. Provide the following information for the Owner.
   (1) Proper procedure in case of failure.
   (2) Circumstances which might affect the validity of warranty or bond.
g. Contractors' name, name of responsible principal, address, and telephone number.

D. Form of Submittal

1. Prepare in duplicate packets: four (4) complete Submittals; two (2) originals and two (2) copies.

2. Format:
   a. Size: 8 ½ " x 11" sheets punched for three-ring binder. Fold larger sheets to fit into binders.
   b. Cover: Identify each packet with typed or printed title, "WARRANTIES AND BONDS." List:
      (1) Title of Project.
      (2) Name of Contractor.

3. Binders: Commercial quality three-ring, with durable and cleanable plastic covers.

E. Time of Submittals

1. Within thirty (30) days after date of Substantial Completion, prior to final request for payment.

2. For items of work, where acceptance is delayed more than thirty (30) days beyond the date of Substantial Completion, provide updated submittal within ten (10) days after Final Completion, listing the date of Final Completion as the start of the warranty period.

F. Submittals Required

1. Submit special warranties, bonds, and service and maintenance contracts specified in the individual Sections.

SECTION 01 78 36
ATTACHMENT "A"
(SAMPLE FORM OF WARRANTY - SUBMIT ON CONTRACTOR/SUBCONTRACTOR LETTERHEAD)

CITY OF BEVERLY HILLS – CITY HALL COMMUNITY DEVELOPMENT REMODEL

WRITTEN WARRANTY
FOR_____
(Entire work, in the case of the Contractor, or a specific Specification Section, in the case of a Subcontractor.)

We hereby warrant
_____
(Description of work, equipment, product, etc.)

Which we have provided in
_____
(Description of location:)

has been completed in accordance with the Specification Section stated above and the Contract Documents requirements and is hereby warranted for a period of
_____
(Indicate overall duration)

commencing on _____and ending on _____.
(Start date) (End date)

We agree to repair or replace any or all of our Work, together with any other adjacent work which may be displaced or damaged by so doing, which may prove to be either patently defective in its workmanship or materials within the period of time prescribed by law or latently defective in its workmanship or materials within the period of time prescribed by law from date established in the Certificate of Substantial Completion of the above-named structure, ordinary wear and tear and unusual abuse or neglect excepted.

We also agree to repair any damages resulting from such defects.

In the event of our failure to comply with above-mentioned conditions within a reasonable time but in no case longer than fourteen (14) calendar days after being notified in writing by the Owner, we collectively and separately do hereby authorize the Owner to have said defective work and damages repaired or replaced and made good at our expense and will honor and pay the costs and charges therefor upon demand.

SIGNED_____
(Subcontractor's name, address, license number, and date of signing)

or

SIGNED_____
(Subcontractor's name, address, license number, and date of signing)

COUNTERSIGNED_____
(Contractor's name, address, license number, and date of signing

SECTION 01 90 00

SEISMIC BRACING AND ANCHORING

PART 1 - GENERAL

1.01 SUMMARY

A. Provide bracing and anchoring for all cabinets, casework, wall-hung and ceiling-hung equipment and specialties, floor-supported and floor-attached equipment, conveying systems, mechanical equipment, electrical equipment, and all other non-portable items essential to operation and use of the facility including items furnished by the Contractor and items furnished by the Owner but installed by the Contractor.

B. For Owner-Furnished-Contractor-Installed items, the Owner will furnish such additional information as is required by the Contractor for preparation of Shop Drawings and calculations.

1.02 SUBMITTALS

A. Where design of bracing and anchoring is completely shown on the Drawings, no submittal is required.

B. Where design of bracing and anchoring is not completely shown on the Drawings, and for equipment and/or items shown as "deferred," prepare and submit the following in accordance with the approved Contract Schedule:
   1. Shop Drawings clearly defining the proposed method for bracing and anchoring the pertinent item or items, and interface of the bracing and anchoring with adjacent materials;
   2. Calculations, prepared, signed, and stamped by a registered civil or structural engineer, employed and paid by the Contractor, supporting the proposed bracing and anchoring design and demonstrating its adequacy.

C. Secure the Architect's approval and approval of all governmental agencies having jurisdiction prior to fabrication and installation.

1.03 QUALITY ASSURANCE

A. Use adequate numbers of skilled workmen thoroughly trained and experienced in the necessary crafts and completely familiar with the specified requirements and methods needed for proper performance of the work of this Section.

B. In addition to complying with pertinent requirements of governmental agencies having jurisdiction, brace and anchor to resist horizontal forces acting in any direction using the following criteria:

1.	Light fixtures	100% of weight;
2.	Fixed equipment	50% of operating weight;
3.	Emergency power and communication	75% of operating weight;
4.	Flexibly-mounted equipment	Use two times the above values;
5.	Simultaneous vertical force	Use 1/3 times the horizontal force.

PART 2 - PRODUCTS

2.01 GENERAL

A. Provide materials, equipment, labor, and all other items as needed to comply with requirements of the governmental agencies having jurisdiction.

PART 3 - EXECUTION

3.01 SURFACE CONDITIONS

A. Examine the areas and conditions under which work of this Section will be performed. Correct conditions detrimental to timely and proper completion of the Work. Do not proceed until unsatisfactory conditions are corrected.

3.02 FABRICATION AND INSTALLATION

A. Fabricate and install bracing and anchoring in accordance with the approved design and all other requirements of the Contract.

END OF SECTION

SECTION 02 41 19

DEMOLITION

PART 1 GENERAL

1.01 SECTION INCLUDES

A. Building demolition excluding removal of hazardous materials and toxic substances.

B. Selective demolition of building elements for alterations purposes.

C. Abandonment and removal of existing utilities.

1.02 RELATED SECTIONS

A. Section 00300 - Information Available to Bidders: Existing building survey conducted by Owner; information about known hazardous materials.

B. Section 0110 00 - Summary: Limitations on Contractor's use of site and premises.

C. Section 01 10 00 - Summary: Sequencing and staging requirements.

D. Section 01 10 00 - Summary: Description of items to be removed by Owner.

E. Section 01 10 00 - Summary: Description of items to be salvaged or removed for re-use by Contractor.

F. Section 01 53 00 - Temporary Facilities and Controls: Site fences, security, protective barriers, and waste removal.

G. Section 01 60 00 - Product Requirements: Handling and storage of items removed for salvage and relocation.

H. Section 01 74 00 - Waste Management: Limitations on disposal of removed materials; requirements for recycling.

1.03 REFERENCES

A. 29 CFR 1926 - U.S. Occupational Safety and Health Standards; current edition.

B. NFPA 241 - Standard for Safeguarding Construction, Alteration, and Demolition Operations; 2004.

1.04 SUBMITTALS

A. See Section 01 33 23 - Administrative Requirements, for submittal procedures.

B. Demolition Plan: Submit demolition plan as specified by OSHA and local authorities.
   1. Indicate extent of demolition, removal sequence, bracing and shoring, and location and construction of barricades and fences.
   2. Identify demolition firm and submit qualifications.
   3. Include a summary of safety procedures.

C. Project Record Documents: Accurately record actual locations of capped and active utilities and subsurface construction.

1.05 QUALITY ASSURANCE

A. Demolition Firm: Company specializing in the type of work required.

1.06 PROJECT CONDITIONS

A. Minimize production of dust due to demolition operations.

B. Comply with other requirements specified in Section 01 70 00.

PART 2 PRODUCTS

2.01 MATERIALS – Not Used.

PART 3 EXECUTION

3.01 SCOPE

A. Removal work shall be as indicated on the drawings.

B. Remove paving and curbs as required to accomplish new work.

C. Remove concrete slabs on grade, as indicated on the drawings.

D. Remove other items indicated, for salvage, relocation, recycling.

3.02 GENERAL PROCEDURES AND PROJECT CONDITIONS

A. Comply with applicable codes and regulations for demolition operations and safety of adjacent structures and the public.
   1. Obtain required permits.
   2. Comply with applicable requirements of NFPA 241.
   3. Use of explosives is not permitted.
   4. Take precautions to prevent catastrophic or uncontrolled collapse of structures to be removed; do not allow worker or public access within range of potential collapse of unstable structures.
   5. Provide, erect, and maintain temporary barriers and security devices.
   6. Use physical barriers to prevent access to areas that could be hazardous to workers or the public.
   7. Conduct operations to minimize effects on and interference with adjacent structures and occupants.
   8. Do not close or obstruct roadways or sidewalks without permit.
   9. Conduct operations to minimize obstruction of public and private entrances and exits; do not obstruct required exits at any time; protect persons using entrances and exits from removal operations.
   10. Obtain written permission from owners of adjacent properties when demolition equipment will traverse, infringe upon or limit access to their property.

B. Do not begin removal until receipt of notification to proceed from Owner.

C. Do not begin removal until built elements to be salvaged or relocated have been removed.

D. Protect existing structures and other elements that are not to be removed.
   1. Provide bracing and shoring.

E. If hazardous materials are discovered during removal operations, stop work and notify Design Professional and Owner; hazardous materials include regulated asbestos containing materials, lead, PCB's, and mercury.

F. Hazardous Materials: Comply with 29 CFR 1926 and state and local regulations.

G. Perform demolition in a manner that maximizes salvage and recycling of materials.
   1. Comply with requirements of Section 01732 - Waste Management.
   2. Dismantle existing construction and separate materials.
   3. Set aside reusable, recyclable, and salvageable materials; store and deliver to collection point or point of reuse.

H. Partial Removal of Paving and Curbs: Neatly saw cut at right angle to surface.

3.03 EXISTING UTILITIES

A. Protect existing utilities to remain from damage.

B. Do not close, shut off, or disrupt existing life safety systems that are in use without at least 7 days prior written notification to Owner.

C. Do not close, shut off, or disrupt existing utility branches or take-offs that are in use without at least 3 days prior written notification to Owner.

D. Prepare building demolition areas by disconnecting and capping utilities outside the demolition zone; identify and mark utilities to be subsequently reconnected, in same manner as other utilities to remain.

3.04 SELECTIVE DEMOLITION FOR ALTERATIONS

A. Drawings showing existing construction and utilities are based on casual field observation and existing record documents only.
   1. Verify that construction and utility arrangements are as shown.
   2. Report discrepancies to Design Professional before disturbing existing installation.
   3. Beginning of demolition work constitutes acceptance of existing conditions.

B. Separate areas in which demolition is being conducted from other areas that are still occupied.
   1. Provide, erect, and maintain temporary dustproof partitions of construction specified in Section 01500 in locations indicated on drawings.
   2. Provide sound retardant partitions of construction indicated on drawings in locations indicated on drawings.

C. Maintain weatherproof exterior building enclosure except for interruptions required for replacement or modifications; take care to prevent water and humidity damage.

D. Remove existing work as indicated and as required to accomplish new work.
   1. Remove rotted wood, corroded metals, and deteriorated masonry and concrete; replace with new construction specified.
   2. Remove items indicated on drawings.

E. Services (Including but not limited to HVAC, Plumbing, Fire Protection, Electrical, and Telecommunications). Remove existing systems and equipment as indicated.
   1. Maintain existing active systems that are to remain in operation; maintain access to equipment and operational components.
   2. Where existing active systems serve occupied facilities but are to be replaced with new services, maintain existing systems in service until new systems are complete and ready for service.
   3. See Section 01100 for other limitations on outages and required notifications.
   4. Verify that abandoned services serve only abandoned facilities before removal.
   5. Remove abandoned pipe, ducts, conduits, and equipment, including those above accessible ceilings; remove back to source of supply where possible, otherwise cap stub and tag with identification.

F. Protect existing work to remain.
   1. Prevent movement of structure; provide shoring and bracing if necessary.
   2. Perform cutting to accomplish removals neatly and as specified for cutting new work.
   3. Repair adjacent construction and finishes damaged during removal work.
   4. Patch as specified for patching new work.

3.05 DEBRIS AND WASTE REMOVAL

A. Remove debris, junk, and trash from site.

B. Remove from site all materials not to be reused on site; comply with requirements of

   Section 01 74 00 - Waste Management.

C. Leave site in clean condition, ready for subsequent work.

END OF SECTION

SECTION 06 40 00

ARCHITECTURAL WOOD CASEWORK

PART 1 GENERAL

1.01 SECTION INCLUDES

A. Specially fabricated cabinet units.

B. Countertops.

C. Cabinet hardware.

D. Factory finishing.

E. Preparation for installing utilities.

1.02 RELATED SECTIONS

A. Section 064015 - Countertops.

B. Section 064230 – Interior Wood Composite Panels

C. Section 099000 - Paints and Coatings: Site finishing of cabinet exterior.

1.03 REFERENCES

A. ANSI A135.4 - American National Standard for Basic Hardboard; 2004.

B. ANSI A208.1 - American National Standard for Particleboard; 1999.

C. ANSI A208.2 - American National Standard for Medium Density Fiberboard for Interior Use; 2002.

D. AWI/WI/ AWMAC_ Architectural Woodwork Standards, latest edition (AWS)

E. BHMA A156.9 - American National Standard for Cabinet Hardware; Builders Hardware Manufacturers Association; 2003 (ANSI/BHMA A156.9).

F. GSA CID A-A-1936 - Adhesive, Contact, Neoprene Rubber; Federal Specifications and Standards; Revision A, 1996.

G. HPVA HP-1 - American National Standard for Hardwood and Decorative Plywood; Hardwood Plywood & Veneer Association; 2004 (ANSI/HPVA HP-1).

H. NEMA LD 3 - High-Pressure Decorative Laminates; National Electrical Manufacturers Association; 2005.

I. NHLA G-101 - Rules for the Measurement & Inspection of Hardwood & Cypress; National Hardwood Lumber Association; 2003.

J. PS 1 - Construction and Industrial Plywood; National Institute of Standards and Technology (Department of Commerce); 1995.

K. PS 20 - American Softwood Lumber Standard; National Institute of Standards and Technology (Department of Commerce); 2005.

1.04 SUBMITTALS

A. See Section 01 33 00 - Administrative Requirements, for submittal procedures.

B. Shop Drawings: Indicate materials, component profiles and elevations, assembly methods, joint details, fastening methods, accessory listings, hardware location and schedule of finishes.

C. Product Data: Provide data for hardware accessories.

D. Samples: Submit actual samples of architectural cabinet construction, minimum 12 inches (300 mm) square, illustrating proposed cabinet, countertop, and shelf unit substrate and finish.

E. Samples: Submit actual sample items of proposed pulls, hinges, shelf standards, and locksets, demonstrating hardware design, quality, and finish..

1.05 QUALITY ASSURANCE

A. Perform work in accordance with AWI/WI/AWMAC Architectural Woodwork Standards, Custom Grade, unless other quality is indicated for specific items.

B. Manufacturer Qualifications: Company specializing in manufacturing the products specified in this section with minimum three years of documented experience.

C. Manufacturer Qualifications: Member in good standing of the Architectural Woodwork Institute (AWI),Woodwork Institute (WI), or the Architectural Woodwork Manufacturers Association of Canada (AWMAC) and familiar with the AWI/WI/AWMAC_ Architectural Woodwork Standards.

D. Quality Certification:

1. Before delivery to the jobsite the woodwork supplier shall provide a Woodwork Institute Certified Compliance Certificate indicating the millwork products being supplied and Certifying that these products fully meet the requirements of the Grade or Grades specified.
2. Each elevation of casework, each laminated plastic top, and each solid surface top shall bear a Woodwork Institute Certified Compliance Label.
3. At completion of installation the woodwork installer shall provide a Woodwork Institute Certified Compliance Certificate indicating the products installed, and Certifying that the installation of these products fully meets the requirements of the Grade or Grades specified.
4. All fees charged by the Woodwork Institute for their Certified Compliance Program are the responsibility of the millwork manufacturer and/or installer and shall be included in their bid.]

1.06 PRE-INSTALLATION MEETING

A. Convene not less than one week before starting work of this section.

1.07 DELIVERY, STORAGE, AND PROTECTION

A. Protect units from moisture damage.

1.08 ENVIRONMENTAL REQUIREMENTS

A. During and after installation of custom cabinets, maintain temperature and humidity conditions in building spaces at same levels planned for occupancy.

PART 2 PRODUCTS

2.01 MANUFACTURERS

A. Fabricate architectural woodwork to “custom grade” standards of the AWS.

B. Fabricate cabinets in flush overlay design

C. At the mill, install the finish hardware.

2.02 PANEL MATERIALS

A. Where wood paneling is indicated on the drawings at cabinets facing public side in Rooms # 106& 107 and where indicated on the drawings. Use interior wood composite panels by Parklex as specified in Section 06 42 30. Used with concealed fasteners.

B. Particleboard: ANSI A208.1; medium density industrial type Grade M-2 as specified in the AWS, composed of wood chips bonded with interior grade adhesive under heat and pressure; sanded faces; thickness as required; use for components indicated on drawings.

C. Medium Density Fiberboard (MDF): ANSI A208.2; Grade 130 minimum, type as specified in AWS; composed of wood fibers pressure bonded with moisture resistant adhesive to suit application; sanded faces; thickness as required.
   1. Use for painted components and concealed components.
   2. Use as backing for plastic laminate unless otherwise indicated.

D. Hardboard: AHA A135.4; Pressed wood fiber with resin binder, Class 1 - Tempered, 1/4 inch (6 mm) thick, smooth two sides (S2S); use for drawer bottoms, dust panels, and other components indicated on drawings.

E. Hardwood Edgebanding: Use solid hardwood edgebanding matching species, color, grain, and grade for exposed portions of cabinetry.

2.03 LAMINATE MATERIALS

A. Manufacturers:
   1. Wilsonart International, Inc; www.wilsonart.com.
   2. Formica Corporation; www.formica.com.
   3. Nevamar Company; www.nevamar.com.
   4. Substitutions: See Section 01600 - Product Requirements.

B. High Pressure Decorative Laminate (HPDL): NEMA LD 3, types as recommended for specific applications and as follows:
   1. Horizontal Surfaces: HGS, 0.048 inch (1.22 mm) nominal thickness, colors as scheduled, finish as scheduled.
   2. Post-Formed Horizontal Surfaces: HGP, 0.039 inch (1.0 mm) nominal thickness, colors as scheduled, finish as scheduled.
   3. Post-Formed Vertical Surfaces: VGP, 0.028 inch (0.71 mm) nominal thickness, colors as scheduled, finish as scheduled.
   4. Flame Retardant Surfaces: HGF, 0.048 inch (1.22 mm) nominal thickness, colors as scheduled, finish as scheduled.
   5. Cabinet Liner: CLS, 0.020 inch (0.51 mm) nominal thickness, colors as scheduled, finish as scheduled.
   6. Laminate Backer: BKL, 0.020 inch (0.51 mm) nominal thickness, undecorated; for application to concealed backside of panels faced with high pressure decorative laminate.
   7. Thru core plastic laminate material where shown on the drawings.
   8. Metal Laminate where shown on the drawings
   9. Chemical resistant Plastic Laminates, where shown on the drawings

2.04 ACCESSORIES

A. Adhesive: Type recommended by fabricator to suit application. Do not use “contact” adhesive.

B. Plastic Edge Banding: Extruded PVC, 1mm flat face; smooth finish; of width to match component thickness, color as selected from manufacturer's standards.
   1. Use at all exposed edges.

C. Same as above except use 3mm flat PVC edge-band where heavy duty edge-banding has been called out on the drawings.
   1. Use at all exposed edges.

D. Glass: Type A as specified in Section 08 80 00.

E. Fasteners: Size and type to suit application.

F. Bolts, Nuts, Washers, Lags, Pins, and Screws: Of size and type to suit application; galvanized or chrome-plated finish in concealed locations and stainless steel, or chrome-plated finish in exposed locations.

G. Concealed Joint Fasteners: Threaded steel.

H. Grommets: Standard plastic cut-outs, in color to match adjacent surface.

2.06 HARDWARE

A. Hardware: BHMA A156.9, types as recommended by fabricator for quality grade specified.

B. Adjustable Shelf Supports: Standard side-mounted system using recessed metal shelf standards or multiple holes for pin supports and coordinated self rests, polished chrome finish, for nominal 1 inch (25 mm) spacing adjustments.
   1. Product: No. 239 manufactured by K-V.

C. Adjustable Shelf Supports: Standard back-mounted system using surface mounted metal shelf standards and coordinated cantilevered shelf brackets, satin chrome finish, for nominal 1 inch (25 mm) spacing adjustments.
   1. Product: No. 346 manufactured by K-V.

D. Drawer and Door Pulls: with matt finish.
   1. Product: Manufactured by Hafele to match existing

E. Cabinet Locks: Keyed cylinder, two keys per lock, master keyed, steel with chrome finish.
   1. Product: 1E Series – Slabbed Mortise Cylinder (1E7E4RP3626) manufactured by Best.

F. Catches: Magnetic.
   1. Product: 246.29.301 manufactured by Hafele.

G. Drawer and Shelf Slides:
   1. Type: Full extension.
   2. Static Load Capacity: Heavy duty.
   3. Mounting: Side mounted.
   4. Stops: Integral type.
   5. Features: Provide self-closing/stay closed type.

H. Manufacturers:
   a. Blum, Inc.; Product 430E, 100 lb. load capacity: www.blum.com.
   b. Equal product by Grass America Inc; www.grassusa.com.
   c. Equal product by Knape & Vogt Manufacturing Company; www.kv.com.
   d. Substitutions: See Section 01600 - Product Requirements.

I. Hinges: European style concealed self-closing type, steel with polished finish.
   1. Manufacturers:

a. Blum, Inc; Product No. 75M5580-125, Degree “Clip” Hinge: www.blum.com.
b. Equal product by Grass America Inc; Product www.grassusa.com.

2.07 SHOP TREATMENT OF WOOD MATERIALS

A. Provide UL approved identification on fire retardant treated material.

B. Deliver fire retardant treated materials cut to required sizes. Minimize field cutting.

2.08 SITE FINISHING MATERIALS

A. Stain, Shellac, Varnish and Finishing Materials: As specified in Section 09900.

B. Finishing: Site finished as specified in Section 09900.

2.09 FABRICATION

A. Cabinet Style: Flush overlay.
B. Cabinet Doors and Drawer Fronts: Flush style.
C. Drawer boxes : Solid hardwood with transparent finish.
D. Exposed surfaces to be HPDL of the appropriate grade per 2.03 B.
E. Exposed Interior surfaces to be HPDL
F. Semi-exposed surfaces to be Cabinet Liner grade CLS.
G. Drawer Construction Technique: Dovetail joints.
H. Assembly: Shop assemble cabinets for delivery to site in units easily handled and to permit passage through building openings.
I. Edging: Fit shelves, doors, and exposed edges with specified edging. Do not use more than one piece for any single length.
J. Fitting: When necessary to cut and fit on site, provide materials with ample allowance for cutting. Provide matching trim for scribing and site cutting.
K. Plastic Laminate: Apply plastic laminate finish in full uninterrupted sheets consistent with manufactured sizes. Fit corners and joints hairline; secure with concealed fasteners. Slightly bevel arises. Locate counter butt joints minimum 2 feet (600 mm) from sink cut-outs.
   1. Apply laminate backing sheet to reverse side of plastic laminate finished surfaces.
   2. Cap exposed plastic laminate finish edges with material of same finish and pattern.
L. Matching Wood Grain: Comply with requirements of quality standard for specified Grade and as follows:
   1. Provide center matched panels at each elevation.
   2. Provide sequence matching across each elevation.
   3. Carry figure of cabinet fronts to toe kicks.
M. Mechanically fasten back splash to countertops with steel brackets at 16 inches (400 mm) on center.
N. Provide cutouts for plumbing fixtures. Verify locations of cutouts from on-site dimensions. Prime paint cut edges.
O. Shop glaze glass materials using the Interior Dry method specified in Section 08800.

2.10 FACTORY FINISHING

A. Sand work smooth and set exposed nails and screws.
B. For opaque finishes, apply wood filler in exposed nail and screw indentations and sand smooth.
C. On items to receive transparent finishes, use wood filler matching or blending with surrounding surfaces and of types recommended for applied finishes.
D. Finish work in accordance with AWS , Section 5, System 2.

E. Seal, stain and varnish exposed to view surfaces. Brush apply only.
F. Seal stain and varnish internal exposed to view and semi-concealed surfaces. Brush apply only.
G. Seal internal surfaces of cabinets with one coat of shellac. Brush apply only.
H. Prime paint surfaces in contact with cementitious materials.

PART 3 EXECUTION

3.01 EXAMINATION

A. Verify adequacy of backing and support framing.

B. Verify location and sizes of utility rough-in associated with work of this section.

3.02 INSTALLATION

A. Set and secure custom cabinets in place, assuring that they are rigid, plumb, and level.

B. Use fixture attachments in concealed locations for wall mounted components.

C. Use concealed joint fasteners to align and secure adjoining cabinet units.

D. Carefully scribe casework abutting other components, with maximum gaps of 1/32 inch (1 mm). Do not use additional overlay trim for this purpose.

E. Secure cabinets to floor using appropriate angles and anchorages.

F. Countersink anchorage devices at exposed locations. Conceal with solid wood plugs of species to match surrounding wood; finish flush with surrounding surfaces.

G. Site glaze glass materials using the Interior Dry method specified in Section 08800.

3.03 ADJUSTING

A. Adjust installed work.

B. Adjust moving or operating parts to function smoothly and correctly.

3.04 CLEANING

A. Clean casework, counters, shelves, hardware, fittings, and fixtures.

END OF SECTION

SECTION 06 40 15

COUNTERTOPS

PART 1 GENERAL

1.01 SECTION INCLUDES

A. Countertops for architectural cabinetwork.

B. Countertops for manufactured casework.

C. Wall-hung counters and vanity tops.

1.02 RELATED SECTIONS

A. Section 06410 - Custom Cabinets.

B. Section 15400 - Plumbing Fixtures: Sinks.

1.03 REFERENCES

A. ANSI A161.2 - Performance Standards for Fabricated High Pressure Decorative Laminate Countertops; 1998.

B. ANSI A208.1 - American National Standard for Particleboard; 1999.

C. ANSI A208.2 - American National Standard for Medium Density Fiberboard for Interior Use; 2002.

D. ANSI Z124.3 - American National Standard for Plastic Lavatories; 2005.

E. ASTM A 666 - Standard Specification for Annealed or Cold-Worked Austenitic Stainless Steel Sheet, Strip, Plate, and Flat Bar; 2003.

F. ASTM D 635 - Standard Test Method for Rate of Burning and/or Extent and Time of Burning of Plastics in a Horizontal Position; 2003.

G. ASTM E 84 - Standard Test Method for Surface Burning Characteristics of Building Materials; 2005.

H. AWI/WI/AWMAC- Architectural Woodwork Standards, latest edition (AWS)

I. ISSFA-2 - Classification and Standards for Solid Surfacing Material; International Solid Surface Fabricators Association; 2001 (2002)

J. NEMA LD 3 - High-Pressure Decorative Laminates; 2005.

K. PS 1 - Construction and Industrial Plywood; 1995.

1.04 SUBMITTALS

A. See Section 01300 - Administrative Requirements, for submittal procedures.

B. Product Data: Manufacturer's data sheets on each product to be used, including:
   1. Preparation instructions and recommendations.
   2. Storage and handling requirements and recommendations.
   3. Specimen warranty.

C. Shop Drawings: Complete details of materials and installation; combine with shop drawings of cabinets and casework specified in other sections. Shop Drawings to comply with AWS requirements.

D. Selection Samples: For each finish product specified, color chips representing manufacturer's full range of available colors and patterns.

E. Verification Samples: For each finish product specified, minimum size 6 inches (150 mm)

square, representing actual product, color, and patterns.

F. Test Reports: Chemical resistance testing, showing compliance with specified requirements.

G. Installation Instructions: Manufacturer's installation instructions and recommendations.

H. Maintenance Data: Manufacturer's instructions and recommendations for maintenance and repair of countertop surfaces.

1.05 QUALITY ASSURANCE

A. Fabricator Qualifications: Same fabricator as for cabinets on which tops are to be installed.

B. Installer Qualifications: Fabricator.

1.06 DELIVERY, STORAGE, AND HANDLING

A. Store products in manufacturer's unopened packaging until ready for installation.

B. Store and dispose of solvent-based materials, and materials used with solvent-based materials, in accordance with requirements of local authorities having jurisdiction.

1.07 PROJECT CONDITIONS

A. Maintain environmental conditions (temperature, humidity, and ventilation) within limits recommended by manufacturer for optimum results. Do not install products under environmental conditions outside manufacturer's absolute limits.

PART 2 PRODUCTS

2.01 COUNTERTOP ASSEMBLIES

A. Plastic Laminate Countertops: High pressure decorative laminate sheet bonded to substrate.
   1. Laminate Sheet, Unless Otherwise Indicated: NEMA LD 3 Grade HGP, for postforming, 0.039 inch (HGP, for postforming, 1.0 mm) nominal thickness.
      a. Surface Burning Characteristics: Flame spread 200 (Class III), maximum, when tested in accordance with ASTM E 84.
      b. NSF approved for food contact.
      c. Wear Resistance: In addition to specified grade, comply with NEMA LD 3 High Wear Grade requirements for wear resistance.
      d. Laminate Core Color: Same as decorative surface.
      e. Finish: Matte or suede, gloss rating of 5 to 20.
      f. Surface Color and Pattern: To be selected from manufacturer's standard line.
      g. Manufacturers:
         1) Formica Corporation: www.formica.com.
         2) Nevamar Company: www.nevamar.com.
         3) Wilsonart International, Inc: www.wilsonart.com.
         4) Substitutions: See Section 01600 - Product Requirements.

   2. Exposed Edge Treatment: Postformed laminate; front edge substrate built up to minimum 1-1/4 inch (32 mm) thick with raised radiused edge, integral coved backsplash with radiused top edge. Provide no drip edge at countertops with sinks.
   3. Back and End Splashes: Same material, same construction.
   4. Fabricate in accordance with AWI/WI/AWMAC Quality Standards Illustrated Premium Grade.

B. Stone Countertops: Stone slabs bonded to substrate; use as large pieces as possible with inconspicuous adhesive joints.
   1. Stone: Cesar Stone Quartz Surface
   2. Color: To be selected.
   3. Stone Thickness: 3/4 inch, minimum.
   4. Surface Finish: Polished.
   5. Exposed Edge Treatment: Square profile stone, 1 inch (25 mm) thick, with 3/16 inch (5 mm) radius corner unless noted otherwise on the drawings.
   6. Back and End Splashes: Same material, same thickness; for field attachment.
   7. Sealants: Per stone distributor's recommendation.

2.02 ACCESSORY MATERIALS

A. Wood-Based Components:
   1. Wood fabricated from old growth timber is not permitted.
   2. Provide sustainably harvested wood, certified or labeled as specified in Section 01600.
   3. Provide wood harvested within a 500 mile (535 km) radius of the project site.
   4. Wood fabricated from timber recovered from riverbeds or otherwise abandoned is permitted, unless otherwise noted, provided it is clean and free of contamination; identify source; provide lumber re-graded by an inspection service accredited by the American Lumber Standard Committee, Inc.

B. Plywood for Supporting Substrate: PS 1 Exterior Type, AC veneer grade, minimum 5-ply; minimum 3/4 inch (19 mm) thick; join lengths using metal splines.

C. Particleboard for Supporting Substrate: ANSI A208.1 Grade 2-M-2, 45 pcf (20 kg/cu m) minimum density; minimum 3/4 inch (19 mm) thick; join lengths using metal splines.

D. Medium Density Fiberboard for Supporting Substrate: ANSI A208.2.

E. Adhesives: Chemical resistant waterproof adhesive as recommended by manufacturer of materials being joined.

F. Cove Molding for Top of Splashes: Rubber with semi-gloss finish and T-spline to fit between splash and wall; 1/2 inch (12 mm) by 1/2 inch (12 mm); color as selected.

G. Joint Sealant: Mildew-resistant silicone sealant, white.

2.03 FABRICATION

A. Fabricate in accordance with standards governing fabrication quality that are specified in Section 06410.

B. Fabricate tops and splashes in the largest sections practicable, with top surface of joints flush.
   1. Join lengths of tops using best method recommended by manufacturer.
   2. Fabricate to overhang fronts and ends of cabinets 1 inch (25 mm) except where top butts against cabinet or wall.
   3. Prepare all cutouts accurately to size; replace tops having improperly dimensioned or unnecessary cutouts or fixture holes.

C. Provide back/end splash wherever counter edge abuts vertical surface unless otherwise indicated.
   1. Secure to countertop with concealed fasteners and with contact surfaces set in waterproof glue.
   2. Height: 4 inches (102 mm), unless otherwise indicated.

D. Solid Surfacing: Fabricate tops up to 144 inches (3657 mm) long in one piece; join pieces with adhesive sealant in accordance with manufacturer's recommendations and instructions.

E. Stainless Steel: Fabricate tops up to 144 inches (3657 mm) long in one piece including nosings and back and end splashes; accurately fitted mechanical field joints in lengths over that dimension are permitted.
   1. Weld joints; grind smooth and polish to match.
   2. Provide stainless steel hat channel stiffeners, welded or soldered to underside, where indicated on drawings.
   3. Provide wall clips for support of back/end splash turndowns.
   4. Sound Deadening: Apply water resistant, fire resistant sound deadening mastic to entire bottom surface.

F. Wall-Mounted Counters: Provide skirts, aprons, brackets, and braces as indicated on drawings, finished to match.

PART 3 EXECUTION

3.01 EXAMINATION

A. Do not begin installation until substrates have been properly prepared.

B. If substrate preparation is the responsibility of another installer, notify Design Professional of unsatisfactory preparation before proceeding.

C. Verify that wall surfaces have been finished and mechanical and electrical services and outlets are installed in proper locations.

3.02 PREPARATION

A. Clean surfaces thoroughly prior to installation.

B. Prepare surfaces using the methods recommended by the manufacturer for achieving the best result for the substrate under the project conditions.

3.03 INSTALLATION

A. Securely attach countertops to cabinets using concealed fasteners. Make flat surfaces level; shim where required.

B. Attach plastic laminate countertops using screws with minimum penetration into substrate board of 5/8 inch (16 mm).

C. Attach wood countertops using screws with minimum penetration into substrate board of 5/8 inch (16 mm).

D. Install tile as specified in Section 09300.

E. Attach stainless steel countertops using stainless steel fasteners and clips.

F. Attach epoxy resin countertops using compatible adhesive.

G. Seal joint between back/end splashes and vertical surfaces.
   1. Where indicated use rubber cove molding.
   2. Where applied cove molding is not indicated use specified sealant.

3.04 CLEANING AND PROTECTION

A. Clean countertops surfaces thoroughly.

B. Protect installed products until completion of project.

C. Touch-up, repair or replace damaged products before Substantial Completion.

END OF SECTION

SECTION 06 42 30

ENGINEERED WOOD PANELING

PART 1 GENERAL

1.01 SECTION INCLUDES

A. Engineered wood paneling.

B. Solid wood panel trim.

C. Site finishing.

1.02 RELATED SECTIONS

A. Section 09 90 00 - Paints and Coatings.

1.03 REFERENCES

A. ASTM E 84 - Standard Test Method for Surface Burning Characteristics of Building Materials; 2005.

B. TECHNICAL DATA

Additional ASTM Test Results

Characteristics Standards and test methods Values
Density (10mm) ASTM D 2395 Method A 1.51 g/cc
Moisture Content ASTM D 4442 Method A 2.1%
Water Absorption (24 h/23°C) ASTM D 1037 Method B 0.34% by mass
0.56% by volume
Thickness Swelling 0.59%
Flexural Properties ASTM D 1037
Modulus of Elasticity
veneer parallel to long dimension dry-soaked
19.0 GPa (2,756,000 psi)
18.0 GPa (2,611,000 psi)
veneer perpendicular to long dim. dry-soaked
9.0 GPa (1,305,000 psi)
8.7 GPa (1,261,000 psi)
Bending Strength (MOR)
parallel to long direction dry-soaked
193 MPa (28,000 psi)
200 MPa (29,000 psi)
perpendicular to long direction dry-soaked
93 MPa (13,500 psi)
108 MPa (15,700 psi)
Bond Durability APA PS-1 6.1.5
maximum load reference
vacuum/pressure soaked
boiled (2 cycles)
2.58 kN (580 lb-f)
3.47 kN (780 lb-f)
2.68 kN (600 lb-f)
Surface Burning Characteristics ASTM E-84 Class B (II) / Class A (I)
Click on the following link for **Interpretation of ASTM Test Data on Parklex 1000**.
ASTM Testing Performed at AEWC Advanced Engineered Wood Composites Center, University of Maine; ASTM E-84
Testing (Surface Burning) performed at Hardwood Plywood & Veneer Association Laboratory, Reston Virginia.

1.04 SUBMITTALS

A. See Section 01 32 23 - Administrative Requirements, for submittal procedures.

B. Shop Drawings: Indicate materials, elevations of sheet paneling, fastening methods, joining methods, and interruptions to other work, to a minimum scale of 1-1/2 inch to 1 ft (1:8). Include plan of panel number sequencing.

C. Product Data: Provide data on fire retardant treatment materials and application instructions.

D. Samples: Submit two samples of finished 12 x 12 inch in size, illustrating wood grain and specified finish.

1.05 QUALITY ASSURANCE

A. Fabricator: Company specializing in fabricating the products specified in this section with minimum three years of documented experience.

1.06 REGULATORY REQUIREMENTS

A. Conform to applicable code for fire retardant requirements.

1.07 MOCK-UP

Not required.

1.08 DELIVERY, STORAGE, AND HANDLING

A. Protect work from moisture damage.

B. Do not deliver wood materials to project site until building is fully enclosed and interior temperature and humidity are in accordance with recommendations of AWI Quality Standards Illustrated.

C. Deliver materials in manufacturer's original, unopened, undamaged containers with identification labels intact. Materials must be transported flat and kept dry and protected from the elements and handled with care.

D. Storage and Protection: Materials must be stored flat and kept dry in a warehouse/storage facility, protected from exposure to harmful weather conditions, at temperatures and humidity conditions recommended by the manufacturer.

1.09 PROJECT CONDITIONS

A. Maintain environmental conditions (temperature, humidity, and ventilation) within limits recommended by manufacturer for optimum results. Do not install products under environmental conditions outside manufacturer’s absolute limits.

B. Verify that field measurements are as indicated.

C. Coordinate the work with electrical rough-in, and installation of associated and adjacent components.

PART 2 PRODUCTS

2.01 MANUFACTURERS

A. Provide PARKLEX 700 Interior Wood Composite Panels
Distributed by: Finland Color Plywood Corporation
Corporate Headquarters
1310 Main St.
Venice, CA 90291
Bus: (310) 396-9991
Bus Fax: (310) 396-4482
E-mail: **info@fcpcusa.com**
Warehouses in Los Angeles, CA & Port Newark, NJ
http://www.fcpcusa.com/
http://www.parklex.com/

B. Substitutions: Approved equal to match composition, texture, color, thickness and anchorage method.

2.02 WOOD-BASED MATERIALS – GENERAL

A. INTERIOR GRADE WOOD COMPOSITE PANEL: Natural laminated wood panel standard **one sided**, (front face only), Ayous wood coated with phenolic resins; inner core paper fibers treated with thermo-hardenend resins (bakelized core), balancing layer on back face (not designed for exposure to the elements).

1. WOOD VENEER:
   ABP Lt. – Ayous Light Brown
   Smooth surface (standard).

2. PANEL DIMENSIONS:
   1220mm (48") x 2440mm (96") x thickness.
   Thickness: 8mm

3. DIMENSIONAL TOLERANCES:
   Length ±2mm, Width ±2mm, Thickness ±0.55mm (10mm thick panel).

4. WEIGHT:
   2.23 lb/ft2 (8mm); 1220mm x 2440mm x 8mm panel weighs approximately 72 pounds.

5. SURFACE BURNING CHARACTERISTICS:
   Report on surface burning characteristics determined by ASTM E-84 (twenty-five foot tunnel furnace test method), meets Class B (II) - 75 or under flame spread, with a flame spread index of 40 and smoke developed index of 35.

6. THERMAL PROPERTIES
   Parameter Description Metric English
   Thermal Conductivity *k* 0.18 W/m·K 0.104 (Btu/h)/ft·F
   Thermal Resistance *R* (10mm) 0.0556 K·m2/W 0.315 h·ft2·F/Btu
   Equivalent to R-9.61 (thermal resistance of 1 ft of Parklex insulation, given in h·ft2·F/Btu).

2.03 PANEL PREPARATION

A. Cutting the Panels: Panels may be cut with a circular saw; a precision carbide or tungsten-tipped blade is recommended.

B. Protective Film: The panels leave the factory with a protective layer of film on the front face to protect the panel surface from scratching during transport and handling. It is necessary to remove this protective film prior to installation.

C. Cleaning Prior to Installation: Once the protective film has been removed, superficial environmental dust will naturally wash away in the rain. However, care must be taken to prevent the panels form being soiled by damp cement, mortar or drops of paint. If these stains are not immediately cleaned, irreversible discoloration may occur on the panel surface. The panels should be cleaned as required at the location of the stain only, without attempting to scrub the entire surface. After the stain is removed, proceed to wash and dry the entire surface of the panel prior to installation.

2.04 ADHESIVES AND FASTENERS

A. Adhesives: Type suitable for intended purpose, complying with applicable air quality regulations.

B. Fastening with Adhesives: It is recommended to attach panels using mechanical fasteners for ease of installation. The strength of the adhesive specified will make the attachment of the panels virtually permanent (removal may cause permanent damage to the panel).

C. Attach Panel at Center: The panel must be attached at its center to prevent curvature. Adhesives accommodate expansion and contraction without penetrating the surface of the panel.

D. Preparation of Panel: Sand down un-faced side (backside) of the panel in the area to be glued, and remove dust.

E. Use of Adhesives: Specific preparation and installation techniques must be followed for successful attachment using adhesive.

F. Fastening with Adhesive: Recommended adhesive product: **Sika Flex – 552 High-Strength Structural Assembly Adhesive.**

2.05 FABRICATION

A. Fabricate composite panels and accessory items in accordance with manufacturer's recommendations and approved submittals.

B. Fabricate panels to sizes indicated.

PART 3 EXECUTION

3.01 INSPECTION

A. Examine alignment of backup structure prior to installing sub-frame. Do not proceed until all defects are corrected.

B. Verify mechanical, electrical, and building items affecting work of this section are placed and ready to receive this work.

3.02 INSTALLATION

A. Comply with Manufacturer's "General Guidelines for Panel Installation". Fastening with adhesives.

B. Install solid wall panels plumb and level and accurately spaced in accordance with manufacturer's recommendations and approved submittals.

C. Fasten solid wall panels to supporting substrate with fasteners adhesive approved for use with adjoining construction.

D. Accessory Items: Install corner profiles, gaskets and trim with fasteners and adhesive appropriate for use with adjoining construction as indicated on drawings and as recommended by manufacturer.

3.03 DAMAGED MATERIAL

A. Repair or replace all damaged material to the satisfaction of the Architect.

3.04 ERECTION TOLERANCES

A. Maximum Variation from True Position: 1/16 inch (1.5 mm).

B. Maximum Offset from True Alignment with Abutting Materials: 1/32 inch (0.7 mm).

3.05 CLEANING

A. Do not use abrasive cleaners or cleaning tools. Dry wipe down panel sections as work progresses.

B. Provide final cleaning of the wall system.

C. Parklex 700 panels are prefinished, however periodic maintenance may be necessary to clean the panel surface of superficial dirt resulting form typical exposure to dust and pollution. Cleaning should be done using a damp, soft cloth and non-abrasive mild household detergent solution. Abrasive and highly acidic or alkaline products should not be used as they could scratch or damage the surface of the panel.

3.06 PROTECTION

A. Protect installed product and finish surfaces from damage during construction.

END OF SECTION

SECTION 07 21 00

BUILDING INSULATION

PART 1 - GENERAL

1.01 SUMMARY

A. Provide building insulation where shown on the Drawings, as specified herein, and as needed for a complete and proper installation.

B. Related work:
   1. Documents affecting work of this Section include, but are not necessarily limited to, General Conditions, Supplementary Conditions, and Sections in Division l of these Specifications.

1.02 QUALITY ASSURANCE

A. Use adequate numbers of skilled workmen thoroughly trained and experienced in the necessary crafts and completely familiar with the specified requirements and methods needed for proper performance of the work of this Section.

B. Upon completion of this portion of the Work, complete and post a certificate of insulation compliance in accordance with pertinent requirements of governmental agencies having jurisdiction.

1.03 DELIVERY, STORAGE, AND HANDLING

A. Comply with pertinent provisions of Section 01 66 00.

PART 2 - PRODUCTS

2.01 MATERIALS

A. Provide the following building insulation where shown on the Drawings or otherwise needed to achieve the degree of insulation required under pertinent regulations of governmental agencies having jurisdiction.
   1. Type A: Unfaced glass fiber sound isolating batts, thickness to suit framing member 3 ½” and 6”.

2.02 OTHER MATERIALS

A. Provide other materials, not specifically described but required for a complete and proper installation, as selected by the Contractor subject to the approval of the Architect.

PART 3 - EXECUTION

3.01 SURFACE CONDITIONS

A. Examine the areas and conditions under which work of this Section will be performed. Correct conditions detrimental to timely and proper completion of the Work. Do not proceed until unsatisfactory conditions are corrected.

B. Remove, or protect against, projections in construction framing which may damage or prevent proper insulation.

3.02 INSTALLATION

A. Install the work of this Section in strict accordance with the original design, requirements of governmental agencies having jurisdiction, and the manufacturer's recommended installation procedures as approved by the Architect, anchoring all components firmly into position.

END OF SECTION

SECTION 07 92 00

JOINT SEALANTS

PART 1 - GENERAL

1.01 SCOPE

A. Furnish all labor, materials, services, equipment and appliances required to perform all sealants and caulking, backing materials and supplementary work to complete the Contract including, but are not limited to, these major items:
   1. At all doors, windows, etc.
   2. At perimeter of all change in finish materials, i.e. between EIFS and metal flashings and/or concrete.
   3. Roof penetrations not specified under Mechanical or Electrical Sections.
   4. All concrete construction and separation joints in concrete building slab and site concrete.
   5. Sealant between storm drainage downspouts and wall outlets.
   6. Fire retardant sealants for type of rated penetration, as required.
   7. All other Sealants and Caulking as indicated on Drawings.

1.02 RELATED WORK IN OTHER SECTIONS

A. Section 07600: Sheet Metal Work

B. Section 08100: Hollow Metal Doors and Frames

C. C.Section 08410: Aluminum Window Wall and Storefront

D. Section 08 81 00: Glass & Glazing

1.03 REFERENCE STANDARDS

A. ASTM C 920 Specification for Elastomeric Joint Sealants.A sealant qualifying under this specification shall be classified as to type, grade, class, and use as follows:
   1. Type S - Single component sealant
   2. Type M - Multi component sealant
   3. Grade P - Pourable or self-leveling
   4. Grade NS - Nonsag or gunable
   5. Class 25 - Adhesion and cohesion under movement shall withstand an increase or decrease of at least 25% of the joint width.
   6. Use T - Pedestrian and vehicular traffic areas. Sealant shall have a hardness reading, after being properly cured, of not less than 25 or more than 50 when tested in accordance with Test Method C 661.
   7. Use NT - Nontraffic applications
   8. Use M - Mortar/Masonry
   9. Use G - Glass
   10. Use A - Aluminum
   11. Use O - Other than the Standard Substrates meeting this specification.

   ASTM C962 Standard Guide Use of Elastomeric Joint Sealants
   ASTM C1193 Standard Guide for Use of Joint Sealants.
   ASTM C1184 Standard Guide for Use of Structural Sealants.
   ASTM D1565 Standard Specification for Flexible Cellular Materials - Vinyl Chloride Polymers and Copolymers (Open-Cell form)
   ASTM D1667 Standard Specification for Flexible Cellular Materials - Vinyl Chloride Polymers and Copolymers (Closed-Cell Foam)

B. Federal Specification:
   FS TT-S-00227E, "Sealing Compound, Rubber Base, Two-Component."

FS TT-S-00230, "Sealing Compounds, Synthetic Rubber Base, Single Component, Chemically Curing.

C. Sealant, Waterproofing and Restoration Institute (SWRI) - Sealant and Caulking Guide Specifications.

1.04 SUBMITTALS

A. Provisions: Comply with Section 01 33 23.

B. Product Data: Submit manufacturer's technical data, mixing instructions, application recommendations and installation instructions, including cleaning and priming instructions and sealant limitations for each type of material required. Include manufacturer's published data, or letter of certification, or certified test laboratory report indicating that each material selected complies or is suitable for the temperatures, movements and weather conditions that will be encountered during the sealants service life.

C. Samples: Submit manufacturer's standard bead samples consisting of strips of actual products to be exposed to view showing full range of cured colors available.

D. Contractor's and manufacturers' guarantees and warranties respectively.

E. Sealant Schedule: Indicate each sealant type and backer rod type proposed for each appropriate location and for each appropriate substrate.

F. Certificates: Furnish manufacturers certification that sealant systems comply with local regulations controlling use of volatile organic compounds. Manufacturer shall certify that sealant systems are compatible with adjacent substrate and related finish materials.

G. Product Testing: Include manufacturer or independent laboratory test results demonstrating hardness, stain resistance, adhesion and cohesion under cyclic movement per ASTM C719, low temperature flexibility, modulus of elasticity at 100 percent strain, effects of heat aging and effects of accelerated weathering.

1.05 QUALITY ASSURANCE

A. Installer Qualifications: Engage an installer who has successfully completed within the last three (3) years at least three (3) joint sealer applications similar to type and size to that of this project.

B. Single Source for Materials: Obtain joint sealer materials from a single manufacturer for each different product required, for each different application.

C. Manufacturer's representative to provide inspection of conditions prior to start of the work and initial supervision at the start of each application, to insure that any physical conditions which would result in defective work are properly corrected before materials are applied, and that proper procedure are being followed. Provide such inspection and supervision by qualified personnel. Report all unsatisfactory conditions existing at the time of inspection in writing to the Architect for correction before proceeding with the work.

D. Notify the manufacturer's representative at least 72 hours prior to the time inspection is required.

E. Failure or refusal of the manufacturer or manufacturer's representative to provide the inspection and supervision as required hereunder constitutes grounds for non-acceptability of materials manufactured, even though such materials have been specified or approved.

1.06 REQUIREMENTS

A. Sealant system shall include joint preparation, joint back-up or bondbreaker, priming, sealant and caulkings required to seal exterior and interior joints throughout the project, including those not specifically indicated in the Contract Documents, but necessary to completely eliminate active, direct and indirect moisture and weather elements of water, air or dust, from entering through, around, over and under joints of building components, to provide a watertight, moisturetight and weathertight building envelope and seal joints between adjacent materials.

B. Sealants are not to harden or soften more than 10 Shore A durometer points as measured 21 days after original installation.

C. Verify compatibility of sealants with various other sealants or joint systems at any point of interface or possible contact.

1.07 PRODUCT DELIVERY, STORAGE AND HANDLING

A. Deliver materials to project site in original unopened containers or bundles with labels, indicating manufacturer, product name and designation, color, expiration period for use, pot life, curing time and mixing instructions for multicomponent materials.

B. Store at 80°F or less in a cool, dry area. Handle materials to prevent their deterioration or damage due to moisture, temperature changes, contaminants or other causes.

C. Use sealant within the time recommended by the manufacturer.

1.08 PROJECT/SITE CONDITIONS

A. Weather Conditions: Do not proceed with installation of sealants under adverse weather conditions, or when ambient and substrate temperatures are below or above manufacturer's recommended limitations for installation or below 40°F. Proceed with the work only when forecasted weather conditions are favorable for proper cure and development of high early bond strength.

B. Surface Conditions: Provide proper primers suited to conditions. Primers may be omitted upon certification by sealant manufacturer that they are not required. Where any doubt exists, prepare sample joints on actual materials as furnished for the job to determine the matter.

1.09 WARRANTY

Contractor shall submit manufacturer's written five (5) year warranty agreeing to replace joint sealers which fail or deteriorate including color resistance compromising system life.

1.10 GUARANTEE

Provide joint installer/manufacturer guarantee of work against inherent or developed defects in material or installation, agreeing to repair or replace joint sealers which fail, leak, crumble, harden, shrink, bleed, sag, stain or loose adhesion. Guarantee installed work to remain watertight for a period of two (2) years.

PART 2 - PRODUCTS

2.01 MATERIALS

Use sealants of the following types and manufacturers. Use manufacturer's standard or custom colored materials to match color of adjacent surfaces. Where adjacent materials on each side of the joint are different colors, the Architect will select sealant colors. If the desired color is not available from one manufacturer, select the proper color from another manufacturer.

2.02 MANUFACTURERS

A. Provide one of the following for each different product required:
   1. Momentive Performance Material
   2. Mameco/International, Inc.
   3. Pacific Polymers
   4. Pecora
   5. Sika
   6. Equivalent products meeting performance criteria specified will be acceptable.

2.03 MATERIAL TYPES

A. POLYURETHANE SEALANTS

1. One part, non sag, non staining, gun grade sealants ASTM C920, Type S, Grade NS, Class 25, uses NT, M, G, A & O, TT-S-00230C, Type II, Class A.

   a. Location/Use: Exterior/Interior, Horizontal/Vertical joints in concrete, masonry, steel, aluminum and glass
   b. Mameco International 'Vulkem 116 or 921'
      Pacific Polymers 'Elasto-thane 230-Type II', Elasto-seal 230
      Pecora 'Dynatrol 1'
      Sika - Sikaflex - 1a or 15LM
      Sonneborn 'Sonolastic NP-1/Ultra/Sonolastic 150

2. Two part, non sag, non staining, gun grade sealant, Type M, Grade NS, Class 25, uses NT, M, A & O, TT-S-00227E, Type II, Class A.

   a. Location/Use: Exterior/Interior, Horizontal/Vertical joints in concrete, masonry, steel, aluminum.
   b. Mameco International 'Vulkem 227 or 922'
      Pacific Polymers 'Elasto-seal 227 or Elasto-thane 920 Type II'
      Pecora 'Dynatrol II'
      Sika - Sikaflex - 2c NS/SL
      Sonneborn 'Sonolastic NP-2'

3. One part, self leveling, pourable sealant, ASTM C920, Type S, Grade P, Class 25, Uses T, M, A & 0, TT-S-00230C, Type 1

   a. Location/Use: Exterior/Interior, Horizontal expansion and control joints; light traffic.
   b. Mameco International 'Vulkem 45'
      Pecora 'Urexpan NR-201'
      Sika - Sikaflex - 1 CSL
      Sonneborn 'Sonolastic SL1'

4. Two part, self leveling, pourable sealant, ASTM C920, Type M, Grade P, Class 25, uses T, M, A & O, TT-S-00227E, Type I.

   a. Location/Use: Exterior/Interior, Horizontal expansion and control joints; medium to heavy traffic.
   b. Mameco International 'Vulkem 245-255'
      Pacific Polymers 'Elasto-thane 227 High Shore'
      Pecora 'Urexpan NR-200'or 'Dynatred'

Permapol 'RC-2SL'
Sika - Sikaflex 2CSL
Sonneborn 'Sonolastic SL2'

B. Silicone Sealants

1. Silicone based, single components, non sag, conforming to Federal Spec. TT-5-0030C (2) & TT-S-001543A.
   a. Joints in glass and metal surfaces of walls and other vertical and sloping surfaces of window surrounds.
      General Electric - GE1200
      Dow Corning - 790
      Pecora 864 or 890
      Sonneborn - Sonolastic 150/Omniseal
   b. Joints in concrete and masonry in vertical and sloping surfaces.
      General Electric - Silpruf
      Dow Corning - 795
      Pecora 895
      Sonneborn - Sonolastic 150/Omniseal

C. Joint Backing: Closed cell materials, neoprene, polypropylene, or polyethylene, ASTM D1565 or D1667 conforming to manufacturers written recommendations. Material is to be non-staining, free of asphalt, oils or creosote. Sized and shaped to control depth of sealant and to provide 25 - 50 percent compression upon insertion. Open cell polyurethane foam backer rod is not allowed.

D. Primers: As recommended in writing by sealant manufacturer. Verify that recommended primer has been tested not to stain the substrate. Refer to 3.01D.

E. Bond Breaker: Pressure sensitive adhesive polyethylene tape, or other type recommended by sealant manufacturer.

F. Fire Retardant Sealant: Products as tested and listed by approved system design as indicated in the U.L.Inc Volume 2, directory. System is to be recognized by UL and ASTM E119 procedures, (and ICBO by report NER #243), for fire rating of penetration to be sealed. Products as distributed by Kirwan Corporation (714) 939-6887.

   1. Pecora Ultra-Block fire safing joint system used in conjunction with acrylic latex sealants (AC-20 FTR), polyurethanes or silicones, as approved by the manufacturer, based on hardness or flexibility of the joint required. Alternate mineral wool safings must comply to approved system designs.

   2. 3M - "Fire Barrier Caulk CP25 and Putty 303", or Dow Corning - "Firestop Sealant".

G. Fire Retardant Foam: UL tested and listed, conforming to ASTM E119 for rating of penetration to be sealed. 3M 2001 RTV "Firestop Foam" or equal.

H. Structural Glazing Adhesives/Sealants
One-component, high-modulus, high-strength, neutral-cure, 100 percent silicone polymer sealant.
   1. Acceptable Product: Momentive, GE SSG4000 UltraGlaze Silicone Structural Glazing Adhesive/Sealant as manufactured by Momentive Performance Materials

   a) Compliance:
      (1) ASTM C 1184, Type S, Use G and O.
      (2) ASTM C 920, Type S, Grade NS, Class 25, Use NT, A, G, O.
      (3) Federal Specification TT-S-001 543A.
      (4) Federal Specification TT-S-00230C.
   b) Dynamic Movement Capability, ASTM C 719: +/- 25 percent.
   c) Color: Black.
   d) Color: Grey.

2.04 INCIDENTAL REQUIREMENTS AND MATERIALS

A. Staining Characteristics: All joint fillers, primers, or other materials used in conjunction with sealants shall be of such composition as to not cause staining of the sealant or the materials to which they are applied.

B. Compressible Joint Filler: As recommended by the sealant manufacturer for use in conjunction with the sealant. Size closed cell joint backing for joint width plus 25 percent.

C. Primers: As recommended by the sealant manufacturer for use in conjunction with the sealant for application onto the various types of materials to which the sealer is applied.

D. Cleaners, where required in lieu of primers, as recommended by the sealant manufacturer, which will not stain or damage building materials.

PART 3- EXECUTION

3.01 EXAMINATION

Examine substrate surfaces to receive sealant system and associated work and conditions under which work will be installed. Do not proceed with sealants until unsatisfactory conditions have been corrected in a manner acceptable to installer. Starting work within a particular area will be construed as applicators acceptance of surface conditions.

3.02 PREPARATION

A. Comply with manufacturers latest written requirements, recommendations and specifications for cleaning, surface preparation and priming. Remove loose foreign materials which could impair adhesion or proper performance of sealants.

B. Prime joint substrates where recommended by joint sealant manufacturer or where required by preconstruction joint sealant substrate tests. Confine primers to areas of joint sealant bond. Do not allow spillage or migration onto adjoining surfaces.

C. Apply epoxy primers to all concrete surfaces to which joints are to be sealed prior to sealant application to increase adhesion, decreasing failure due to temperature exposure, thermal and structural movement.

D. Prevent contact of sealant with adjoining surfaces that otherwise would be permanently stained or damaged by such contact or by cleaning methods required to remove sealant smears.

3.03 APPLICATION

A. Install back-up and sealants in accordance with ASTM C1193 and manufacturers written recommendations as recommended for each use type and substrate, or as directed by manufacturer's technical field representative to ensure proper preparation and application.

B. Accurately install/position joint back-up to provide support of sealants during application and at position required to control/produce the uniform cross sectional shape and depth of installed sealants relative to designated joint thickness/widths to achieve required width to depth ratios, that allow optimum sealant movement capability.

1. Do not leave gaps between ends of back-up rod.
2. Do not stretch, twist, puncture or tear back-up rod.
3. Install bond breaker tape where backer rods cannot be used do to shallow joint depth, to avoid three side adhesions.

C. Install/apply sealants by proven techniques using caulking guns with proper nozzles using sufficient pressure that results in sealants directly contacting and fully wetting joint substrates. Completely fill recesses provided for each joint configuration, providing uniform, cross sectional shapes and depths relative to joint widths, and to assure/obtain uniform adhesion free of air pockets, voids, embedded matter, ridges and sags. During application keep tip of nozzle at bottom of joint, forcing sealant to fill from bottom to top. Finish joints smooth, uniform and free of ridges, wrinkles, sags, air pockets, and embedded impurities.

D. Tool sealants to form smooth, uniform beads of concave configuration finished below the surface. Use tooling agents that are approved by sealant manufacturer. Remove excess sealants from surface adjacent to joint.

E. Fire Retardant Foam and Sealant: Conform to manufacturer's printed directions for preparation and application of materials per applicable details for fire-rated penetrations. Seal all gaps, cracks, and holes around the perimeter of materials penetrating the fire rated floors and walls.

F. Fire Retardant Putty: Apply to thicknesses required for rating and type of construction, in accordance with manufacturer's directions.

3.04 PROTECTION

A. Protect joint sealants from contact with contaminating substances or from damage resulting from construction operations or other causes.

B. Cut out and remove damaged or deteriorated joint sealants and repair so that areas are indistinguishable from original work.

END OF SECTION

SECTION 08 11 16

INTERIOR ALUMINUM DOOR FRAMES

PART 1 GENERAL

1.1 SUMMARY

A. SECTION INCLUDES
1. Pre-finished aluminum door frames for interior use.
2. Pre-finished aluminum window frames for interior use.
3. Pre-finished aluminum framing system for interior use.
4. Pre-finished aluminum doors for interior use.

B. RELATED SECTIONS
1. Division 01 Section "Sustainable Design Requirements" for additional LEED documentation and requirements
2. Division 08 Section "Glazing" for glass view panels in interior aluminum doors.
3. Division 08 Sections "Flush Wood Doors", "Clad Wood Doors", and "Stile and Rail Wood Doors" for wood doors used in interior aluminum frames.
4. Division 08 Sections "Door Hardware" and "Access Control Hardware" for door hardware used on interior aluminum doors and frames.
5. Division 26 "Electrical" Sections for electrical connections including conduit and wiring for door controls and operators installed on interior aluminum frames.
6. Division 28 Section "Access Control" for access control devices installed at interior aluminum frame openings and provided as part of a security access system.

C. CODES AND REFERENCES:

Comply with the version year adopted by the Authority Having Jurisdiction.

1. AAMA 603.8 - Performance Requirements and Test Procedures for Pigmented Organic on Extruded Aluminum.
2. AAMA 607.1 - Guide Specification and Inspection Methods for Clear Anodized Finishes for Architectural Aluminum.
3. AAMA 608.1 - Guide Specification and Inspections Methods for Electrolytically Deposited Color Anodic Finished for Architectural Aluminum.
4. AAMA 609 & 610-02 - Cleaning and Maintenance Guide for Architecturally Finished Aluminum.
5. ASTM B221 - Standard Specification for Aluminum and Aluminum-alloy Extruded Bars, Rods, Wire, Profiles, and Tubes.
6. NAAMM - "Metal Finishes Manual for Architectural and Metal Products".
7. ANSI/NFPA 80 - Standard for Fire Doors and Fire Windows; National Fire Protection Association.
8. NFPA 252 - Standard Method of Fire Tests of Door Assemblies.
9. ANSI A117.1 - Accessible and Usable Buildings and Facilities
10. ICC/IBC - International Building Code.

1.2 SUBMITTALS

A. Submit under provisions of Section 01 33 23.

B. Product Data: For each type of product indicated. Include construction details, material descriptions, hardware reinforcements, profiles, anchors, fire-resistance rating, and finishes.

C. Templates: Door hardware supplier is to furnish templates, template reference number and/or physical hardware to the interior aluminum door and frame supplier in order to prepare the doors and frames to receive the finish hardware items.

D. Shop Drawings: Include the following:

1. Frame details for each frame type, including dimensioned profiles.
2. Locations of reinforcement and preparations for hardware.
3. Details of each different wall opening condition. Include requirements for steel framing at partitions for fit and securing of frames, partition widths and tolerances, direction of framing members, clips and attachments.
4. Details of anchorages, joints, field splices, and connections.
5. Details of accessories.
6. Details of moldings, removable stops, and glazing.
7. Elevations of each door design.
8. Details of doors, including vertical and horizontal edge details.
9. Details of preparations for power, signal, and control systems.

E. Samples for verification: Provide, at the request of architect, prepared Samples as indicated below:
1. Framing Member: 12 inches long
2. Corner Fabrication: 12-by-12-inch-long, full size window corner, including full-size sections of extrusions with factor-applied finish.
3. Aluminum chips in full range of manufacturer's standard finishes for architect's color selection.

F. Interior Aluminum Door and Frame Schedule: Use same designations indicated on Drawings. Coordinate with Door Hardware schedule and glazing.

G. Informational Submittals:
1. LEED Documentation: Submit manufacturer's environmental documentation and applicable sustainability program credits for MR-4 and that are specified herein.
2. Certificates of Compliance: Submit any product test report or information necessary to indicate compliance with this specification section.

1.3 QUALITY ASSURANCE

A. Source Limitations: Obtain aluminum frames and doors through one source from a single qualified manufacturer.

B. Manufacturer Qualifications: A firm experienced in the manufacturing of interior aluminum framing systems and doors with a minimum five (5) years successful in-service performance providing product similar to those indicated, including pre-engineering and pre-fabricating all components of aluminum framing systems and doors.

C. Installer Qualifications: An experienced installer with a minimum five (5) years experience who has completed aluminum framing systems and door installations similar in material, design, and extent to those indicated and whose work has resulted in construction with a record of successful in-service performance.

D. Aesthetic Effects: Do not modify intended aesthetic effects, as judged solely by Architect, except with Architect's approval. If modifications are proposed, submit comprehensive explanatory data to Architect for review.

E. Fire Rated Assemblies: In locations where fire-rated openings are scheduled or required by regulatory agencies, provide fire-rated aluminum frames that have been tested and certified for specified exposure by an agency acceptable to governing authorities.

1. Provide labels permanently fastened on each frame that is within size limits established by NFPA and the testing authority.
   a. Provide 20-minute labels.
   b. Provide 90-minute labels.
   c. Provide labels for openings as scheduled on the drawings.

F. Pre-Installation Conference: Conduct conference in compliance with requirements in Division 01 Section "Project Meetings" with attendance by representatives of Supplier, Installer, and Contractor to review proper methods and procedures for installing interior aluminum frames and

doors and to verify installation of electrical knockout boxes and conduit at frames with electrified or access control hardware.

1.4 DELIVERY, STORAGE, AND PROTECTION

A. Deliver interior aluminum frames and doors individually protective wrapped within car- tons and marked for the corresponding scheduled opening. Do not bulk pack frames.

B. Inspect frames upon delivery for damage.
   1. Repair minor damage to pre-finished products as recommended by Manufacturer.
   2. Replace frames that cannot be satisfactorily repaired.

C. Store Interior aluminum frames and doors at Project site under cover and as near as possible to final installation location. Do not use covering material that will cause discoloration of aluminum finish.

1.5 PROJECT CONDITIONS

A. Field Measurements: Verify actual dimensions of interior aluminum frame openings by field measurements before fabrication and indicate measurements on Shop Drawings submittals.

B. Do not begin installation of aluminum frames and doors until area of work has been completely enclosed and interior is protected from the elements.

C. Maintain temperature and humidity in areas of installation within reasonable limits, as close as possible to final occupancy standards. If necessary, provide artificial heating, cooling, and ventilation to maintain required environmental conditions.

1.6 WARRANTY

A. Provide manufacturer's written warranty against defects in materials and workmanship upon final completion and acceptance of Work in this section.

PART 2 PRODUCTS

2.1 MANUFACTURERS

A. Manufacturers: Subject to compliance with requirements, provide products by the following:
   Western Integrated Materials, Inc.
   3310 E. 59TH St., Long Beach, CA 90805
   Telephone: 562-634-2823
   Fax: 562-634-8449
   Web Site: www.western-integrated.com

   1. Acceptable Products:
      a. Western Integrated Materials, Inc. - Interior Aluminum Frames
      b. Western Integrated Materials, Inc. - Interior Aluminum Swinging Doors
      c. Western Integrated Materials, Inc. - Interior Aluminum Sliding Doors and Sliding Door Frame - ALUMAglide TM

B. Substitutions: Material from alternate interior aluminum framing system and door fabricators will not be accepted without prior written and sample approval in accordance with requirements specified in Division 01 and at the discretion of Architect and their designated openings consultant.

C.

2.2 MATERIALS

A. Extruded Aluminum: Controlled ASTM B221 alloy billets of 6063-T5, to assure compliance with tight dimensional tolerances and maintain color uniformity.

B. Recycled Content of Aluminum Products: Post consumer recycled content plus pre consumer recycled content not less than 50 percent.

C. EXTRUDED INTERIOR ALUMINUM FRAMES

1. Provide interior aluminum framing components complying with dimensions, profiles, and relationships to adjoining work of components as indicated on Drawings. Provide frames that are fitted for partition types and throat openings meeting the throat opening and required clearances per frame manufacturer's recommendations. Reinforce for specified hinges, strikes, closers, and other hardware as required.

   a. Western Integrated Materials Series 300, 400, and 700 Frames: Provide frames with the following characteristics:

Provide frames with the following characteristics:

1. Rectilinear design.
2. 2” face profiles.
3. Trim:
   a. 1” with 3/8” return
   b. Trim to be removed at doors with wood casing. (Refer to drawings for location.)

5. Series 300 Throat sizes:

   2-1/4”, 3”, 3-1/4”, 3-3/8”, 3-1/2”, 3-3/4”, 4-1/2”, 4-5/8”, 4-3/4”, 4-7/8”, 5”, 5-1/4”, 5-1/2”, 6”, 7-1/4”.

   (Field verify throat size at existing walls prior to submittal of shop drawings.)

1.3 ACCESSORIES

A. Fasteners: Aluminum, nonmagnetic, stainless-steel or other noncorrosive metal fasteners compatible with frames, stops, panels, reinforcement plates, hardware, anchors, and other items being fastened.
B. Door Silencers: Manufacturer's standard continuous mohair, wool pile, or vinyl seals.
C. Glazing Gaskets: Manufacturer's standard extruded or molded plastic, to accommodate glazing thickness indicated.
D. Glazing: Comply with requirements in Division 08 Section, "Glazing."
E. Hardware: As specified in Division 08 Section, "Door Hardware".

1.4 FABRICATION

A. FRAME CONSTRUCTION

1. Factory pre-engineer and pre-cut interior aluminum frame components to the greatest extent practical. Linear glazing components fabricated in the field are not allowed. If necessary, allow for 2 inches excess vertical length for scribing to suit floor conditions. Face trim to be pre-cut to match jamb lengths. Machine jambs and prepare for hardware, with concealed plates, drilled and tapped as required, fastened in frame with concealed screws.
2. Provide concealed corner reinforcements and alignment clips for precise joints at butt or mitered connections.

3. Hardware Preparation: Factory interior aluminum frames to receive template mortised hardware; include cutouts, reinforcement, mortising, drilling, and tapping according to the Door Hardware Schedule and templates as specified in Division 08 section, "Door Hardware".
   a. Reinforce frames to receive surface mounted door hardware. Machine jambs and prepare for hardware, with concealed reinforcement plates, drilled and tapped as required and fastened within frame with concealed screws.
   b. Locate hardware as indicated.
   c. Coordinate locations of conduit, wiring boxes, and power transfers for electrical connections with Division 26 Sections.

4. Fabricate frames for glazing with removable stops to allow glazing replacement without dismantling frame.
5. Fabricate all components to allow secure installation without exposed fasteners.

2.5 ALUMINUM FINISHES

A. General: Comply with NAAMM's "Metal Finishes Manual for Architectural and Metal Products" for recommendations for apply and designated finishes. Exposed surfaces to be free of scratches and other serious blemishes.

B. Factory finish extruded frame components so that any part exposed to view upon completion of installation will be uniform in finish and color.

C. Commercial Color anodic coating: Comply with AAMA 608.1
   1. Class II, AAM12C22A24 bronze anodized coating, 0.4 mil minimum thickness
      A. Dark Bronze Anodic: Comply with AAMA 611

PART 3 EXECUTION

3.1 EXAMINATION

A. Examine substrates, areas, and conditions, with Installer present, for compliance with requirements for installation tolerances and other conditions affecting performance of the Work.

B. VERIFY WALL THICKNESS DOES NOT EXCEED STANDARD TOLERANCE OF +- 1/16".

B. General Contractor to verify the accuracy of dimensions given to frame and door manufacturer for pre-cut openings.

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

3.2 INSTALLATION

A. General: Install and set interior aluminum frames plumb, rigid, properly aligned, and securely fastened in place; comply with Drawings and manufacturer's written instructions.
   1. At fire-protection-rated openings, install frames according to NFPA 80,

B. Install frame components in the longest possible lengths with no component less than 48 inches.
   1. Fasten to suspended ceiling grid at 48 inches on center maximum, using #6 sheet metal screws or other fasteners approved by frame manufacturer.
   2. Use concealed installation clips to produce tightly fitted and aligned splices and connections.
   3. Secure clips to extruded main-frame components and not to snap-in or trim members.
   4. Do not use screws or other fasteners exposed to view when installation is complete

3.3 ADJUSTING AND CLEANING

A. Final adjustments: Check and readjust operating hardware items immediately before final inspection. Leave work in complete and proper operating condition.

B. Clean exposed frames promptly after installation, using cleaning methods recommended by frame manufacturer and according to AAMA 609 & 610.

C. Touch up marred areas so that touch-up is not visible from a distance of 48 inches. Remove and replace frames that cannot be satisfactorily adjusted.

3.4 PROTECTION

A. Provide protection required to assure that frames and doors will be without damage or deterioration upon substantial completion of the project.

END OF SECTION

SECTION 08 12 14

TRIMLESS DOOR FRAMES

PART 1 - GENERAL

1.1 DESCRIPTION OF WORK

A. Work Included: Provide labor, materials and equipment necessary to complete the work of this Section including the following.

1. Flush steel door jamb systems of the following types:
   a. Adjustable split-jamb door frames. (EZYJamb Classic Adjust - EZC)
   b. Single rabbet door frames. (EZYJamb Single Rabbet - SRC)
   c. In-swing door frames. (EZYJamb Inswing - ISD)

2. Flush-finish accessory products:
   a. Wall end caps. (EZYcap)
   b. Wall reveals. (EZYreveal)
   c. Recessed window reveals. (EZYpelmet)
   d. Drywall partition caps. (fastcap)
   e. Architectural door hardware. (Rocyork)
   f. Wallbase skirting. (Alubase)
   g. Flush finish pocket door system. (SlideSet)
   h. Flush finish pocket door trim. (cavkit)

B. Related Work: The following items are not included in this Section and are specified under the designated Sections:
1. Section 08 11 13 - HOLLOW METAL DOORS AND FRAMES for steel doors and frames.
2. Section 08 14 00 - WOOD DOORS for wood doors.
3. Section 08 71 00 - DOOR HARDWARE for hardware not included in this Section.
4. Section 09 21 16 - METAL FRAMING for coordination with drywall framing.
5. Section 09 90 00 - PAINTING AND COATING for field-painting metal frames.

1.2 SUBMITTALS

A. Product Data: Submit manufacturer's product data and installation instructions for each product specified.

B. Shop Drawings: Submit shop drawings showing details of each opening, including elevations, frame profiles, accessories and attachment.

C. Schedule: Submit a door frame schedule indicating number and location of each frame, matching door numbering on the Drawings.

D. Sustainable Design: Submit manufacturer's documentation indicating percentage of recycled steel in frames.

1.3 QUALITY ASSURANCE

A. Manufacturing: Product manufactured under both ISO9001and ISO14001 - 2015 EMS policy.

B. Source Limitations: Obtain metal frames through one source from a single manufacturer.

C. Preinstallation Conference: Conduct conference at Project site to comply with requirements in Division 01.

1.4 DELIVERY, STORAGE, AND HANDLING

A. Delivery: Deliver materials in manufacturer's original, unopened, undamaged containers with identification labels intact.

B. Storage and Handling: Comply with manufacturer's recommendations for storage and handling. Protect from weather damage.

1.5 WARRANTY

A. Warranty: Provide manufacturer's standard limited warranty against defects in manufacturing.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

A. Basis-of-Design Manufacturer: EzyJamb, 1700 Boulter Industrial Pkwy, Webster, NY 14850. Toll Free: 888-399-5262. Fax: 585-545-3010. Web: www.ezyjamb.com.

2.2 TRIMLESS INTERIOR DOOR FRAMES

A. Adjustable Split-Jamb Door Frames: EZYJamb Classic Adjust - EZC complying with the following.

1. Material: 20 gauge galvanneal steel, two-piece with perforated flanges.
2. Depth: Suitable for 1-3/8 and 1-3/4 inch thick doors, and applicable partition thickness.
3. Fire Rating for 1-3/4 Inch Thick Doors: Up to 90 minutes; Intertek listed.
4. Hardware:
   a. Invisible Door Hinges for 1-3/4 Inch Thick Doors: [Rocyork RY-45] [Rocyork RY-50] [Rocyork RY-80] [Tectus 340] [Soss 216].
   b. Surface-Applied Hinges: 4 inch surface applied [oil rubbed bronze (OB)].
   c. Door Strikes for 1-3/4 Inch Thick Doors: [ASA Strike] [T-strike 1-1/8 x 2-3/4 inches]

B. Single Rabbet Door Frames: EZYJamb Single Rabbet - SRC complying with the following.

1. Material: 18 gauge galvanneal steel, one-piece with perforated flanges.
2. Depth: Suitable for 1-3/4 inch thick doors, and applicable partition thickness.
3. Fire Rating: Up to 90 minutes; Intertek listed.
4. Hardware:
   a. Invisible Door Hinges: [Rocyork RY-45] [Rocyork RY-50] [Rocyork RY-80 [Rocyork RY-120] [Tectus 340].
   b. Standard Non-Mortised Hinges: 4 inch surface applied [stainless steel (SS)] [satin chrome (SC)] [polished chrome (PC)] [[oil rubbed bronze (OB)].
   c. Mortised Door Hinges: [Rocyork 4-1/2 by 4-1/2 by 0.134 inch] [ball bearing and spring hinges] with [stainless steel (SS)] [satin chrome (SC)] [polished chrome (PC)] [[oil rubbed bronze (OB)] finish.
   d. Door Strikes: [T Strike 2-3/4 inches] [ASA Strike 4-7/8 inches] [Deadbolt 2-3/4 inches].

C. In-Swing Door Frames: EZYJamb Inswing - ISD complying with the following.

1. Material: 18 gauge galvanneal steel, one-piece with perforated flanges.
2. Depth: Suitable for 2-1/4 inch thick doors, and applicable partition thickness.
3. Fire Rating: Not applicable.
4. Hardware:
   a. Invisible Door Hinges: [Rocyork RY-180] Rocyork RY-120] [Tectus 340]
   b. Mortised Door Hinges: [Rocyork 4-1/2 by 4-1/2 in by 0.134 inch] [Ball bearing and spring hinges].
   c. Door Strikes: [T Strike 2-3/4 inches] [ASA Strike 4-7/8 inches]

2.3 FLUSH-FINISH ACCESSORY PRODUCTS

A. Wall End Caps: EZYcap by EZYJamb, manufactured from 20 gauge cold rolled steel with perforated flanges, size as applicable to wall configuration.

B. Wall Reveals: EZYreveal by EZYJamb, manufactured from 20 gauge cold rolled steel with perforated flanges, size as applicable to wall configuration.

C. Recessed Window Reveals: EZYpelmet by EZY Jamb, manufactured from 20 gauge cold rolled steel with perforated flanges, size as applicable to wall configuration.

D. Drywall Partition Caps: fastcap by EZY Jamb, manufactured from 20 gauge cold rolled steel with perforated flanges, size as applicable to wall configuration.

E. Architectural Door Hardware: Rocyork premium quality door hardware of the following types:

1. Door handles for EZYJamb.
2. Door locks for EZYJamb.
3. Door hinges for EZYJamb.
4. Door hinges with integrated door closer for EZYJamb.
5. Door closers for EZYJamb.
6. Door strikes & latches for EZYJamb.
7. Door security for door accessories for EZYJamb.
8. UL Certification - Fire rating: Series Rocyork RY-80, RY-120 and Series Rocyork RY-45 and RY-50. Aluminum 3-Axis adjustable concealed door hinges (for use on swinging type wood fire doors mounted in wood or steel frames), rated up to and including 1/3 hr (20 minutes). Evaluated in accordance with Standard UL 10C.

F. Wallbase Skirting: Alubase by EZYJamb, SK100-36,100 mm (3.9 inches) x 1.6 mm, flat clear anodized aluminum skirting.

2.4 FABRICATION

A. Fabricate frames and accessories accurately, with true lines and profiles.

B. Fabricate frames to receive specified hardware.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Examine substrates for compliance with requirements for installation. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 INSTALLATION

A. Install trimless door frames in accordance with manufacturer's instructions and approved submittals including the following:

1. Install frames plumb and square.
2. Use door as a template when available to ensure proper alignment and clearances.
3. Install frames securely using fasteners suitable for substrate.
4. Leave frames ready for taping and application of drywall compound.
5. Repair frames damaged during installation.
6. Replace frames which cannot be successfully repaired.

B. Install accessory products in accordance with manufacturer's instructions and approved submittals including the following:

1. Install products plumb and square.
2. Install products in proper relationship to adjacent construction.
3. Repair products damaged during installation.
4. Replace products which cannot be successfully repaired.

3.3 CLEANING AND PROTECTION

A. Clean frames as recommended by manufacturer. Protect from damage until acceptance.

END OF SECTION

SECTION 08 14 23.16

PLASTIC-LAMINATE-FACED WOOD DOORS

PART 1 - GENERAL

1.01 SUMMARY

A. Provide plastic faced wood doors, complete in place with finish hardware installed, where shown on the Drawings, as specified herein, and as needed for a complete and proper installation.

B. Related work:
   1. Documents affecting work of this Section include, but are not necessarily limited to, General Conditions, Supplementary Conditions, and Sections in Division 1 of these Specifications.

1.02 SUBMITTALS

A. Comply with pertinent provisions of Section 01 33 23.

B. Product data: Within 35 calendar days after the Contractor has received the Owner's Notice to Proceed, submit:
   1. Materials list of items proposed to be provided under this Section;
   2. Manufacturer's specifications and other data needed to prove compliance with the specified requirements;
   3. Samples, approximately 200 mm x 200 mm (8" x 8") in size, of each of the proposed door face materials.

1.03 QUALITY ASSURANCE

A. Use adequate numbers of skilled workmen thoroughly trained and experienced in the necessary crafts and completely familiar with the specified requirements and methods needed for proper performance of the work of this Section.

B. In addition to complying with pertinent codes and regulations of governmental agencies having jurisdiction, comply with:
   1. "Manual of Millwork" of the Woodwork Institute of California, for the grade or grades specified; or
   2. "Architectural Woodwork Quality Standards" of the Architectural Woodwork Institute, for the grade or grades specified.
   3. Certification and stamps will not be required.

1.04 DELIVERY, STORAGE, AND HANDLING

A. Comply with pertinent provisions of Section 016500.

B. Delivery:
   1. Deliver doors to site after plaster and cement are dry, and after the building has reached average prevailing humidity of its locality.
   2. Deliver prefinished doors in manufacturers' original containers, clearly marked with manufacturer's name, brand name, size, thickness, and identifying symbol on the covering.

C. Storage:

1. Stack flat on 50 mm x 100 mm (2" x 4") lumber, laid 300 mm (12") from ends and across center.
2. Under bottom door and over top of stack, provide plywood or corrugated cardboard to protect door surfaces.
3. Store doors in area where there will be no great variations in heat, dryness, and humidity.

D. Lift doors and carry them into position. Do not drag doors across one another.

PART 2 – PRODUCTS

2.01 MANUFACTURER

A. Acceptable manufacturer: Marshfield Door System or equal products of:
1. Algoma
2. Edcers

2.02 MATERIALS

A. Provide laminated plastic faced doors of the types, designs, and thicknesses shown on the Door Schedule in the Drawings, labeled or non-labeled as indicated and as required, and in solid core as shown on the Door Schedule.

B. Except as may be shown otherwise on the Drawings, fabricate the work of this Section to "custom grade" of the referenced organization.

C. Provide sound-insulated door where shown on the door schedule. Marshfield # DSR 45.

D. Faces:
1. On both faces, use .48 plastic laminate as manufactured by Wilsonart Division of Ralph Wilson Plastics, or an equal approved in advance by the Architect, in colors and patterns selected by the Architect from standard colors and patterns of the approved plastics manufacturer. Use .050 fire-rated laminate at fire-rated doors.
2. On both vertical edges, as specifically approved in advance by the Architect, provide prefinished hardwood.
3. On tops and bottoms of doors, provide a positive sealer applied after completion of machining and fitting.

E. Vision Lite Frame: Square profile, satin aluminum. By: Air Louvers or equal.

PART 3 – EXECUTION

3.01 SURFACE CONDITIONS

A. Examine the areas and conditions under which work of this Section will be performed. Correct conditions detrimental to timely and proper completion of the Work. Do not proceed until unsatisfactory conditions are corrected.

3.02 INSTALLATION

A. Fitting and machining laminated plastic faced doors:
   1. Using measurements obtained in the field from installed frames, machine the doors at the factory to fit the prescribed frames with proper clearance at top, bottom, and vertical edges.
   2. Replace or rehang doors which are hinge bound and do not swing or operate freely.

B. Finish hardware:
   1. Receive and retain custody of finish hardware furnished under Section 08710 of these Specifications for the work of this Section.
   2. Except as otherwise directed by the Architect, install finish hardware in accordance with its manufacturers' recommendations.

3.03 ADJUST AND CLEAN

A. Upon completion of the installation, inspect each component.
   1. Verify that each item has been fabricated and installed in accordance with the specified requirements.
   2. Make necessary adjustments.
   3. Touch-up as necessary to make surface blemishes permanently invisible to the unaided eye from a distance of 1500 mm (5'-0").

3.04 COMPLIANCE

A. The Owner reserves the right to request and pay for an inspection by a representative of the referenced organization to determine that the work of this Section has been performed in accordance with the specified standards.

B. In the event such inspection determines the work of this Section does not comply with the specified requirements, immediately remove the non-complying items and replace them with items complying with the specified requirements, all at no additional cost to the Owner, and reimburse the Owner for the cost of the inspection.

END OF SECTION

SECTION 08 31 00

ACCESS DOORS AND PANELS

PART 1 – GENERAL

1.01 SUMMARY

A. Section includes:
   1. Flush access doors and panels.
   2. Related hardware and attachments.

1.02 RELATED SECTION

A. Section 092900 - Gypsum Board Assemblies.

B. Section 095100 - Suspended Acoustical Ceilings.

C. Section 099000– Paints and Coatings.

D. Division 23 - Mechanical.

E. Division 26 – Electrical.

1.03 SYSTEM DESCRIPTION

A. Milcor M and MS Access Doors provide critical service access in drywall, masonry or tile walls and offer superior resistance to corrosion.

1.04 SUBMITTALS

A. Comply with Sections 01 31 00 & 0133 23.

B. Shop Drawings:
   1. Door and panel units: Show types, elevations, thickness of metals, full size profiles of door members.
   2. Hardware: Show materials, finishes, locations of fasteners, types of fasteners, locations and types of operating hardware, and details of installation.

C. General: Show connections of units and hardware to other Work. Include schedules showing location of each type and size of door and panel units.

D. Product Data: Manufacturer’s technical data for each type of access door and panel assembly, including setting drawings, templates, fire-resistive characteristics, finish requirements, and details of anchorage devices.

E. Include complete schedule, types, locations, construction details, finishes, latching or locking provisions, and other pertinent data.

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

1.05 QUALITY ASSURANCE

A. Comply with Section 01 40 00 and 01 41 00.

B. Single Source Responsibility: Obtain access door and panel units, and frames for entire Project from 1 source and 1 single manufacturer.

C. Fire-Resistance Ratings:
   1. Where a fire-resistance classification is indicated, provide access door and panel assemblies with panel door, frame, hinge, and latch from manufacturer listed in Underwriter's Laboratories (UL), "Building Materials Directory" for rating shown.
   2. Provide 90 minutes UL label at 20 hour rated partitions. Provide 3 hour label at horizontal applications, up to 24 inch wide x 36 inch high.
   3. Provide 2 hour label at horizontal applications greater than 24 inch wide x 36 inch high.

D. Size Variations: Obtain Architect's acceptance and approval of manufacturer's standard size units that may vary slightly from sizes indicated on Drawings.

E. Coordination: Provide inserts and anchoring devices that will be built into other Work for installation of access door assemblies. Coordinate delivery with other Work to avoid delay.

1.06 DELIVERY, STORAGE AND HANDLING

A. Comply with Section 01 65 00
   1. Package and ship per manufacturer's recommendations. One per carton.
   2. Store per manufacturer's instructions.
   3. Store in dry area out of direct sunlight.

PART 2 - PRODUCTS

2.01 MANUFACTURER

A. Equal to Milcor, Telephone:800.624.8642
   1. Style M and MS Doors
   2. Finish: Style M Factory Primed field painted
      Style MS stainless steel
   3. Location: Use MS Style at wet areas

2.02 MATERIALS

A. Style M, Prime Painted: 14-gauge steel frame and door panel. Style MS.

B. Stainless Steel: 16-gauge stainless steel frame and door panel.

2.03. ACCESS PANELS

A. Finishes: Milcor access doors are offered in corrosion-resistant, prime-painted and stainless steel surfaces. The prime-painted surface is factory-painted through an electro-static binding process with an ionized power paint and then thermo set in a curing cycle to eliminate runs and bubble. This paint able surface can be used as is, or painted to suit specific décor. Stainless steel models in a satin finish are available for added corrosion resistance

B. Hinge: Concealed spring hinges open to 175 degrees. Extracting pin from hinge leaf attached to panel permits panel removal. Number of hinges varies with size of door: check with your Milcor representative for details.

C. Flush: Screwdriver-operated with steel cam. Available with Allen head or spanner head cam on special order. Cylinder lock with two keys furnished to replace one cam lock, if required, at slight extra charge.

D. Anchor: Milcor M & MS door frames are furnished with masonry anchors, if specified, at slight extra charge. Number of anchors varies per door size requirements.

PART 3 - EXECUTION

3.01 EXAMINATION

A. Comply with Section 017000

B. Verify that rough openings for door and frame are correctly sized and located.

C. Verify mechanical and electrical requirements for ceiling or wall access panels.

3.02 PREPARATION

A. Advise installers of work relating to access panel installation including rough opening dimensions, locations of supports, and anchoring methods. Coordinate delivery with other work to avoid delay.

3.03 INSTALLATION

A. Install access door and frame units per manufacturer's written instructions.

B. Install frames plumb and level in opening. Secure rigidly in place.

C. Position units to provide convenient access to concealed Work requiring access.

3.04 ADJUST AND CLEAN

A. Adjust panel after installation for proper operation.

B. Remove and replace panels or frames that are warped, bowed, or damaged.

END OF SECTION

SECTION 08 71 00

DOOR HARDWARE

PART 1 GENERAL

1.01 SECTION INCLUDES

A. Hardware for wood, hollow steel and aluminum doors.

B. Hardware for fire-rated doors.

C. Electrically operated and controlled hardware.

D. Lock cylinders for doors for which hardware is specified in other sections.

E. Thresholds.

F. Weatherstripping, seals and door gaskets.

G. Gate locks.

1.02 RELATED SECTIONS

A. Section 08 11 16 – Interior Aluminum Door Frames.

B. Section 08 14 23.16 – Plastic Laminate Face Wood Doors

E. Section 13 85 20 - Fire Alarm System Equipment: Electrical connection to activate door closers.

F. Card Access System (Allowance # 1)

1.03 ALLOWANCES

A. See Section 01 21 00 - Allowances, for allowances affecting this section.

1.04 REFERENCES

A. ANSI/ICC A117.1 - American National Standard for Accessible and Usable Buildings and Facilities; International Code Council; 2003.

B. BHMA A156.1 - American National Standard for Butts and Hinges; Builders Hardware Manufacturers Association, Inc.; 2000 (ANSI/BHMA A156.1).

C. BHMA A156.2 - American National Standard for Bored and Preassembled Locks & Latches; Builders Hardware Manufacturers Association; 2003 (ANSI/BHMA A156.2).

D. BHMA A156.3 - American National Standard for Exit Devices; Builders Hardware Manufacturers Association; 2001 (ANSI/BHMA A156.3).

E. BHMA A156.4 - American National Standard for Door Controls - Closers; Builders Hardware Manufacturers Association, Inc.; 2000 (ANSI/BHMA A156.4).

F. BHMA A156.5 - American National Standard for Auxiliary Locks & Associated Products; Builders Hardware Manufacturers Association; 2001 (ANSI/BHMA A156.5).

G. BHMA A156.6 - American National Standard for Architectural Door Trim; Builders Hardware Manufacturers Association; 2005 (ANSI/BHMA A156.6).

H. BHMA A156.7 - American National Standard for Template Hinge Dimensions; Builders Hardware Manufacturers Association; 2003 (ANSI/BHMA A156.7).

I. BHMA A156.8 - American National Standard for Door Controls - Overhead Stops and Holders; Builders Hardware Manufacturers Association, Inc.; 2005 (ANSI/BHMA A156.8).

J. BHMA A156.9 - American National Standard for Cabinet Hardware; Builders Hardware Manufacturers Association; 2003 (ANSI/BHMA A156.9).

K. BHMA A156.12 - American National Standard for Interconnected Locks & Latches; Builders Hardware Manufacturers Association; 2005 (ANSI/BHMA A156.12).

L. BHMA A156.13 - American National Standard for Mortise Locks & Latches; Builders Hardware Manufacturers Association; 2005 (ANSI/BHMA A156.13).

M. BHMA A156.14 - American National Standard for Sliding & Folding Door Hardware; Builders Hardware Manufacturers Association; 2002 (ANSI/BHMA A156.14).

N. BHMA A156.15 - American National Standard for Release Devices - Closer Holder, Electromagnetic and Electromechanical; Builders Hardware Manufacturers Association; 2006 (ANSI/BHMA A156.15).

O. BHMA A156.16 - American National Standard for Auxiliary Hardware; Builders Hardware Manufacturers Association; 2002 (ANSI/BHMA A156.16).

P. BHMA A156.17 - American National Standard for Self Closing Hinges & Pivots; Builders Hardware Manufacturers Association, Inc.; 2004 (ANSI/BHMA A156.17).

Q. BHMA A156.18 - American National Standard for Materials and Finishes; Builders Hardware Manufacturers Association, Inc.; 2000 (ANSI/BHMA A156.18).

R. BHMA A156.20 - American National Standard for Strap and Tee Hinges and Hasps; Builders Hardware Manufacturers Association; 2006 (ANSI/BHMA A156.20).

S. BHMA A156.21 - American National Standard for Thresholds; Builders Hardware Manufacturers Association; 2006 (ANSI/BHMA A156.21).

T. BHMA A156.23 - American National Standard for Electromagnetic Locks; Builders Hardware Manufacturers Association, Inc.; 2004 (ANSI/BHMA A156.23).

U. BHMA A156.24 - American National Standard for Delayed Egress Locks; Builders Hardware Manufacturers Association; 2003 (ANSI/BHMA A156.24).

V. DHI A115 Series - Specifications for Steel Doors and Frame Preparation for Hardware; Door and Hardware Institute; 2000.

W. DHI A115W Series - Specifications for Wood Door and Frame Preparation for Hardware; Door and Hardware Institute; 2000.

X. DHI (LOCS) - Recommended Locations for Architectural Hardware for Standard Steel Doors and Frames; Door and Hardware Institute; 2004.

Y. DHI WDHS.3 - Recommended Locations for Architectural Hardware for Flush Wood Doors; Door and Hardware Institute; 1996.

Z. ITS (DIR) - Directory of Listed Products; Intertek Testing Services NA, Inc.; current edition.

AA. NFPA 80 - Standard for Fire Doors and Fire Windows; National Fire Protection Association; 2007.

AB. NFPA 101 - Code for Safety to Life from Fire in Buildings and Structures; National Fire Protection Association; 2006.

AC. UL (BMD) - Building Materials Directory; Underwriters Laboratories Inc.; current edition.

1.05 SUBMITTALS

A. See Section 01 33 00 - Administrative Requirements, for submittal procedures.

B. Shop Drawings:
   1. Indicate locations and mounting heights of each type of hardware, schedules, catalog cuts, electrical characteristics and connection requirements.
   2. Submit manufacturer's parts lists, templates, and cut sheets.

C. Samples: Prior to preparation of hardware schedule:
   1. Submit 1 sample of hinge, latchset, lockset, closer, illustrating style, color, and finish.
   2. Samples will be returned to supplier.

D. Manufacturer's Installation Instructions: Indicate special procedures, perimeter conditions requiring special attention.

E. Project Record Documents: Record actual locations of concealed equipment, services, and conduit.

F. Maintenance Data: Include data on operating hardware, lubrication requirements, and inspection procedures related to preventative maintenance.

G. Keys: Deliver with identifying tags to Owner by security shipment direct from hardware supplier.

H. Warranty: Submit manufacturer's warranty and ensure that forms have been completed in Owner's name and registered with manufacturer.

1.06 QUALITY ASSURANCE

A. Standards for Fire-Rated Doors: Maintain one copy of each referenced standard on site, for use by Design Professional and Contractor.

B. Manufacturer Qualifications: Company specializing in manufacturing the products specified in this section with minimum three years of documented experience.

C. Hardware Supplier Qualifications: Company specializing in supplying commercial door hardware with _____ years of experience.

D. Hardware Supplier Personnel: Employ an Architectural Hardware Consultant (AHC) to assist in the work of this section.

1.07 PRE-INSTALLATION MEETING

A. Convene one week prior to commencing work of this section.

1.08 DELIVERY, STORAGE, AND PROTECTION

A. Package hardware items individually; label and identify each package with door opening code to match hardware schedule.

1.09 COORDINATION

A. Coordinate the work with other directly affected sections involving manufacture or fabrication of internal reinforcement for door hardware.

B. Furnish templates for door and frame preparation.

C. Sequence installation to ensure utility connections are achieved in an orderly and expeditious manner.

D. Coordinate Owner's keying requirements during the course of the Work.

1.10 WARRANTY

A. See Section 01 78 00 - Closeout Submittals, for additional warranty requirements.

B. Provide five year warranty for door closers.

1.11 MAINTENANCE PRODUCTS

A. Provide special wrenches and tools applicable to each different or special hardware component.

B. Provide maintenance tools and accessories supplied by hardware component manufacturer.

1.12 EXTRA MATERIALS

A. Provide ten extra key lock cylinders for each master keyed group.

PART 2 PRODUCTS

2.01 MANUFACTURERS

A. Hinges: Hager Companies: www.hagerhinge.com.
   1. Stanley Hardware: www.stanleyworks.com.
   2. Substitutions per Section 01 60 00.

B. Pivots: Ives: www.ives.com
   1. Glynn-Johnson: www.glynn-johnson.com.
   2. Substitution per Section 01 60 00.

C. Lock and Latch Sets: Best Access Systems: www.bestlock.com.1.
   1. No substitution.

D. Mortise Locksets: Best Access Systems: www.bestlock.com.
   1. No substitution.

E. Push/Pulls: Ives: www.ives.com
   1. Assa Abloy McKinney: www.assaabloydss.com.
   2. Hager Companies: www.hagerhinge.com.
   3. Substitutions per Section 01 60 00.

F. Exit Devices: Von Duprin: www.vonduprin.com.
   1. No substitution.

G. Closers: LCN: www.lcnclosers.com

   1. DORMA Group North America: www.dorma-usa.com/usa.
   2. Substitution per Section 01 60 00.

H. Holder/Release: DORMA
   1. Substitutions per Section 01 60 00.

I. Overhead Holders/Stops: Glynn-Johnson: www.glynn-johnson.com

   1. DORMA Group North America: www.dorma-usa.com/usa.
   2. Substitutions per Section 01 60 00.

J. Wall, Floor Stops/Holders and Silencers:
   1. Ives: www.ives.com
   2. Hiawatha, Inc: www.hiawathainc.com.
   3. Substitutions per Section 01 60 00.

K. Manual and Automatic Bolts: Ives: www.ives.com
   1. Glynn-Johnson: www.glynn-johnson.com.
   2. Hager Companies: www.hagerhinge.com.
   3. Substitutions per Section 01 60 00.

L. Gasketing and Thresholds: Pemko Manufacturing Co: www.pemko.com.
   1. National Guard Products, Inc: www.ngpinc.com.
   2. Assa Abloy McKinney: www.assaabloydss.com.
   3. Substitutions per Section 01 60 00.

M. Protection Plates: Ives: www.ives.com
   1. Assa Abloy McKinney: www.assaabloydss.com.
   2. Hager Companies: www.hagerhinge.com.
   3. Substitutions per Section 01 60 00.

N. Cylindrical Locksets: Best Access Systems: www.bestlock.com
   1. No substitution.

O. Locksets: Adams Rite: www.adamsrite.com
   1. No substitution

P. Electric Strikes: Von Duprin: www.vonduprin.com
   1. No substitution

Q. Sliding Door Pull: Trimco: www.trimco.com

R. Substitutions: See Section 01 60 00 - Product Requirements.

2.03 GENERAL REQUIREMENTS FOR DOOR HARDWARE PRODUCTS

A. Provide products that comply with the following:
   1. Applicable provisions of Federal, State, and local codes.
   2. ANSI/ICC A117.1, American National Standard for Accessible and Usable Buildings and Facilities.
   3. Applicable provisions of NFPA 101, Life Safety Code.
   4. Fire-Rated Doors: NFPA 80.
   5. All Hardware on Fire-Rated Doors: Listed and classified by UL as suitable for the purpose specified and indicated.
   6. Hardware for Smoke and Draft Control Doors (Indicated as "S" on Drawings): Provide hardware that enables door assembly to comply with air leakage requirements of the applicable code.
   7. Products Requiring Electrical Connection: Listed and classified by UL as suitable for the purpose specified and indicated.

B. Finishes: Identified in schedule at end of section.

2.04 KEYING

All locks shall be supplied with interchangeable cores keyed by the Owner.

PART 3 EXECUTION

3.01 EXAMINATION

A. Verify that doors and frames are ready to receive work and dimensions are as indicated on shop drawings.

B. Verify that electric power is available to power operated devices and of the correct characteristics.

3.02 INSTALLATION

A. Install hardware in accordance with manufacturer's instructions and applicable codes.

B. Use templates provided by hardware item manufacturer.

C. Install hardware on fire-rated doors and frames in accordance with code and NFPA 80.

D. Mounting heights for hardware from finished floor to center line of hardware item: As listed in Schedule, unless otherwise noted:
   1. For steel doors and frames: Comply with DHI "Recommended Locations for Architectural Hardware for Steel Doors and Frames."
   2. For steel doors and frames: See Section 08 11 00.

3. For wood doors: Comply with DHI "Recommended Locations for Architectural Hardware for Wood Flush Doors."

4. Wood doors: See Section 08211.
5. Locksets: ____ inch (____ mm).
6. Push/Pulls: ____ inch (____ mm).
7. Dead Locks: ____ inch (____ mm).
8. Exit Devices: ____ inch (____ mm).

3.03 FIELD QUALITY CONTROL

A. Field inspection and testing will be performed under provisions of Section 01400.

B. Provide an Architectural Hardware Consultant to inspect installation and certify that hardware and installation has been furnished and installed in accordance with manufacturer's instructions and as specified.

3.04 ADJUSTING

A. Adjust work under provisions of Section 01700.

B. Adjust hardware for smooth operation.

3.05 PROTECTION OF FINISHED WORK

A. Protect finished Work under provisions of Section 01 70 00.

B. Do not permit adjacent work to damage hardware or finish.

3.06 SCHEDULE

HW SET: 01

2	EA	HINGE	(A)	BB1168 4 ½” X 4 ½”	650
1	EA	ELECTRIC HINGE	(A)	BB1168 4 ½” X 4 ½” X ETW4	650
1	EA	LOCK SET	(D)	45HW-7-DEU-3	612
1	EA	SFIC CYL. CORE	(D)	BLDG. STANDARD	612
1	EA	CLOSER	(G)	4010T	612
1	EA	STOP	(J)	WS401	BRZ
1	EA	CARD READER		BY OTHERS	

HW SET: 02

3	EA	HINGE	(A)	BB1168 4 ½” X 4 ½”	650
1	EA	LOCK SET	(D)	45H-7-A-3	612
1	EA	SFIC CYL. CORE	(D)	BLDG. STANDARD	612
1	EA	STOP*	(J)	WS401	BRZ

HW SET: 03

2	EA	HINGE	(A)	By Door and frame manufacturer	626
1	EA	ELECTRIC HINGE	(A)	By Door and frame manufacturer	626
1	EA	LOCK SET	(D)	45HW-7-DEU-3	626
1	EA	SFIC CYL. CORE	(D)	BLDG. STANDARD	626
1	EA	CLOSER	(G)	4010 With Hold Open Arm	ALUM
1	EA	STOP	(J)	FS13	626
1	SET	SEAL	(L)	S88	BLK
1	EA	CARD READER		BY OTHERS	

END OF SCHEDULE

SECTION 08 81 00

GLAZING

PART 1 – GENERAL

1.01 SECTION INCLUDES

A. Glass.

B. Glazing compounds and accessories.

1.02 RELATED SECTIONS

A. Section 07 92 00 – Joint Sealant
B. Section 08 11 16 - Aluminum Doors and Frames: Glazed doors and borrowed lites.

C. Section 08 14 23.16 – Solid Core Wood Doors

1.03 REFERENCES

A. 16 CFR 1201 - Safety Standard for Architectural Glazing Materials; current edition.

B. ANSI Z97.1 - American National Standard for Safety Glazing Materials Used in Buildings, Safety Performance Specifications and Methods of Test; 2004.

C. ASTM C 864 - Standard Specification for Dense Elastomeric Compression Seal Gaskets, Setting Blocks, and Spacers; 2005.

D. ASTM C 920 - Standard Specification for Elastomeric Joint Sealants; 2005.

E. ASTM C 1036 - Standard Specification for Flat Glass; 2001.

F. ASTM C 1048 - Standard Specification for Heat-Treated Flat Glass--Kind HS, Kind FT Coated and Uncoated Glass; 2004.

G. ASTM C 1172 - Standard Specification for Laminated Architectural Flat Glass; 2003.

H. ASTM C 1193 - Standard Guide for Use of Joint Sealants; 2005a.

I. ASTM E 84 - Standard Test Method for Surface Burning Characteristics of Building Materials; 2005.

J. ASTM E 773 - Standard Test Method for Accelerated Weathering of Sealed Insulating Glass Units; 2001.

K. ASTM E 774 - Standard Specification for the Classification of the Durability of Sealed Insulating Glass Units; 1997.

L. ASTM E 1300 - Standard Practice for Determining Load Resistance of Glass in Buildings; 2004.

M. ASTM E 2190 - Standard Specification for Insulating Glass Unit Performance and Evaluation;

2002.

N. GANA (GM) - GANA Glazing Manual; Glass Association of North America; 2004.

O. GANA (SM) - FGMA Sealant Manual; Glass Association of North America; 1990.

P. GANA (LGDG) - Laminated Glazing Reference Manual; Glass Association of North America; 2006.

Q. SIGMA TM-3000 - Glazing Guidelines for Sealed Insulating Glass Units; Sealed Insulating Glass Manufacturers Association; 2004.

1.04 PERFORMANCE REQUIREMENTS

A. Provide glass and glazing materials for continuity of building enclosure vapor retarder and air barrier:
   1. In conjunction with vapor retarder and joint sealer materials described in other sections.
   2. To utilize the inner pane of multiple pane sealed units for the continuity of the air barrier and vapor retarder seal.
   3. To maintain a continuous air barrier and vapor retarder throughout the glazed assembly from glass pane to heel bead of glazing sealant.

B. Select type and thickness of exterior glass to withstand dead loads and wind loads acting normal to plane of glass at design pressures calculated in accordance with Chapter 24, California Building Code, 2001.
   1. Use the procedure specified in ASTM E 1300 to determine glass type and thickness.
   2. Limit glass deflection to 1/200 or flexure limit of glass, whichever is less, with full recovery of glazing materials.
   3. Thicknesses listed are minimum.

1.05 SUBMITTALS

A. See Section 01 33 23 - Administrative Requirements, for submittal procedures.

B. Product Data on Glass Types: Provide structural, physical and environmental characteristics, size limitations, special handling or installation requirements.

C. Product Data on Glazing Compounds: Provide chemical, functional, and environmental characteristics, limitations, special application requirements. Identify available colors.

D. Samples: Submit two samples 12 x 12 inch (300 x 300 mm) in size of glass and plastic units, showing coloration and design.

E. Samples: Submit 1-inch (25 mm) long bead of glazing sealant. Color to be selected.

F. Certificates: Certify that products meet or exceed specified requirements.

G. Manufacturer's Certificate: Certify that glass meets or exceeds specified requirements.

1.06 QUALITY ASSURANCE

A. Perform Work in accordance with GANA Glazing Manual and FGMA Sealant Manual for glazing installation methods.

B. Installer Qualifications: Company specializing in performing the work of this section with documented experience.

1.07 PRE-INSTALLATION MEETING

A. Convene one week before starting work of this section.

1.08 ENVIRONMENTAL REQUIREMENTS

A. Do not install glazing when ambient temperature is less than 50 degrees F (10 degrees C).

B. Maintain minimum ambient temperature before, during and 24 hours after installation of glazing compounds.

1.09 WARRANTY

A. See Section 01740 - Closeout Submittals, for additional warranty requirements.

B. Provide a five (5) year warranty to include coverage for sealed glass units from seal failure, interpane dusting or misting, and replacement of same.

C. Provide a five (5) year warranty to include coverage for delamination of laminated glass and replacement of same.

1.10 MAINTENANCE PRODUCTS

A. Provide two of each glass size and each glass type, of insulated glass units.

PART 2 - PRODUCTS

2.01 FLAT GLASS MATERIALS

A. Manufacturers:
   1. PPG Industries, Inc: www.ppg.com.
   2. Pilkington Building Products North America: www.pilkington.com.
   3. ACH Glass/Versalux: www.versaluxglass.com.
   4. Substitutions: Refer to Section 01 60 00 - Product Requirements.

B. Clear Float Glass (Type 1): Clear, fully tempered.
   1. Comply with ASTM C 1036, Type I, transparent flat, Class 1 clear, Quality Q3 (glazing select).
   2. Comply with ASTM C 1048.
   3. 6 mm minimum thick.

C. Safety Glass (Type 2): Clear; fully tempered with horizontal tempering.
   1. Laminated with 0.030 inch (0.76 mm) thick plastic interlayer; comply with ASTM C 1172
   2. Comply with ASTM C 1036, Type I, transparent flat, Class 1 clear, Quality Q3 (glazing select) and ASTM C 1048.
   3. Comply with 16 CFR 1201 test requirements for Category II.
   4. Comply with ANSI Z97.1.
   5. Where glazing is to be installed in fire-rated partition, provide glazing that is also fire-protection rated in accordance with applicable code.
   6. 6 mm minimum thick.
   7. Provide this type of glazing in the locations required by code.
      a. Glazed lites in doors except fire doors.
      b. Glazed sidelights to doors.

D. One-Way Reflective Mirror Glass (Type 3): Clear, float type. (Fire-rated; 60-minute rating)
   1. Comply with ASTM C 1036, Type I, transparent flat, Class 1 clear, Quality Q2.
   2. 6 mm minimum thick.

E. Acid-Etched Laminated Glass (Type III) by: Vision Glass
   1. Distributor: Goldray Industries Ltd., 800.640.3709
   2. ¼" thick, tempered, Style # S10663 Royal Satin
   3. Comply with ASTM.

2.02 GLAZING COMPOUNDS

A. Manufacturers:
   1. Bostik, Inc: www.bostik-us.com.
   2. GE Silicones: www.gesilicones.com.
   3. Pecora Corporation: www.pecora.com.
   4. BASF Construction Chemicals, Inc: www.chemrex.com.
   5. Substitutions: Refer to Section 01600 - Product Requirements.

B. Glazing Putty: Polymer modified latex recommended by manufacturer for outdoor use, knife grade consistency; custom color.

C. Polyurethane Sealant (Type 2): Single component, chemical curing, non-staining, non-bleeding; ASTM C 920, Type S, Grade NS, Class 25, Uses M, A, and G; Shore A Hardness Range 20 to 35; color to be selected.

D. Silicone Sealant (Type 3): Single component; neutral curing; capable of water immersion without loss of properties; non-bleeding, non-staining; ASTM C 920, Type S, Grade NS, Class 25, Uses M, A, and G; cured Shore A hardness of 15 to 25; clear color.

2.03 GLAZING ACCESSORIES

A. Setting Blocks: Neoprene, 80 to 90 Shore A durometer hardness, ASTM C 864 Option I. Length of 0.1 inch for each square foot (25 mm for each square meter) of glazing or minimum 4 inch (100 mm) x width of glazing rabbet space minus 1/16 inch (1.5 mm) x height to suit glazing method and pane weight and area.

B. Spacer Shims: Neoprene, 50 to 60 Shore A durometer hardness, ASTM C 864 Option I. Minimum 3 inch (75 mm) long x one half the height of the glazing stop x thickness to suit application, self adhesive on one face.

C. Glazing Tape: Preformed butyl compound with integral resilient tube spacing device; 10 to 15 Shore A durometer hardness; coiled on release paper.
   1. Manufacturers:
      a. Pecora Corporation: www.pecora.com.
      b. Tremco, Inc: www.tremcosealants.com.
      c. Substitutions: Refer to Section 01600 - Product Requirements.

D. Glazing Tape: Closed cell polyvinyl chloride foam, coiled on release paper over adhesive on two sides, maximum water absorption by volume of 2 percent, designed for compression of 25 percent to affect an air barrier and vapor retarder seal.
   1. Manufacturers:
      a. Pecora Corporation: www.pecora.com.
      b. Saint-Gobain Performance Plastics: www.plastics.saint-gobain.com.
      c. Substitutions: Refer to Section 01600 - Product Requirements.

E. Glazing Gaskets: Resilient silicone extruded shape to suit glazing channel retaining slot; ASTM C 864 Option I.

F. Glazing Clips: Manufacturer's standard type.

G. Smoke Removal Unit Targets: Adhesive targets affixed to glass to identify glass units intended for removal for smoke control.

2.04 SOURCE QUALITY CONTROL AND TESTS

A. Provide shop inspection and testing for safety glass.

B. Test samples in accordance with ANSI Z97.1.

PART 3 - EXECUTION

3.01 EXAMINATION

A. Verify that openings for glazing are correctly sized and within tolerance.

B. Verify that surfaces of glazing channels or recesses are clean, free of obstructions that may impede moisture movement, weeps are clear, and ready to receive glazing.

3.02 PREPARATION

A. Clean contact surfaces with solvent and wipe dry.

B. Seal porous glazing channels or recesses with substrate compatible primer or sealer.

C. Prime surfaces scheduled to receive sealant.

D. Install sealants in accordance with ASTM C 1193 and FGMA Sealant Manual.

E. Install sealant in accordance with manufacturer's instructions.

3.03 INSTALLATION - EXTERIOR/INTERIOR DRY METHOD (GASKET GLAZING)

A. Place setting blocks at 1/4 points with edge block no more than 6 inches (150 mm) from corners.

B. Rest glazing on setting blocks and push against fixed stop with sufficient pressure on gasket to attain full contact.

C. Install removable stops without displacing glazing gasket; exert pressure for full continuous contact.

3.04 INSTALLATION - EXTERIOR DRY METHOD (TAPE AND GASKET SPLINE GLAZING)

A. Cut glazing tape to length; install on glazing pane. Seal corners by butting tape and sealing junctions with butyl sealant.

B. Place setting blocks at 1/4 points with edge block no more than 6 inches (150 mm) from corners.

C. Rest glazing on setting blocks and push against fixed stop with sufficient pressure to attain full contact.

D. Install removable stops without displacing glazing spline. Exert pressure for full continuous

contact.

E. Trim protruding tape edge.

3.05 INSTALLATION - EXTERIOR WET/DRY METHOD (PREFORMED TAPE AND SEALANT)

A. Cut glazing tape to length and set against permanent stops, 3/16 inch (5 mm) below sight line. Seal corners by butting tape and dabbing with butyl sealant.

B. Apply heel bead of butyl sealant along intersection of permanent stop with frame ensuring full perimeter seal between glass and frame to complete the continuity of the air and vapor seal.

C. Place setting blocks at 1/4 points with edge block no more than 6 inches (150 mm) from corners.

D. Rest glazing on setting blocks and push against tape and heel bead of sealant with sufficient pressure to attain full contact at perimeter of pane or glass unit.

E. Install removable stops, with spacer strips inserted between glazing and applied stops below sight line. Place glazing tape on glazing pane or unit with tape flush with sight line.

F. Fill gap between glazing and stop with sealant to depth equal to bite of frame on glazing, but not more than 3/8 inch (9 mm) below sight line.

G. Apply cap bead type sealant along void between the stop and the glazing, to uniform line, flush with sight line. Tool or wipe sealant surface smooth.

3.06 INSTALLATION - EXTERIOR WET METHOD (SEALANT AND SEALANT)

A. Place setting blocks at 1/4 points and install glazing pane or unit.

B. Install removable stops with glazing centered in space by inserting spacer shims both sides at 24 inch (600 mm) intervals, 1/4 inch (6 mm) below sight line.

C. Fill gaps between glazing and stops with sealant to depth of bite on glazing, but not more than 3/8 inch (9 mm) below sight line to ensure full contact with glazing and continue the air and vapor seal.

D. Apply sealant to uniform line, flush with sight line. Tool or wipe sealant surface smooth.

3.07 INSTALLATION - EXTERIOR BUTT GLAZED METHOD (SEALANT ONLY)

A. Temporarily brace glass in position for duration of glazing process. Mask edges of glass at adjoining glass edges and between glass edges and framing members.

B. Temporarily secure a small diameter non-adhering foamed rod on back side of joint.

C. Apply sealant to open side of joint in continuous operation; thoroughly fill the joint without displacing the foam rod. Tool the sealant surface smooth to concave profile.

D. Permit sealant to cure then remove foam backer rod. Apply sealant to opposite side, tool smooth to concave profile.

E. Remove masking tape.

3.08 INSTALLATION - INTERIOR DRY METHOD (TAPE AND TAPE)

A. Cut glazing tape to length and set against permanent stops, projecting 1/16 inch (1.6 mm) above sight line.

B. Place setting blocks at 1/4 points with edge block no more than 6 inches (150 mm) from corners.

C. Rest glazing on setting blocks and push against tape for full contact at perimeter of pane or unit.

D. Place glazing tape on free perimeter of glazing in same manner described above.

E. Install removable stop without displacement of tape. Exert pressure on tape for full continuous contact.

F. Knife trim protruding tape.

3.09 INSTALLATION - INTERIOR WET/DRY METHOD (TAPE AND SEALANT)

A. Cut glazing tape to length and install against permanent stops, projecting 1/16 inch (1.6 mm) above sight line.

B. Place setting blocks at 1/4 points with edge block no more than 6 inches (150 mm) from corners.

C. Rest glazing on setting blocks and push against tape to ensure full contact at perimeter of pane or unit.

D. Install removable stops, spacer shims inserted between glazing and applied stops at 24 inch (600 mm) intervals, 1/4 inch (6 mm) below sight line.

E. Fill gaps between pane and applied stop with sealant to depth equal to bite on glazing, to uniform and level line.

F. Trim protruding tape edge.

3.10 INSTALLATION - INTERIOR WET METHOD (COMPOUND AND COMPOUND)

A. Install glazing resting on setting blocks. Install applied stop and center pane by use of spacer shims at 24 inch (600 mm) centers, kept 1/4 inch (6 mm) below sight line.

B. Locate and secure glazing pane using glazers' clips.

C. Fill gaps between glazing and stops with glazing compound until flush with sight line. Tool surface to straight line.

3.11 INSTALLATION - PLASTIC FILM

A. Install plastic film with adhesive, applied in accordance with film manufacturer's instructions.

B. Place without air bubbles, creases or visible distortion.

C. Fit tight to glass perimeter with razor cut edge.

3.12 MANUFACTURER'S FIELD SERVICES

A. Glass and Glazing product manufacturers to provide field surveillance of the installation of their products.

B. Monitor and report installation procedures and unacceptable conditions.

3.13 CLEANING

A. Remove glazing materials from finish surfaces.

B. Remove labels after Work is complete.

C. Clean glass and adjacent surfaces.

3.14 PROTECTION OF FINISHED WORK

A. After installation, mark pane with an 'X' by using removable plastic tape or paste; do not mark heat absorbing or reflective glass units.

3.15 SCHEDULE

A. Aluminum Windows: Type 1.

B. Steel Windows: Type 4, exterior wet method with Type 2 compound.

C. Metal-Framed Storefronts and Curtain Wall: Type 2, thicknesses required to comply with performance requirements, exterior dry method.

D. Flush Wood Doors:
   1. Fire-rated: Firelite glass, interior wet method.
   2. Interior: Type 1, 6 mm thick, interior wet method.

E. Stile and Rail Wood Doors:
   1. Interior: Type 1, 6 mm thick, interior wet method.

F. Glass Wall:
   1. Interior: Type 5

END OF SECTION

SECTION 09 22 16.13

NON-STRUCTURAL METAL STUD FRAMING

PART 1 - GENERAL

1.01 SECTION INCLUDES

A. Metal partition, ceiling, and soffit framing.

B. Framing accessories.

1.02 RELATED SECTIONS

A. Section 05400 - Cold Formed Metal Framing: Structural load bearing metal stud framing and Exterior wall stud framing.

B. Section 06114 - Wood Blocking and Curbing: Rough wood blocking within stud framing.

C. Section 07212 - Board and Batt Insulation: Acoustic Insulation.

D. Section 083100 - Access Doors and Panels.

E. Section 09206 - Metal Lath.

F. Section 092900 - Gypsum Board Assemblies: Metal studs for gypsum board partition framing.

1.03 REFERENCES

A. AISI SG02-1 - North American Specification for the Design of Cold-Formed Steel Structural Members; American Iron and Steel Institute; 2001 with 2004 supplement. (Replaced SG-971)

B. ASTM C 645 - Standard Specification for Nonstructural Steel Framing Members; 2004a.

C. ASTM C 665 - Standard Specification for Mineral-Fiber Blanket Thermal Insulation for Light Frame Construction and Manufactured Housing; 2001.

D. ASTM C 754 - Standard Specification for Installation of Steel Framing Members to Receive Screw-Attached Gypsum Panel Products; 2004.

E. ASTM C 1002 - 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; 2004.

F. ASTM E 90 - Standard Test Method for Laboratory Measurement of Airborne Sound Transmission Loss of Building Partitions and Elements; 2004.

G. ASTM E 413 - Classification for Rating Sound Insulation; 2004.

H. SSPC-Paint 20 - Zinc-Rich Primers (Type I, "Inorganic," and Type II, "Organic"); Society for Protective Coatings; 2002 (Ed. 2004).

1.04 SUBMITTALS

A. See Section 01 33 00 - Administrative Requirements, for submittal procedures.

B. Shop Drawings:
   1. Indicate prefabricated work, component details, stud layout, framed openings, anchorage to structure, acoustic details, type and location of fasteners, accessories, and items of other related work.
   2. Describe method for securing studs to tracks, splicing, and for blocking and reinforcement of framing connections.

C. Product Data: Provide data describing framing member materials and finish, product criteria, load charts, and limitations.

D. Product Data: Provide manufacturer's data on partition head to structure connectors, showing compliance with requirements.

E. Manufacturer's Installation Instructions: Indicate special procedures and perimeter conditions requiring special attention.

1.05 QUALITY ASSURANCE

A. Fire-Test-Response Characteristics: For fire-resistance-rated assemblies that incorporate non-structural steel framing, provide materials and construction identical to those tested in assembly indicated according to ASTM E 119 by an independent testing agency. Products used in the assembly shall carry a classification label from a testing laboratory acceptable to authority having jurisdiction.

B. STC-Rated Assemblies: For STC-rated assemblies, provide materials and construction identical to those tested in assembly indicated according to ASTM E 90 and classified according to ASTM E 413 by an independent testing agency.

1.06 MOCK-UP

A. Provide mock-up of stud wall, ceiling, and soffit framing including insulation, sheathing, window frame, and door frame and finish specified in other sections. Coordinate with installation of associated work specified in other sections.
   1. Mock-up Size: Full height, minimum 12 feet (3.5 m) long, including corner.
   2. Mock-up may remain as part of the Work.

1.07 PROJECT CONDITIONS

A. Coordinate the placement of components to be installed within stud framing system.

PART 2 PRODUCTS

2.01 MANUFACTURERS

A. Metal Framing, Connectors, and Accessories: Member of Steel Stud Manufacturer's Association.
   1. Dietrich Metal Framing; www.dietrichindustries.com.
   2. Equal products by: Clark Steel Framing Systems; www.clarksteel.com.
   3. Substitutions: See Section 01600 - Product Requirements.

2.02 FRAMING MATERIALS

A. Fire Rated Assemblies: Comply with applicable code and as follows:
   1. Fire Rated Partitions: Listed assembly by UL, No. U419 or U448; 1-hour rating.
   2. Fire Rated Partitions: Listed assembly by UL, No. U412 or U419; 2-hour rating.
   3. Fire Rated Ceiling and Soffits: Listed assembly by UL, No. ____; ___ hour rating.
   4. Fire Rated Shaft Wall Requirements: Listed assembly by UL, No. ___; ___ hour rating.

B. Non-Loadbearing Framing System Components: ASTM C 645; galvanized sheet steel, of size and properties necessary to comply with ASTM C 754 for the spacing indicated, with maximum deflection of wall framing of L/240 at 5 psf (240 Pa).
   1. Studs: C shaped with flat or formed webs with knurled faces.
   2. Runners: U shaped, sized to match studs.
   3. Ceiling Channels: C shaped.
   4. Furring: Hat-shaped sections, minimum depth of 7/8 inch (22 mm).

C. Loadbearing Studs: As specified in Section 05400.

D. Ceiling Hangers: Type and size as specified in ASTM C 754 for spacing required.

E. Partition Head to Structure Connections: Provide track fastened to structure with legs of sufficient length to accommodate deflection, for friction fit of studs cut short and fastened as indicated on drawings.

F. Partition Head to Structure Connections: Provide mechanical anchorage devices that accommodate deflection using slotted holes, screws and anti-friction bushings, preventing rotation of studs while maintaining structural performance of partition.
   1. Structural Performance: Maintain lateral load resistance and vertical movement capacity required by applicable code, when evaluated in accordance with AISI North American Specification for the Design of Cold-Formed Steel Structural Members.
   2. Material: ASTM A 653/A 653M steel sheet, SS Grade 50, with G60/Z180 hot dipped galvanized coating.
   3. Provide components UL-listed for use in UL-listed fire-rated head of partition joint systems indicated on drawings.
   4. Provide top track preassembled with connection devices spaced to fit stud spacing indicated on drawings; minimum track length of 12 feet (3660 mm).

G. Tracks and Runners: Same material and thickness as studs, bent leg retainer notched to receive studs with provision for crimp locking to stud.

H. Furring and Bracing Members: Of same material as studs; thickness to suit purpose; complying with applicable requirements of ASTM C 754.

I. Fasteners: ASTM C 1002 self-piercing tapping screws.

J. Sheet Metal Backing: 0.036 inch (0.9 mm) thick, galvanized.

K. Anchorage Devices: Power actuated.

L. Acoustic Insulation: ASTM C 665; preformed glass fiber, friction fit type, unfaced. Thickness: As indicated on drawings.

M. Acoustic Insulation: As specified in Section 07212.

N. Acoustic Sealant: Non-hardening, non-skinning, for use in conjunction with gypsum board. Provide Sheetrock Brand acoustical sealant manufactured by USG.

O. Acoustic Sealant: As specified in Section 09260.

P. Touch-Up Primer for Galvanized Surfaces: SSPC-Paint 20, Type I - Inorganic.

2.03 FABRICATION

A. Fabricate assemblies of framed sections to sizes and profiles required.

B. Fit, reinforce, and brace framing members to suit design requirements.

C. Fit and assemble in largest practical sections for delivery to site, ready for installation.

PART 3 - EXECUTION

3.01 EXAMINATION

A. Verify existing conditions before starting work.

B. Verify that rough-in utilities are in proper location.

3.02 INSTALLATION OF STUD FRAMING

A. Comply with requirements of ASTM C 754.

B. Extend partition framing to structure where indicated and to ceiling in other locations.

C. Partitions Terminating at Ceiling: Attach ceiling runner securely to ceiling track in accordance with manufacturer's instructions.

D. Partitions Terminating at Structure: Attach extended leg top runner to structure, maintain clearance between top of studs and structure, and brace both flanges of studs as indicated.

E. Partitions Terminating at Structure: Attach top runner to structure, maintain clearance between top of studs and structure, and connect studs to track using specified mechanical devices in accordance with manufacturer's instructions; verify free movement of top of stud connections; do not leave studs unattached to track.

F. Align and secure top and bottom runners at 24 inches (600 mm) on center.

G. At partitions indicated with an acoustic rating:
   1. Provide components and install as required to produce STC rating of 52, based on published tests by manufacturer conducted in accordance with ASTM E 90 with STC rating calculated in accordance with ASTM E 413.
   2. Place one bead of acoustic sealant between runners and substrate, studs and adjacent construction.
   3. Place one bead of acoustic sealant between studs and adjacent vertical surfaces.

H. Fit runners under and above openings; secure intermediate studs to same spacing as wall studs.

I. Install studs vertically at 12 inches (300 mm) on center.

J. Install studs vertically at spacing indicated on drawings.

K. Align stud web openings horizontally.

L. Secure studs to tracks using crimping method. Do not weld.

M. Stud splicing is not permissible.

N. Stud splicing is permissible; splice studs with 8 inch (200 mm) nested lap, secure each stud flange with flush head screw.

O. Fabricate corners using a minimum of three studs.

P. Double stud at wall openings, door and window jambs, not more than 2 inches (50 mm) from each side of openings.

Q. Brace stud framing system rigid.

R. Coordinate erection of studs with requirements of door frames; install supports and attachments.

S. Coordinate installation of bucks, anchors, and blocking with electrical and mechanical work to be placed within or behind stud framing.

T. Blocking: Use wood blocking secured to studs. Provide blocking for support of plumbing fixtures.

U. Use sheet metal backing for reinforcement of partitions with wall-hung cabinetry, and as indicated on the drawings.

3.03 CEILING AND SOFFIT FRAMING

A. Comply with requirements of ASTM C 754.

B. Install furring after work above ceiling or soffit is complete. Coordinate the location of hangers with other work.

C. Install furring independent of walls, columns, and above-ceiling work.

D. Securely anchor hangers to structural members or embed in structural slab. Space hangers as required to limit deflection to criteria indicated. Use rigid hangers at exterior soffits.

E. Space main carrying channels at maximum 72 inch (1 800 mm) on center, and not more than 6 inches (150 mm) from wall surfaces. Lap splice securely.

F. Securely fix carrying channels to hangers to prevent turning or twisting and to transmit full load to hangers.

G. Place furring channels perpendicular to carrying channels, not more than 2 inches (50 mm) from perimeter walls, and rigidly secure. Lap splices securely.

H. Reinforce openings in suspension system which interrupt main carrying channels or furring channels with lateral channel bracing. Extend bracing minimum 24 inches (600 mm) past each opening.

I. Laterally brace suspension system.

3.04 ERECTION TOLERANCES

A. Maximum Variation from True Position: 1/8 inch in 10 feet (3 mm in 3 m).

B. Maximum Variation from Plumb: 1/8 inch in 10 feet (3 mm in 3 m).

END OF SECTION

SECTION 09 29 00

GYPSUM BOARD

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. Interior gypsum board.
   2. Exterior gypsum board for ceilings and soffits.

B. Related Requirements:
   1. Section 061600 "Sheathing" for gypsum sheathing for exterior walls.
   2. Section 092216 "Non-Structural Metal Framing" for non-structural framing and suspension systems that support gypsum board panels.

1.3 ACTION SUBMITTALS

A. Product Data: For each type of product.

B. Samples: For the following products:
   1. Trim Accessories: Full-size Sample in 12-inch- (300-mm-) long length for each trim accessory indicated.

1.4 QUALITY ASSURANCE

A. Mockups: Before beginning gypsum board installation, install mockups of at least 100 sq. ft. (9 sq. m) in surface area to demonstrate aesthetic effects and set quality standards for materials and execution.
   1. Install mockups for the following:
      a. Each level of gypsum board finish indicated for use in exposed locations.
      b. Each texture finish indicated.
   2. Apply or install final decoration indicated, including painting and wallcoverings, on exposed surfaces for review of mockups.
   3. Simulate finished lighting conditions for review of mockups.
   4. Subject to compliance with requirements, approved mockups may become part of the completed Work if undisturbed at time of Substantial Completion.

1.5 DELIVERY, STORAGE AND HANDLING

A. Store materials inside under cover and keep them dry and protected against weather, condensation, direct sunlight, construction traffic, and other potential causes of damage. Stack panels flat and supported on risers on a flat platform to prevent sagging.

1.6 FIELD CONDITIONS

A. Environmental Limitations: Comply with ASTM C 840 requirements or gypsum board manufacturer's written recommendations, whichever are more stringent.

B. Do not install paper-faced gypsum panels until installation areas are enclosed and conditioned.

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

1. Indications that panels are wet or moisture damaged include, but are not limited to, discoloration, sagging, or irregular shape.
2. Indications that panels are mold damaged include, but are not limited to, fuzzy or splotchy surface contamination and discoloration.

PART 2 – PRODUCTS

2.1 PERFORMANCE REQUIREMENTS

A. Moisture- and Mold-Resistant Assemblies: Provide and install moisture- and mold-resistant glass-mat gypsum wallboard products with moisture-resistant surfaces complying with ASTM C 1658 and ASTM C 1177 where indicated on Drawings and in all locations which might be subject to moisture exposure during construction.

B. Fire-Resistance-Rated Assemblies: For fire-resistance-rated assemblies, provide materials and construction identical to those tested in assembly indicated according to ASTM E 119 by an independent testing agency.

C. STC-Rated Assemblies: For STC-rated assemblies, provide materials and construction identical to those tested in assembly indicated according to ASTM E 90 and classified according to ASTM E 413 by an independent testing agency.

D. Low-Emitting Materials: For ceiling and wall assemblies, provide materials and construction identical to those tested in assembly and complying with the testing and product requirements of the California Department of Health Services' "Standard Practice for the Testing of Volatile Organic Emissions from Various Sources Using Small-Scale Environmental Chambers."

2.2 GYPSUM BOARD, GENERAL

A. Recycled Content of Gypsum Panel Products: Postconsumer recycled content plus one-half of preconsumer recycled content not less than 10% percent.

B. Size: Provide maximum lengths and widths available that will minimize joints in each area and that correspond with support system indicated.

2.3 INTERIOR GYPSUM BOARD

A. Basis-of-Design Product: The design for each type of gypsum board and related products is based on Georgia-Pacific Gypsum products named. Subject to compliance with requirements, provide the named product or a comparable product by one of the following:

1. USG Corporation
2. American Gypsum
3. National Gypsum Company
4. CertainTeed Corp.
5. Lafarge North America Inc.
6. PABCO Gypsum

B. Gypsum Wallboard: ASTM C 1396/C 1396M.

1. Basis-of-Design Product: Georgia-Pacific Gypsum; DensArmor Plus High-Performance Interior Panel
2. Thickness: 1/2 inch (12.7 mm).
3. Long Edges: Tapered.

C. Gypsum Board, Type X: ASTM C 1396/C 1396M.

1. Basis-of-Design Product: Georgia-Pacific Gypsum; DensArmor Plus Fireguard High-Performance Interior Panel

2. Thickness: 5/8 inch (15.9 mm).
3. Long Edges: Tapered.

D. Flexible Gypsum Board: ASTM C 1396/C 1396M. Manufactured to bend to fit radii and to be more flexible than standard regular-type gypsum board of same thickness.

1. Basis-of-Design Product: Georgia-Pacific Gypsum; "ToughRock FlexRoc Gypsum Board".
2. Thickness: 1/4 inch (6.4 mm).
3. Long Edges: Tapered.

E. Gypsum Ceiling Board: ASTM C 1396/C 1396M.

1. Basis-of-Design Product: Georgia-Pacific Gypsum; DensArmor Plus High-Performance Interior Panel
2. Thickness: 1/2 inch (12.7 mm).
3. Long Edges: Tapered.

F. Foil-Backed Gypsum Board: ASTM C 1396/C 1396M.

1. Core: [3/8 inch (9.5 mm), regular type] [1/2 inch (12.7 mm), regular type] [5/8 inch (15.9 mm), Type X] [Type C as required by fire-resistance-rated assembly indicated on Drawings].
2. Long Edges: Tapered.

G. Abuse-Resistant Gypsum Board: ASTM C 1629/C 1629M, Level 3.

1. Basis-of-Design Product: Georgia-Pacific Gypsum; DensArmor Plus Abuse-Resistant Panel.
2. Thickness: 5/8 inch (15.9 mm).
3. Long Edges: Tapered.

H. Impact-Resistant Gypsum Board: ASTM C 1629/C 1629M.

1. Basis-of-Design Product: Georgia-Pacific Gypsum; "DensArmor Plus Impact-Resistant Panel".
2. Thickness: 5/8 inch (15.9 mm).
3. Long Edges: Tapered.

I. Moisture- and Mold-Resistant Gypsum Board: ASTM C 1396/C 1396M. With moisture- and mold-resistant core and paper surfaces.

1. Basis-of-Design Product: Georgia-Pacific-P Gypsum; "[DensArmor Plus High-Performance Interior Panel] [DensArmor Plus Fireguard High-Performance Interior Panel] [DensArmor Plus Fireguard C High-Performance Interior Panel]
2. Core: [1/2 inch (12.7 mm), regular type] [5/8 inch (15.9 mm), Type X] [1/2 inch (12.7 mm), type C] [5/8 inch (15.9 mm), Type C].
3. Long Edges: Tapered.
4. Mold Resistance: ASTM D 3273, score of 10 as rated according to ASTM D 3274.

2.4 SPECIALTY GYPSUM BOARD

A. Gypsum Board, Type C: ASTM C 1396/C 1396M. Manufactured to have increased fire-resistive capability.

1. Basis-of-Design Product: Subject to compliance with requirements, provide Georgia-Pacific Gypsum; "[DensArmor Plus Fireguard C High-Performance Interior Panel] or a comparable product by one of the following:

a. USG Corporation
b. American Gypsum
c. National Gypsum Company

d. CertainTeed Corp.
e. Lafarge North America Inc.
f. PABCO Gypsum

2. Thickness: As required by fire-resistance-rated assembly indicated on Drawings.

3. Long Edges: Tapered.

B. Glass-Mat Interior Gypsum Board: ASTM C 1658/C 1658M. With fiberglass mat laminated to both sides. Specifically designed for interior use.

1. Products: Subject to compliance with requirements
   a. Georgia-Pacific Gypsum LLC; DensArmour Plus.
2. Core: [5/8 inch (15.9 mm), Type X] [5/8 inch (15.9 mm), Type C] [5/8 inch (15.9 mm), abuse resistant] [5/8 inch (15.9 mm), impact resistant] and as indicated on the drawings
3. Long Edges: Tapered.
4. Mold Resistance: ASTM D 3273, score of 10 as rated according to ASTM D 3274.

C. Acoustically Enhanced Gypsum Board: ASTM C 1396/C 1396M. Multilayer products constructed of two layers of gypsum boards sandwiching a viscoelastic sound-absorbing polymer core.

1. Products: Subject to compliance with requirements,
   a. National Gypsum Company; Sound Break.
   b. Quiet Solution, Quiet Rock.
2. Core: [5/8 inch (15.9 mm), regular type] [5/8 inch (15.9 mm), Type X] [1-3/8 inch (35 mm), regular type] and as indicated on the drawings.
3. Long Edges: Tapered.

D. Skim-Coated Gypsum Board: ASTM C 1396/C 1396M. Manufactured with a factory-applied skim coat.

1. Products: Subject to compliance with requirements,
   a. Lafarge North America Inc.; Rapid Deco L5.
2. Core: [1/2 inch (12.7 mm), regular type] [5/8 inch (15.9 mm), Type X] an as indicated on the drawings.
3. Long Edges: Tapered.

2.5 EXTERIOR GYPSUM BOARD FOR CEILINGS AND SOFFITS

A. Exterior Gypsum Soffit Board: ASTM C 1396/C 1396M, with manufacturer's standard edges.

1. Basis-of-Design Product: Subject to compliance with requirements, provide Georgia-Pacific Gypsum; "ToughRock Soffit Board" or a comparable product by one of the following:

   a. USG Corporation
   b. American Gypsum
   c. National Gypsum Company
   d. CertainTeed Corp.
   e. Lafarge North America Inc.
   f. PABCO Gypsum

2. Core: [As indicated] [1/2 inch (12.7 mm), regular type] [5/8 inch (15.9 mm), Type X].

B. Glass-Mat Gypsum Sheathing Board: ASTM C 1177/C 1177M, with fiberglass mat laminated to both sides and with manufacturer's standard edges.

1. Basis-of-Design Product: Subject to compliance with requirements, provide Georgia-Pacific Gypsum; "DensGlass Sheathing" or a comparable product by one of the following:

a. USG Corporation.
b. CertainTeed Corp.
c. National Gypsum Company.
d. Core: As indicated on the drawings.

2. Size: [48 by 96 inches (1219 by 2438 mm)] [48 by 108 inches (1219 by 2743 mm)] [48 by 120 inches (1219 by 3048 mm)] [1200 by 2400 mm] [1200 by 2750 mm] [1200 by 3050 mm].

C. Glass-Mat Gypsum Interior Board: ASTM C 1658/1658M, with fiberglass mat laminated to both sides and with manufacturer's standard edges.

1. Basis-of-Design Product: Subject to compliance with requirements, provide Georgia-Pacific Gypsum; "DensArmor Plus" or a comparable product by one of the following:
   a. National Gypsum Company.
2. Core: As indicated on the drawings
3. Long Edges: Tapered.

D. Fiberglass-Mat Faced Gypsum Sheathing: ASTM C1177:

1. Thickness: 1/2 inch.
2. Width: 4 feet.
3. Length: [8 feet] [9 feet] [10 feet].
4. Weight: 1.9 lb/sq. ft.
5. Edges: Square.
6. Surfacing: Fiberglass mat on face, back, and long edges.
7. Racking Strength (Ultimate, not design value) (ASTM E72): Not less than 540 pounds per square foot, dry.
8. Flexural Strength, Parallel (ASTM C473): 80 lbf, parallel.
9. Humidified Deflection (ASTM C1177): Not more than 2/8 inch.
10. Permeance (ASTM E96): Not less than 23 perms.
11. R-Value (ASTM C518): 0.56.
12. Mold Resistance (ASTM D3273): 10, in a test as manufactured.
13. Microbial Resistance (ASTM D6329, UL Environmental GREENGUARD 3-week protocol): Will not support microbial growth.
14. Acceptable Products:
    a. 1/2 inch DensGlass Sheathing, Georgia-Pacific Gypsum LLC.

E. Fire-Rated Fiberglass-Mat Faced Gypsum Sheathing: ASTM C1177, Type X:

1. Thickness: 5/8 inch.
2. Width: 4 feet.
3. Length: [8 feet] [9 feet] [10 feet].
4. Weight: 2.5 lb/sq. ft.
5. Edges: Square.
6. Surfacing: Fiberglass mat on face, back, and long edges.
7. Racking Strength (Ultimate, not design value) (ASTM E72): Not less than 654 pounds per square foot, dry.
8. Flexural Strength, Parallel (ASTM C1177): 100 lbf, parallel.
9. Humidified Deflection (ASTM C1177): Not more than 1/8 inch.
10. Permeance (ASTM E96): Not less than 17 perms.
11. R-Value (ASTM C518): 0.67.
12. Mold Resistance (ASTM D3273): 10, in a test as manufactured.
13. Microbial Resistance (ASTM D6329, UL Environmental GREENGUARD 3-week protocol): Will not support microbial growth.
14. Acceptable Products:
    a. 5/8 inch DensGlass Fireguard Sheathing, Georgia-Pacific Gypsum LLC.

2.6 TRIM ACCESSORIES

A. Interior Trim: ASTM C 1047.

1. Material: Galvanized or aluminum-coated steel sheet or rolled zinc
2. Shapes:
   a. Cornerbead.
   b. Bullnose bead.
   c. LC-Bead: J-shaped; exposed long flange receives joint compound.
   d. L-Bead: L-shaped; exposed long flange receives joint compound.
   e. U-Bead: J-shaped; exposed short flange does not receive joint compound.
   f. Expansion (control) joint.
   g. Curved-Edge Cornerbead: With notched or flexible flanges.

B. Exterior Trim: ASTM C 1047.

1. Material: Hot-dip galvanized steel sheet
2. Shapes:
   a. Cornerbead.
   b. LC-Bead: J-shaped; exposed long flange receives joint compound.
   c. Expansion (Control) Joint: One-piece, rolled zinc with V-shaped slot and removable strip covering slot opening.

C. Aluminum Trim: Extruded accessories of profiles and dimensions indicated.

1. Manufacturers: Subject to compliance with requirements:
   a. Fry Reglet Corp.
   b. Flannery
   c. Pittcon Industries
2. Aluminum: Alloy and temper with not less than the strength and durability properties of ASTM B 221 (ASTM B 221M), Alloy 6063-T5.
3. Finish: Corrosion-resistant primer compatible with joint compound and finish materials specified

2.7 JOINT TREATMENT MATERIALS

A. General: Comply with ASTM C 475/C 475M.

B. Joint Tape:

1. Interior Gypsum Board: Paper.
2. Exterior Gypsum Soffit Board: Paper.
3. Exterior Glass Mat Gypsum Soffit: Fiberglass mesh.
4. Glass-Mat Gypsum Wallboard: 10-by-10 fiberglass meh.
5. Glass-Mat Gypsum Sheathing Board: 10-by-10 fiberglass mesh.
6. Tile Backing Panels: As recommended by panel manufacturer.

C. Joint Compound for Interior Gypsum Board: For each coat use formulation that is compatible with other compounds applied on previous or for successive coats.

1. Prefilling: At open joints, rounded or beveled panel edges, and damaged surface areas, use setting-type taping compound.
   a. Basis-of-Design Product: Georgia-Pacific Gypsum; ToughRock Sandable Setting Compound.
2. Embedding and First Coat: For embedding tape and first coat on joints, fasteners, and trim flanges, use drying-type, all-purpose compound.
   a. Basis-of-Design Product: Georgia-Pacific Gypsum; ToughRock Sandable Setting Compound, ToughRock Ready Mix All-Purpose Joint Compound.
   b. Use setting-type compound for installing paper-faced metal trim accessories.
3. Fill Coat: For second coat, use drying-type, all-purpose compound.

a. Basis-of-Design Product: Georgia-Pacific Gypsum; ToughRock Sandable Setting Compound, ToughRock Ready Mix All-Purpose Joint Compound, ToughRock Ready Mix Topping Joint Compound.

4. Finish Coat: For third coat, use setting-type, sandable topping compound.
   a. Basis-of-Design Product: Georgia-Pacific Gypsum; ToughRock Sandable Setting Compound, ToughRock Ready Mix All-Purpose Joint Compound, ToughRock Ready Mix Topping Joint Compound.
5. Skim Coat: For final coat of Level 5 finish, use [setting-type, sandable topping compound] [drying-type, all-purpose compound.
   a. Basis-of-Design Product: Georgia-Pacific Gypsum; ToughRock Sandable Setting Compound, ToughRock Ready Mix All-Purpose Joint Compound, ToughRock Ready Mix Topping Joint Compound.

D. Joint Compound for Exterior Soffit Applications:

1. Basis-of-Design Product: Georgia-Pacific Gypsum; "ToughRock Setting Compound."
2. Exterior Gypsum Soffit Board: Use setting-type taping compound and setting-type, sandable topping compound.
3. Glass-Mat Gypsum Sheathing Board: As recommended by sheathing board manufacturer.

E. Joint Compound for Tile Backing Panels:

1. Glass-Mat, Water-Resistant Backing Panel: As recommended by backing panel manufacturer.
2. Cementitious Backer Units: As recommended by backer unit manufacturer.

2.8 AUXILIARY MATERIALS

A. General: Provide auxiliary materials that comply with referenced installation standards and manufacturer's written recommendations.

B. Laminating Adhesive: Adhesive or joint compound recommended for directly adhering gypsum panels to continuous substrate.

1. Laminating adhesive shall have a VOC content of 50g/L or less when calculated according to 40 CFR 59, Subpart D (EPA Method 24).
2. Laminating adhesive shall comply with the testing and product requirements of the California Department of Health Services' "Standard Practice for the Testing of Volatile Organic Emissions from Various Sources Using Small-Scale Environmental Chambers."

C. Steel Drill Screws: ASTM C 1002, unless otherwise indicated.

1. Use screws complying with ASTM C 954 for fastening panels to steel members from 0.033 to 0.112 inch (0.84 to 2.84 mm) thick.
2. For fastening cementitious backer units, use screws of type and size recommended by panel manufacturer.

D. Sound Attenuation Blankets: ASTM C 665, Type I (blankets without membrane facing) produced by combining thermosetting resins with mineral fibers manufactured from glass, slag wool, or rock wool.

1. Fire-Resistance-Rated Assemblies: Comply with mineral-fiber requirements of assembly.
2. Recycled Content of Blankets: Postconsumer recycled content plus one-half of preconsumer recycled content not less than 10% percent.

E. Acoustical Joint Sealant: Manufacturer's standard nonsag, paintable, nonstaining latex sealant complying with ASTM C 834. Product effectively reduces airborne sound transmission through perimeter joints and openings in building construction as demonstrated by testing representative assemblies according to ASTM E 90.

1. Products: Subject to compliance with requirements, available products that may be incorporated into the Work include, but are not limited to, the following:
   a. USG Corporation; SHEETROCK Acoustical Sealant.
   b. Accumetric LLC; BOSS 824 Acoustical Sound Sealant.
   c. Grabber Construction Products; Acoustical Sealant GSC.
   d. Pecora Corporation; [AC-20 FTR] [AIS-919].
2. Acoustical joint sealant shall have a VOC content of 250g/L or less when calculated according to 40 CFR 59, Subpart D (EPA Method 24).
3. Acoustical joint sealant shall comply with the testing and product requirements of the California Department of Health Services' "Standard Practice for the Testing of Volatile Organic Emissions from Various Sources Using Small-Scale Environmental Chambers."

F. Thermal Insulation: As indicated on the drawings.

G. Vapor Retarder: As indicated on the drawings.

2.9 FINISHES

A. Primer: As recommended by textured finish manufacturer.

Part 3 – EXECUTION

3.1 EXAMINATION

A. Examine areas and substrates including welded hollow-metal frames and framing, with Installer present, for compliance with requirements and other conditions affecting performance.

B. Examine panels before installation. Reject panels that are wet, moisture damaged, and mold damaged.

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

3.2 APPLYING AND FINISHING PANELS, GENERAL

A. Comply with ASTM C 840.

B. Install ceiling panels across framing to minimize the number of abutting end joints and to avoid abutting end joints in central area of each ceiling. Stagger abutting end joints of adjacent panels not less than one framing member.

C. Install panels with face side out. Butt panels together for a light contact at edges and ends with not more than 1/16 inch (1.5 mm) of open space between panels. Do not force into place.

D. Locate edge and end joints over supports, except in ceiling applications where intermediate supports or gypsum board back-blocking is provided behind end joints. Do not place tapered edges against cut edges or ends. Stagger vertical joints on opposite sides of partitions. Do not make joints other than control joints at corners of framed openings.

E. Form control and expansion joints with space between edges of adjoining gypsum panels.

F. Cover both faces of support framing with gypsum panels in concealed spaces (above ceilings, etc.), except in chases braced internally.

   1. Unless concealed application is indicated or required for sound, fire, air, or smoke ratings, coverage may be accomplished with scraps of not less than 8 sq. ft. (0.7 sq. m) in area.
   2. Fit gypsum panels around ducts, pipes, and conduits.

3. Where partitions intersect structural members projecting below underside of floor/roof slabs and decks, cut gypsum panels to fit profile formed by structural members; allow 1/4- to 3/8-inch- (6.4- to 9.5-mm-) wide joints to install sealant.

G. Isolate perimeter of gypsum board applied to non-load-bearing partitions at structural abutments, except floors. Provide 1/4- to 1/2-inch- (6.4- to 12.7-mm-) wide spaces at these locations and trim edges with edge trim where edges of panels are exposed. Seal joints between edges and abutting structural surfaces with acoustical sealant.

H. Attachment to Steel Framing: Attach panels so leading edge or end of each panel is attached to open (unsupported) edges of stud flanges first.

I. Wood Framing: Install gypsum panels over wood framing, with floating internal corner construction. Do not attach gypsum panels across the flat grain of wide-dimension lumber, including floor joists and headers. Float gypsum panels over these members or provide control joints to counteract wood shrinkage.

J. STC-Rated Assemblies: Seal construction at perimeters, behind control joints, and at openings and penetrations with a continuous bead of acoustical sealant. Install acoustical sealant at both faces of partitions at perimeters and through penetrations. Comply with ASTM C 919 and with manufacturer's written recommendations for locating edge trim and closing off sound-flanking paths around or through assemblies, including sealing partitions above acoustical ceilings.

K. Install sound attenuation blankets before installing gypsum panels unless blankets are readily installed after panels have been installed on one side.

3.3 APPLYING INTERIOR GYPSUM BOARD

A. Install interior gypsum board in the following locations:

1. Wallboard Type: As indicated on drawings.
2. Type X As indicated on drawings.
3. Ceiling Type: As indicated on drawings.
4. Foil-Backed Type: As indicated on drawings.
5. Abuse-Resistant Type: As indicated on drawings.
6. Impact-Resistant Type: As indicated on drawings.
7. Moisture- and Mold-Resistant Type: As indicated on drawings.
8. Type C: As indicated on drawings.
9. Glass-Mat Interior Type: As indicated on drawings.
10. Acoustically Enhanced Type: As indicated on drawings.

B. Single-Layer Application:

1. On ceilings, apply gypsum panels before wall/partition board application to greatest extent possible and at right angles to framing unless otherwise indicated.

2. On partitions/walls, apply gypsum panels horizontally (perpendicular to framing unless otherwise indicated or required by fire-resistance-rated assembly, and minimize end joints.

   a. Stagger abutting end joints not less than one framing member in alternate courses of panels.
   b. Usually retain first subparagraph below if vertical application of panels is specified.

3. On Z-furring members, apply gypsum panels vertically (parallel to framing) with no end joints.

4. Locate edge joints over furring members.

5. Fastening Methods: Apply gypsum panels to supports with steel drill screws.

C. Multilayer Application:

1. On ceilings, apply gypsum board indicated for base layers before applying base layers on walls/partitions; apply face layers in same sequence. Apply base layers at right angles to framing members and offset face-layer joints one framing member, 16 inches (400 mm) minimum, from parallel base-layer joints, unless otherwise indicated or required by fire-resistance-rated assembly.
2. On partitions/walls, apply gypsum board indicated for base layers and face layers vertically (parallel to framing) with joints of base layers located over stud or furring member and face-layer joints offset at least one stud or furring member with base-layer joints, unless otherwise indicated or required by fire-resistance-rated assembly. Stagger joints on opposite sides of partitions.
3. On Z-furring members, apply base layer vertically (parallel to framing) and face layer either vertically (parallel to framing) or horizontally (perpendicular to framing) with vertical joints offset at least one furring member. Locate edge joints of base layer over furring members.
4. Fastening Methods: Fasten base layers and face layers separately to supports with screws.

D. Laminating to Substrate: Where gypsum panels are indicated as directly adhered to a substrate (other than studs, joists, furring members, or base layer of gypsum board), comply with gypsum board manufacturer's written recommendations and temporarily brace or fasten gypsum panels until fastening adhesive has set.

E. Curved Surfaces:

1. Install panels horizontally (perpendicular to supports) and unbroken, to extent possible, across curved surface plus 12-inch- (300-mm-) long straight sections at ends of curves and tangent to them.
2. For double-layer construction, fasten base layer to studs with screws 16 inches (400 mm) o.c. Center gypsum board face layer over joints in base layer, and fasten to studs with screws spaced 12 inches (300 mm) o.c.

3.4 APPLYING EXTERIOR GYPSUM PANELS FOR CEILINGS AND SOFFITS

A. Apply panels perpendicular to supports, with end joints staggered and located over supports.

1. Install with 1/4-inch (6.4-mm) open space where panels abut other construction or structural penetrations.
2. Fasten with corrosion-resistant screws.

3.5 APPLYING TILE BACKING PANELS

A. Glass-Mat, Water-Resistant Backing Panels: Comply with manufacturer's written installation instructions and install at [showers, tubs, and where indicated] [locations indicated to receive tile]. Install with 1/4-inch (6.4-mm) gap where panels abut other construction or penetrations.

B. Cementitious Backer Units: ANSI A108.11, at [showers, tubs, and where indicated] [locations indicated to receive tile].

C. Where tile backing panels abut other types of panels in same plane, shim surfaces to produce a uniform plane across panel surfaces.

3.6 INSTALLING TRIM ACCESSORIES

A. General: For trim with back flanges intended for fasteners, attach to framing with same fasteners used for panels. Otherwise, attach trim according to manufacturer's written instructions.

B. Control Joints: Install control joints [at locations indicated on Drawings] [according to ASTM C 840 and in specific locations approved by Architect for visual effect].

C. Interior Trim: Install in the following locations:

1. Cornerbead: Use at outside corners [unless otherwise indicated].
2. Bullnose Bead: Use [at outside corners] [where indicated] <Insert requirements>.
3. LC-Bead: Use [at exposed panel edges] <Insert requirements>.
4. L-Bead: Use [where indicated] <Insert requirements>.
5. U-Bead: Use [at exposed panel edges] [where indicated] <Insert requirements>.
6. Curved-Edge Cornerbead: Use at curved openings.

D. Exterior Trim: Install in the following locations:
1. Cornerbead: Use at outside corners.
2. LC-Bead: Use [at exposed panel edges] <Insert requirements>.

E. Aluminum Trim: Install in locations [indicated on Drawings] <Insert requirements>.

3.7 FINISHING GYPSUM BOARD

A. General: Treat gypsum board joints, interior angles, edge trim, control joints, penetrations, fastener heads, surface defects, and elsewhere as required to prepare gypsum board surfaces for decoration. Promptly remove residual joint compound from adjacent surfaces.

B. Prefill open joints[, rounded or beveled edges,] and damaged surface areas.

C. Apply joint tape over gypsum board joints, except for trim products specifically indicated as not intended to receive tape.

D. Gypsum Board Finish Levels: Finish panels to levels indicated below and according to ASTM C 840:

1. Level 1: Ceiling plenum areas, concealed areas, and where indicated.
2. Level 2: [Panels that are substrate for tile] [Panels that are substrate for acoustical tile] [Where indicated on Drawings] <Insert locations>.
3. Level 3 is suitable for surfaces receiving medium- or heavy-textured finishes before painting or heavy wallcoverings where lighting conditions are not critical.
4. Level 3: [Where indicated on Drawings] <Insert locations>.
5. Level 4: [At panel surfaces that will be exposed to view unless otherwise indicated] <Insert locations>.
   a. Primer and its application to surfaces are specified in Section 099123 "Interior Painting."
6. Level 5: [Where indicated on Drawings] <Insert locations>.
   a. Primer and its application to surfaces are specified in Section 099123 "Interior Painting."

E. Glass-Mat Gypsum Sheathing Panel: Finish according to manufacturer's written instructions for use as exposed soffit board.

F. Glass-Mat Faced Panels: Finish according to manufacturer's written instructions.

G. Cementitious Backer Units: Finish according to manufacturer's written instructions.

3.8 APPLYING TEXTURE FINISHES

A. Surface Preparation and Primer: Prepare and apply primer to gypsum panels and other surfaces receiving texture finishes. Apply primer to surfaces that are clean, dry, and smooth.

B. Texture Finish Application: Mix and apply finish using powered spray equipment, to produce a uniform texture[matching approved mockup and] free of starved spots or other evidence of thin application or of application patterns.

C. Prevent texture finishes from coming into contact with surfaces not indicated to receive texture finish by covering them with masking agents, polyethylene film, or other means. If, despite these

precautions, texture finishes contact these surfaces, immediately remove droppings and overspray to prevent damage according to texture-finish manufacturer's written recommendations.

3.9 PROTECTION

A. Protect adjacent surfaces from drywall compound and promptly remove from floors and other non-drywall surfaces. Repair surfaces stained, marred, or otherwise damaged during drywall application.

B. Protect installed products from damage from weather, condensation, direct sunlight, construction, and other causes during remainder of the construction period.

C. Remove and replace panels that are wet, moisture damaged, and mold damaged.

1. Indications that panels are wet or moisture damaged include, but are not limited to, discoloration, sagging, or irregular shape.
2. Indications that panels are mold damaged include, but are not limited to, fuzzy or splotchy surface contamination and discoloration.

END OF SECTION

SECTION 09 51 00

ACOUSTICAL CEILING SUSPENSIONS ASSEMBLIES

PART 1 – GENERAL

1.01 SECTION INCLUDES

A. Suspended metal grid ceiling system.

B. Acoustical units.

C. Supplementary acoustical insulation above ceiling.

1.02 RELATED SECTIONS

A. Section 072100 - Board and Batt Insulation: Acoustical insulation.

B. Section 079200 - Joint Sealers: Acoustical sealant.

C. Section 083100 - Access Doors and Panels: Access panels.

D. Section 283000 - Fire Alarm System: Fire alarm components in ceiling system.

E. Section 211100 - Fire Suppression Sprinklers: Sprinkler heads in ceiling system.

F. Section 230593 - Air Outlets and Inlets: Air diffusion devices in ceiling.

G. Section 260500 - Interior Luminaires: Light fixtures in ceiling system.

1.03 REFERENCES

A. ASTM C 635 - Standard Specification for the Manufacture, Performance, and Testing of Metal Suspension Systems for Acoustical Tile and Lay-in Panel Ceilings; 2004.

B. ASTM C 636 - Standard Practice for Installation of Metal Ceiling Suspension Systems for Acoustical Tile and Lay-in Panels; 2004.

C. ASTM C 665 - Standard Specification for Mineral-Fiber Blanket Thermal Insulation for Light Frame Construction and Manufactured Housing; 2001.

D. ASTM E 580 - Standard Practice for Application of Ceiling Suspension Systems for Acoustical Tile and Lay-in Panels in Areas Requiring Seismic Restraint; 2002.

E. ASTM E 1264 - Standard Classification for Acoustical Ceiling Products; 1998 (Reapproved 2005).

F. ITS (DIR) - Directory of Listed Products; Intertek Testing Services NA, Inc.; current edition.

G. UL (FRD) - Fire Resistance Directory; Underwriters Laboratories Inc.; current edition.

1.04 SUBMITTALS

A. See Section 01 30 00 - Administrative Requirements, for submittal procedures.

B. Shop Drawings: Indicate grid layout and related dimensioning.
C. Product Data: Provide data on suspension system components.

D. Samples: Submit two samples 6 x 6 inches in size illustrating material and finish of acoustical units.

E. Samples: Submit two full size samples illustrating material and finish of acoustical units.

F. Samples: Submit two samples each, 12 inches long, of suspension system main runner.

G. Manufacturer's Installation Instructions: Indicate special procedures.

1.04.1 QUALITY ASSURANCE

A. Fire-Resistive Assemblies: Complete assembly listed and classified by UL for the fire resistance indicated.

B. Suspension System Manufacturer Qualifications: Company specializing in manufacturing the products specified in this section with minimum three years documented experience.

C. Acoustical Unit Manufacturer Qualifications: Company specializing in manufacturing the products specified in this section with minimum three years documented experience.

1.04.2 ENVIRONMENTAL REQUIREMENTS

A. Maintain uniform temperature of minimum 60 degrees F (16 degrees C), and maximum humidity of 40 percent prior to, during, and after acoustical unit installation.

1.04.3 PROJECT CONDITIONS

A. Sequence work to ensure acoustical ceilings are not installed until building is enclosed, sufficient heat is provided, dust generating activities have terminated, and overhead work is completed, tested, and approved.

B. Install acoustical units after interior wet work is dry.

1.04.4 EXTRA MATERIALS

A. See Section 01600 - Product Requirements, for additional provisions.

B. Provide 5 sq ft of each type of acoustical unit for Owner's use in maintenance of project.

C. Provide 5 percent of total acoustical unit area of each type of acoustical unit for Owner's use in maintenance of project.

PART 2 - PRODUCTS

2.01 ACOUSTICAL UNITS

A. Manufacturers:
   1. Armstrong World Industries, Inc., Product: Cirrus Tegular, fine texture - www.armstrong.com.

   2. Hunter Douglas Contract: www.hunterdoublascontract.com/ceilings
   3. USG - www.usg.com
   4. Substitutions: See Section 01 60 00 - Product Requirements.

B. Acoustical Units - General: ASTM E 1264, Class A.
   1. Units for Installation in Fire-Rated Suspension System: Listed and classified for the fire-resistive assembly the suspension system is a part of.

C. Acoustical Tile, Type 1: Mineral fiber, ASTM E 1264 Type III, with to the following characteristics:
   1. Size: 24 x 48 inches (600 x 1200 mm)
   2. Thickness: 7/8 inches (22 mm).
   3. Composition:
   4. Density: ____ lb/cu ft.
   5. Light Reflectance: 86 percent, determined as specified in ASTM E 1264.
   6. NRC Range: 0.70 determined as specified in ASTM E 1264.
   7. Articulation Class (AC): A, determined as specified in ASTM E 1264.
   8. Ceiling Attenuation Class (CAC): 40, determined as specified in ASTM E 1264.
   9. Joint: Kerfed and rabbeted.
   10. Edge: Beveled Tegular
   11. Surface Color: White.
   12. Product: # 539 by Armstrong.
   13. Suspension System: Type 1:Exposed 9/16" tee. (See drawings for location)

D. **Acoustical Tile, Type 2:** Acoustical mat, with the following characteristics:
   1. Size: 48 x 72 inches.
   2. Thickness: 1 1/8".
   3. Perimeter: Option 1- Elsewhere. Option 2 – Customer Waiting # 107, Lobby#101 and Hall#105 (between Grid lines 11 & 13).
   4. Attachment: Pre-attached clip system to 15/16" T-Grid system.
   5. Light Reflectance: 75 percent, determined as specified in ASTM E 1264.
   6. NRC Range: 0.85, determined as specified in ASTM E 1264.
   7. Articulation Class (AC): A, determined as specified in ASTM E 1264.
   8. Ceiling Attenuation Class (CAC): 17, determined as specified in ASTM E 1414.
   9. Joint: Kerfed and rabbeted.
   10. Edge: Square.
   11. Surface Color: Off-White.
   12. Surface Finish: Polyester non-woven.
   13. Product: Tech Style – Classic Series by Hunter Douglas Contract.
   14. Suspension System: Type 2, Exposed T grid. (See drawings for location).
   15. Product: TECHSTYLE by Hunter Douglas..

2.02 SUSPENSION SYSTEM(S)

A. Manufacturers:
   1. Same as for acoustical units.
   2. Armstrong World Industries, Inc; Product Exposed T-Grid: www.armstrong.com.
   3. Chicago Metallic Corporation; Equal Product: www.chicagometallic.com.
   4. Substitutions: See Section 01 60 00 - Product Requirements.

B. Suspension Systems - General: ASTM C 635; die cut and interlocking components, with stabilizer bars, clips, splices, perimeter moldings, and hold down clips as required.

C. Exposed Steel Suspension System Type 1: Formed steel, commercial quality cold rolled; heavy-duty.
   1. Profile: Tee; 9/16 inch (14 mm) wide face.
   2. Finish: White painted.
   3. Product: Suprafine by Armstrong.

D. Exposed Steel Suspension System Type 2: Formed steel, commercial quality cold rolled; heavy-duty.
   1. Profile: Tee; 15/16 inch (24 mm) wide face.
   2. Finish: White painted.
   3. Product: Prelude by Armstrong.

E. Drywall Grid Suspension System: ASTM C 645. Direct-hung heavy-duty system
   1. Product: Armstrong; Drywall Grid System
   2. Chicago Metallic Corporation: Product: 640C Drywall Furring System

2.03 ACCESSORIES

A. Support Channels and Hangers: Galvanized steel; size and type to suit application, seismic requirements, and ceiling system flatness requirement specified.

B. Perimeter Moldings: Same material and finish as grid.
   1. At Exposed Grid:
      a. Provide L-shaped molding for mounting at same elevation as face of grid.
      b. At Grids with 'TechStyle' acoustic tile , use option 1 or 2 as delineated on 2.01.D.

C. Acoustical Insulation: Specified in Section 07 21 00.
   1. Thickness: 2 inch (50 mm).
   2. Size: To fit acoustical suspension system.

D. Gypsum Board: Fire rated type; 5/8 inch (15 mm) thick, ends and edges square, paper faced.

E. Acoustical Sealant For Perimeter Moldings: Specified in Section 07 90 00.

F. Gasket For Perimeter Moldings: Closed cell rubber sponge tape.

G. Touch-up Paint: Type and color to match acoustical and grid units.

PART 3 - EXECUTION

3.01 EXAMINATION

A. Verify existing conditions before starting work.

B. Verify that layout of hangers will not interfere with other work.

3.02 INSTALLATION - SUSPENSION SYSTEM

A. Install suspension system in accordance with ASTM C 636, ASTM E 580, and manufacturer's instructions and as supplemented in this section.

B. Rigidly secure system, including integral mechanical and electrical components, for maximum deflection of 1:360.

C. Lay out system to a balanced grid design with edge units no less than 50 percent of acoustical unit size.

D. Locate system on room axis according to reflected plan.

E. Install after major above-ceiling work is complete. Coordinate the location of hangers with other work.

F. Provide hanger clips during steel deck erection. Provide additional hangers and inserts as required.

G. Hang suspension system independent of walls, columns, ducts, pipes and conduit. Where carrying members are spliced, avoid visible displacement of face plane of adjacent members.

H. Where ducts or other equipment prevent the regular spacing of hangers, reinforce the nearest affected hangers and related carrying channels to span the extra distance.

I. Do not support components on main runners or cross runners if weight causes total dead load to exceed deflection capability.

J. Support fixture loads using supplementary hangers located within 6 inches (150 mm) of each corner, or support components independently.

K. Do not eccentrically load system or induce rotation of runners.

L. Perimeter Molding: Install at intersection of ceiling and vertical surfaces and at junctions with other interruptions.
   1. Install with continuous gasket.
   2. Use longest practical lengths.
   3. Overlap and rivet corners.

M. Form expansion joints as detailed. Form to accommodate plus or minus 1 inch (25 mm) movement. Maintain visual closure.

N. Install light fixture boxes constructed of gypsum board above light fixtures in accordance with fire rated assembly requirements and light fixture ventilation requirements.

3.03 INSTALLATION - ACOUSTICAL UNITS

A. Install acoustical units in accordance with manufacturer's instructions.

B. Fit acoustical units in place, free from damaged edges or other defects detrimental to appearance and function.

C. Lay directional patterned units with pattern parallel to longest room axis.

D. Fit border trim neatly against abutting surfaces.

E. Install units after above-ceiling work is complete.

F. Install acoustical unit level, in uniform plane, and free from twist, warp, and dents.

G. Cutting Acoustical Units:
   1. Cut to fit irregular grid and perimeter edge trim.
   2. Make field cut edges of same profile as factory edges.
   3. Double cut and field paint exposed reveal edges.

H. Where round obstructions occur, provide preformed closures to match perimeter molding.
I. Lay acoustical insulation for a distance of 48 inches (1 200 mm) either side of acoustical partitions as indicated.
J. Install hold-down clips on each panel to retain panels tight to grid system; comply with fire rating requirements.
K. Install hold-down clips on panels within 20 ft (6 m) of an exterior door.

3.04 ERECTION TOLERANCES

A. Maximum Variation from Flat and Level Surface: 1/8 inch in 10 feet (3 mm in 3 m).
B. Maximum Variation from Plumb of Grid Members Caused by Eccentric Loads: 2 degrees.

3.05 SCHEDULE

A. Public Areas: 48 x 72 inch techstyle acoustical units.
B. Other Areas: 24 x 48 inch (600 x 1 200 mm) mineral acoustical units.

END OF SECTION

SECTION 09 66 23

RESINOUS MATRIX TERRAZZO FLOORING

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. Thin-set epoxy-resin terrazzo flooring and precast cove base.

B. Related Section:

1. Division 07 Section "Joint Sealants" for sealants installed with terrazzo.

1.3 SUBMITTALS

A. Product Data: For each type of product indicated.

B. LEED Submittals:

1. Product Data for Credit MR 4.1 and Credit MR 4.2: For marble and glass chips aggregate documentation indicating percentages by weight of postconsumer and preconsumer recycled content.

a. Include statement that indicates cost for each product having recycled content.

2. Product Data for Credit EQ 4.1: For adhesives, including printed statement of VOC content.

C. Shop Drawings: Include terrazzo installation requirements. Include plans, elevations, sections, component details, and attachments to other work. Show layout of the following:

1. Divider strips.
2. Control-joint strips.
3. Accessory strips.
4. Abrasive strips.
5. Stair treads, risers, and landings.
6. Precast terrazzo jointing and edge configurations.
7. Terrazzo patterns.

D. Samples for Initial Selection: Manufacturer's color plates showing the full range of colors and patterns available for each terrazzo type indicated.

E. Samples for Verification: For each type, material, color, and pattern of terrazzo and accessory required showing the full range of color, texture, and pattern variations expected. Label each terrazzo sample to identify manufacturer's matrix color and aggregate types, sizes, and proportions. Prepare samples of same thickness and from same material to be used for the Work in size indicated below:

1. Terrazzo: 6-inch (150-mm) square Samples.
2. Accessories: 6-inch (150-mm) long Samples of each exposed strip item required.

F. Installer Certificates: Signed by manufacturers certifying that installers comply with requirements.

G. Qualification Data: For qualified Installer of accepted materials

H. Material Certificates: For each type of terrazzo material or product, from manufacturer.

I. Maintenance Data: For terrazzo to include in maintenance manuals.

1.4 QUALITY ASSURANCE

A. Installer Qualifications: A qualified installer who is acceptable to terrazzo manufacturer to install manufacturer's products.

1. Engage an installer who is certified in writing by terrazzo manufacturer as qualified to install manufacturer's products.
2. Engage an installer who has installed similar projects of size and design complexity using methods identical to previous terrazzo work within facility.

B. Source Limitations: Obtain primary terrazzo materials from one source from a single manufacturer. Provide secondary materials including patching and fill material, joint sealant, and repair materials of type and from source recommended by manufacturer of primary materials.

C. Source Limitations for Marble and Glass Chips Aggregates: Obtain each color, grade, type, and variety of granular materials from one source with resources to provide materials of consistent quality in appearance and physical properties.

D. NTMA Standards: Comply with NTMA's "Terrazzo Specifications and Design Guide" and with written recommendations for terrazzo type indicated unless more stringent requirements are specified.

E. Mockups: Build mockups to verify selections made under sample submittals and to demonstrate aesthetic effects and set quality standards for materials and execution.

1. Build mockups for terrazzo including accessories.

a. Size: Minimum 4sq. ft. of typical poured-in-place flooring for each color and pattern in locations directed by Architect..

2. Approved mockups may become part of the completed Work if undisturbed at time of Substantial Completion.

F. Pre-installation Conference: Conduct conference at the Director of the City of Henderson Department of Public Works.

1. Review methods and procedures related to terrazzo including, but not limited to, the following:

    a. Inspect and discuss condition of substrate and other preparatory work performed by other trades.
    b. Review and finalize construction schedule and verify availability of materials, Installer's personnel, equipment, and facilities needed to make progress and avoid delays.
    c. Review special terrazzo designs and patterns.
    d. Review dust-control procedures.
    e. Additional agenda items to be determined.

1.5 DELIVERY, STORAGE, AND HANDLING

A. Deliver materials to Project site in supplier's original wrappings and containers, labeled with sources or manufacturer's name, material or product brand name, and lot number if any.

B. Store materials in their original, undamaged packages and containers, inside a well-ventilated area protected from weather, moisture, soiling, extreme temperatures, and humidity.

1.6 PROJECT CONDITIONS

A. Environmental Limitations: Comply with manufacturer's written instructions for substrate temperature, ambient temperature, moisture, ventilation, and other conditions affecting terrazzo installation.

B. Field Measurements: Verify actual dimensions of construction contiguous with precast terrazzo by field measurements before fabrication.

C. Provide permanent lighting or, if permanent lighting is not in place, simulate permanent lighting conditions during terrazzo installation.

D. Close spaces to traffic during terrazzo application and for not less than 24 hours after application unless manufacturer recommends a longer period.

E. Control and collect dust produced by grinding operations. Protect adjacent construction from detrimental effects of grinding operations.

    1. Provide dustproof partitions and temporary enclosures to limit dust migration and to isolate areas from noise.

PART 2 - PRODUCTS

2.1 EPOXY-RESIN TERRAZZO (TZ-1. TZ-2, TZ-3, TZ-4)

A. Products: Subject to compliance with requirements, [available products that may be incorporated into the Work include, but are not limited to, the following]:
    1. Marbella Flooring, Inc. (951)-674-0408 – Contact Bob Imus
        a. TZ-4 Marbella Flooring Inc.: Pattern/Color to match existing
    2. Key Resin Company: Equivalent to Marbella Flooring Inc. Product.
    3. General Polymers Corporation: Equivalent to Marbella Flooring Inc. Product.

4. Polymerica Incorporated;
5. Or, Approved Equal equivalent to Marbella Flooring Inc. Product.

B. Materials:

1. Flexible Reinforcing Membrane: Manufacturer's resinous membrane for substrate crack preparation and reflective crack reduction.

   a. Reinforcement: Fiberglass scrim.

2. Primer: Manufacturer's product recommended for substrate and use indicated.
3. Epoxy-Resin Matrix: Manufacturer's standard recommended for use indicated and in color required for mix indicated.

   a. Physical Properties without Marble and Glass Chips Aggregate:

      1) Hardness: 60 to 85 per ASTM D 2240, Shore D.
      2) Minimum Tensile Strength: 3000 psi (20.7 MPa) per ASTM D 638 for a 2-inch (51-mm) specimen made using a "C" die per ASTM D 412.
      3) Minimum Compressive Strength: 10,000 psi (6.9 MPa) per ASTM D 695, Specimen B cylinder.
      4) Chemical Resistance: No deleterious effects by contaminants listed below after seven-day immersion at room temperature per ASTM D 1308.

         a) Distilled water.
         b) Mineral water.
         c) Isopropanol.
         d) Ethanol.
         e) 0.025 percent detergent solution.
         f) 1.0 percent soap solution.
         g) 10 percent sodium hydroxide.
         h) 10 percent hydrochloric acid.
         i) 30 percent sulfuric acid.
         j) 5 percent acetic acid.

   b. Physical Properties with Marble and Glass Chip Aggregate: For resin blended with Georgia white marble, ground, grouted, and cured per requirements in NTMA's "Terrazzo Specifications and Design Guide," comply with the following:

      1) Flammability: Self-extinguishing, maximum extent of burning 0.25 inch (6.35 mm) per ASTM D 635.
      2) Thermal Coefficient of Linear Expansion: 0.0025 inch/inch per deg F (0.0025 mm/mm per 0.5556 deg C) for temperature range of minus 12 to plus 140 deg F (minus 24 to plus 60 deg C) per ASTM D 696.

4. Marble and Glass Chip Aggregrate: Complying with NTMA gradation standards for mix indicated and containing no deleterious or foreign matter.

   a. Abrasion and Impact Resistance: Less than 40 percent loss per ASTM C 131.
   b. 24-Hour Absorption Rate: Less than 0.75 percent.
   c. Dust Content: Less than 1.0 percent by weight.
   d. Recycled Content: Provide products with average recycled content such that postconsumer recycled content plus one-half of preconsumer recycled content is not less than manufacturer’s recommended standard.

5. Finishing Grout: Resin based.

C. Terrazzo: Comply with NTMA's "Terrazzo Specifications and Design Guide" and manufacturer's written instructions for matrix and marble-chip proportions and mixing.

1. Formulated Mix Color and Pattern: As selected by Architect from manufacturer's full range.

D. Terrazzo: Comply with NTMA's "Terrazzo Specifications and Design Guide" and manufacturer's written instructions for matrix and marble-chip and aggregate proportions and mixing.

1. Custom Mix Color and Pattern: Match Architect's sample.

2.2 STRIP MATERIALS

A. Thin-Set Divider Strips: Stop and Divider “L” Strips, 16 gauge, 3/8 inch high.

1. Material: Zinc.
2. Top Width: 1/8 inch (3.2 mm).

B. Control-Joint Strips: Separate, double L-type angles, positioned back to back, that match material, thickness, and color of divider strips and in depth required for topping thickness indicated.

C. Accessory Strips: Match divider strip width, material, and color unless otherwise indicated. Use the following types of accessory strips as required to provide a complete installation:

1. Base-bead strips for exposed top edge of terrazzo base.
2. Edge-bead strips for exposed edges of terrazzo.
3. Nosings for terrazzo stair treads and landings.

2.3 MISCELLANEOUS ACCESSORIES

A. Strip Adhesive: Epoxy-resin adhesive recommended by adhesive manufacturer for this use and acceptable to terrazzo manufacturer.

1. Use adhesives that have a VOC content of 70 g/L or less when calculated according to 40 CFR 59, Subpart D (EPA Method 24).

B. Anchoring Devices:

1. Strips: Provide mechanical anchoring devices for strip materials as required for secure attachment to substrate.
2. Precast Terrazzo: Provide mechanical anchoring devices as recommended by fabricator for proper anchorage and support of units for conditions of installation and support.

C. Patching and Fill Material: Terrazzo manufacturer's resinous product approved and recommended by manufacturer for application indicated.

D. Joint Compound: Terrazzo manufacturer's resinous product approved and recommended by manufacturer for application indicated.

E. Cleaner: Chemically neutral cleaner with pH factor between 7 and 10 that is biodegradable, phosphate free, and recommended by sealer manufacturer for use on terrazzo type indicated.

F. Sealer: Tesco Crystal Seal,

Bio-degradable and phosphate free: Slip and stain-resistant penetrating-type sealer that is chemically neutral with pH factor between 7 and 10; does not affect color or physical properties of terrazzo; is bio-degradable and phosphate free; is recommended by sealer manufacturer; and complies with NTMA's "Terrazzo Specifications and Design Guide" for terrazzo type indicated.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Examine substrates and areas, with Installer present, for compliance with requirements for installation tolerances and other conditions affecting performance.

B. Proceed with installation only after unsatisfactory conditions, including levelness tolerances, have been corrected.

3.2 PREPARATION

A. Clean substrates of substances, including oil, grease, and curing compounds, that might impair terrazzo bond. Provide clean, dry, and neutral substrate for terrazzo application.

B. Concrete Slabs:

1. Provide sound concrete surfaces free of laitance, glaze, efflorescence, curing compounds, form-release agents, dust, dirt, grease, oil, and other contaminants incompatible with terrazzo.

    a. Shot-blast surfaces with an apparatus that abrades the concrete surface, contains the dispensed shot within the apparatus, and recirculates the shot by vacuum pickup.
    b. Repair damaged and deteriorated concrete according to terrazzo manufacturer's written recommendations.
    c. Use patching and fill material to fill holes and depressions in substrates according to terrazzo manufacturer's written instructions.

2. Verify that concrete substrates are visibly dry and free of moisture.
3. Moisture Testing:

    a. Test for moisture by anhydrous calcium chloride method according to ASTM F 1869. Proceed with installation only after substrates have maximum moisture-vapor-emission rate of 3 lb of water/1000 sq. ft. 1.36 kg of water/92.9 sq. m in 24 hours.
    b. Test for moisture by relative humidity probe and digital meter method according to ASTM F 2170. Proceed with installation only after substrates have a maximum relative-humidity-measurement reading of 70 to 75 percent in 24 hours.
    c. Test for moisture content by [method recommended in writing by terrazzo manufacturer]. Proceed with installation only after substrates pass testing.

C. Protect other work from dust generated by grinding operations. Control dust to prevent air pollution and comply with environmental protection regulations.

1. Erect and maintain temporary enclosures and other suitable methods to limit dust migration and to ensure adequate ambient temperatures and ventilation conditions during installation.

D. Installation of terrazzo indicates acceptance of surfaces and conditions.

3.3 EPOXY-RESIN TERRAZZO INSTALLATION

A. General:

1. Comply with NTMA's written recommendations for terrazzo and accessory installation.
2. Place, rough grind, grout, cure grout, fine grind, and finish terrazzo according to manufacturer's written instructions and NTMA's "Terrazzo Specifications and Design Guide."
3. Installation Tolerance: Limit variation in terrazzo surface from level to 1/4 inch in 10 feet (6 mm in 3 m); noncumulative.
4. Ensure that matrix components and fluids from grinding operations do not stain terrazzo by reacting with divider and control-joint strips.
5. Delay fine grinding until heavy trade work is complete and construction traffic through area is restricted.

B. Thickness: 3/8 inch (9.5 mm) finished thickness.

C. Flexible Reinforcing Membrane:

1. Prepare and pre-fill substrate cracks with membrane material.
2. Install membrane to produce full substrate coverage in areas to receive terrazzo.
3. Reinforce membrane with fiberglass scrim.
4. Prepare membrane according to manufacturer's written instructions before applying substrate primer.

D. Primer: Apply to terrazzo substrates according to manufacturer's written instructions.

E. Strip Materials:

1. Divider and Control-Joint Strips:

a. Locate divider strips in locations indicated.
b. Install control-joint strips [in locations indicated].
c. Install control-joint strips with 1/4-inch (6.4-mm) gap between strips, and install sealant in gap.
d. Install strips in adhesive setting bed without voids below strips, or mechanically anchor strips as required to attach strips to substrate, as recommended by strip manufacturer.

2. Accessory Strips: Install accessory strips as required to provide a complete installation.
3. Abrasive Strips: Install with surface of abrasive strip positioned 1/32 inch (0.8 mm) higher than terrazzo surface.

F. Fine Grinding: Grind with stones 80 grit or finer until all grout is removed from surface. Repeat rough grinding, grout coat, and fine grinding if large voids exist after initial fine grinding. Produce surface with a minimum of 70 percent aggregate exposure.

G. Repair: Remove and replace terrazzo areas that evidence lack of bond with substrate. Cut out terrazzo areas in panels defined by strips and replace to match adjacent terrazzo, or repair panels according to NTMA's written recommendations, as approved by Architect.

3.4 PRECAST TERRAZZO INSTALLATION

A. Install precast terrazzo units using method recommended NTMA and manufacturer unless otherwise indicated.

B. Installation Tolerance: Set units with alignment level and true to dimensions, varying 1/8-inch (3.2-mm) maximum in length, height, or width; noncumulative.

C. Do not install units that are chipped, cracked, discolored, or not properly finished.

3.5 CLEANING AND PROTECTION

A. Cleaning:

1. Remove grinding dust from installation and adjacent areas.
2. Wash surfaces with cleaner according to NTMA's written recommendations and manufacturer's written instructions; rinse surfaces with water and allow to dry thoroughly.

B. Sealing:

1. Seal surfaces according to NTMA's written recommendations.
2. Apply sealer according to sealer manufacturer's written instructions.

C. Protection: Provide final protection and maintain conditions, in a manner acceptable to Installer, that ensure that terrazzo is without damage or deterioration at time of Substantial Completion.

END OF SECTION 096623

SECTION 09 68 13

TILE CARPETING

PART 1 – GENERAL

1.01 SECTION INCLUDES

A. Carpet tile, loose laid with edges and control grid adhered.

B. Removal of existing carpet tile.

C. Matching roll carpet for direct glue installation on base.

1.02 RELATED SECTIONS

A. Section 01732 - Waste Management: Reclamation/Recycling of new carpet tile scrap

B. Section 26 00 00: Electrical floor cover plates with recess for carpet.

1.03 ALLOWANCES

A. Section 01 21 00 - Allowances: Cash allowances affecting this section.

1.04 REFERENCES

A. ASTM D 2859 - Standard Test Method for Ignition Characteristics of Finished Textile Floor Covering Materials; 2004.

B. ASTM E 84 - Standard Test Method for Surface Burning Characteristics of Building Materials; 2005.

C. ASTM E 648 - Standard Test Method for Critical Radiant Flux of Floor-Covering Systems Using a Radiant Heat Energy Source; 2006.

D. CRI 104 - Standard for Installation of Commercial Textile Floorcovering Materials; Carpet and Rug Institute; 2002.

E. CRI (GLA) - Green Label Testing Program - Approved Adhesive Products; www.carpet-rug.org; current edition.

F. CRI (GLC) - Green Label Testing Program - Approved Product Categories for Carpet; www.carpet-rug.org; current edition.

G. CRI (GLP) - Green Label Plus Carpet Testing Program - Approved Products; www.carpet-rug.org; current edition.

H. NFPA 253 - Standard Method of Test for Critical Radiant Flux of Floor Covering Systems Using a Radiant Heat Energy Source; National Fire Protection Association; 2006.

1.05 SUBMITTALS

A. See Section 01 33 00 - Administrative Requirements, for submittal procedures.

B. Shop Drawings: Indicate layout of joints.

C. Product Data: Provide data on specified products, describing physical and performance characteristics; sizes, patterns, colors available, and method of installation.

D. Samples: Submit two carpet tiles illustrating color and pattern design for each carpet color selected.

E. Submit two, 12 inch long samples of edge strip.

F. LEED Report: Submit data documenting VOC content of carpet tile and adhesives; copy of current CRI Approved Products Listing is acceptable.

G. Manufacturer's Installation Instructions: Indicate special procedures.

H. Maintenance Data: Include maintenance procedures, recommended maintenance materials, and suggested schedule for cleaning.

1.06 QUALITY ASSURANCE

A. Manufacturer Qualifications: Company specializing in manufacturing specified carpet tile with minimum three years documented experience.

B. Installer Qualifications: Company specializing in installing carpet with minimum 5 years experience.

1.07 ENVIRONMENTAL REQUIREMENTS

A. Store materials in area of installation for minimum period of 24 hours prior to installation.

1.08 EXTRA MATERIALS

A. See Section 01 60 00 - Product Requirements, for additional provisions.

B. Provide four (4) of carpet tiles of each color and pattern selected.

PART 2 – PRODUCTS

2.01 MANUFACTURERS

A. Shaw Contract Group; Product: Knit

B. Other Acceptable Manufacturers:
   1 Interface, Inc; www.interfaceinc.com.
   2. Milliken & Company; www.milliken.com.
   3. Substitutions: See Section 01600 - Product Requirements.

2.02 MATERIALS

A. Carpet Tile Type I: Tufted, manufactured in one color dye lot.
   1. Product: Embody manufactured by Shaw Contract Group.
   2. Tile Size: 24 x 24 inch, nominal.
   3. Thickness: .271 inch.
   4. Color: To be selected.
   5. Pattern: # 59414.
   6. Surface Burning Characteristics: Flame spread/Smoke developed index of Class 7, maximum, when tested in accordance with ASTM E 84.

7. Critical Radiant Flux: Minimum of 0.22 watts/sq cm, when tested in accordance with ASTM E 648 or NFPA 253.
8. Surface Flammability Ignition: Pass ASTM D 2859 (the "pill test").
9. VOC Content: Provide CRI Green Label Plus certified product; in lieu of labeling, independent test report showing compliance is acceptable.
10. Static Control Fiber: Permanent Conductive Fiber.
11. Max. Electrostatic Charge: 3 Kv. at 20 percent relative humidity.
12. Dye Method: 70% solution dyed, 30% space dyed.
13. Gage: 1/10 inch.
14. Stitches: 9.00 per inch.
15. Average Yarn Weight: 22 oz/sq. yd.
16. Fmaling Mode: < 450
17. Warranty: Lifetime High
18. Primary Backing Material: Polypropylene.
19. Secondary Backing Material: Ecoworx.
20. Total Weight: 78 oz/sq yd.

2.03 ACCESSORIES

A. Sub-Floor Filler: White premix latex; type recommended by flooring material manufacturer.

B. Adhesives: Acceptable to carpet manufacturers, compatible with materials being adhered; maximum VOC of 50 g/L; CRI Green Label certified; in lieu of labeled product, independent test report showing compliance is acceptable.

PART 3 – EXECUTION

3.01 EXAMINATION

A. Verify that sub-floor surfaces are smooth and flat within tolerances specified for that type of work and are ready to receive carpet tile.

B. Verify that wall surfaces are smooth and flat within the tolerances specified for that type of work, are dust-free, and are ready to receive carpet tile.

C. Verify that sub-floor surfaces are dust-free and free of substances which would impair bonding of adhesive materials to sub-floor surfaces.

D. Verify that concrete sub-floor surfaces are ready for carpet tile installation by testing for moisture emission rate and alkalinity; obtain instructions if test results are not within limits recommended by carpet tile manufacturer and adhesive materials manufacturer.

E. Verify that concrete sub-floor surfaces are ready for carpet tile installation by testing for moisture emission rate and alkalinity; obtain instructions if test results are not within the following limits:
   1. Moisture emission rate: Not greater than 3 lb per 1000 sq ft (7.1 kg per 100 sq m) per 24 hours when tested using calcium chloride moisture test kit for 72 hours.
   2. Alkalinity: pH range of 5-9.

F. Verify that required floor-mounted utilities are in correct location.

3.02 PREPARATION

A. Remove existing carpet tile.

B. Remove sub-floor ridges and bumps. Fill minor or local low spots, cracks, joints, holes, and other defects with sub-floor filler.

C. Apply, trowel, and float filler to achieve smooth, flat, hard surface. Prohibit traffic until filler is cured.

D. Vacuum clean substrate.

3.03 INSTALLATION

A. Install carpet tile in accordance with manufacturer's instructions and CRI 104.

B. Blend carpet from different cartons to ensure minimal variation in color match.

C. Cut carpet tile clean. Fit carpet tight to intersection with vertical surfaces without gaps.

D. Lay carpet tile in square pattern, with pile direction parallel to next unit, set parallel to building lines.

E. Locate change of color or pattern between rooms under door centerline.

F. Adhere carpet tile to substrate along centerline of rooms, at perimeter of rooms, where tiles are cut, and at 15 foot (4.5 m) intervals throughout rooms. Lay remainder of tile dry over substrate.

G. Adhere carpet tile as base finish up vertical surfaces to form base. Terminate top of base with cap strip.

H. Trim carpet tile neatly at walls and around interruptions.

I. Complete installation of edge strips, concealing exposed edges.

3.04 INSTALLATION ON STAIRS

A. Use one piece of carpet for each tread and the riser below. Apply seam adhesive to all cut edges.

B. Lay carpet with pile direction in the length of the stair.

C. Adhere carpet tight to stair treads and risers.

3.05 CLEANING

A. Remove excess adhesive without damage, from floor, base, and wall surfaces.

B. Clean and vacuum carpet surfaces.

END OF SECTION

SECTION 09 72 00

WALL COVERINGS

PART 1 GENERAL

1.01 SECTION INCLUDES

A. Surface preparation and prime painting.

B. Wall covering and borders.

1.02 RELATED SECTIONS

A. Section 09 29 00 - Gypsum Board Wall substrate.

1.03 ALLOWANCES

A. See Section 01 21 00 - Allowances, for additional requirements.

B. Allowance includes purchase and delivery only.

1.04 REFERENCES

A. ASTM E 84 - Standard Test Method for Surface Burning Characteristics of Building Materials; 2005.

B. ASTM F 793 - Standard Classification of Wallcovering by Durability Characteristics; 2005.

C. FS L-P-1040 - Plastic Sheets and Strips (Polyvinyl Fluoride); Federal Specifications and Standards; Revision B, 1977.

1.05 SUBMITTALS

A. See Section 01 33 00 - Administrative Requirements, for submittal procedures.

B. Product Data: Provide data on wall covering and adhesive.

C. Shop Drawings: Indicate wall elevations with seaming layout.

D. Samples: Submit two samples of wall covering, 12 x 12 inch (300 x 300 mm) in size illustrating color, finish, and texture.

E. Test Reports: Indicate verification of flame and smoke ratings, when tested by UL.

F. Manufacturer's Installation Instructions: Indicate special procedures.

G. Maintenance Data: Submit data on cleaning, touch-up, and repair of covered surfaces.

1.06 QUALITY ASSURANCE

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

B. Installer Qualifications: Company specializing in performing the type of work specified in this section with minimum of three years of experience.

1.07 MOCK-UP

A. Provide a sample panel illustrating installed wall covering and joint seaming technique.

B. Locate where directed.

C. Mock-up may remain as part of the Work.

1.08 DELIVERY, STORAGE, AND PROTECTION

A. Inspect roll materials at arrival on site, to verify acceptability.

B. Protect packaged adhesive from temperature cycling and cold temperatures.

C. Do not store roll goods on end.

1.09 ENVIRONMENTAL REQUIREMENTS

A. Do not apply materials when surface and ambient temperatures are outside the temperature ranges required by the adhesive or wall covering product manufacturer.

B. Maintain these conditions 24 hours before, during, and after installation of adhesive and wall covering.

C. Provide lighting level of 80 ft candles (860 lx) measured mid-height at substrate surfaces.

1.10 EXTRA MATERIALS

A. See Section 01600 - Product Requirements, for additional provisions.

B. Supply 25 linear feet (8 linear m) of each color and pattern of wall covering; store where directed.

C. Package and label each roll by manufacturer, color and pattern, and destination room number.

PART 2 PRODUCTS

2.01 BASE BID MANUFACTURER

A. Maharam, www.maharam.com. Phone: 800.645.3943

Product# 394001

B. Other Acceptable Manufacturers:
   1. Knoll Textile: www.knoll.com
   2 Substitutions: See Section 01600 - Product Requirements.

2.02 MATERIALS

A. Requirements for All Wall Coverings:
   1. Surface Burning Characteristics: Flame spread/Smoke developed index of 25/50, maximum, when tested in accordance with ASTM E 84.

B. Wall Covering: Conforming to the following:
   1. Total Thickness: _____ mil.
   2. Total Weight: 21 oz/sq yd.
   3. Backing: Polyester/Cotton Onsaburg, Type 2
   4. Roll Width: 52 inches.
   5. Color: To be selected.
   6. Pattern: whirlwind 394001
   7. Content: 95% vinyl, 5% polyester.

C. Adhesive: Type recommended by wall covering manufacturer to suit application to substrate.

D. Termination Trim: Extruded plastic, clear.

E. Substrate Filler: As recommended by adhesive and wall covering manufacturers; compatible with substrate.

F. Substrate Primer and Sealer: Alkyd enamel type.

PART 3 EXECUTION

3.01 EXAMINATION

A. Verify that substrate surfaces are prime painted and ready to receive work, and conform to requirements of the wall covering manufacturer.

B. Measure moisture content of surfaces using an electronic moisture meter. Do not apply wall coverings if moisture content of substrate exceeds level recommended by wall covering manufacturer.

C. Verify flatness tolerance of surfaces does not vary more than 1/8 inch in 10 feet (3 mm in 3 m) nor vary at a rate greater than 1/16 inch/ft (1.5 mm/300 mm).

3.02 PREPARATION

A. Fill cracks in substrate and smooth irregularities with filler; sand smooth.

B. Wash impervious surfaces with tetra-sodium phosphate, rinse and neutralize; wipe dry.

C. Surface Appurtenances: Remove or mask electrical plates, hardware, light fixture trim, escutcheons, and fittings prior to preparing surfaces or finishing.

D. Surfaces: Correct defects and clean surfaces that affect work of this section. Remove existing coatings that exhibit loose surface defects.

E. Marks: Seal with shellac those that may bleed through surface finishes.

F. Apply one coat of primer sealer to substrate surfaces. Allow to dry. Lightly sand smooth.

G. Vacuum clean surfaces free of loose particles.

3.03 INSTALLATION

A. Apply adhesive and wall covering in accordance with manufacturer's instructions.

B. Apply adhesive to wall surface immediately prior to application of wall covering. Let contact adhesive set tack free.

C. Use wall covering in roll number sequence.

D. Razor trim edges on flat work table. Do not razor cut on gypsum board surfaces.

E. Apply wall covering smooth, without wrinkles, gaps or overlaps. Eliminate air pockets and ensure full bond to substrate surface. Butt edges tightly.

F. Horizontal seams are not acceptable.

G. Do not seam within 2 inches (50 mm) of internal corners or within 6 inches (150 mm) of external corners.

H. Install wall covering before installation of bases and items attached to or spaced slightly from wall surface.

I. Do not install wall covering more than 1/4 inch (6 mm) below top of resilient base.

J. Cover spaces above and below windows, above doors, in pattern sequence from roll.

K. Apply wall covering to electrical wall plates prior to replacing.

L. Wall covering is required behind fin tube cabinets.

M. Where wall covering tucks into reveals, or metal wallboard or plaster stops, apply with contact adhesive within 6 inches (150 mm) of wall covering termination. Ensure full contact bond.

N. Install termination trim.

O. Remove excess adhesive while wet from seam before proceeding to next wall covering sheet. Wipe clean with dry cloth.

3.04 CLEANING

A. Clean wall coverings of excess adhesive, dust, dirt, and other contaminants.

B. Reinstall wall plates and accessories removed prior to work of this section.

3.05 PROTECTION OF FINISHED WORK

A. Do not permit construction activities at or near finished wall covering areas.

END OF SECTION

Product# 394001

B. Other Acceptable Manufacturers:
   1. Knoll Textile: www.knoll.com
   2 Substitutions: See Section 01600 - Product Requirements.

2.02 MATERIALS

A. Requirements for All Wall Coverings:
   1. Surface Burning Characteristics: Flame spread/Smoke developed index of 25/50, maximum, when tested in accordance with ASTM E 84.

B. Wall Covering: Conforming to the following:
   1. Total Thickness: _____ mil.
   2. Total Weight: 21 oz/sq yd.
   3. Backing: Polyester/Cotton Onsaburg, Type 2
   4. Roll Width: 52 inches.
   5. Color: To be selected.
   6. Pattern: whirlwind 394001
   7. Content: 95% vinyl, 5% polyester.

C. Adhesive: Type recommended by wall covering manufacturer to suit application to substrate.

D. Termination Trim: Extruded plastic, clear.

E. Substrate Filler: As recommended by adhesive and wall covering manufacturers; compatible with substrate.

F. Substrate Primer and Sealer: Alkyd enamel type.

SECTION 09 90 00

PAINTING & COATING

PARTS 1 – GENERAL

1.01 SUMMARY:

A. Section Includes: Painting and finishing of all interior and exterior items and surfaces, unless otherwise indicated or listed under exclusions below:
   1. Paint all exposed surfaces, except as otherwise indicated, whether or not colors are designated. Include field painting of exposed exterior and interior plumbing, mechanical and electrical work, except as indicated below. .
   2. Paint exterior stucco where indicated on Drawings.

B. Work Included:
   1. The intent and requirements of this Section is that all work, items and surfaces which are normally painted and finished in a building of this type and quality, shall be so included in this contract, whether or not said work, item or surface is specifically called out and included in the schedules and notes on the drawings, or is, or is not, specifically mentioned in these specifications.

C. The following general categories of work and items that are included under other sections shall not be a part of this section:
   1. Shop prime painting of structural and miscellaneous iron or steel.
   2. Shop prime painting of hollow metal work.
   3. Shop finished items.

D. The Room Finish Schedules indicated on the drawings indicates the location of interior room surfaces to be painted or finished. The schedule indications are general and do not necessarily define the detail requirements. Include all detailed refinements and further instructions as may be given for the required complete finishing of all spaces and rooms.

1.02 SUBMITTALS:

A. Product Data: Submit complete manufacturer's descriptive literature and specifications in accordance with the provisions of Section 01 30 00.
   1. Materials List: Submit complete lists of materials proposed for use, giving the manufacturer's name, catalog number, and catalog cut for each item when applicable. When required, provide a list of paint and coating materials proposed for use, which equates such materials with the design-basis products specified.

B. Samples: In accordance with provisions of Section 01300, submit, on 8-1/2 inch by 11 inch hardboard, samples of each color, gloss, texture and material selected by the Architect from standard colors available for the coatings required.
   1. For natural and stained finishes, provide sample on each type and quality of wood used on the project.

C. Manufacturer's Instructions: Submit the manufacturer's current recommended methods of installation, including relevant limitations, safety and environmental cautions, application rates, and composition analysis

1.03 QUALITY ASSURANCE:

A. Regulatory Requirements: Comply with applicable codes and regulations of governmental agencies having jurisdiction including those having jurisdiction over airborne emissions and industrial waste disposal. Where those requirements conflict with this Specification, comply with the more stringent provisions. Regulatory changes may affect the formulation, availability, or use of specified coatings. Confirm availability of coatings to be used prior to job going out to bid and before start of painting project.
   a. Comply with the current applicable regulations of the California Air Resources Board (CARB) and the Environmental Protection Agency (EPA).
   b. Comply with South Coast Air Quality Management District (SCAQMD) Rule 1113. A copy of this regulation can be obtained from http://www.aqmd.gov/rules/reg/reg11/r1113.pdf.

B. Field Sample: When and as directed by the Architect, apply one complete coating system for each color, gloss and texture required. When approved, the sample panel areas will be deemed incorporated into the Work and will serve as the standards by which the subsequent Work of this Section will be judged.

1.04 DELIVERY, STORAGE, AND HANDLING:

A. Storage and Protection: Use all means necessary to protect the materials of this Section before, during, and after installation.

B. Deliver materials to job site in new, original, and unopened containers bearing manufacturer's name and trade name. Store where directed in accordance with manufacturer's instructions.

1.05 PROJECT CONDITIONS:

A. Do not apply exterior materials during fog, rain or mist, or when inclement weather is expected within the dry time specified by the manufacturer. No exterior or interior painting shall be done until the surfaces are thoroughly dry and cured. Do not apply paint when temperature is below 50° F. Avoid painting surfaces when exposed to direct sunlight.

PART 2 - PRODUCTS

2.01 MANUFACTURERS:

A. Manufacturer's catalog names and number of paint types in this Section herein are based on products manufactured or distributed by the Dunn-Edwards Corporation www.dunnedwards.com and are the basis of design against which the Architect will judge equivalency. The quantity of titanium dioxide, the use of clays, aluminum silicate, talc and the purity of acrylic materials are a few of the criteria which will be used by the Architect in determining equivalency of materials.

B. Substitutions: Requests for substitutions will be considered in accordance with provisions of Section 01 60 00 Product Requirements. When submitting request for substitution, provide complete product data specified above under Submittals, for each substitute product.

C. Acceptable Manufacturers
   1. Carboline www.carboline.com
   2. Deft www.deftfinishes.com
   3. Dumond Chemicals www.dumondchemicals.com
   4. Okon www.okoninc.com
   5. Rustoleum www.rustoleumibg.com
   6. Valspar www.valsparwood.com

2.02 MATERIALS:

A. Paints: Provide ready-mixed, except field catalyzed coatings. Pigments shall be fully ground maintaining soft paste consistency, capable of being readily and uniformly dispersed to complete homogeneous mixture. Paints shall have good flowing and brushing properties and be capable of drying or curing free of streaks and sags.

B. Accessory Materials: Linseed oil, shellac, solvents, and other materials not specified but required to achieve required finishes shall be of high quality and approved by manufacturer.

C. Colors shall be selected from color chip samples provided by manufacturer of paint system approved for use. Match approved samples for color, texture and coverage.

D. Aromatic Compounds: Paints and coatings shall not contain more than 1.0 percent by weight of total aromatic compounds (hydrocarbon compounds containing one or more benzene rings).

E. Restricted Components: Paints and coatings shall not contain any of the following.

1. Acrolein.
2. Acrylonitrile.
3. Antimony.
4. Benzene.
5. Butyl benzyl phthalate.
6. Cadmium.
7. Di (2-ethylhexyl) phthalate.
8. Di-n-butyl phthalate.
9. Di-n-octyl phthalate.
10. 1,2-dichlorobenzene.
11. Diethyl phthalate.
12. Dimethyl phthalate.
13. Ethylbenzene.
14. Ethylene Glycol.
15. Formaldehyde.
16. Hexavalent chromium.
17. Isophorone.
18. Lead.
19. Mercury.
20. Methyl ethyl ketone.
21. Methyl isobutyl ketone.
22. Methylene chloride.
23. Naphthalene.
24. Toluene (methylbenzene).
25. 1,1,1-trichloroethane.
26. Vinyl chloride.

2.04 MIXES:

A. Mix, prepare, and store painting and finishing materials in accordance with manufacturer's directions.

PART 3 – EXECUTION

3.01 EXAMINATION:

A. Examine surfaces to be painted before beginning painting work. Work of other trades that has been left or installed in a condition not suitable to receive paint, stain other specified finish shall be repaired or corrected by the applicable trade before painting. Painting of defective or unsuitable surface implies acceptance of the surfaces.

B. Beware of a condition known as critical lighting. This condition causes shadows that accentuate even the slightest surface variations. A pigmented sealer will provide tooth for succeeding decorative coating, but "does not" equalize smoothness or surface texture. Any corrective action to drywall must be done by the drywall contractor prior to decorating.

3.02 PROTECTION:

A. Protect previously installed work and materials, which may be affected by Work of this Section.
   1. Protect prefinished surfaces, lawns, shrubbery and adjacent surfaces against paint and damage.
   2. Furnish sufficient drop cloths, shields, and protective equipment to prevent spray or splatter from fouling surfaces not being painted.
   3. Protect surfaces, equipment, and fixtures from damage resulting from use of fixed, movable and hanging scaffolding, planking, and staging.

B. Provide wet paint signs, barricades, and other devices required to protect newly finished surfaces. Remove temporary protective wrappings provided by others for protection of their work after completion of painting operations.

3.03 PREPARATION:

A. Perform preparation and cleaning procedures in strict accordance with coating manufacturer's instructions for each substrate condition.

B. Concrete and Masonry: Surfaces shall be dry, clean, and free of dirt, efflorescence, encrustation, and other foreign matter. Glazed surfaces on concrete shall be roughened or etched to uniform texture.

C. Ferrous Metal: Clean oil, grease, and foreign matter with solvent. Surface shall be primed within 3 hours after preparation.

D. Sand and scrape metal to remove loose primer and rust.

E. Non-Ferrous Metal: Chemically or solvent clean and then treat with an etching-type solution if recommended by the finish manufacturer. Cleaned and retreated Non-Ferrous Metal shall be primed the same day that cleaning has been performed.

F. Wood Surfaces: Remove dust, grit and foreign matter. Sand surfaces and dust clean. Spot coat knots, pitch streaks, and sappy section with pigmented stain sealer when surfaces are to be painted. Fill nail holes, cracks and other defects after priming and spot prime repairs when fully cured.

G. Remove hardware and accessories, machined surfaces, plates, lighting fixtures and similar items in place and not-to-be-finish painted, or provide surface-applied protection. Reinstall removed items upon completion of work in each area.

H. Existing surfaces to be recoated shall be thoroughly cleaned and deglossed by sanding or other means prior to painting. Patched and bare areas shall be spot primed with same primer as specified for new work.

I. Thoroughly backpaint all surfaces of exterior and interior finish lumber and millwork, including doors and window frames, trim, cabinetwork, etc., which will be concealed after installation. Backpaint items to be painted or enameled with the priming coat. Use a clear sealer for backpriming where transparent finish is required.

3.03 PREPARATION:

J. Bare and covered pipes, ducts, hangers, exposed steel and ironwork, and primed metal surfaces of equipment installed under mechanical and electrical work shall be cleaned prior to priming.

K. Preparation of other surfaces shall be performed following specific recommendations of the coatings manufacturer.

L. Bond breakers and curing agents shall be removed and the surface cleaned before primers, sealers or finish paints can be applied.

M. All drywall surfaces shall be completely dry and dust free before painting. Skim coated drywall shall be sealed with a sealer recommended by the paint manufacturer for this surface. Use the appropriate light or medium tack masking tape.

3.04 APPLICATION:

A. Apply painting and finishing materials in accordance with the manufacturer's recommendations.
   1. The number of coats specified is the minimum that shall be applied. Apply additional coats when undercoats, stains or other conditions show through final paint coat, until paint film is of uniform finish, color and appearance.

B. Apply each material at not less than the manufacturer's recommended spreading rate:

C. Apply prime coat to surface which is required to be painted or finished.

D. Finish exterior doors on tops, bottoms, and edges same as exterior faces, after fitting.

E. Sand lightly and dust clean between succeeding coats.

3.05 CLEANING, TOUCH-UP AND REFINISHING:

A. Carefully remove all spattering, spots and blemishes caused by work under this section from surfaces throughout the project.

B. Upon completion of painting work remove all rubbish, paint cans, and accumulated materials resulting from work in each space or room. All areas shall be left in a clean, orderly condition.

C. Runs, sags, misses, holidays, stains and other defects in the painted surfaces, including inadequate coverage and mil thickness shall be satisfactorily touched up, or refinished, or repainted as necessary.

3.06 FINISH SCHEDULE

A. Apply the following finishes to the surfaces specified on the finish schedule or on the drawings. Apply all materials in accordance with manufacturer’s instructions on properly prepared surfaces and foundation coats. All intermediate undercoats must be tinted to approximate the final color.
   1. Architect will issue a color schedule prior to start of painting to designate the various

colors and locations required for the work.

B. Exterior Systems:

1. Masonry Concrete Tilt-up

a. Flat - 100% Acrylic

First Coat	EFF-STOP Select Masonry Primer/Sealer (ESSL00)
Second Coat	SPARTASHIELD Exterior Flat Paint (SSHL10)
Third Coat	SPARTASHIELD Exterior Flat Paint (SSHL10)

b. Velvet - 100% Acrylic

First Coat	EFF-STOP Select Masonry Primer/Sealer (ESSL00)
Second Coat	SPARTASHIELD Exterior Velvet Paint (SSHL20)
Third Coat	SPARTASHIELD Exterior Velvet Paint (SSHL20)

c. Eggshell - 100% Acrylic

First Coat	EFF-STOP Select Masonry Primer/Sealer (ESSL00)
Second Coat	SPARTASHIELD, Exterior Eggshell Paint (SSHL30)
Third Coat	SPARTASHIELD, Exterior Eggshell Paint (SSHL30)

e. Low Sheen - 100% Acrylic

First Coat	Eff-Stop Select Masonry Primer/Sealer (ESSL00)
Second Coat	SPARTASHIELD, Exterior Low Sheen Paint (SSHL40)
Third Coat	SPARTASHIELD, Exterior Low Sheen Paint (SSHL40)

f. Semi-Gloss or Gloss - 100 % Acrylic

First Coat	Eff-Stop Select Masonry Primer/Sealer (ESSL00)
Second Coat	SPARTASHIELD, Exterior Semi-Gloss or Gloss Paint (SSHL50) or (SSHL60)
Third Coat	SPARTASHIELD, Exterior Semi-Gloss or Gloss Paint (SSHL50) or (SSHL60)

2. Masonry and Stucco

a. Flat – Modified Copolymer / 100% Acrylic

First Coat	FLEX-PRIME Select, Flexible Crack-Resistant Primer (FPSL00)
Second Coat	SPARTASHIELD Exterior Flat Paint (SSHL10)
Third Coat	SPARTASHIELD Exterior Flat Paint (SSHL10)

b. Velvet Sheen - Modified Copolymer / 100% Acrylic

First Coat	FLEX-PRIME Select, Flexible Crack-Resistant Primer (FPSL00)
Second Coat	SPARTASHIELD Exterior Velvet Paint (SSHL20)
Third Coat	SPARTASHIELD Exterior Velvet Paint (SSHL20)

c. Eggshell - Modified Copolymer / 100% Acrylic

First Coat	FLEX-PRIME Select, Flexible Crack-Resistant Primer (FPSL00)
Second Coat	SPARTASHIELD, Exterior Eggshell Paint (SSHL30)
Third Coat	SPARTASHIELD, Exterior Eggshell Paint (SSHL30)

d. Low Sheen – Modified Copolymer / 100% Acrylic

First Coat	FLEX-PRIME Select, Flexible Crack-Resistant Primer (FPSL00)
Second Coat	SPARTASHIELD, Exterior Low Sheen Paint (SSHL40)
Third Coat	SPARTASHIELD, Exterior Low Sheen Paint (SSHL40)

e. Semi-Gloss or Gloss – Modified Copolymer / 100% Acrylic

First Coat	FLEX-PRIME Select, Flexible Crack-Resistant Primer (FPSL00)
Second Coat	SPARTASHIELD, Exterior Semi-Gloss or Gloss Paint (SSHL50) or (SSHL60)
Third Coat	SPARTASHIELD, Exterior Semi-Gloss or Gloss Paint (SSHL50) or (SSHL60)

f. Elastomeric - Modified Acrylic

First Coat	ELAST-O-KOTE Surface Conditioner
Second Coat	ELAST-O-KOTE 5, High Build Elastomeric Waterproofing
Third Coat	ELAST-O-KOTE 5, High Build Elastomeric Waterproofing

g. Graffiti Barrier - Unpainted Surface - Waterborne Urethane/Waterborne Polyurethane

First Coat	DUMOND CHEMICAL, WATCH DOG CPU, Masonry Primer/Sealer
Second Coat	DUMOND CHEMICAL, WATCH DOG CPU-747, Polyurethane

h. Graffiti Barrier - Painted Surface - Waterborne Polyurethane

One Coat DUMOND CHEMICAL, WATCH DOG CPU-747, Polyurethane

3. Exterior Gypsum Board

a. Flat – 100% Acrylic

First Coat	ULTRA-GRIP Premium, Multi Purpose Primer (UGPR00-1)
Second Coat	SPARTASHIELD Exterior Flat Paint (SSHL10)
Third Coat	SPARTASHIELD Exterior Flat Paint (SSHL10)

b. Velvet Sheen – 100% Acrylic

First Coat	ULTRA-GRIP Premium, Multi Purpose Primer (UGPR00-1)
Second Coat	SPARTASHIELD Exterior Velvet Paint (SSHL20)
Third Coat	SPARTASHIELD Exterior Velvet Paint (SSHL20)

c. Eggshell – 100% Acrylic

First Coat	ULTRA-GRIP Premium, Multi Purpose Primer (UGPR00-1)
Second Coat	SPARTASHIELD, Exterior Eggshell Paint (SSHL30)
Third Coat	SPARTASHIELD, Exterior Eggshell Paint (SSHL30)

d. Low Sheen – 100% Acrylic

First Coat	ULTRA-GRIP Premium, Multi Purpose Primer (UGPR00-1)
Second Coat	SPARTASHIELD, Exterior Low Sheen Paint (SSHL40)
Third Coat	SPARTASHIELD, Exterior Low Sheen Paint (SSHL40)

e. Semi-Gloss or Gloss – 100% Acrylic

First Coat	ULTRA-GRIP Premium, Multi Purpose Primer (UGPR00-1)
Second Coat	SPARTASHIELD, Exterior Semi-Gloss or Gloss Paint (SSHL50) or (SSHL60)
Third Coat	SPARTASHIELD, Exterior Semi-Gloss or Gloss Paint (SSHL50) or (SSHL60)

4. Concrete Block – CMU

a. Flat –Acrylic Copolymer / 100% Acrylic

First Coat	SMOOTH BLOCFIL SELECT CONCRETE BLOCK FILLER (SBSL00)
Second Coat	SPARTASHIELD Exterior Flat Paint (SSHL10)
Third Coat	SPARTASHIELD Exterior Flat Paint (SSHL10)

b. Velvet - Acrylic Copolymer / Acrylic

First Coat	SMOOTH BLOCFIL SELECT CONCRETE BLOCK FILLER (SBSL00)
Second Coat	SPARTASHIELD Exterior Velvet Paint (SSHL20)
Third Coat	SPARTASHIELD Exterior Velvet Paint (SSHL20)

c. Eggshell - Acrylic Copolymer / Acrylic

First Coat	SMOOTH BLOCFIL SELECT CONCRETE BLOCK FILLER (SBSL00)
Second Coat	SPARTASHIELD, Exterior Eggshell Paint (SSHL30)
Third Coat	SPARTASHIELD, Exterior Eggshell Paint (SSHL30)

d. Low Sheen – Acrylic Copolymer / Acrylic

First Coat	SMOOTH BLOCFIL SELECT CONCRETE BLOCK FILLER (SBSL00)
Second Coat	SPARTASHIELD, Exterior Low Sheen Paint (SSHL40)
Third Coat	SPARTASHIELD, Exterior Low Sheen Paint (SSHL40)

e. Semi-Gloss or Gloss – Acrylic Copolymer / Acrylic

First Coat	SMOOTH BLOCFIL SELECT CONCRETE BLOCK FILLER (SBSL00)
Second Coat	SPARTASHIELD, Exterior Semi-Gloss or Gloss Paint (SSHL50) or (SSHL60)
Third Coat	SPARTASHIELD, Exterior Semi-Gloss or Gloss Paint (SSHL50) or (SSHL60)

f. Graffiti Barrier - Unpainted Surface - Waterborne Urethane/Waterborne Polyurethane

First Coat	DUMOND CHEMICAL, WATCH DOG CPU, Masonry Primer/Sealer
Second Coat	DUMOND CHEMICAL, WATCH DOG CPU-747, Polyurethane 09 90 00-9

g. Graffiti Barrier - Painted Surface - Waterborne Polyurethane

One Coat DUMOND CHEMICAL, WATCH DOG CPU-747, Polyurethane

5. Wood – Paint Finish

a. Flat – 100% Acrylic

First Coat	EZ-PRIME Premium, Exterior Wood Primer (EZPR00)
Second Coat	SPARTASHIELD Exterior Flat Paint (SSHL10)
Third Coat	SPARTASHIELD Exterior Flat Paint (SSHL10)

b. Velvet - 100% Acrylic

First Coat	EZ-PRIME Premium, Exterior Wood Primer (EZPR00)
Second Coat	SPARTASHIELD Exterior Velvet Paint (SSHL20)
Third Coat	SPARTASHIELD Exterior Velvet Paint (SSHL20)

c. Eggshell - 100% Acrylic

First Coat	EZ-PRIME Premium, Exterior Wood Primer (EZPR00)
Second Coat	SPARTASHIELD, Exterior Eggshell Paint (SSHL30)
Third Coat	SPARTASHIELD, Exterior Eggshell Paint (SSHL30)

d. Low Sheen – 100% Acrylic

First Coat	EZ-PRIME Premium, Exterior Wood Primer (EZPR00)
Second Coat	SPARTASHIELD, Exterior Low Sheen Paint (SSHL40)
Third Coat	SPARTASHIELD, Exterior Low Sheen Paint (SSHL40)

e. Semi-Gloss or Gloss – 100% Acrylic

First Coat	EZ-PRIME Premium, Exterior Wood Primer (EZPR00)
Second Coat	SPARTASHIELD, Exterior Semi-Gloss or Gloss Paint (SSHL50) or (SSHL60)
Third Coat	SPARTASHIELD, Exterior Semi-Gloss or Gloss Paint (SSHL50) or (SSHL60)

f. Graffiti Barrier - Painted Surface - Waterborne Urethane/Waterborne Polyurethane

One Coat DUMOND CHEMICAL, WATCH DOG CPU-747, Polyurethane

6. Wood Rough Sawn – Stain Finish – Opaque:

Two Coats SPARTASHIELD Exterior Flat Paint (SSHL10)

7. Wood – Stain Finish – Semi-Transparent:

Two Coats OKON WEATHER PRO, 100% Acrylic Semi-Transparent Stain (WPT3)

8. Ferrous Metal

a. Flat – Alkyd Emulsion / 100% Acrylic

First Coat	BLOC-RUST Premium, Rust Preventative Metal Primer (BRPR00-1 series)
Second Coat	SPARTASHIELD Exterior Flat Paint (SSHL10)
Third Coat	SPARTASHIELD Exterior Flat Paint (SSHL10)

b. Velvet – Alkyd Emulsion / 100% Acrylic

First Coat	BLOC-RUST Premium, Rust Preventative Metal Primer (BRPR00-1 series)

Second Coat	SPARTASHIELD Exterior Velvet Paint (SSHL20)
Third Coat	SPARTASHIELD Exterior Velvet Paint (SSHL20)

c. Eggshell – Alkyd Emulsion / 100% Acrylic

First Coat	BLOC-RUST Premium, Rust Preventative Metal Primer (BRPR00-1 series)
Second Coat	SPARTASHIELD, Exterior Eggshell Paint (SSHL30)
Third Coat	SPARTASHIELD, Exterior Eggshell Paint (SSHL30)

d. Low Sheen - Alkyd Emulsion / 100% Acrylic

First Coat	BLOC-RUST Premium, Rust Preventative Metal Primer (BRPR00-1 series)
Second Coat	SPARTASHIELD, Exterior Low Sheen Paint (SSHL40)
Third Coat	SPARTASHIELD, Exterior Low Sheen Paint (SSHL40)

e. Semi-Gloss – Alkyd Emulsion / 100% Acrylic

First Coat	BLOC-RUST Premium, Rust Preventative Metal Primer (BRPR00-1 series)
Second Coat	SYN-LUSTRO, Rust Preventive 100% Acrylic Semi-Gloss Paint (W-9)
Third Coat	SYN-LUSTRO, Rust Preventive 100% Acrylic Semi-Gloss Paint (W-9)

B. Exterior Systems: (Continued)

8. Ferrous Metal (Continued)

f. Semi-Gloss – Modified Aluminum Epoxy Mastic / Aliphatic Acrylic Polyurethane

First Coat	CARBOLINE, CARBOMASTIC, Epoxy 15
Second Coat	CARBOLINE, CARBOTHANE, Acrylic Polyurethane 133 Series
Third Coat	CARBOLINE, CARBOTHANE, Acrylic Polyurethane 133 Series

g. Gloss – Alkyd Emulsion / 100% Acrylic

First Coat	BLOC-RUST Premium, Rust Preventative Metal Primer (BRPR00-1 series)
Second Coat	SYN-LUSTRO, Rust Preventive 100% Acrylic Gloss Paint (W-10)
Third Coat	SYN-LUSTRO, Rust Preventive 100% Acrylic Gloss Paint (W-10)

h. Gloss - Modified Aluminum Epoxy Mastic / Aliphatic Acrylic Polyurethane

First Coat	CARBOLINE, CARBOMASTIC, Epoxy 15
Second Coat	CARBOLINE, CARBOTHANE, Acrylic Polyurethane 134 Series
Third Coat	CARBOLINE, CARBOTHANE, Acrylic Polyurethane 134 Series

i. Graffiti Barrier - Painted Surface - Waterborne Urethane/Waterborne Polyurethane

One Coat DUMOND CHEMICAL, WATCH DOG CPU-747, Polyurethane

9. Non-Ferrous Metal

a. Flat – Alkyd / 100% Acrylic

Pretreatment	SUPREME CHEMICAL, METAL CLEAN AND ETCH (ME 01)
First Coat	GALV-ALUM Premium, Non Ferrous Metal Primer (GAPR00)
Second Coat	SPARTASHIELD Exterior Flat Paint (SSHL10)
Third Coat	SPARTASHIELD Exterior Flat Paint (SSHL10)

b. Velvet Sheen - Alkyd / 100% Acrylic

Pretreatment	SUPREME CHEMICAL, METAL CLEAN AND ETCH (ME 01)
First Coat	GALV-ALUM Premium, Non Ferrous Metal Primer (GAPR00)
Second Coat	SPARTASHIELD Exterior Velvet Paint (SSHL20)
Third Coat	SPARTASHIELD Exterior Velvet Paint (SSHL20)

c. Eggshell - Alkyd / 100% Acrylic

Pretreatment	SUPREME CHEMICAL, METAL CLEAN AND ETCH (ME 01)
First Coat	GALV-ALUM Premium, Non Ferrous Metal Primer (GAPR00)
Second Coat	SPARTASHIELD, Exterior Eggshell Paint (SSHL30)
Third Coat	SPARTASHIELD, Exterior Eggshell Paint (SSHL30)

d. **Low Sheen - Alkyd / 100% Acrylic** (Existing Exterior/Site Metals)

Pretreatment	SUPREME CHEMICAL, METAL CLEAN AND ETCH (ME 01)
First Coat	GALV-ALUM Premium, Non Ferrous Metal Primer (GAPR00)
Second Coat	SPARTASHIELD, Exterior Low Sheen Paint (SSHL40)
Third Coat	SPARTASHIELD, Exterior Low Sheen Paint (SSHL40)

e. Semi-Gloss – Alkyd / 100% Acrylic (Exterior Metal Doors, factory primed)

Pretreatment	SUPREME CHEMICAL, METAL CLEAN AND ETCH (ME 01)
First Coat	GALV-ALUM Premium, Non Ferrous Metal Primer (GAPR00)
Second Coat	SYN-LUSTRO, Rust Preventive 100% Acrylic Semi-Gloss Paint (W-9)
Third Coat	SYN-LUSTRO, Rust Preventive 100% Acrylic Semi-Gloss Paint (W-9)

f. Semi-Gloss – Modified Aluminum Epoxy Mastic / Aliphatic Polyurethane

Pretreatment	SUPREME CHEMICAL, METAL CLEAN AND ETCH (ME 01)
First Coat	CARBOLINE, CORBOMASTIC EPOXY 15
Second Coat	CARBOLINE, CARBOTHANE, Acrylic Polyurethane 133 Series
Third Coat	CARBOLINE, CARBOTHANE, Acrylic Polyurethane 133 Series

g. Gloss – Alkyd / 100%Acrylic

Pretreatment	SUPREME CHEMICAL, METAL CLEAN AND ETCH (ME 01)
First Coat	GALV-ALUM Premium, Non Ferrous Metal Primer (GAPR00)
Second Coat	SYN-LUSTRO, Rust Preventive 100% Acrylic Gloss Paint (W10)
Third Coat	SYN-LUSTRO, Rust Preventive 100% Acrylic Gloss Paint (W10)

h. Gloss - Modified Aluminum Epoxy Mastic Aliphatic Polyurethane

Pretreatment	SUPREME CHEMICAL, METAL CLEAN AND ETCH (ME 01)
First Coat	CARBOLINE, CARBOLINE, CORBOMASTIC EPOXY 15
Second Coat	CARBOLINE, CARBOTHANE, Acrylic Polyurethane 134 Series
Third Coat	CARBOLINE, CARBOTHANE, Acrylic Polyurethane 134 Series

i. Graffiti Barrier - Painted Surface - Waterborne Urethane/Waterborne Polyurethane

One Coat DUMOND CHEMICAL, WATCH DOG CPU-747, Polyurethane

C. Interior Systems:

1. Gypsum Board

a. Flat - Acrylic Copolymer

First Coat	VINYLASTIC Select, Interior Wall Sealer (VNSL00)
Second Coat	SPARTAWALL, Interior Flat Paint (SWLL10)
Third Coat	SPARTAWALL, Interior Flat Paint (SWLL10)

b. Velvet Sheen – Acrylic Copolymer

First Coat	VINYLASTIC Select, Interior Wall Sealer (VNSL00)
Second Coat	SPARTAWALL, Interior Velvet Sheen Paint (SWLL20)
Third Coat	SPARTAWALL, Interior Velvet Sheen Paint (SWLL20)

c. Eggshell – Acrylic Copolymer / Acrylic

First Coat	VINYLASTIC Select, Interior Wall Sealer (VNSL00)
Second Coat	SPARTAWALL, Interior Eggshell Sheen Paint (SWLL30)
Third Coat	SPARTAWALL, Interior Eggshell Sheen Paint (SWLL30)

d Low Sheen - Acrylic Copolymer / Acrylic

First Coat	VINYLASTIC Select, Interior Wall Sealer (VNSL00)
Second Coat	SPARTAWALL, Interior Low Sheen Paint (SWLL40)
Third Coat	SPARTAWALL, Interior Low Sheen Paint (SWLL40)

e. Semi-Gloss or Gloss – Acrylic Copolymer / Acrylic or 100% Acrylic (Toilet Rooms)

First Coat	VINYLASTIC Select, Interior Wall Sealer (VNSL00)
Second Coat	SPARTAWALL, Interior Semi-Gloss or Gloss Paint (SWLL50 or SSHL60)
Third Coat	SPARTAWALL, Interior Semi-Gloss or Gloss Paint (SWLL50 or SSHL60)

f. Gloss - Waterborne Acrylic / Cycloaliphatic Amine Epoxy

First Coat	CARBOLINE, CARBOCRYLIC, Waterborne Acrylic Bonding Primer 120
Second Coat	CARBOLINE, CARBOGUARD, Epoxy 890
Third Coat	CARBOLINE, CARBOGUARD, Epoxy 890

g. Flat - Zero VOC / Modified Copolymer

First Coat	ECOSHIELD, Low-Order/Zero VOC Interior Latex Primer (W600)

Second Coat	ECOSHIELD, Low-Order/Zero VOC Interior Latex Flat Paint (W601)
Third Coat	ECOSHIELD, Low-Order/Zero VOC Interior Latex Flat Paint (W601)

h. Low Sheen - Zero VOC / Modified Copolymer

First Coat	ECOSHIELD, Low-Order/Zero VOC Interior Latex Primer (W600)
Second Coat	ECOSHIELD, Low-Order/Zero VOC Interior Latex Low Sheen Paint (W 602)
Third Coat	ECOSHIELD, Low-Order/Zero VOC Interior Latex Low Sheen Paint (W 602)

i. Semi-Gloss - Zero VOC / Modified Copolymer / 100% Acrylic

First Coat	ECOSHIELD, Low-Order/Zero VOC Interior Latex Primer (W600)
Second Coat	ECOSHIELD, Low-Order/Zero VOC Interior Latex Semi-Gloss (W 603)
Third Coat	ECOSHIELD, Low-Order/Zero VOC Interior Latex Semi-Gloss (W 603)

j. Gloss - Zero VOC / Acrylic / Epoxy

First Coat	RUSTOLEUM, SIERRA GRIPTEC, Multi-Surface Primer S30
Second Coat	RUSTOLEUM, SIERRA, Industrial Epoxy Enamel S60
Third Coat	RUSTOLEUM, SIERRA, Industrial Epoxy Enamel S60

2. Masonry Concrete Tilt-up / Plaster

a. Flat – 100% Acrylic / Acrylic Copolymer

First Coat	EFF-STOP Select Masonry Primer/Sealer (ESSL00)
Second Coat	SPARTAWALL, Interior Flat Paint (SWLL10)
Third Coat	SPARTAWALL, Interior Flat Paint (SWLL10)

b. Velvet Sheen – 100% Acrylic / Acrylic

First Coat	EFF-STOP Select Masonry Primer/Sealer (ESSL00)
Second Coat	SPARTAWALL, Interior Velvet Sheen Paint (SWLL20)
Third Coat	SPARTAWALL, Interior Velvet Sheen Paint (SWLL20)

c. Eggshell – 100% Acrylic / Acrylic

First Coat	EFF-STOP Select Masonry Primer/Sealer (ESSL00)
Second Coat	SPARTAWALL, Interior Eggshell Sheen Paint (SWLL30)
Third Coat	SPARTAWALL, Interior Eggshell Sheen Paint (SWLL30)

d. Low Sheen – 100% Acrylic / Acrylic

First Coat	EFF-STOP Select Masonry Primer/Sealer (ESSL00)
Second Coat	SPARTAWALL, Interior Low Sheen Paint (SWLL40)
Third Coat	SPARTAWALL, Interior Low Sheen Paint (SWLL40)

e. Semi-Gloss or Gloss – 100% Acrylic / Acrylic or 100% Acrylic

First Coat	EFF-STOP Select Masonry Primer/Sealer (ESSL00)
Second Coat	SPARTAWALL, Interior Semi-Gloss or Gloss Paint (SWLL50 or SSHL60)
Third Coat	SPARTAWALL, Interior Semi-Gloss or Gloss Paint (SWLL50 or SSHL60)

f. Gloss - Waterborne Acrylic / Cycloaliphatic Epoxy

First Coat	CARBOLINE, CARBOCRYLIC, Waterborne Acrylic Bonding Primer 120
Second Coat	CARBOLINE, CARBOGUARD, Epoxy 890
Third Coat	CARBOLINE, CARBOGUARD, Epoxy 890

g. Flat - Zero VOC / Modified Copolymer

First Coat	ECOSHIELD, Low-Order/Zero VOC Int.Latex Primer (W600)
Second Coat	ECOSHIELD, Low-Order/Zero VOC Int. Latex Flat Paint (W 601)
Third Coat	ECOSHIELD, Low-Order/Zero VOC Int. Latex Flat Paint (W 601)

h. Low Sheen - Zero VOC / Modified Copolymer

First Coat	ECOSHIELD, Low-Order/Zero VOC Int. Latex Primer (W 600)
Second Coat	ECOSHIELD, Low-Order/Zero VOC Int. Latex Low Sheen Paint (W 602)
Third Coat	ECOSHIELD, Low-Order/Zero VOC Interior Latex Low Sheen Paint (W 602)

i. Semi-Gloss - Zero VOC / Modified Copolymer / 100% Acrylic

First Coat	ECOSHIELD, Low-Order/Zero VOC Interior Latex Primer (W600)
Second Coat	ECOSHIELD, Low-Order/Zero VOC Interior Latex Semi-Gloss (W 603)
Third Coat	ECOSHIELD, Low-Order/Zero VOC Interior Latex Semi-Gloss (W 603)

j. Gloss - Zero VOC / Acrylic / Epoxy

First Coat	RUSTOLEUM, SIERRA GRIPTEC, Multi-Surface Primer S-30
Second Coat	RUSTOLEUM, SIERRA, Industrial Epoxy Gloss Enamel S60
Third Coat	RUSTOLEUM, SIERRA, Industrial Epoxy Gloss Enamel S60

3. Concrete Block – CMU

a. Flat – Modified Copolymer / Acrylic Copolymer

First Coat	SMOOTH BLOCFIL SELECT CONCRETE BLOCK FILLER (SBSL00)
Second Coat	SPARTAWALL, Interior Flat Paint (SWLL10)
Third Coat	SPARTAWALL, Interior Flat Paint (SWLL10)

b. Velvet Sheen – Modified Copolymer / Acrylic Copolymer

First Coat	SMOOTH BLOCFIL SELECT CONCRETE BLOCK FILLER (SBSL00)
Second Coat	SPARTAWALL, Interior Velvet Sheen Paint (SWLL20)
Third Coat	SPARTAWALL, Interior Velvet Sheen Paint (SWLL20)

c. Eggshell – Modified Copolymer / Acrylic

First Coat	SMOOTH BLOCFIL SELECT CONCRETE BLOCK FILLER (SBSL00)
Second Coat	SPARTAWALL, Interior Eggshell Sheen Paint (SWLL30)
Third Coat	SPARTAWALL, Interior Eggshell Sheen Paint (SWLL30)

d. Low Sheen – Modified Copolymer / Acrylic

First Coat	SMOOTH BLOCFIL SELECT CONCRETE BLOCK FILLER (SBSL00)
Second Coat	SPARTAWALL, Interior Low Sheen Paint (SWLL40)
Third Coat	SPARTAWALL, Interior Low Sheen Paint (SWLL40)

e. Semi-Gloss or Gloss – Modified Copolymer / Acrylic

First Coat	SMOOTH BLOCFIL SELECT CONCRETE BLOCK FILLER (SBSL00)
Second Coat	SPARTAWALL, Interior Semi-Gloss or Gloss Paint (SWLL50 or SSHL60)
Third Coat	SPARTAWALL, Interior Semi-Gloss or Gloss Paint (SWLL50 or SSHL60)

f. Gloss - Waterborne Acrylic / Cycloaliphatic Amine Epoxy

First Coat	CARBOLINE, SANTILE Waterborne Acrylic Block Filler 100
Second Coat	CARBOLINE, CARBOGUARD, Epoxy 890
Third Coat	CARBOLINE, CARBOGUARD, Epoxy 890

g. Flat - Zero VOC - Finish Coat / Modified Copolymer

First Coat	SMOOTH BLOCFIL SELECT CONCRETE BLOCK FILLER (SBSL00)
Second Coat	ECOSHIELD, Low-Order/Zero VOC Int. Latex Flat Paint (W 601)
Third Coat	ECOSHIELD, Low-Order/Zero VOC Int.Latex Flat Paint (W 601)

h. Low Sheen - Zero VOC - Finish Coat / Modified Copolymer

First Coat	SMOOTH BLOCFIL SELECT CONCRETE BLOCK FILLER (SBSL00)
Second Coat	ECOSHIELD, Low-Order/Zero VOC Interior Latex Low Sheen Paint (W 602)
Third Coat	ECOSHIELD, Low-Order/Zero VOC Interior Latex Low Sheen Paint (W 602)

i. Semi-Gloss - Zero VOC - Finish Coat / Modified Copolymer / 100% Acrylic

First Coat	SMOOTH BLOCFIL SELECT CONCRETE BLOCK FILLER (SBSL00)
Second Coat	ECOSHIELD, Low-Order/Zero VOC Interior Latex Low Sheen Paint (W 603)
Third Coat	ECOSHIELD, Low-Order/Zero VOC Interior Latex Low Sheen Paint (W 603)

4. Wood – Paint Finish

a. Flat – 100% Acrylic / Acrylic Copolymer

First Coat	INTER-KOTE, Interior Undercoater (W 6325)
Second Coat	SPARTAWALL, Interior Flat Paint (SWLL10)
Third Coat	SPARTAWALL, Interior Flat Paint (SWLL10)

b. Velvet Sheen – 100% Acrylic / Acrylic Copolymer

First Coat	INTER-KOTE, Interior Undercoater (W 6325)
Second Coat	SPARTAWALL, Interior Velvet Sheen Paint (SWLL20)

Third Coat SPARTAWALL, Interior Velvet Sheen Paint (SWLL20)

c. Eggshell – 100% Acrylic / Acrylic (Interior Wood Doors, factory primed)

First Coat INTER-KOTE, Interior Undercoater (W 6325)
Second Coat SPARTAWALL, Interior Eggshell Sheen Paint (SWLL30)
Third Coat SPARTAWALL, Interior Eggshell Sheen Paint (SWLL30)

d. Low Sheen – 100% Acrylic / Acrylic

First Coat INTER-KOTE, Interior Undercoater (W 6325)
Second Coat SPARTAWALL, Interior Low Sheen Paint (SWLL40)
Third Coat SPARTAWALL, Interior Low Sheen Paint (SWLL40)

e. Semi-Gloss or Gloss – 100 %Acrylic / Acrylic

First Coat INTER-KOTE, Interior Undercoater (W 6325)
Second Coat SPARTAWALL, Interior Semi-Gloss or Gloss Paint (SWLL50 or SSHL60)
Third Coat SPARTAWALL, Interior Semi-Gloss or Gloss Paint (SWLL50 or SSHL60)

f. Flat - Zero VOC / Modified Copolymer

First Coat ECOSHIELD, Low-Order/Zero VOC Int. Latex Primer (W600)
Second Coat ECOSHIELD, Low-Order/Zero VOC Int. Latex Flat Paint (W601)
Third Coat ECOSHIELD, Low-Order/Zero VOC Int. Latex Flat Paint (W 601)

g. Low Sheen - Zero VOC / Modified Copolymer

First Coat ECOSHIELD, Low-Order/Zero VOC Int.Latex Primer (W 600)
Second Coat ECOSHIELD, Low-Order/Zero VOC Int.Latex Low Sheen Paint (W 602)
Third Coat ECOSHIELD, Low-Order/Zero VOC Int. Latex Low Sheen Paint (W 602)

h. Semi-Gloss - Zero VOC / Modified Copolymer / 100% Acrylic

First Coat ECOSHIELD, Low-Order/Zero VOC Int. Latex Primer (W600)
Second Coat ECOSHIELD, Low-Order/Zero VOC Int. Latex Semi-Gloss (W 603)
Third Coat ECOSHIELD, Low-Order/Zero VOC Interior Latex Semi-Gloss (W 603)

5. Wood – Stain & Clear Finishes

a. Satin – Alkyd / Alkyd Polyurethane

Stain STAINSEAL (V-QYB or V-QYR Series) Interior Wiping Oil Stain
First Coat DEFTHANE, Polyurethane Clear Satin
Second Coat DEFTHANE, Polyurethane Clear Satin
Third Coat DEFTHANE, Polyurethane Clear Satin

b. Semi-Gloss – Alkyd / Alkyd Polyurethane

Stain STAINSEAL (V-QYB or V-QYR Series) Interior Wiping Oil Stain
First Coat DEFTHANE, Polyurethane Clear Semi-Gloss

Second Coat DEFTHANE, Polyurethane Clear Semi-Gloss
Third Coat DEFTHANE, Polyurethane Clear Satin

c. Gloss – Alkyd /Alkyd Polyurethane

Stain STAINSEAL (V-QYB or V-QYR Series) Interior Wiping Oil Stain
First Coat DEFTHANE, Polyurethane Clear Gloss
Second Coat DEFTHANE, Polyurethane Clear Gloss
Third Coat DEFTHANE, Polyurethane Clear Satin

d. Satin – Alkyd / Acrylic Polyurethane

Stain STAINSEAL (V-QYB or V-QYR Series) Interior Wiping Oil Stain
First Coat CABOT, Water-Borne Polyurethane (8082)
Second Coat CABOT, Water-Borne Polyurethane (8082)
Third Coat CABOT, Water-Borne Polyurethane (8082)

e. Semi-Gloss – Alkyd / Acrylic Polyurethane

Stain STAINSEAL (V-QYB or V-QYR Series) Interior Wiping Oil Stain
First Coat CABOT, Water-Borne Polyurethane (8087)
Second Coat CABOT, Water-Borne Polyurethane (8087)
Third Coat CABOT, Water-Borne Polyurethane (8087)

f. Gloss – Alkyd / Acrylic Polyurethane

Stain STAINSEAL (V-QYB or V-QYR Series) Interior Wiping Oil Stain
First Coat CABOT, Water-Borne Polyurethane (8080)
Second Coat CABOT, Water-Borne Polyurethane (8080)
Third Coat CABOT, Water-Borne Polyurethane (8080)

g. Eggshell – Alkyd / Lacquer

Stain STAINSEAL (V-QYB or V-QYR Series) Interior Wiping Oil Stain

First Coat CONTRACTOR'S EDGE, Production Sanding Sealer (CE-PROSS)
Second Coat CONTRACTOR'S EDGE, Production Clear Lacquer (CE-PRO 20)
Third Coat CONTRACTOR'S EDGE, Production Clear Lacquer (CE-PRO 20)

h. Semi-Gloss – Alkyd / Lacquer

Stain STAINSEAL (V-QYB or V-QYR Series) Interior Wiping Oil Stain
First Coat CONTRACTOR'S EDGE, Production Sanding Sealer (CE-PROSS)
Second Coat CONTRACTOR'S EDGE, Production Clear Lacquer (CE-PRO60)
Third Coat CONTRACTOR'S EDGE, Production Clear Lacquer (CE-PRO60)

i. Gloss – Alkyd / Lacquer

Stain STAINSEAL (V-QYB or V-QYR Series) Interior Wiping Oil Stain
First Coat CONTRACTOR'S EDGE, Sanding Sealer (CE- PROSS)
Second Coat CONTRACTOR'S EDGE, Production Clear Lacquer

	(CE-PRO90)
Third Coat	CONTRACTOR'S EDGE, Production Clear Lacquer (CE-PRO90)

j. Low Sheen – Alkyd / Water White Lacquer

Stain	STAINSEAL (V-QYB or V-QYR Series) Interior Wiping Oil Stain
First Coat	CONTRACTOR'S EDGE, Water White Sanding Sealer (CE-WWSS)
Second Coat	CONTRACTOR'S EDGE, Water White Clear Lacquer (CE-WW10)
Third Coat	CONTRACTOR'S EDGE, Water White Clear Lacquer (CE-WW10)

6. Ferrous Metal

a. Flat – Alkyd Emulsion / Acrylic Copolymer

First Coat	BLOC-RUST Premium, Rust Preventative Metal Primer (BRPR00-1 series)
Second Coat	SPARTAWALL, Interior Flat Paint (SWLL10)
Third Coat	SPARTAWALL, Interior Flat Paint (SWLL10)

b. Velvet Sheen – Alkyd Emulsion / Acrylic Copolymer

First Coat	BLOC-RUST Premium, Rust Preventative Metal Primer (BRPR00-1 series)
Second Coat	SPARTAWALL, Interior Velvet Sheen Paint (SWLL20)
Third Coat	SPARTAWALL, Interior Velvet Sheen Paint (SWLL20)

c. Eggshell Sheen - Alkyd Emulsion / Acrylic

First Coat	BLOC-RUST Premium, Rust Preventative Metal Primer (BRPR00-1 series)
Second Coat	SPARTAWALL, Interior Eggshell Sheen Paint (SWLL30)
Third Coat	SPARTAWALL, Interior Eggshell Sheen Paint (SWLL30)

d. Low Sheen– Alkyd Emulsion / Acrylic

First Coat	BLOC-RUST Premium, Rust Preventative Metal Primer (BRPR00-1 series)
Second Coat	SPARTAWALL, Interior Low Sheen Paint (SWLL40)
Third Coat	SPARTAWALL, Interior Low Sheen Paint (SWLL40)

e. Semi-Gloss or Gloss – Alkyd Emulsion / Acrylic

First Coat	BLOC-RUST Premium, Rust Preventative Metal Primer (BRPR00-1 series)
Second Coat	SPARTAWALL, Interior Semi-Gloss or Gloss Paint (SWLL50 or SSHL60)
Third Coat	SPARTAWALL, Interior Semi-Gloss or Gloss Paint (SWLL50 or SSHL60)

f. Semi-Gloss – Alkyd Emulsion / 100% Acrylic

First Coat	BLOC-RUST Premium, Rust Preventative Metal Primer (BRPR00-1 series)

Second Coat	SYN-LUSTRO, Rust Preventive 100% Acrylic Semi-Gloss Paint (W-9)
Third Coat	SYN-LUSTRO, Rust Preventive 100% Acrylic Semi-Gloss Paint (W-9)

f. Gloss – Alkyd Emulsion / 100% Acrylic

First Coat	BLOC-RUST Premium, Rust Preventative Metal Primer (BRPR00-1 series)
Second Coat	SYN-LUSTRO, Rust Preventive 100% Acrylic Gloss Paint (W-10)
Third Coat	SYN-LUSTRO, Rust Preventive 100% Acrylic Semi-Gloss Paint (W-10)

h. Flat – Zero VOC / Acrylic Urethane / Modified Copolymer

First Coat	RUSTOLEUM, METALMAX, DTM Acrylic Urethane Enamel S37
Second Coat	ECOSHIELD, Low-Order/Zero VOC Interior Latex Flat (W 601)
Third Coat	ECOSHIELD, Low-Order/Zero VOC Interior Latex Flat (W 601)

i. Low Sheen – Zero VOC / Acrylic Urethane / Modified Copolymer

First Coat	RUSTOLEUM, METALMAX, DTM Acrylic Urethane Enamel S37
Second Coat	ECOSHIELD, Low-Odor/Zero VOC Interior Latex Low Sheen Paint (W 602)
Third Coat	ECOSHIELD, Low-Odor/Zero VOC Interior Latex Low Sheen Paint (W 602)

j. Semi-Gloss – Zero VOC /Acrylic Urethane /100% Acrylic

First Coat	RUSTOLEUM, METALMAX, DTM Acrylic Urethane Enamel S37
Second Coat	ECOSHIELD, Low-Odor/Zero VOC Interior Latex Semi-Gloss Paint (W 603)
Third Coat	ECOSHIELD, Low-Odor/Zero VOC Interior Latex Semi-Gloss Paint (W 603)

l. **Low sheen Interior** (metal deck9s0, Exposed ducts, exposed beams and columns)

First Coat:	Ultrashield DTM Gray primer
Second Coat	DE ULMS00
Third Coat	DE Ultrashield ULSH40

6. Non Ferrous Metal

a. Flat – 100% Acrylic / Acrylic Copolymer

Pretreatment	SUPREME CHEMICAL, METAL CLEAN AND ETCH (ME 01)
First Coat	ULTRA-GRIP Premium, Multi Purpose Primer (UGPR00-1)
Second Coat	SPARTAWALL, Interior Flat Paint (SWLL10)
Third Coat	SPARTAWALL, Interior Flat Paint (SWLL10)

b. Velvet Sheen – 100% Acrylic / Acrylic

Pretreatment	SUPREME CHEMICAL, METAL CLEAN AND ETCH (ME 01)
First Coat	ULTRA-GRIP Premium, Multi Purpose Primer (UGPR00-1)
Second Coat	SPARTAWALL, Interior Velvet Sheen Paint (SWLL20)
Third Coat	SPARTAWALL, Interior Velvet Sheen Paint (SWLL20)

c. Eggshell – 100% Acrylic / Acrylic

Pretreatment	SUPREME CHEMICAL, METAL CLEAN AND ETCH (ME 01)
First Coat	ULTRA-GRIP Premium, Multi Purpose Primer (UGPR00-1)
Second Coat	SPARTAWALL, Interior Eggshell Sheen Paint (SWLL30)
Third Coat	SPARTAWALL, Interior Eggshell Sheen Paint (SWLL30)

d. Low Sheen – 100% Acrylic

Pretreatment	SUPREME CHEMICAL, METAL CLEAN AND ETCH (ME 01)
First Coat	ULTRA-GRIP Premium, Multi Purpose Primer (UGPR00-1)
Second Coat	SYN-LUSTRO, Rust Preventive 100% Acrylic Semi-Gloss Paint (W-9)
Third Coat	SYN-LUSTRO, Rust Preventive 100% Acrylic Semi-Gloss Paint (W-9)

e. Semi-Gloss or Gloss – 100% Acrylic

Pretreatment	SUPREME CHEMICAL, METAL CLEAN AND ETCH (ME 01)
First Coat	ULTRA-GRIP Premium, Multi Purpose Primer (UGPR00-1)
Second Coat	SYN-LUSTRO, Rust Preventive 100% Acrylic Gloss Paint (W-10)
Third Coat	SYN-LUSTRO, Rust Preventive 100% Acrylic Semi-Gloss Paint (W-10)

f. Flat - Zero VOC / Acrylic Urethane / Modified Copolymer

Pretreatment	SUPREME CHEMICAL, METAL CLEAN AND ETCH (ME 01)
First Coat	RUSTOLUEM, METALMAX, DTM Acrylic Urethane Enamel S37
Second Coat	ECOSHIELD, Low-Order/Zero VOC Interior Latex Flat (W 601)
Third Coat	ECOSHIELD, Low-Order/Zero VOC Interior Latex Flat (W 601)

g. Low Sheen - Zero VOC / Acrylic Urethane /Modified Copolymer

Pretreatment	SUPREME CHEMICAL, METAL CLEAN AND ETCH (ME 01)
First Coat	RUSTOLUEM, METALMAX, DTM Acrylic Urethane Enamel S37
Second Coat	ECOSHIELD, Low-Odor/Zero VOC Interior Latex Low Sheen Paint (W 602)
Third Coat	ECOSHIELD, Low-Odor/Zero VOC Interior Latex Low Sheen Paint (W 602)

h. Semi-Gloss - Zero VOC / Acrylic Urethane /100% Acrylic

Pretreatment	SUPREME CHEMICAL, METAL CLEAN AND ETCH (ME 01)
First Coat	RUSTOLUEM, METALMAX, DTM Acrylic Urethane Enamel S37
Second Coat	ECOSHIELD, Low-Odor/Zero VOC Interior Latex Semi-Gloss Paint (W 603)
Third Coat	ECOSHIELD, Low-Odor/Zero VOC Interior Latex Semi-Gloss Paint (W 603)

3.07 Specialty Painting and Coatings (Professional Line Products)

1. EXTERIOR ACRYLIC LOW VOC METALLIC FINISH WITH HP CLEAR COAT – GLOSS AS SELECTED

Primer: 1st coat: Rustoleum Sierra S 70 Epoxy Primer
Finish: 1st coat: Modern Masters Metallic Paint Collection – Color as Selected
Finish: 2nd coat: Modern Masters Metallic Paint Collection – Color as Selected
Finish 3rd coat: Deft Industrial 36 Series Acrylic Polyurethane Clear Protective Topcoat

2. DUCTWORK/VENTS/MISC. METAL INCLUDING DECKING – EXTERIOR (at louvers adjacent to metal paneling at higher roof of Multi-purpose room)

Rustoleum Modern Masters Ext. Grade Mettalic Architectural coating 274223 Bright silver
Primer Galv. Or Non-ferrous with Rustoleum Griptec primer/ prime metal max DTM

Note: Important to apply the Metallic over the S70 Primer within timeframes for adhesion – see data sheets / application guidelines

NOTICE

Availability of products listed in this specification may be affected by local, state, or federal regulatory requirements for architectural coatings. Consult your Dunn-Edwards representative for information on current product availability. Submittals prepared by Dunn-Edwards in accordance with this specification may include product codes that are modified with a letter suffix (e.g., W 901V or W 901E) to indicate the specific product formulation currently available to meet applicable requirements.

END OF SECTION

SECTION 260500

ELECTRICAL GENERAL REQUIREMENTS

PART 1 GENERAL

1.01 SECTION INCLUDES

A. Electrical general requirements. These requirements shall apply to all Division 26 Sections of this Specification.

B. Maintenance of electrical services during various phases of construction.

C. Demolition, dismantling, cutting and alterations of the existing electrical systems as indicated and/or required for demolition of existing structures and systems.

D. Disconnection and removal of existing electrical services as indicated and required by the demolition process.

E. Removal of debris and demolished equipment.

F. Coordination with the Owner to allow the Owner to salvage specific electrical and electronic items that the Owner wishes to salvage. Contractor shall allow the Owner personnel reasonable access to the site for the Owner's salvage operation. Contractor shall coordinate the timing of the salvage operation with the Owner.

1.02 RELATED SECTIONS

A. Division 1: GENERAL

REQUIREMENTS B. Division 23:

MECHANICAL

C. Division 26: ELECTRICAL

1.03 REFERENCES

A. California Building Code

(CBC) B. California Electric Code

(CEC)

C. National Fire Protection Association (NFPA) Standards

D. California State Fire Marshal (CSFM)

E. National Electrical Contractors Association (NECA)

F. Occupational Safety and Health Administration

(OSHA) G. California Administrative Code Title 24

H. American National Standards Institute (ANSI)

I. Institute of Electrical and Electronics Engineers (IEEE)

J. National Electric Manufacturer's Association (NEMA)

K. City, State and other local codes and requirements as applicable

1.04 SUBMITTALS

A. Submittals: Procedures for submittals.

B. Shop Drawings: Furnish shop drawings for specific electrical equipment and systems as required in the associated Section of this Specification.

C. Product Data: Furnish complete product data for specific electrical equipment and systems as required in the associated Section of this Specification.

D. Samples: Furnish samples of specific electrical equipment and components as required in the associated Section of this Specification.

1.05 QUALIFICATIONS

A. Refer to each Section of Division 16 for specific qualifications required for manufacturers and installers for each specific electrical system and component.

1.06 PROJECT CONDITIONS

A. Division 1: GENERAL REQUIREMENTS

B. The Contractor shall carefully examine the site and existing conditions, and shall compare the Drawings with the existing conditions as it affects the work under this Division. By the act of submitting a bid, the Contractor will be deemed to have made such examination and to have accepted such conditions and to have made allowance therefore in preparing bids.

C. All scaled and figured dimensions are approximate and are given for estimating purposes only. Before proceeding with the work, the Contractor shall carefully check and verify all dimensions and sizes and shall assume all responsibility for the fitting of his/her equipment and materials to other parts of the equipment and to the structure.

D. Where apparatus and equipment have been indicated on the Drawings, dimensions have been taken from typical equipment of the class indicated. The Contractor shall carefully check the Drawings to see that the exact equipment contemplated for installation will fit into the spaces provided.

E. Final dimensions, location of stub ups, junction or terminal boxes on equipment shall be obtained from approved shop or installation Drawings of the equipment being furnished, and shall be coordinated with all other sections as necessary. ***Do not "scale" the Drawings.***

1.07 GENERAL SUMMARY OF ELECTRICAL WORK

A. The work of this section shall include all services, labor, materials, transportation, equipment, plant and facilities to complete the electrical work indicated on the Drawings and specified herein.

B. The work listed or required by this Section of the Specification is not intended to limit or establish the extent of the electrical work. It shall be the Contractor's responsibility to establish to extent of the work specified hereunder and indicated on the Drawings.

C. Drawings and Specifications Coordination:

1. For purposes of clearness and legibility, the electrical Drawings are essentially diagrammatic. The size and location of equipment is shown to scale whenever possible. The Contractor shall verify all conditions, data and information as indicated on the Drawings and in specification sections where electrical work is required.

2. The electrical Drawings show the required size and points of termination of the conduits, the number and size of wires, and suggest the proper route for the conduit. It shall be the responsibility of the Contractor to install the conduits with minimum number of bends to conform to the structure, avoid obstructions, preserve headroom, keep openings and passageways clear, and meet all applicable code requirements.

3. The routing of conduits may be changed, if approved by the Architect/Engineer, provided that the length of any conduit run is not increased or decreased more than 10% of the length shown on the Drawings.

4. It is intended that outlets be located symmetrical with architectural elements, not withstanding the fact that locations shown on the Drawings may be distorted for clarity.

D. The Specifications and Drawings are intended to cover complete operational systems. The omissions of expressed reference to any item of labor or material for the proper execution of the work in accordance with present practice of the trade shall not relieve the Contractor from providing such additional labor and materials.

E. Refer to the Drawings and shop Drawings of other trades for additional details that affect the proper installation of this work. Diagrams and symbols showing electrical connection are diagrammatic only. Wiring diagrams do not necessarily show the exact physical arrangement of the equipment.

F. If there are omissions or conflicts between the Drawings and Specifications, clarify these points with the Architect before submitting bid.

1. If the Contractor believes that there are conflicts within these Electrical Specifications; between the Specifications and the Drawings; or between the Electrical Documents and any Architectural, Mechanical, Plumbing, or Structural Document, the Contractor shall bid the more expensive or elaborate material, process or procedure and shall call the discrepancy to the Architects attention. Should the Owner, in its discretion, choose to implement the less expensive or simpler material, process or procedure after bid opening, a credit Change Order will be issued to the Contractor.

G. This Specification, the Drawings and General Conditions cover the complete furnishing and installation of the electrical system and all related work.

H. Terminology:

1. The term "signal system" shall apply to the clock, fire alarm, annunciator, sound, public telephone and data network systems.

2. The term "low voltage" shall apply to systems operating at 600 volts and under.

3. The term "provide" used on the Drawings and elsewhere in the Specifications shall be considered to mean "furnish and install".

4. The term "furnish" used on the Drawings and elsewhere in the Specifications shall be considered to mean "furnish and install".

5. The term "UL" means Underwriters Laboratories Inc.

1.08 WORK INCLUDED

A. Overcurrent devices in existing distribution switchboards complete.

B. Distribution transformers complete.

C. Distribution panelboards complete.

D. Secondary distribution for the lighting and power systems, including panelboards, conduit, raceways, cable trays, outlets, wiring, wiring devices, equipment and miscellaneous items required for a complete and operating system.

E. Lighting fixtures, installed complete with lamps, mounting hardware and all accessories.

F. The complete connecting of all electrical equipment and devices, including motors and equipment or devices furnished under other Sections of the Specifications.

G. Disconnect switches, manual or magnetic motor starters, relays and miscellaneous control devices indicated or required.

H. Examine all other Sections for work related to those other sections and required to be included as work under this section.

I. General provisions and requirements for electrical work.

J. Conduit, raceways and outlets for signal systems including, telephone and Data/LAN.

K. Demolition of certain existing electrical components as indicated on the Drawings

1.09 ORDINANCES AND REGULATIONS

A. All work and materials shall be in full accordance with the latest edition of the California Electrical Code, the State of California Administrative Code, Title 24, the Safety Orders of the State Division of Industrial Safety, and the Fire and Panic Safety Standards of the State Fire Marshal and with any prevailing rules and regulations pertaining to adequate protection and/or guarding of any moving parts or otherwise hazardous locations. Material and labor shall conform to the Regulations of the National Board of Fire Underwriters for Electrical Wiring and Apparatus. All new material shall be "UL" listed.

B. Nothing in these Drawings and Specifications is to be construed as permitting work not conforming to these codes.

C. Should any changes be necessary in the Drawings or Specifications to make the work comply with the requirements, the Contractor shall notify the Architect at once and cease work on all parts of the Contract which are affected.

1.10 PERMITS AND INSPECTION

A. The Contractor shall apply and pay for all permits required by any of the legally constituted public authorities for the installation or construction of the work included under this Division. The Contractor shall arrange and pay for any inspections or examinations so required and deliver certificate of all such inspections to the Architect.

1.11 RECORD DRAWINGS

A. Contract Closeout

B. Record (As-Built) Drawings shall be completed and delivered to the Architect prior to or at the time of final inspection. Record Drawings shall comply with the requirements of Division 1 of the Specifications.

C. Record Drawings shall accurately locate pull boxes and main conduit runs. Conduit runs between outlets, panels, devices, etc. that are changed from that shown on the drawing shall be clearly noted. All pull boxes indicated for future extension shall be completely dimensioned on Record Drawings.

D. The Drawings shall be complete, legible, and color-coded in the following manner: Red shall be used for removals and green shall indicate the revised conditions. Blue ink shall not be used. Record Drawings not satisfactorily prepared will be returned to the Contractor.

1.12 GUARANTEE

A. Division 1: GENERAL REQUIREMENTS

1.13 ELECTRICALLY OPERATED EQUIPMENT AND APPLIANCES

A. Equipment and Appliances Furnished by the Contractor:

1. The electrical work shall include furnishing and installing wiring enclosures for, and the complete connection of all electrically operated equipment and appliances and any electrical control devices which are specified to be furnished and installed in this or other electrical sections of the Specifications. All wiring enclosures shall be installed concealed except where exposed work is indicated on the electrical Drawings.

2. Connections shall be made as necessary to completely install the equipment ready for use. The equipment shall be tested for proper operation.

1.14 PHASING OF WORK

A. The project will be constructed in multiple phases as described elsewhere in the Contract Documents.

B. Contractor shall furnish and install all temporary and/or interim connections as required for proper operation of all systems during all phases of construction.

PART 2 PRODUCTS

2.01 GENERAL PRODUCT REQUIREMENTS

A. Products for Division 26, Electrical Work, shall be new and suited to the intended use.

B. Quality of products shall be established by specified products and substitute products shall be equal or exceed the quality of products specified. Refer to Division I for substitution procedure.

C. Provide Underwriter's Laboratories, Inc. examination and label for all products where such examination and labels are available.

D. Any products judged by Architect and/or Owner not in accordance with the Specifications either before or after installation will be rejected. If after installation, the Contractor shall replace with specified items at no cost to the Owner.

E. Products of similar nature shall be of the same type and manufacturer.

F. Where products are specified by manufacturer's brand name, type and/or catalog number, such designation is to establish standards for desired quality, style, disposition of warranty items and operating characteristics, and shall be the basis of the bid.

G. Refer to other sections of specifications for method of submittal of required Shop Drawings, lists and data. Refer to other paragraphs in this Section for other requirements relating to product selection.

H. Confirm the electrical characteristics of powered equipment specified in other Divisions of the Specifications prior to ordering electrical equipment required for the equipment.

2.02 PROTECTION OF FINISH

A. The Contractor shall provide adequate means for and shall fully protect all finished parts of the materials and equipment against damage from any cause during the progress of the work and until acceptance by the Owner.

B. All materials and equipment in storage and during construction shall be covered in such a manner that no finished surfaces will be damaged, marred or splattered with paint. All moving parts shall be kept perfectly clean and dry. No paint spraying will be permitted in the building.

C. Verify that there is safe storage for products at the project site prior to authorizing shipment by the manufacturer.

D. Leave protective crating and wrapping in place until job site conditions will permit removal with no risk of damage to the product finish from construction processes.

E. Store equipment received at the site in a dry location during the construction period.

F. All damaged material or equipment shall be replaced or refinished by the contractor at no expense to the Owner.

2.03 SUBMITTALS

A. Material lists and Shop Drawings shall comply with the requirements of other sections, “SUBMITTALS”. All submittals shall be submitted with a minimum of eight (8) copies (or more if required)

B. A complete list of all proposed materials and equipment specified in Division 26 and the Electrical Drawings shall be submitted after the Contract is awarded. The list shall include the name of the manufacturer and such information required to identify the item. Where the Specifications show a choice, only one brand, type or manufacturer shall be listed.

C. Exact catalog number and fixture cut shall be provided for each lighting fixture.

D. Detailed Drawings, either to scale or adequately dimensioned, shall be provided for the unit substations, main switchboards, distribution switchboards, transformers, lighting and power panelboards, terminal cabinets, special relay or control cabinets and other equipment with special requirements.

E. Where electrical systems interface with systems specified in other Divisions, the electrical components shall be reviewed and approved by the Contractor furnishing those other systems, prior to submittal for review by Engineer.

F. More than one manufacturer may be utilized for rough in products, such as conduit, boxes and wire, but only one manufacturer may be used for finish work equipment or devices.

G. Product samples shall be furnished where required.

2.04 SUBSTITUTIONS

A. Where shop Drawings are being submitted for products which are being substituted for specific products, refer to other Divisions for limitations governing requests for substitutions.

B. For complex products and/or systems, the availability of qualified service organizations, so located that service can be rendered to the equipment within 24 hours upon receipt of notification, may be significant factor in considering substitution requests.

C. Product substitutions will not be allowed unless approved in writing by the Architect in accordance with the requirements of other divisions.

D. Only "standard products" of manufacturer shall be offered as substitutions for specified "standard products".

2.05 NON-SPECIFIED EQUIPMENT OR MATERIALS

A. In the event equipment or materials are indicated on the Drawings but not described in the Specifications, the Contractor shall determine from the Architect, prior to submitting his/her bid, what this descriptive information is and shall base his/her bid accordingly. Should the Contractor fail to do this, the Contractor shall furnish such equipment and material as later indicated to be the intent by the Architect without change in contract price.

PART 3 EXECUTION

3.01 GENERAL

A. All work specified in Division 16 and indicated on the electrical Drawings shall:

1. Be installed by a qualified installer and skilled craftsman experienced in the

trade.

2. Be installed in a neat and workmanlike manner.

3. Conform to NECA Standards of Installation.

3.02 LOCATIONS

A. The location of conduit, outlets, apparatus and equipment indicated on the Drawings are approximate only and shall be changed to meet the architectural and structural conditions as required.

B. The location of conduit runs, outlets and pull boxes shall be verified on the job and the locations shall be adjusted as required to clear obstructions such as equipment racks, structural bracing, cable trays, duct work, piping, conduit and pull boxes.

C. Install all conduit and equipment in such a manner as to avoid all obstructions, maintaining headroom and keeping openings and passageways clear.

D. The Drawings are essentially diagrammatic to the extent that many offsets, bends, special fittings and exact locations are not indicated. The Contractor shall carefully study the Drawings and the premises in order to determine the best methods, exact locations, routes, obstructions, etc., which affect his/her installation.

E. Furnish and install additional pull boxes, fittings or offsets as required to clear obstructions or to simplify the pulling in of wires or cables.

F. Proper judgment must be exercised in executing work so as to secure the best possible installation in the available space and to overcome difficulties owing to space limitations or interference of structural conditions wherever encountered. It shall be the Contractor's responsibility to verify and coordinate the location of all outlets and lighting fixtures with the Architectural, Structural and Mechanical Drawings and with all Shop Drawings, including Shop Drawings of other trades. Architectural elevations and reflected ceiling plans shall generally take precedence. However, in the event of large variations between Architectural and Electrical Drawings, the Architect shall be consulted for instructions.

G. In the event changes in the indicated locations or arrangements are necessary due to developed conditions in the buildings' construction or rearrangement of furnishings or equipment, such changes shall be made by the Contractor at no cost, provided the work in place is not affected and no extra materials are required.

3.03 EXCAVATION

A. All excavating, trench work and backfilling required for the installation of the work shall be

performed in accordance with the applicable portions of the Specifications and Plans on the subjects ‘Excavation, Backfilling, and Trenching’.

B. After the installation of work requiring excavation has been inspected and approved, all excavations shall be filled with slurry mix or clean earth (as detailed on the Drawings) and tamped to a consistency so that no settlement will occur, and the ground left flush at natural grade. All excavated earth, which is not used for backfill, shall be removed from the premises or otherwise disposed of, by the Contractor, as directed.

3.04 CONCRETE WORK

A. All rough and finished concrete required for the installation of the work shall be installed in accordance with the applicable portions of other DIVISIONS of the specifications

and/or plans.

3.05 COOPERATION WITH OTHERS

A. The Contractor shall so organize his/her work that progress will harmonize with the work of all trades, so that all work may proceed as expeditiously as possible.

B. The Contractor shall be responsible for the correct placing of his/her work and the connection to this work of all related trades.

C. The Contractor shall cross check the Drawings against the Drawings of other trades, to avoid installing work that conflicts with the work of other trades.

3.06 LAYOUT OF WORK

A. Lay out work in advance of construction so that exposed work will be parallel with the building lines.

3.07 CLEARANCES AND ACCESS

A. Install electrical materials with proper working clearances as required by the California Electrical Code.

B. Provide specified, indicated or code required access to electrical products. Where access doors in walls or ceilings are required for access to electrical products, such doors shall be of the identical manufacture as the doors utilized for access to mechanical products, and shall be provided by the Electrical Contractor.

3.08 OPENINGS

A. The Contractor shall cooperate with all trades in providing information at the proper times as to openings required in walls, slabs and footings for conduit and equipment.

B. The core drilling, cutting and patching of walls or slabs shall be as specified under the General Requirements. The Electrical Contractor shall be responsible for his/her own openings. Refer to Architectural Drawings for location of all masonry and/or fire rated walls. Contractor shall be responsible for all required core drilling even if not specifically indicated or noted on the Electrical Drawings.

3.09 CLEANING EQUIPMENT AND PREMISES

A. Thoroughly clean all parts of the materials and equipment. Exposed parts shall be thoroughly cleaned of cement, plaster and other materials, and all oil and grease spots shall be removed with a non-flammable cleaning solvent.

B. Such surfaces shall be carefully wiped and all cracks and corners scraped out.

C. Exposed metalwork shall be carefully brushed down with steel brushes to remove rust and other spots and left smooth and clean.

D. The interior of each panelboard, switchboard section or terminal cabinet shall be cleaned of all dust and debris.

E. During the progress of the work the Contractor shall carefully and continuously clean up after his/her men and shall leave the premises and all parts of the building in which he is

working free from his/her debris.

3.10 DISPOSAL AND RECYCLING OF FLUORESCENT BALLASTS

A. It is assumed that all existing fluorescent light fixtures to be demolished contain a magnetic ballast (or multiple ballasts) that contain polychlorinated biphenyls (PCBs). The PCBs are contained in the ballasts' internal capacitor and possibly in the asphalt-potting compound.

B. The Contractor shall remove all fluorescent ballasts from all demolished light fixtures. The ballasts shall be recycled in an approved manner. The recycling shall meet all local, state and federal requirements for disposal and recycling of fluorescent ballasts that contain PCBs.

3.11 DISPOSAL AND RECYCLING OF FLUORESCENT LAMPS

A. It is assumed that all existing fluorescent light fixtures to be demolished contain fluorescent lamps that contain small quantities of mercury.

B. The Contractor shall remove all fluorescent lamps from all demolished light fixtures. The lamps shall be recycled in an approved manner. The recycling shall meet all local, state and federal requirements for disposal and recycling of fluorescent lamps that contain mercury.

3.12 MAINTENANCE OF ELECTRICAL SERVICES

A. Uninterrupted electrical services shall be maintained to Owner occupied portions of the buildings at all times, except during pre-scheduled shut-downs of the electrical service.

B. Any work that will require the shutdown of any electrical system shall be pre-scheduled with the Owner. Upon such a shutdown, the work, once started, shall continue uninterrupted until the work has been completed and service is restored.

C. The Contractor shall prepare a written method of procedure and notify the Owner two weeks in advance of any service shutdown.

D. The bid price shall include all charges for overtime work.

END OF SECTION

SECTION 260501

BASIC ELECTRICAL REQUIREMENTS

PART 1 GENERAL

1.01 SCOPE

A. This section supplements all sections of this division and shall apply to all phases of work hereinafter specified, shown on the drawings, or required to provide a complete installation of electrical systems for the Project. The Work required under this division, is not limited to the Electrical Drawings. Refer to Site, Architectural, Structural, and Mechanical Drawings that may designate Work to be accomplished. The intent of the Specifications is to provide a complete electrical system that includes all documents that are a part of the Contract.

1. Work Included: Furnish all labor, material, services and skilled supervision necessary for the construction, erection, installation, connections, testing, and adjustment of all circuits and electrical equipment specified herein, or shown or noted on the Drawings, and its delivery to the Owner complete in all respects ready for use.

B. Contract Drawings: The Contract Drawings are shown in part diagrammatic, intended to convey the Scope of Work indicating the intended general arrangement of equipment, conduit and outlets. Follow the contract drawings in laying out the work and verify spaces for the installation of the materials and equipment based on actual dimensions of equipment furnished. Where conflicts occur, the most stringent application shall apply
wherever a question exists as to the exact intended location of outlets or equipment, obtain instructions from the Architect before proceeding with the Work.

C. Equipment or Fixtures: Equipment and fixtures shall be connected to provide circuit continuity in accordance with the Specifications whether or not each piece of conductor, conduit, or protective device is shown between such items of equipment or fixtures, and the point of circuit origin.

D. Work Installed but Furnished under Other Sections: The Electrical Work includes the installation or connection of certain materials and equipment furnished under other sections. Verify installation details. Foundations for apparatus and equipment will be furnished under other sections unless otherwise noted or detailed.

1.02 GENERAL REQUIREMENTS

A. Guarantee: Furnish a written guarantee for a period of one year from date of substantial completion.

B. Equipment Safety: All electrical materials and equipment shall be new and shall be listed by Underwriter's Laboratories and bear their label, or listed and certified by a nationally recognized testing authority where UL does not have an approval. Custom made equipment must have complete test data submitted by the manufacturer attesting to its safety.

C. Codes and Regulations:

1. Design, manufacture, testing and method of installation of all apparatus and materials furnished under the requirements of these specifications shall conform to the latest publications or standard rules of the following:

Institute of Electrical and Electronic Engineers - IEEE
National Electrical Manufacturers' Association - NEMA
California Fire Code - CFC
California Building Code - CBC Underwriters'
Laboratories, Inc. - UL National Fire
Protection Association - NFPA Federal
Specifications - Fed. Spec.
American Society for Testing and Materials - ASTM
American National Standards Institute - ANSI
American Standard Association - ASA
California Electrical Code - CEC
National Electrical Safety Code - NESC
Insulated Power Cable Engineers Association - IPCEA
Public Utilities Commission - PUC
California Code of Regulations, Title 8, Subchapter 5
California Code of Regulations, Title 24
State & Municipal Codes in Force in the Specific Project Area
Occupational Safety and Health Administration -OSHA

The term "Code", when used within the specifications, shall refer to the Publications, Standards, ordinances and codes, listed above. In the case where the codes have different levels of requirements the most stringent rules shall apply.

D. Seismic Design of Electrical Equipment:

1. All electrical prefabricated equipment is to be designed and constructed in such a manner that all portions, elements, sub-assemblies and/or parts of said equipment and the equipment as a whole, including their attachments, will resist a horizontal load equal to the operating weights of those parts multiplied times the following factors:

Type of Equipment	Horizontal CP	Vertical CP
Rigid and rigidly supported piping or equipment such as boilers, chillers, pumps, motors, transformers, unit substations and control panels.	0.50	0.33
Flexible and flexibly supported equipment such as air-handling units, piping and other equipment so supported that the fundamental period of vibration of the equipment and its supporting system is greater than 0.05 seconds. Communication equipment and emergency stand-by equipment.	1.00	0.67

2. Load is to be applied at the center of gravity of the part and to be in any direction horizontally. Design part and to be in any direction horizontally. Design stresses shall be in accordance with the specifications for design of the American Institute of

Steel.

Construction. Anchorage, support and/or attachment of said prefabricated equipment to the structure should be in accordance with the details found in the plans and specifications.

3. It is the entire responsibility of the Contractor to verify the design of equipment so that the strength and anchorage of the internal components of the equipment exceeds the force level used to restrain and anchor the unit itself to the supporting structure.

E. Requirements of Regulatory Agencies:

1. Codes, Permits and Fees: Where the Contract Documents exceed minimum requirements, the Contract Documents take precedence. Where code conflicts occur, the most stringent shall apply unless variance is approved. Where provisions in the drawings and specifications differ in regard to code application, size, quality, quantity or type of equipment, Contractor shall include in the bid, costs for the most costly provision either denoted in the specifications or on the drawings. This provision shall apply as an amendment to the California Public Contracts Code.

a. Comply with all requirements for permits, licenses, fees and Code. Permits, licenses, fees, inspections and arrangements required for the Work shall be obtained by the Contractor at his expense, unless otherwise specified.

b. Comply with the requirements of the applicable utility companies serving the Project. Make all arrangements with the utility companies for proper coordination of the Work.

2. Substitutions: The materials, products, and equipment described in the Contract Documents establish a standard of required function, dimension, appearance, and quality. Architect may consider requests for substitutions of specified equipment, materials, or products and then only when request are submitted in accordance with the provisions of the Contract Documents and are received by the Architect a minimum of 21 days prior to the date established for the receipt of the bid. No substitutions will be considered after the date of the receipt of the bid or contract award unless there is cause for a substitution which complies in every respect to the provisions of the Contract Documents. Substitution requests shall be made in accordance with Public Contracts Code revisions as follows:

a. No substitutions are allowed after bid opening.

b. All substitutions must be requested 14 days prior to bid opening date.

c. Final addendum naming approved substitutions of materials/equipment must be issued 7 days prior to bid date.

F. Record Drawings: Keep up to date, monthly payments withheld if not updated.

G. Shop Drawings and Submittals: Submittals on <u>all</u> material prior to installation.

1. Drawings shall be submitted, as required.

2. Shop drawings shall be submitted on, but not limited to, the following:

a. 260513 Conductors (600 Volt)

c. 260519 Building Wire and Cable

d. 260534 Boxes

e. 262726 Wiring Devices

f. 262816 Enclosed Switches

g. 262413 Distribution Switchboards and Equipment

h. 262817 Disconnect Switches

i. 262416 Panelboards

j. 265100 Interior Luminaries

H. Trenching and Backfilling: All trenching and backfilling for electrical work shall be the responsibility of the contractor and shall be done in accordance with other Sections of this specification. The Contractor shall examine the drawings of all other sections to determine locations of all existing underground lines. The Contractor shall use extreme caution when working in the vicinity of these lines and shall be responsible for the proper and approved repair of any damage caused by his work.

I. Cutting and Patching:

1. Obtain written permission from the Architect before core drilling or cutting any structural members. Exact method and location of conduit penetrations and/or openings in concrete walls, floors, or ceilings shall be as approved by the Architect.

2. All core drilling, cutting and patching for this work shall be performed under this Section of the specifications. Use craftsmen skilled in their respective sections for cutting, fitting, repairing, patching of plaster and finishing of materials including carpentry work, metal work or concrete work required for this Work. Do not weaken walls, partitions or floor with cutting. Holes required to be cut in floors must be drilled without excessive breaking out around the holes. Patching and/or refinishing shall be determined by the Architect.

3. Use care in piercing waterproofing. After the part piercing the waterproofing has been set in place, seal openings and make absolutely watertight.

4. Seal all openings to meet the fire rating of the particular wall floor or ceiling.

1.03 JOB CONDITIONS

A. Existing Conditions:

1. The contractor shall visit the site and verify existing conditions. Where existing conditions differ from the drawings, adjustment shall be made and allowances included for all necessary equipment to complete all parts of the drawings and specifications.

2. Electrical circuits affecting work shall be de-energized while working on or near them.

3. Arrange the work so that electrical power is available to all electrical equipment within existing facility at all times. Schedule all interruptions at the convenience of the Owner, including exact time and duration. Provide temporary power during all periods of interruption, which are deemed excessive by the Owner. Costs of all premium time (overtime) resulting from the scheduled power interruptions and all costs for providing temporary power shall be included in the cost of the Work.

B. Protection:

1. Protection of apparatus, materials and equipment. Take such precautions as necessary to properly protect all apparatus, fixtures, appliances, material, equipment and installations from damage of any kind. The Engineer may reject any particular piece or pieces of material, apparatus or equipment scratched, dented or otherwise damaged.

2. Seal equipment or components exposed to the weather and make watertight and insect proof. Protect equipment outlets and conduit openings with temporary plugs or caps at all times that work is not in progress.

C. Sequencing and Scheduling:

1. Work lines and established heights shall be in strict accordance with architectural drawings and specifications insofar as these drawings and specifications extend. Verify all dimensions shown and establish all elevations and detailed dimensions not shown.

2. Lay out and coordinate all work well enough in advance to avoid conflicts or interferences with other work in progress so that in case of interference the electrical layout may be altered to suit the conditions, prior to the installation of any work and without additional cost to the Owner. Conflicts arising from lack of coordination shall be this Contractor's responsibility. Maintain all code-required clearances about electrical equipment. Unless specifically noted otherwise, establish the exact location of electrical equipment based on the actual dimensions of equipment furnished.

1.04 WORK IN COOPERATION WITH OTHER SECTIONS

A. Examine the drawings and specifications and determine the work to be performed by the electrical, mechanical and other sections. Provide the type and amount of electrical materials and equipment necessary to place this work in proper operation, completely wired, tested and ready for use. This shall include all conduit, wire, motor starters, disconnects, relays, time clocks and other devices for the required operation sequence of all electrical, mechanical and other systems or equipment. Where a conflict occurs on drawings, the most stringent shall apply.

B. Provide conduit and wire for all controls and other devices, both line and low voltage, described in this or other parts of the contract documents. Install all control housings and back boxes required for installing conduit and wire to the controls.

C. Install control wiring in separate conduit between each heating, ventilating and air conditioning sensing device and its control panel and/or control motor. Before installing any conduit for heating, ventilating and air conditioning control wiring, verify from the control manufacturer's shop drawings where these separate conduit runs are required.

D. Plan all work so that it proceeds with a minimum of interference with other sections. Inform all parties concerned of openings required for equipment or conduit required in the building construction for Electrical Work and provide all special frames, sleeves and anchor bolts as required. Coordinate the electrical work with the mechanical installation. Promptly report to the Architect any delay or difficulties encountered in the installation of this work which might prevent prompt and proper installation, or make it unsuitable to connect with or receive the work of other sections. Failure to so report shall constitute an acceptance of the work of other sections as being fit and proper for the execution of this work.

1.05 TESTING AND ADJUSTMENT

A. Upon completion of all Electrical Work, the contractor shall provide all testing as follows:

1. Operational Test: Test all circuit breakers, receptacles, motors and all other electrical and communication equipment. Replace all faulty devices and equipment discovered during testing with new devices and equipment at no additional cost, and that part of the system (or devices or equipment) shall then be retested.

2. Secondary Grounding Resistance: Perform ground continuity test between main ground system and equipment frame, system neutral and/or derived neutral point.

3. Ground Fault System Test: Measure system neutral insulation resistances to ensure no shunt ground paths exist.

4. All test procedure shall be performed by an independent testing firm.

1.06 MAINTENANCE, SERVICING AND INSTRUCTION MANUALS, AND WIRING DIAGRAMS

A. Prior to substantial completion, the contractor shall submit 5 copies of operating and maintenance and servicing instructions, as well as an equal number of copies of complete wiring diagrams all neatly bound in hard cover 3-ring binders with table of contents and tabs for the following items or equipment: (See Section 01730 - Operation and Maintenance Data):

1. Section 16426 - Distribution Switchboards and Equipment.

2. Section 16470 - Panelboards

B. All wiring diagrams shall specifically cover the installed system indicating zones, wiring, and components added to the system. Typical drawings will not be accepted.

1.07 FINAL INSPECTION AND ACCEPTANCE

A. After all requirements of the specifications and/or the drawings have been fully completed, representatives of the Owner will inspect the Work. The Contractor shall provide competent personnel to demonstrate the operation of any item of system, to

the full satisfaction of each representative. The Contractor shall provide 4 hours of minimum scheduled operation and maintenance training for school maintenance staff on each system indicated in 1.06A above. See specific sections for additional training/operation hours required for school personnel.

B. Final acceptance of the work will be made by the Owner after receipt of approval and recommendation of acceptance from each representative.

C. The Contractor shall furnish Record Drawings before final payment of retention.

END OF SECTION

SECTION 260502

BASIC ELECTRICAL MATERIALS AND METHODS

PART 1 - GENERAL

1.1 SUMMARY

A. This Section includes the following:

1. Raceways.
2. Building wire and connectors.
3. Supporting devices for electrical components.
4. Electrical identification.
5. Utility company electricity-metering components.
6. Concrete equipment bases.
7. Cutting and patching for electrical construction.

1.2 SUBMITTALS

A. Product Data: For utility company electricity-metering components.

B. Shop Drawings: Dimensioned plans and sections or elevation layouts and single-line diagram of electricity-metering component assemblies specific to this Project.

1.3 QUALITY ASSURANCE

A. Electrical Components, Devices, and Accessories: Listed and labeled as defined in NFPA 70, Article 100, by a testing agency acceptable to authorities having jurisdiction, and marked for intended use.

B. Devices for Utility Company Electricity Metering: Comply with utility company published standards.

C. Comply with NFPA 70.

1.4 COORDINATION

A. Coordinate chases, slots, inserts, sleeves, and openings for electrical supports, raceways, and cable with general construction work.

B. Sequence, coordinate, and integrate installing electrical materials and equipment for efficient flow of the Work. Coordinate installing large equipment that requires positioning before closing in the building.

C. Coordinate electrical service connections to components furnished by utility companies.

1. Coordinate installation and connection of exterior underground utilities and services, including provision for service entrances and electricity-metering components.

D. Coordinate location of access panels and doors for electrical items that are concealed by finished surfaces. Access doors and panels are specified in Division 8 Section "Access Doors and Frames."

E. Where electrical identification devices are applied to field-finished surfaces, coordinate installation of identification devices with completion of finished surface.

PART 2 - PRODUCTS

2.1 RACEWAYS

A. EMT: Electrical metallic tubing; ANSI C80.3, zinc-coated steel, with set-screw fittings.

B. FMC: Flexible metal conduit; zinc-coated steel.

C. IMC: Intermediate metal conduit; ANSI C80.6, zinc-coated steel, with threaded fittings.

D. LFMC: Liquid-tight flexible metal conduit; zinc-coated steel with sunlight-resistant and mineral-oil-resistant plastic jacket.

E. RMC: Rigid metal conduit; galvanized rigid steel; ANSI C80.1.

F. RNC: Rigid nonmetallic conduit; NEMA TC 2, Schedule 40 PVC, with NEMA TC3 fittings.

G. Raceway Fittings: Specifically designed for raceway type with which used.

2.2 WIRES, CABLES, AND CONNECTIONS

A. Conductors, No. 10 AWG and Smaller: Solid or stranded copper.

B. Conductors, Larger than No. 10 AWG: Stranded copper.

C. Insulation: Thermoplastic, rated 600 V, 75 deg C minimum, Type THW, THHN-THWN, or USE depending on application..

D. Cable: Type MC with ground wire.

E. Wire Connectors and Splices: Units of size, ampacity rating, material, type, and class suitable for service indicated.

2.3 SUPPORTING DEVICES

A. Material: Cold-formed steel, with corrosion-resistant coating.

B. Metal Items for Use Outdoors or in Damp Locations: Hot-dip galvanized steel.

C. Slotted-Steel Channel: Flange edges turned toward web, and 9/16-inch- (14-mm-) diameter slotted holes at a maximum of 2 inches (50 mm) o.c., in webs. Strength rating to suit structural loading.

D. Nonmetallic Slotted Channel and Angle: Structural-grade, factory-formed, glass-fiber-resin channels and angles with 9/16-inch- (14-mm-) diameter holes at a maximum of 8 inches (203 mm) o.c., in at least one surface. Strength rating to suit structural loading.

E. Slotted Channel Fittings and Accessories: Recommended by the manufacturer for use with the type and size of channel with which used.

1. Materials: Same as channels and angles, except metal items may be stainless steel.

F. Raceway and Cable Supports: Manufactured clevis hangers, riser clamps, straps, threaded C-clamps with retainers, ceiling trapeze hangers, wall brackets, and spring-steel clamps or click-type hangers.

G. Pipe Sleeves: ASTM A 53, Type E, Grade A, Schedule 40, galvanized steel, plain ends.

H. Cable Supports for Vertical Conduit: Factory-fabricated assembly consisting of threaded body and insulating wedging plug for nonarmored electrical cables in riser conduits. Plugs have number and size of conductor gripping holes as required to suit individual risers. Body constructed of malleable-iron casting with hot-dip galvanized finish.

I. Expansion Anchors: Carbon-steel wedge or sleeve type.

J. Toggle Bolts: All-steel springhead type.

K. Powder-Driven Threaded Studs: Heat-treated steel.

2.4 ELECTRICAL IDENTIFICATION

A. Identification Device Colors: Use those prescribed by ANSI A13.1, NFPA 70, and these Specifications.

B. Colored Adhesive Marking Tape for Raceways, Wires, and Cables: Self-adhesive vinyl tape, not less than 1 inch wide by 3 mils thick (25 mm wide by 0.08 mm thick).

C. Tape Markers for Conductors: Vinyl or vinyl-cloth, self-adhesive, wraparound type with preprinted numbers and letters.

D. Color-Coding Cable Ties: Type 6/6 nylon, self-locking type. Colors to suit coding scheme.

E. Underground Warning Tape: Permanent, bright-colored, continuous-printed, vinyl tape compounded for permanent direct-burial service, and with the following features:

1. Not less than 6 inches wide by 4 mils thick (150 mm wide by 0.102 mm thick).
2. Embedded continuous metallic strip or core.
3. Printed legend that indicates type of underground line.

F. Engraved-Plastic Labels, Signs, and Instruction Plates: Engraving stock, melamine plastic laminate punched or drilled for mechanical fasteners 1/16-inch (1.6-mm) minimum thickness for signs up to 20 sq. in. (129 sq. cm) and 1/8-inch (3.2-mm) minimum thickness for larger sizes. Engraved legend in black letters on white background.

G. Warning and Caution Signs: Preprinted; comply with 29 CFR 1910.145, Chapter XVII. Colors, legend, and size appropriate to each application.

1. Interior Units: Aluminum, baked-enamel-finish, punched or drilled for mechanical fasteners.
2. Exterior Units: Weather-resistant, nonfading, preprinted, cellulose-acetate butyrate with 0.0396-inch (1-mm), galvanized-steel backing. 1/4-inch (6-mm) grommets in corners for mounting.

H. Fasteners for Nameplates and Signs: Self-tapping, stainless-steel screws or No. 10/32 stainless-steel machine screws with nuts and flat and lock washers.

2.5 EQUIPMENT FOR UTILITY COMPANY'S ELECTRICITY METERING

A. Comply with requirements of electrical power utility company for current transformer cabinets, meter sockets and modular meter centers.

2.6 CONCRETE BASES

A. Concrete Forms and Reinforcement Materials: As specified in Division 3 Section "Cast-in-Place Concrete."

B. Concrete: 3000-psi (20.7-MPa), 28-day compressive strength.

PART 3 - EXECUTION

3.1 ELECTRICAL EQUIPMENT INSTALLATION

A. Headroom Maintenance: If mounting heights or other location criteria are not indicated, arrange and install components and equipment to provide maximum possible headroom.

B. Materials and Components: Install level, plumb, and parallel and perpendicular to other building systems and components, unless otherwise indicated.

C. Equipment: Install to facilitate service, maintenance, and repair or replacement of components. Connect for ease of disconnecting, with minimum interference with other installations.

D. Right of Way: Give to raceways and piping systems installed at a required slope.

3.2 RACEWAY APPLICATION

A. Outdoor Installations:

1. Exposed: IMC, RMC, RNC.
2. Concealed: IMC, RMC, RNC.
3. Underground, Single Run: RNC, RMC.
4. Underground, Grouped: RNC.
5. Connection to Vibrating Equipment: LFMC.
6. Boxes and Enclosures: NEMA 250, Type 3R or Type 4, unless otherwise indicated.

B. Indoor Installations:

1. Exposed: EMT except in wet or damp locations, use IMC.

2. Concealed in Walls or Ceilings: EMT.
3. In Concrete Slab: RNC, IMC, RMC, EMT.
4. Below Slab on Grade or in Crawlspace: RNC, IMC, RMC.
5. Connection to Vibrating Equipment: FMC; except in wet or damp locations: LFMC.
6. Boxes and Enclosures: NEMA 250, Type 1, unless otherwise indicated.

3.3 RACEWAY AND CABLE INSTALLATION

A. Conceal raceways and cables, unless otherwise indicated, within finished walls, ceilings, and floors.

B. Keep legs of raceway bends in the same plane and keep straight legs of offsets parallel.

C. Use RMC elbows where RNC turns out of slab.

D. Install pull wires in empty raceways. Use No. 14 AWG zinc-coated steel or woven polypropylene or monofilament plastic line with not less than 200-lb (90-kg) tensile strength. Leave at least 12 inches (300 mm) of slack at each end of pull wires.

E. Install telephone and signal system raceways, 2-inch trade size (DN 53) and smaller, in maximum lengths of 150 feet (45 m) and with a maximum of two 90-deg ree bends or equivalent. Add pull boxes where necessary to accomplish this.

F. Connect motors and equipment subject to vibration, noise transmission, or movement with a maximum of 72-inches (1830-mm) flexible conduit. Install LFMC in wet or damp locations. Install separate ground conductor across flexible connections.

G. Set floor boxes level and trim after installation to fit flush to finished floor surface.

3.4 WIRING METHODS FOR POWER, LIGHTING, AND CONTROL CIRCUITS

A. Application: Use wiring methods specified below to the extent permitted by applicable codes as interpreted by authorities having jurisdiction.

B. Exposed Feeders: Insulated single conductors in raceway, Metal-clad cable, Armored cable.

C. Concealed Feeders in Ceilings Walls, Gypsum Board Partitions: Insulated single conductors in raceway, Metal-clad cable, Armored cable.

D. Concealed Feeders in Concrete, below Floors on Grade, in Crawlspaces: Insulated single conductors in raceway.

E. Exposed Branch Circuits Including in Crawlspaces: Insulated single conductors in raceway, Metal-clad cable, Armored cable.

F. Concealed Branch Circuits in Ceilings Walls, Gypsum Board Partitions: Insulated single conductors in raceway, Metal-clad cable, Armored cable.

G. Concealed Branch Circuits in Concrete, below Floors on Grade: Insulated single conductors in raceway.

H. Underground Feeders and Branch Circuits: Insulated single conductors in raceway.

I. Remote-Control Signaling and Power-Limited Circuits, Classes 1, 2, and 3: Insulated conductors in raceway unless otherwise indicated.

3.5 WIRING INSTALLATION

A. Make splices and taps that are compatible with conductor material and that possess equivalent or better mechanical strength and insulation ratings than unspliced conductors.

3.6 ELECTRICAL SUPPORTING DEVICE APPLICATION

A. Damp Locations and Outdoors: Hot-dip galvanized materials or nonmetallic, slotted channel system components.

B. Dry Locations: Steel materials.

C. Strength of Supports: Adequate to carry present and future loads, times a safety factor of at least four with, 200-lb (90-kg) minimum design load for each support element.

3.7 SUPPORT INSTALLATION

A. Support parallel runs of horizontal raceways together on trapeze- or bracket-type hangers.

B. Size supports for multiple raceway or cable runs so capacity can be increased by a 25 percent minimum in the future.

C. Support individual horizontal single raceways with separate, malleable-iron pipe hangers or clamps except use spring-steel fasteners for 1-1/2-inch (38-mm) and smaller single raceways above suspended ceilings and for fastening raceways to slotted channel and angle supports.

D. Install sleeves for cable and raceway penetrations of concrete slabs and walls unless core-drilled holes are used. Install sleeves for cable and raceway penetrations of masonry and fire-rated gypsum walls and of all other fire-rated floor and wall assemblies. Install sleeves during erection of concrete and masonry walls.

E. Secure electrical items and their supports to building structure, using the following methods unless other fastening methods are indicated:

1. Wood: Wood screws or screw-type nails.
2. Gypsum Board: Toggle bolts. Seal around sleeves with joint compound, both sides of wall.
3. Masonry: Toggle bolts on hollow block and expansion bolts on solid block. Seal around sleeves with mortar, both sides of wall.
4. New Concrete: Concrete inserts with machine screws and bolts.
5. Existing Concrete: Expansion bolts or threaded studs driven by powder charge and provided with lock washers.
6. Structural Steel: Spring-tension clamps, Threaded studs driven by powder charge and provided with lock washers.

    a. Comply with AWS D1.1 for field welding.

7. Light Steel Framing: Sheet metal screws.
8. Fasteners for Damp, Wet, or Weather-Exposed Locations: Stainless steel.
9. Light Steel: Sheet-metal screws.

10. Fasteners: Select so load applied to each fastener does not exceed 25 percent of its proof-test load.

3.8 IDENTIFICATION MATERIALS AND DEVICES

A. Install at locations for most convenient viewing without interference with operation and maintenance of equipment.

B. Coordinate names, abbreviations, colors, and other designations used for electrical identification with corresponding designations indicated in the Contract Documents or required by codes and standards. Use consistent designations throughout Project.

C. Self-Adhesive Identification Products: Clean surfaces before applying.

D. Tag and label circuits designated to be extended in the future. Identify source and circuit numbers in each cabinet, pull and junction box, and outlet box. Color-coding may be used for voltage and phase identification.

E. Install continuous underground plastic markers during trench backfilling, for exterior underground power, control, signal, and communication lines located directly above power and communication lines. Locate 6 to 8 inches (150 to 200 mm) below finished grade. If width of multiple lines installed in a common trench or concrete envelope does not exceed 16 inches (400 mm), overall, use a single line marker.

F. Install warning, caution, and instruction signs where required to comply with 29 CFR 1910.145, Chapter XVII, and where needed to ensure safe operation and maintenance of electrical systems and of items to which they connect. Indoors install engraved plastic-laminated instruction signs with approved legend where instructions are needed for system or equipment operation. Install metal-backed butyrate signs for outdoor items.

G. Install engraved-laminated emergency-operating signs with white letters on red background with minimum 3/8-inch- (9-mm-) high lettering for emergency instructions on power transfer, load shedding, and other emergency operations.

3.9 ELECTRICITY-METERING EQUIPMENT

A. Install utility company metering equipment according to utility company's written requirements. Provide grounding and empty conduits as required by utility company.

3.10 FIRESTOPPING

A. Apply firestopping to cable and raceway sleeves and other penetrations of fire-rated floor and wall assemblies to restore original undisturbed fire-resistance ratings of assemblies. Firestopping installation is specified in Division 7 Section "Through-Penetration Firestop Systems."

3.11 CONCRETE BASES

A. Construct concrete bases of dimensions indicated, but not less than 4 inches (100 mm) larger, in both directions, than supported unit. Follow supported equipment manufacturer's

anchorage recommendations and setting templates for anchor-bolt and tie locations, unless otherwise indicated.

3.12 DEMOLITION

A. Protect existing electrical equipment and installations indicated to remain. If damaged or disturbed in the course of the Work, remove damaged portions and install new products of equal capacity, quality, and functionality.

B. Accessible Work: Remove exposed electrical equipment and installations, indicated to be demolished, in their entirety.

C. Abandoned Work: Cut and remove buried raceway and wiring, indicated to be abandoned in place, 2 inches (50 mm) below the surface of adjacent construction. Cap raceways and patch surface to match existing finish.

D. Remove, store, clean, reinstall, reconnect, and make operational components indicated for relocation.

3.13 CUTTING AND PATCHING

A. Cut, channel, chase, and drill floors, walls, partitions, ceilings, and other surfaces required to permit electrical installations. Perform cutting by skilled mechanics of trades involved.

B. Repair, refinish and touch up disturbed finish materials and other surfaces to match adjacent undisturbed surfaces.

END OF SECTION

SECTION 260513

CONDUCTORS AND CABLES

PART 1 - **GENERA**L

1.1 SUMMARY

A. This Section includes building wires and cables and associated connectors, splices, and terminations for wiring systems rated 600 V and less.

1.2 SUBMITTALS

A. Field quality-control test reports.

1.3 QUALITY ASSURANCE

A. Electrical Components, Devices, and Accessories: Listed and labeled as defined in NFPA 70, Article 100, by a testing agency acceptable to authorities having jurisdiction, and marked for intended use.

B. Comply with NFPA 70.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

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

1. Available Manufacturers: Subject to compliance with requirements, manufacturers offering products that may be incorporated into the Work include, but are not limited to, the manufacturers specified.
2. Manufacturers: Subject to compliance with requirements, provide products by the manufacturers specified.

2.2 CONDUCTORS AND CABLES

A. Manufacturers:

1. Alcan Aluminum Corporation; Alcan Cable Div.
2. American Insulated Wire Corp.; a Leviton Company.
3. General Cable Corporation.
4. Senator Wire & Cable Company.
5. Southwire Company.

B. Refer to Part 3 "Conductor and Insulation Applications" Article for insulation type, cable construction, and ratings.

C. Conductor Material: Copper, stranded conductor, solid conductor for No. 10 AWG and smaller, stranded for No. 8 AWG and larger.

D. Conductor Insulation Types: Type THW, THHN-THWN, XHHW, UF, USE and SO.

E. Multi-conductor Cable: Armored cable, Type AC. Metal-clad cable, Type MC, Nonmetallic-sheathed cable, Type NM, Type SO and Type USE with ground wire.

2.3 CONNECTORS AND SPLICES

A. Manufacturers:

1. AFC Cable Systems, Inc.
2. AMP Incorporated/Tyco International.
3. Hubbell/Anderson.
4. O-Z/Gedney; EGS Electrical Group LLC.
5. 3M Company; Electrical Products Division.

B. Description: Factory-fabricated connectors and splices of size, ampacity rating, material, type, and class for application and service indicated.

PART 3 - EXECUTION

3.1 CONDUCTOR AND INSULATION APPLICATIONS

A. Service Entrance: Type THHN-THWN, single conductors in raceway, XHHW, single conductors in raceway, SE or USE multi-conductor cable.

B. Exposed Feeders: Type THHN-THWN, single conductors in raceway, Armored cable, Type AC, [Metal-clad cable, Type MC, Nonmetallic-sheathed cable, Type NM.

C. Feeders Concealed in Ceilings, Walls, and Partitions: Type THHN-THWN, single conductors in raceway, Armored cable, Type AC, Metal-clad cable, Type MC, Nonmetallic-sheathed cable, Type NM.

D. Feeders Concealed in Concrete, below Slabs-on-Grade, and in Crawlspaces: Type THHN-THWN, single conductors in raceway.

E. Exposed Branch Circuits, including in Crawlspaces: Type THHN-THWN, single conductors in raceway, Armored cable, Type AC, Metal-clad cable, Type MC, Nonmetallic-sheathed cable, Type NM]

F. Branch Circuits Concealed in Ceilings, Walls, and Partitions: Type THHN-THWN, single conductors in raceway, Armored cable, Type AC, Metal-clad cable, Type MC, Nonmetallic-sheathed cable, Type NM.

G. Branch Circuits Concealed in Concrete and below Slabs-on-Grade: Type THHN-THWN, single conductors in raceway.

H. Underground Feeders and Branch Circuits: Type UF multi-conductor cable.

I. Cord Drops and Portable Appliance Connections: Type SO, hard service cord.

J. Fire Alarm Circuits: Type THHN-THWN, in raceway, Power-limited, fire-protective, signaling circuit cable.

K. Class 1 Control Circuits: Type THHN-THWN, in raceway.

L. Class 2 Control Circuits: Type THHN-THWN, in raceway, Power-limited cable, concealed in building finishes, Power-limited tray cable, in cable tray.

3.2 INSTALLATION

A. Conceal cables in finished walls, ceilings, and floors, unless otherwise indicated.

B. Use manufacturer-approved pulling compound or lubricant where necessary; compound used must not deteriorate conductor or insulation. Do not exceed manufacturer's recommended maximum pulling tensions and sidewall pressure values.

C. Use pulling means, including fish tape, cable, rope, and basket-weave wire/cable grips, that will not damage cables or raceway.

D. Install exposed cables parallel and perpendicular to surfaces of exposed structural members, and follow surface contours where possible.

E. Support cables according to Division 16 Section "Basic Electrical Materials and Methods."

F. Seal around cables penetrating fire-rated elements according to Division 7 Section "Through-Penetration Firestop Systems."

G. Identify and color-code conductors and cables according to Division 16 Section "Basic Electrical Materials and Methods and Electrical Identification."

H. Make splices and taps that are compatible with conductor material and that possess equivalent or better mechanical strength and insulation ratings than un-spliced conductors.

   1. Use oxide inhibitor in each splice and tap conductor for aluminum conductors.

I. Wiring at Outlets: Install conductor at each outlet, with at least **12 inches (300 mm)** of slack.

3.3 FIELD QUALITY CONTROL

A. Testing: Perform each electrical test and visual and mechanical inspection stated in NETA ATS, Section 7.3.1. Certify compliance with test parameters.

B. Test Reports: Prepare a written report to record the following:

   1. Test procedures used.
   2. Test results that comply with requirements.
   3. Test results that do not comply with requirements and corrective action taken to achieve compliance with requirements.

END OF SECTION

SECTION 260519

BUILDING WIRING AND CABLE

PART 1 GENERAL

1.01 SECTION INCLUDES

A. Building wire and cable.

B. Underground feeder and branch circuit cable.

C. Service entrance cable.

D. Armored cable.

E. Metal clad cable.

F. Wiring connectors and connections.

1.02 REFERENCES

A. ANSI/NFPA 70 - National Electrical Code.

1.03 SUBMITTALS

A. Submit under provisions of Section 01300.

B. Product Data: Provide for each cable assembly type.

C. Test Reports: Indicate procedures and values obtained.

D. Design Data: Indicate voltage drop and ampacity calculations for aluminum conductors substituted for copper conductors.

E. Manufacturer's Installation Instructions: Indicate application conditions and limitations of use stipulated by product testing agency specified under Regulatory Requirements.

1.04 QUALIFICATIONS

A. Manufacturer: Company specializing in manufacturing products specified in this Section with minimum ten years documented experience.

1.05 REGULATORY REQUIREMENTS

A. Conform to requirements of ANSI/NFPA 70.

B. Furnish products listed and classified by Underwriters Laboratories, Inc. or testing firm acceptable to authority having jurisdiction as suitable for purpose specified and shown.

1.06 FIELD SAMPLES

A. Provide under provisions of other Sections.

B. Submit two lengths, each 18 inches of cable assembly from each reel. C.

Select each length to include complete set of manufacturer markings. D.

Attach tag indicating cable size and application information.

1.07 PROJECT CONDITIONS

A. Verify that field measurements are as shown on Drawings. B.

Conductor sizes are based on copper.

C. Aluminum conductors shall not be used.

D. Wire and cable routing shown on Drawings is approximate unless dimensioned. Route wire and cable as required to meet Project Conditions.

E. Where wire and cable routing is not shown, and destination only is indicated, determine exact routing and lengths required.

1.08 COORDINATION

A. Coordinate Work under provisions of Section 01039

B. Determine required separation between cable and other work. C.

Determine cable routing to avoid interference with other work.

PART 2 PRODUCTS

2.01 MANUFACTURERS - BUILDING WIRE AND CABLE

A. Anaconda Power Cable. B.

Carol Cable.

C. Rome Wire and Cable. D.

Alpha Wire.

2.02 BUILDING WIRE AND CABLE

A. Description: Single conductor insulated wire. B.

Conductor: Copper.

C. Insulation Voltage Rating: 600 volts.

D. Insulation: ANSI/NFPA 70; Type THHN/THWN or XHHN insulation for feeders and branch circuits.

2.03 MANUFACTURERS - UNDERGROUND FEEDER AND BRANCH-CIRCUIT CABLE

A. Substitutions: Under provisions of Section 01600.

2.04 UNDERGROUND FEEDER AND BRANCH CIRCUIT CABLE

A. Description: ANSI/NFPA 70, Type UF. B.

Conductor: Copper.

C. Insulation Voltage Rating: 600 volts.

D. Insulation Temperature Rating: 90 degrees C.

2.05 MANUFACTURERS - SERVICE-ENTRANCE CABLE

A. Substitutions: Under provisions of Section 01600.

2.06 SERVICE ENTRANCE CABLE

A. Description: ANSI/NFPA 70, Type USE. B.

Conductor: Copper.

C. Insulation Voltage Rating: 600 volts. D.

Insulation: Type XHHW.

2.07 WIRING CONNECTORS

A. Split Bolt Connectors:

1. Ilsco, Model SK.
2. Burndy, Model KSU.
3. Blackburn, Model HPS.

B. Solderless Pressure Connectors:

1. Ilsco, Model SLUH.
2. Burndy, Model KA-U.
3. Panduit, Model LAM. C.

Spring Wire Connectors:

1. Buchanan, Model 31, 33, 35 and 37.
2. 3M.
3. Ideal Wirenut.

D. Compression Connectors:

1. Burndy, Model HYLUG / HYLINK

2. Panduit, Model LAA.

3. Blackburn, Model ATL.

PART 3 EXECUTION

3.01 EXAMINATION

A. Verify that interior of building has been protected from weather.

B. Verify that mechanical work likely to damage wire and cable has been completed.

3.02 PREPARATION

A. Completely and thoroughly swab raceway before installing wire.

3.03 WIRING METHODS

A. Concealed Dry Interior Locations: Use only building wire, Type THHN/THWN or XHHN insulation, in raceway.

B. Exposed Dry Interior Locations: Use only building wire, Type THHN/THWN or XHHN insulation, in raceway.

C. Above Accessible Ceilings: Use only building wire, Type THHN/THWN or XHHN insulation, in raceway.

D. Wet or Damp Interior Locations: Use only building wire, Type THHN/THWN or XHHN insulation, in raceway.

E. Exterior Locations: Use only building wire, Type XHHW insulation, in raceway. F.

Underground Installations: Use only building wire, Type XHHW insulation, in raceway.

G. Use wiring methods indicated on Drawings.

3.04 INSTALLATION

A. Install products in accordance with manufacturers instructions.

B. Use solid conductor for feeders and branch circuits 10 AWG and smaller.

C. Use stranded conductors for control circuits.

D. Use conductor not smaller than 12 AWG for power and lighting circuits.

E. Use conductor not smaller than 16 AWG for control circuits.

F. Use 10 AWG conductors for 20 ampere, 120-volt branch circuits longer than 75 feet.

G. Use 10 AWG conductors for 20 ampere, 277-volt branch circuits longer than 200 feet.

H. Pull all conductors into raceway at same time.

I. Use suitable wire pulling lubricant for building wire 4 AWG and larger.

J. Protect exposed cable from damage.

K. Support cables above accessible ceiling, using spring metal clips or metal or plastic cable ties to support cables from structure. Do not rest cable on ceiling panels.

L. Use suitable cable fittings and connectors.

M. Neatly train and lace wiring inside boxes, equipment, and panelboards.

N. Clean conductor surfaces before installing lugs and connectors.

O. Make splices, taps, and terminations to carry full ampacity of conductors with no perceptible temperature rise.

P. Terminate aluminum conductors with tin-plated aluminum-bodied compression connectors only. Fill with anti-oxidant compound before installing conductor.

Q. Use suitable reducing connectors or mechanical connector adaptors for connecting aluminum conductors to copper conductors.

R. Use split bolt connectors for copper conductor splices and taps, 6 AWG and larger. Tape uninsulated conductors and connector with electrical tape to 150 percent of insulation rating of conductor.

S. Use solderless pressure connectors with insulating covers for copper conductor splices and taps, 8 AWG and smaller.

T. Use insulated spring wire connectors with plastic caps for copper conductor splices and taps, 10 AWG and smaller.

3.05 INTERFACE WITH OTHER PRODUCTS

A. Identify wire and cable under provisions of Section 16195.

B. Identify each conductor with its circuit number or other designation indicated on Drawings.

3.06 FIELD QUALITY CONTROL

A. Perform field inspection and testing under provisions of other Sections.

B. Inspect wire and cable for physical damage and proper connection.

C. Measure tightness of bolted connections and compare torque measurements with manufacturer's recommended values.

D. Verify continuity of each branch circuit conductor.

END OF SECTION

SECTION 260526

GROUNDING AND BONDING

PART 1 - GENERAL

1.1 SUMMARY

A. This Section includes grounding of electrical systems and equipment. Requirements specified in this Section may be supplemented by requirements of other Sections.

1.2 SUBMITTALS

A. Product Data: For ground rods.

B. Field quality-control test reports.

1.3 QUALITY ASSURANCE

A. Electrical Components, Devices, and Accessories: Listed and labeled under UL 467 as defined in NFPA 70, Article 100, by a testing agency acceptable to authorities having jurisdiction, and marked for intended use.

B. Comply with NFPA 70; for overhead-line construction and medium-voltage underground construction, comply with IEEE C2.

C. Comply with NFPA 780 and UL 96 when interconnecting with lightning protection system.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

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

B. Manufacturers: Subject to compliance with requirements, provide products by one of the following:

1. Apache Grounding/Erico Inc.
2. Boggs, Inc.
3. Chance/Hubbell.
4. Copperweld Corp.
5. Dossert Corp.
6. Erico Inc.; Electrical Products Group.
7. Framatome Connectors/Burndy Electrical.
8. Galvan Industries, Inc.
9. Harger Lightning Protection, Inc.
10. Hastings Fiber Glass Products, Inc.
11. Heary Brothers Lightning Protection Co.
12. Ideal Industries, Inc.
13. ILSCO.
14. Kearney/Cooper Power Systems.
15. Korns, C. C. Co.; Division of Robroy Industries.
16. Lightning Master Corp.

17. Lyncole XIT Grounding.
18. O-Z/Gedney Co.; a business of the EGS Electrical Group.
19. Raco, Inc.; Division of Hubbell.
20. Robbins Lightning, Inc.
21. Salisbury, W. H. & Co.
22. Superior Grounding Systems, Inc.
23. Thomas & Betts, Electrical.

2.2 GROUNDING CONDUCTORS

A. For insulated conductors, comply with Division 16 Section "Conductors and Cables."

B. Equipment Grounding Conductors: Insulated with green-colored insulation.

C. Isolated Ground Conductors: Insulated with green-colored insulation with yellow stripe. On feeders with isolated ground, use colored tape, alternating bands of green and yellow tape to provide a minimum of three bands of green and two bands of yellow.

D. Grounding Electrode Conductors: Stranded cable.

E. Underground Conductors: Bare, tinned, stranded, unless otherwise indicated.

F. Bare, Solid-Copper Conductors: ASTM B 3.

G. Assembly of Bare, Stranded-Copper Conductors: ASTM B 8.

H. Bare, Tinned-Copper Conductors: ASTM B 33.

I. Copper Bonding Conductor: No. 4 or No. 6 AWG, stranded copper conductor.

J. Copper Bonding Jumper: Bare copper tape, braided bare copper conductors, terminated with copper ferrules; 1-5/8 inches (42 mm) wide and 1/16 inch (1.5 mm) thick.

K. Tinned-Copper Bonding Jumper: Tinned-copper tape, braided copper conductors, terminated with copper ferrules; 1-5/8 inches (42 mm) wide and 1/16 inch (1.5 mm) thick.

L. Ground Conductor for Overhead Distribution: No. 4 AWG minimum, soft-drawn copper.

M. Grounding Bus: Bare, annealed copper bars of rectangular cross section, with insulated spacer.

N. Connectors: Comply with IEEE 837 and UL 467; listed for use for specific types, sizes, and combinations of conductors and connected items. Bolted type, compression type, or exothermic-welded type, in kit form, selected per manufacturer's written instructions.

2.3 GROUNDING ELECTRODES

A. Ground Rods: [Copper-clad steel.

B. Ground Rods: Sectional type; copper-clad steel.

1. Size: [**3/4 by 120 inches (19 by 3000 mm)** in diameter.

C. Chemical Electrodes: Copper tube, straight or L-shaped, filled with nonhazardous chemical salts, terminated with a 4/0 bare conductor. Provide backfill material recommended by manufacturer.

PART 3 - EXECUTION

3.1 INSTALLATION

A. Use only copper conductors for both insulated and bare grounding conductors in direct contact with earth, concrete, masonry, crushed stone, and similar materials.

B. In raceways, use insulated equipment grounding conductors.

C. Exothermic-Welded Connections: Use for connections to structural steel and for underground connections.

D. Grounding Bus: Install in electrical and telephone equipment rooms, in rooms housing service equipment, and elsewhere as indicated.

1. Use insulated spacer; space 1 inch (25.4 mm) from wall and support from wall 6 inches (150 mm) above finished floor, unless otherwise indicated.
2. At doors, route the bus up to the top of the door frame, across the top of the doorway, and down to the indicated height above the floor.

E. Underground Grounding Conductors: Use copper conductor, No. 2/0 AWG minimum. Bury at least 24 inches (600 mm) below grade or bury 12 inches (300 mm) above duct bank when installed as part of the duct bank.

F. Equipment Grounding Conductors: Comply with NFPA 70, Article 250, for types, sizes, and quantities of equipment grounding conductors, unless specific types, larger sizes, or more conductors than required by NFPA 70 are indicated.

1. Install insulated equipment grounding conductors in feeders and branch circuits receptacle circuits.
2. Busway Supply Circuits: Install insulated equipment grounding conductor from the grounding bus in the switchgear, switchboard, or distribution panel to equipment grounding bar terminal on busway.
3. Computer Outlet Circuits: Install insulated equipment grounding conductor in branch-circuit runs from computer-area power panels or power-distribution units.
4. Isolated Grounding Receptacle Circuits: Install an insulated equipment grounding conductor connected to the receptacle grounding terminal. Isolate grounding conductor from raceway and from panelboard grounding terminals. Terminate at equipment grounding conductor terminal of the applicable derived system or service, unless otherwise indicated.
5. Isolated Equipment Enclosure Circuits: For designated equipment supplied by a branch circuit or feeder, isolate equipment enclosure from supply raceway with a nonmetallic raceway fitting listed for the purpose. Install fitting where raceway enters enclosure, and install an insulated equipment grounding conductor. Isolate equipment grounding conductor from raceway and from panelboard grounding terminals. Terminate at equipment grounding conductor terminal of the applicable derived system or service, unless otherwise indicated.
6. Nonmetallic Raceways: Install an equipment grounding conductor in nonmetallic raceways unless they are designated for telephone or data cables.
7. Air-Duct Equipment Circuits: Install an insulated equipment grounding conductor to duct-mounted electrical devices operating at 120 V and more, including air cleaners and heaters. Bond conductor to each unit and to air duct.
8. Water Heater, Heat-Tracing, and Antifrost Heating Cables: Install an insulated equipment grounding conductor to each electric water heater, heat-tracing, and antifrost heating cable. Bond conductor to heater units, piping, connected equipment, and components.
9. Signal and Communication Systems: For telephone, alarm, voice and data, and other communication systems, provide No. 4 AWG minimum insulated grounding conductor

in raceway from grounding electrode system to each service location, terminal cabinet, wiring closet, and central equipment location.

a. Service and Central Equipment Locations and Wiring Closets: Terminate grounding conductor on a 1/4-by-2-by-12-inch (6.4-by-50-by-300-mm) grounding bus.
b. Terminal Cabinets: Terminate grounding conductor on cabinet grounding terminal.

10. Metal Poles Supporting Outdoor Lighting Fixtures: Provide a grounding electrode in addition to installing an insulated equipment grounding conductor with supply branch-circuit conductors.
11. Common Ground Bonding with Lightning Protection System: Bond electrical power system ground directly to lightning protection system grounding conductor at closest point to electrical service grounding electrode. Use bonding conductor sized same as system grounding electrode conductor, and install in conduit.

G. Metal Frame Grounding for Buildings: Drive a ground rod at the base of every corner column and at intermediate exterior columns at distances not more than 60 feet (18 m) apart. Connect rod to column with an underground grounding conductor.. Use tinned-copper conductor not less than No. 2/0 AWG for underground conductor, and bury 18 inches (450 mm) below grade, minimum.

H. Ground Rods: Install at least three rods spaced at least one-rod length from each other and located at least the same distance from other grounding electrodes.

1. Drive ground rods until tops are 2 inches (50 mm) below finished floor or final grade, unless otherwise indicated.
2. Interconnect ground rods with grounding electrode conductors. Use exothermic welds, except as otherwise indicated. Make connections without exposing steel or damaging copper coating.

I. Grounding Conductors: Route along shortest and straightest paths possible, unless otherwise indicated. Avoid obstructing access or placing conductors where they may be subjected to strain, impact, or damage.

J. Bonding Straps and Jumpers: Install so vibration by equipment mounted on vibration isolation hangers or supports is not transmitted to rigidly mounted equipment. Use exothermic-welded connectors for outdoor locations, unless a disconnect-type connection is required; then, use a bolted clamp. Bond straps directly to the basic structure taking care not to penetrate any adjacent parts. Install straps only in locations accessible for maintenance.

K. Metal Water Service Pipe: Provide insulated copper grounding conductors, in conduit, from building's main service equipment, or grounding bus, to main metal water service entrances to building. Connect grounding conductors to main metal water service pipes by grounding clamp connectors. Where a dielectric main water fitting is installed, connect grounding conductor to street side of fitting. Bond metal grounding conductor conduit or sleeve to conductor at each end.

L. Water Meter Piping: Use braided-type bonding jumpers to electrically bypass water meters. Connect to pipe with grounding clamp connectors.

M. Comply with NFPA 780 and UL 96 when interconnecting with lightning protection system.

N. Bond interior metal piping systems and metal air ducts to equipment grounding conductors of associated pumps, fans, blowers, electric heaters, and air cleaners. Use braided-type bonding straps.

O. Bond each aboveground portion of gas piping system upstream from equipment shutoff valve.

P. Connections: Make connections so galvanic action or electrolysis possibility is minimized. Select connectors, connection hardware, conductors, and connection methods so metals in direct contact will be galvanically compatible.

1. Use electroplated or hot-tin-coated materials to ensure high conductivity and to make contact points closer to order of galvanic series.
2. Make connections with clean, bare metal at points of contact.
3. Make aluminum-to-steel connections with stainless-steel separators and mechanical clamps.
4. Make aluminum-to-galvanized steel connections with tin-plated copper jumpers and mechanical clamps.
5. Coat and seal connections having dissimilar metals with inert material to prevent future penetration of moisture to contact surfaces.
6. Exothermic-Welded Connections: Comply with manufacturer's written instructions. Welds that are puffed up or that show convex surfaces indicating improper cleaning are not acceptable.
7. Equipment Grounding Conductor Terminations: For No. 8 AWG and larger, use pressure-type grounding lugs. No. 10 AWG and smaller grounding conductors may be terminated with winged pressure-type connectors.
8. Noncontact Metal Raceway Terminations: If metallic raceways terminate at metal housings without mechanical and electrical connection to housing, terminate each conduit with a grounding bushing. Connect grounding bushings with a bare grounding conductor to grounding bus or terminal in housing. Bond electrically noncontinuous conduits at entrances and exits with grounding bushings and bare grounding conductors, unless otherwise indicated.
9. Tighten screws and bolts for grounding and bonding connectors and terminals according to manufacturer's published torque-tightening values. If manufacturer's torque values are not indicated, use those specified in UL 486A[**and UL 486B**].
10. Compression-Type Connections: Use hydraulic compression tools to provide correct circumferential pressure for compression connectors. Use tools and dies recommended by connector manufacturer. Provide embossing die code or other standard method to make a visible indication that a connector has been adequately compressed on grounding conductor.
11. Moisture Protection: If insulated grounding conductors are connected to ground rods or grounding buses, insulate entire area of connection and seal against moisture penetration of insulation and cable.

Q. Duct Banks: Install a grounding conductor with at least 50 percent ampacity of the largest phase conductor in the duct bank.

R. Manholes and Handholes: Install a driven ground rod close to wall and set rod depth so 4 inches (100 mm) will extend above finished floor. If necessary, install ground rod before manhole is placed and provide a No. 1/0 AWG bare, tinned-copper conductor from ground rod into manhole through a waterproof sleeve in manhole wall. Protect ground rods passing through concrete floor with a double wrapping of pressure-sensitive tape or heat-shrunk insulating sleeve from 2 inches (50 mm) above to 6 inches (150 mm) below concrete. Seal floor opening with waterproof, nonshrink grout.

S. Connections to Manhole Components: Connect exposed-metal parts, such as inserts, cable racks, pulling irons, ladders, and cable shields within each manhole or handhole, to ground rod or grounding conductor. Make connections with No. 4 AWG minimum, stranded, hard-drawn copper conductor. Train conductors level or plumb around corners and fasten to manhole walls. Connect to cable armor and cable shields as recommended by manufacturer of splicing and termination kits.

T. Pad-Mounted Transformers and Switches: Install two ground rods and counterpoise circling pad. Ground pad-mounted equipment and noncurrent-carrying metal items associated with

substations by connecting them to underground cable and grounding electrodes. Use tinned-copper conductor not less than No. 2 AWG for counterpoise and for taps to equipment ground pad. Bury counterpoise not less than 18 inches (450 mm) below grade and 6 inches (150 mm) from the foundation.

3.2 FIELD QUALITY CONTROL

A. Testing: Perform the following field quality-control testing:

1. After installing grounding system but before permanent electrical circuitry has been energized, test for compliance with requirements.
2. Test completed grounding system at each location where a maximum ground-resistance level is indicated and at service disconnect enclosure grounding terminal. Measure ground resistance not less than two full days after the last trace of precipitation, and without the soil being moistened by any means other than natural drainage or seepage and without chemical treatment or other artificial means of reducing natural ground resistance. Perform tests, by the fall-of-potential method according to IEEE 81.
3. Provide drawings locating each ground rod, ground rod assembly, and other grounding electrodes. Identify each by letter in alphabetical order, and key to the record of tests and observations. Include the number of rods driven and their depth at each location and include observations of weather and other phenomena that may affect test results. Describe measures taken to improve test results. Nominal maximum values are as follows:

    a. Equipment Rated 500 kVA and Less: 10 ohms.
    b. Equipment Rated 500 to 1000 kVA: 5 ohms.
    c. Equipment Rated More Than 1000 kVA: 3 ohms.
    d. Overhead Distribution Line Equipment: 25 ohms.
    e. Substations and Pad-Mounted Switching Equipment: 5 ohms.
    f. Manhole Grounds: 10 ohms.

END OF SECTION

SECTION 260529

SUPPORTING DEVICES

PART 1 GENERAL

1.01 SECTION INCLUDES

A. Conduit and equipment

supports. B. Anchors and fasteners.

1.02 REFERENCES

A. NECA - National Electrical Contractors

Association. B. ANSI/NFPA 70 - National

Electrical Code.

1.03 SUBMITTALS

A. Submit under provisions of Section 01340.

B. Product Data: Provide manufacturer's catalog data for fastening systems.

C. Manufacturer's Instructions: Indicate application conditions and limitations of use stipulated by Product testing agency specified under Regulatory Requirements. Include instructions for storage, handling, protection, examination, preparation, installation, and starting of Product.

1.04 REGULATORY REQUIREMENTS

A. Conform to requirements of ANSI/NFPA 70.

B. Furnish products listed and classified by Underwriters Laboratories, Inc. or testing firm acceptable to authority having jurisdiction as suitable for purpose specified and shown.

PART 2 PRODUCTS

2.01 PRODUCT REQUIREMENTS

A. Materials and Finishes: Provide adequate corrosion resistance.

B. Provide materials, sizes, and types of anchors, fasteners and supports to carry the loads of equipment and conduit. Consider weight of wire in conduit when selecting products.

C. Anchors and Fasteners:

1. Concrete Structural Elements: Use precast insert system, expansion anchors, powder-actuated anchors and preset inserts.

2. Steel Structural Elements: Use beams clamps with seismic safety strap,

spring steel clips, steel ramset fasteners, and welded fasteners.

3. Concrete Surfaces: Use self-drilling anchors and expansion anchors.
4. Hollow Masonry, Plaster, and Gypsum Board Partitions: Use toggle bolts and hollow wall fasteners.
5. Solid Masonry Walls: Use expansion anchors and preset inserts.
6. Sheet Metal: Use sheet metal screws.

PART 3 EXECUTION

3.01 INSTALLATION

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

B. Provide anchors, fasteners, and supports in accordance with NECA "Standard of Installation".

C. Do not fasten supports to pipes, ducts, mechanical equipment, and

conduit.

D. Do not use spring steel clips and clamps.

E. Do not use powder-actuated anchors.

F. Obtain permission from Architect before drilling or cutting structural members.

G. Fabricate supports from structural steel or steel channel. Rigidly weld members or use hexagon head bolts to present neat appearance with adequate strength and rigidity. Use spring lock washers under all nuts.

H. Install surface-mounted cabinets and panelboards with minimum of four

anchors.

I. In wet and damp locations uses steel channel supports to stand cabinets and panelboards one inch off wall.

J. Use sheet metal channel to bridge studs above and below cabinets and panelboards recessed in hollow partitions.

END OF SECTION

SECTION 260533

RACEWAY AND BOXES

PART 1 - **GENERAL**

1.1 SUMMARY

A. This Section includes raceways, fittings, boxes, enclosures, and cabinets for electrical wiring.

B. See Division 2 Section "Underground Ducts and Utility Structures" for exterior ductbanks, manholes, and underground utility construction.

C. See Division 7 Section "Through-Penetration Firestop Systems" for firestopping materials and installation at penetrations through walls, ceilings, and other fire-rated elements.

D. See Division 16 Section "Basic Electrical Materials and Methods" for supports, anchors, and identification products.

E. See Division 16 Section "Seismic Controls for Electrical Work" for seismic restraints and bracing of raceways, boxes, enclosures, and cabinets.

F. See Division 16 Section "Wiring Devices" for devices installed in boxes and for floor-box service fittings.

1.2 SUBMITTALS

A. Product Data: For surface raceways, wireways and fittings, floor boxes, hinged-cover enclosures, and cabinets indicated.

B. Shop Drawings: Show fabrication and installation details of components for raceways, fittings, boxes, enclosures, and cabinets.

1.3 QUALITY ASSURANCE

A. Electrical Components, Devices, and Accessories: Listed and labeled as defined in NFPA 70, Article 100, by a testing agency acceptable to authorities having jurisdiction, and marked for intended use.

B. Comply with NFPA 70.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

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

1. Available Manufacturers: Subject to compliance with requirements, manufacturers offering products that may be incorporated into the Work include, but are not limited to, the manufacturers specified.
2. Manufacturers: Subject to compliance with requirements, provide products by the manufacturers specified.

2.2 METAL CONDUIT AND TUBING

A. Manufacturers:

1. AFC Cable Systems, Inc.
2. Alflex Inc.
3. Anamet Electrical, Inc.; Anaconda Metal Hose.
4. Electri-Flex Co.
5. Grinnell Co./Tyco International; Allied Tube and Conduit Div.
6. LTV Steel Tubular Products Company.
7. Manhattan/CDT/Cole-Flex.
8. O-Z Gedney; Unit of General Signal.
9. Wheatland Tube Co.

B. Rigid Steel Conduit: ANSI C80.1.

C. Aluminum Rigid Conduit: ANSI C80.5.

D. IMC: ANSI C80.6.

E. EMT and Fittings: ANSI C80.3.

1. Fittings: **Set-screw** type.

F. FMC: **Aluminum Zinc-coated steel**.

G. LFMC: Flexible steel conduit with PVC jacket.

H. Fittings: NEMA FB 1; compatible with conduit and tubing materials.

2.3 NONMETALLIC CONDUIT AND TUBING

A. Manufacturers:

1. American International.
2. Anamet Electrical, Inc.; Anaconda Metal Hose.
3. Arnco Corp.
4. Cantex Inc.
5. Certainteed Corp.; Pipe & Plastics Group.
6. Condux International.
7. ElecSYS, Inc.
8. Electri-Flex Co.
9. Lamson & Sessions; Carlon Electrical Products.
10. Manhattan/CDT/Cole-Flex.
11. RACO; Division of Hubbell, Inc.
12. Spiralduct, Inc./AFC Cable Systems, Inc.
13. Thomas & Betts Corporation.

B. ENT: NEMA TC 13.

C. RNC: NEMA TC 2, Schedule 40 and Schedule 80 PVC.

D. ENT and RNC Fittings: NEMA TC 3; match to conduit or tubing type and material.

E. LFNC: UL 1660.

2.4 METAL WIREWAYS

A. Manufacturers:

1. Hoffman.
2. Square D.

B. Material and Construction: Sheet metal sized and shaped as indicated, NEMA 1 and 3R.

C. Fittings and Accessories: Include couplings, offsets, elbows, expansion joints, adapters, hold-down straps, end caps, and other fittings to match and mate with wireways as required for complete system.

D. Select features, unless otherwise indicated, as required to complete wiring system and to comply with NFPA 70.

E. Wireway Covers: **Screw-cover type**.

F. Finish: Manufacturer's standard enamel finish.

2.5 NONMETALLIC WIREWAYS

A. Manufacturers:

1. Hoffman.
2. Lamson & Sessions; Carlon Electrical Products.

B. Description: PVC plastic, extruded and fabricated to size and shape indicated, with snap-on cover and mechanically coupled connections with plastic fasteners.

C. Fittings and Accessories: Include couplings, offsets, elbows, expansion joints, adapters, hold-down straps, end caps, and other fittings to match and mate with wireways as required for complete system.

D. Select features, unless otherwise indicated, as required to complete wiring system and to comply with NFPA 70.

2.6 SURFACE RACEWAYS

A. Surface Metal Raceways: Galvanized steel with snap-on covers. Finish with manufacturer's standard prime coating.

1. Manufacturers:

a. Airey-Thompson Sentinel Lighting; Wiremold Company (The).
b. Thomas & Betts Corporation.
c. Walker Systems, Inc.; Wiremold Company (The).
d. Wiremold Company (The); Electrical Sales Division.

B. Surface Nonmetallic Raceways: Two-piece construction, manufactured of rigid PVC compound with matte texture and manufacturer's standard**,** color.

1. Manufacturers:

a. Butler Manufacturing Co.; Walker Division.
b. Enduro Composite Systems.

c. Hubbell, Inc.; Wiring Device Division.
d. Lamson & Sessions; Carlon Electrical Products.
e. Panduit Corp.
f. Walker Systems, Inc.; Wiremold Company (The).
g. Wiremold Company (The); Electrical Sales Division.

C. Types, sizes, and channels as indicated and required for each application, with fittings that match and mate with raceways.

2.7 BOXES, ENCLOSURES, AND CABINETS

A. Manufacturers:

1. Cooper Crouse-Hinds; Div. of Cooper Industries, Inc.
2. Emerson/General Signal; Appleton Electric Company.
3. Erickson Electrical Equipment Co.
4. Hoffman.
5. Hubbell, Inc.; Killark Electric Manufacturing Co.
6. O-Z/Gedney; Unit of General Signal.
7. RACO; Division of Hubbell, Inc.
8. Robroy Industries, Inc.; Enclosure Division.
9. Scott Fetzer Co.; Adalet-PLM Division.
10. Spring City Electrical Manufacturing Co.
11. Thomas & Betts Corporation.
12. Walker Systems, Inc.; Wiremold Company (The).
13. Woodhead, Daniel Company; Woodhead Industries, Inc. Subsidiary.

B. Sheet Metal Outlet and Device Boxes: NEMA OS 1.

C. Cast-Metal Outlet and Device Boxes: NEMA FB 1, Type FD, with gasketed cover.

D. Nonmetallic Outlet and Device Boxes: NEMA OS 2.

E. Floor Boxes: Cast metal, fully adjustable, rectangular.

F. Floor Boxes: Nonmetallic, nonadjustable, round.

G. Small Sheet Metal Pull and Junction Boxes: NEMA OS 1.

H. Cast-Metal Pull and Junction Boxes: NEMA FB 1, cast aluminum with gasketed cover.

I. Hinged-Cover Enclosures: NEMA 250, Type 1, with continuous hinge cover and flush latch.

1. Metal Enclosures: Steel, finished inside and out with manufacturer's standard enamel.
2. Nonmetallic Enclosures: Plastic, finished inside with radio-frequency-resistant paint.

J. Cabinets: NEMA 250, Type 1, galvanized steel box with removable interior panel and removable front, finished inside and out with manufacturer's standard enamel. Hinged door in front cover with flush latch and concealed hinge. Key latch to match panelboards. Include metal barriers to separate wiring of different systems and voltage and include accessory feet where required for freestanding equipment.

2.8 FACTORY FINISHES

A. Finish: For raceway, enclosure, or cabinet components, provide manufacturer's standard prime-coat finish ready for field painting.

B. Finish: For raceway, enclosure, or cabinet components, provide manufacturer's standard paint applied to factory-assembled surface raceways, enclosures, and cabinets before shipping.

PART 3 - EXECUTION

3.1 RACEWAY APPLICATION

A. Outdoors:

1. Exposed: Rigid steel or IMC.
2. Concealed: Rigid steel or IMC.
3. Underground, Single Run: RNC.
4. Underground, Grouped: RNC.
5. Connection to Vibrating Equipment (Including Transformers and Hydraulic, Pneumatic, Electric Solenoid, or Motor-Driven Equipment): LFMC.
6. Boxes and Enclosures: NEMA 250, Type 3R.

B. Indoors:

1. Exposed: EMT.
2. Concealed: EMT.
3. Connection to Vibrating Equipment (Including Transformers and Hydraulic, Pneumatic, Electric Solenoid, or Motor-Driven Equipment): FMC; except use LFMC in damp or wet locations.
4. Damp or Wet Locations: Rigid steel conduit.
5. Boxes and Enclosures: NEMA 250, Type 1, except as follows:

   a. Damp or Wet Locations: NEMA 250, Type 4, stainless steel**.**

C. Minimum Raceway Size: **1/2-inch trade size (DN 16)**.

D. Raceway Fittings: Compatible with raceways and suitable for use and location.

1. Intermediate Steel Conduit: Use threaded rigid steel conduit fittings, unless otherwise indicated.
2. PVC Externally Coated, Rigid Steel Conduits: Use only fittings approved for use with that material. Patch all nicks and scrapes in PVC coating after installing conduits.

E. Install nonferrous conduit or tubing for circuits operating above 60 Hz. Where aluminum raceways are installed for such circuits and pass through concrete, install in nonmetallic sleeve.

F. Do not install aluminum conduits embedded in or in contact with concrete.

3.2 INSTALLATION

A. Keep raceways at least 6 inches (150 mm) away from parallel runs of flues and steam or hot-water pipes. Install horizontal raceway runs above water and steam piping.

B. Complete raceway installation before starting conductor installation.

C. Support raceways as specified in Division 16 Section "Basic Electrical Materials and Methods."

D. Install temporary closures to prevent foreign matter from entering raceways.

E. Protect stub-ups from damage where conduits rise through floor slabs. Arrange so curved portions of bends are not visible above finished slab.

F. Make bends and offsets so ID is not reduced. Keep legs of bends in same plane and keep straight legs of offsets parallel, unless otherwise indicated.

G. Conceal conduit and EMT within finished walls, ceilings, and floors, unless otherwise indicated.

1. Install concealed raceways with a minimum of bends in shortest practical distance, considering type of building construction and obstructions, unless otherwise indicated.

H. Raceways Embedded in Slabs: Install in middle 1/3 of slab thickness where practical and leave at least 2 inches (50 mm) of concrete cover.

1. Secure raceways to reinforcing rods to prevent sagging or shifting during concrete placement.
2. Space raceways laterally to prevent voids in concrete.
3. Run conduit larger than 1-inch trade size (DN 27) parallel or at right angles to main reinforcement. Where at right angles to reinforcement, place conduit close to slab support.
4. Change from nonmetallic tubing to Schedule 80 nonmetallic conduit, rigid steel conduit, or IMC before rising above floor.

I. Install exposed raceways parallel or at right angles to nearby surfaces or structural members and follow surface contours as much as possible.

1. Run parallel or banked raceways together on common supports.
2. Make parallel bends in parallel or banked runs. Use factory elbows only where elbows can be installed parallel; otherwise, provide field bends for parallel raceways.

J. Join raceways with fittings designed and approved for that purpose and make joints tight.

1. Use insulating bushings to protect conductors.

K. Tighten set screws of thread-less fittings with suitable tools.

L. Terminations:

1. Where raceways are terminated with locknuts and bushings, align raceways to enter squarely and install locknuts with dished part against box. Use two locknuts, one inside and one outside box.
2. Where raceways are terminated with threaded hubs, screw raceways or fittings tightly into hub so end bears against wire protection shoulder. Where chase nipples are used, align raceways so coupling is square to box; tighten chase nipple so no threads are exposed.

M. Install pull wires in empty raceways. Use polypropylene or monofilament plastic line with not less than 200-lb (90-kg) tensile strength. Leave at least 12 inches (300 mm) of slack at each end of pull wire.

N. Telephone and Signal System Raceways, 2-Inch Trade Size (DN 53) and Smaller: In addition to above requirements, install raceways in maximum lengths of 150 feet (45 m) and with a maximum of two 90-deg ree bends or equivalent. Separate lengths with pull or junction boxes where necessary to comply with these requirements.

O. Install raceway sealing fittings at suitable, approved, and accessible locations and fill them with UL-listed sealing compound. For concealed raceways, install each fitting in a flush steel box with a blank cover plate having a finish similar to that of adjacent plates or surfaces. Install raceway sealing fittings at the following points:

1. Where conduits pass from warm to cold locations, such as boundaries of refrigerated spaces.
2. Where otherwise required by NFPA 70.

P. Stub-up Connections: Extend conduits through concrete floor for connection to freestanding equipment. Install with an adjustable top or coupling threaded inside for plugs set flush with finished floor. Extend conductors to equipment with rigid steel conduit; FMC may be used 6 inches (150 mm) above the floor. Install screwdriver-operated, threaded plugs flush with floor for future equipment connections.

Q. Flexible Connections: Use maximum of 72 inches (1830 mm) of flexible conduit for recessed and semirecessed lighting fixtures; for equipment subject to vibration, noise transmission, or movement; and for all motors. Use LFMC in damp or wet locations. Install separate ground conductor across flexible connections.

R. Surface Raceways: Install a separate, green, ground conductor in raceways from junction box supplying raceways to receptacle or fixture ground terminals.

S. Set floor boxes level and flush with finished floor surface.

T. Set floor boxes level. Trim after installation to fit flush with finished floor surface.

U. Install hinged-cover enclosures and cabinets plumb. Support at each corner.

3.3 PROTECTION

A. Provide final protection and maintain conditions that ensure coatings, finishes, and cabinets are without damage or deterioration at time of Substantial Completion.

1. Repair damage to galvanized finishes with zinc-rich paint recommended by manufacturer.
2. Repair damage to PVC or paint finishes with matching touchup coating recommended by manufacturer.

END OF SECTION

SECTION 260534

BOXES

PART 1 GENERAL

1.01 WORK INCLUDED

A. Wall and ceiling outlet boxes.

B. Floor boxes.

C. Pull and junction boxes.

1.02 REFERENCES

A. ANSI/NEMA FB 1-88 - Fittings and Supports for Conduit and Cable Association.

B. ANSI/NEMA OS 1 - Sheet-Steel Outlet Boxes, Device Boxes, Covers and Box Supports.

C. ANSI/NEMA OS 2 - Nonmetallic Outlet Boxes, Device Boxes, Covers and Box Supports.

D. ANSI/NFPA 70 - National Electrical Code.

E. NEMA 250 - Enclosures for Electrical Equipment (1000 Volts Maximum).

1.03 PROJECT RECORD DOCUMENTS

A. Submit under provisions of Section 01700.

B. Accurately records actual locations and mounting heights of outlet, pull and junction boxes.

1.04 REGULATORY REQUIREMENTS

A. Conform to requirements of ANSI/NFPA 70.

B. Furnish products listed and classified by Underwriters Laboratories Inc. or testing firm acceptable to authority having jurisdiction as suitable for purpose specified and shown.

1.05 PROJECT CONDITIONS

A. Verify field measurements are as shown on Drawings.

B. Verify locations of floor boxes and outlets in offices and work areas prior to rough in.

C. Electrical boxes are shown on Drawings in approximate locations unless dimensioned. Install at location required for box to serve intended purpose. Include installation within 10 feet of location shown.

PART 2 PRODUCTS

2.01 OUTLET BOXES

A. Sheet Metal Outlet Boxes: ANSI/NEMA OS 1; galvanized steel.

1. Luminaire and Equipment Supporting Boxes: Rated for weight of equipment supported; include 1/2-inch male fixture studs where required.

2. Concrete Ceiling Boxes: Concrete type.

B. Nonmetallic Outlet Boxes: ANSI/NEMA OS 2.

C. Cast Boxes: NEMA FB 1, Type FD, aluminum or cast ferroalloy. Provide gasketed cover by box manufacturer. Provide threaded hubs.

2.02 FLOOR BOXES

A. Floor Boxes: ANSI/NEMA OS 1, fully adjustable semi-adjustable.

B. Material: Cast metal.

C. Shape: Rectangular.

D. Conform to regulatory requirements for concrete-tight floor boxes.

2.03 PULL AND JUNCTION BOXES

A. Sheet Metal Boxes: ANSI/NEMA OS 1; galvanized steel.

B. Surface-Mounted Cast Metal Box: NEMA 250, Type 4; flat-flanged, surface-mounted junction box.

1. Material: Galvanized cast iron or cast aluminum.

2. Cover: Furnish with ground flange, neoprene gasket, and stainless steel cover screws.

C. In-Ground Cast Metal Boxes: NEMA 250; Type 6, inside flanged, recessed cover box for flush mounting.

1. Material: Galvanized cast iron or cast aluminum.

2. Cover: Nonskid cover with neoprene gasket and stainless steel cover screws.

3. Cover Legend: ELECTRIC.

D. Fiberglass Handholes: Die-molded fiberglass handholes.

1. Cable Entrance: Pre-cut 6 x 6-inch cable entrance at center bottom of each side.

2. Cover: Fiberglass weatherproof cover with nonskid finish.

PART 3 EXECUTION

3.01 INSTALLATION

A. Install electrical boxes as shown on Drawings, and as required for splices, taps, wire pulling, equipment connections, and compliance with regulatory requirements.

B. Install electrical boxes to maintain headroom and to present neat mechanical appearance.

C. Install pullboxes and junction boxes above accessible ceiling and in unfinished areas only.

D. Inaccessible Ceiling Areas: Install outlet and junction boxes no more than 6 inches from ceiling access panel or from removable recessed luminaire.

E. Install boxes to preserve fire resistance rating of partitions and other elements, using materials and methods under the provisions of Section 07270.

F. Align adjacent wall-mounted outlet boxes for switches, thermostats, and similar devices with each other.

G. Use flush mounting outlet boxes in finished area.

H. Do not install flush mounting boxes back-to-back in walls; provide minimum 6-inch separation. Provide minimum 24 inches separation in acoustic rated walls.

I. Secure flush mounting boxes to interior wall and partition studs. Accurately position to allow for surface finish thickness.

J. Use stamped steel bridges to fasten flush mounting outlet box between studs.

K. Install flush mounting box without damaging wall insulation or reducing its effectiveness.

L. Use adjustable steel channel fasteners for hung ceiling outlet box.

M. Do not fasten boxes to ceiling support wires.

N. Support boxes independently of conduit, except cast box that is connected to two rigid metal conduits, both supported within 12 inches of box.

O. Use gang boxes where more than one device is mounted together. Do not use sectional boxes.

P. Use gang box with plaster ring for single device outlets.

Q. Use cast outlet boxes in exterior locations exposed to the weather and wet locations.

R. Use cast floor boxes for installations in slab on grade; formed steel boxes are acceptable for other installations.

S. Set floor boxes level.

T. Large Pullboxes: Boxes larger than 100 cubic inches in volume or 12 inches in any dimension.

1. Interior Dry Locations: Use hinged enclosure under provisions of Section 16160.

2. Other Locations: Use surface-mounted cast metal box.

3.02 INTERFACE WITH OTHER PRODUCTS

A. Coordinate locations and sizes of required access doors with Section 08305.

B. Locate flush mounting box in masonry wall to require cutting of masonry unit corner only. Coordinate masonry cutting to achieve neat opening.

C. Coordinate mounting heights and locations of outlets mounted above counters, benches, and backsplashes.

D. Position outlets to locate luminaires as shown on reflected ceiling plans.

3.03 ADJUSTING

A. Adjust floor box flush with finish flooring material.

B. Adjust flush-mounting outlets to make front flush with finished wall material.

C. Install knockout closure in unused box opening.

END OF SECTION

SECTION 260535

CONDUIT

PART 1 GENERAL

1.01 SECTION INCLUDES

A. Metal conduit.

B. Flexible metal conduit.

C. Electrical metallic tubing. D.

Nonmetal conduit.

E. Electrical nonmetallic tubing. F.

Flexible nonmetallic conduit. G.

Fittings and conduit bodies.

1.02 REFERENCES

A. ANSI C80.1 - Rigid Steel Conduit, Zinc Coated.

B. ANSI C80.3 - Electrical Metallic Tubing, Zinc Coated. C.

ANSI C80.5 - Rigid Aluminum Conduit.

D. ANSI/NEMA FB 1-88 - Fittings, Cast Metal Boxes, and Conduit Bodies for Conduit and Cable Assemblies.

E. ANSI/NFPA 70 - National Electrical Code. F.

NECA "Standard of Installation."

G. NEMA RN 1 - Polyvinyl Chloride (PVC) Externally Coated Galvanized Rigid Steel Conduit and Intermediate Metal Conduit.

H. NEMA TC 2 - Electrical Plastic Tubing (EPT) and Conduit (EPC-40 and EPC-80). I.

NEMA TC 3 - PVC Fittings for Use with Rigid PVC Conduit and Tubing.

1.03 DESIGN REQUIREMENTS

A. Conduit Size: ANSI/NFPA 70.

1.04 SUBMITTALS

A. Submit under provisions of other Sections.

B. Product Data: Provide for metallic conduit, flexible metal conduit, liquid-tight flexible metal conduit, metallic tubing, nonmetallic conduit, flexible nonmetallic conduit, nonmetallic tubing, fittings, and conduit bodies.

1.05 PROJECT RECORD DOCUMENTS

A. Submit under provisions of other Sections.

B. Accurately record actual routing of conduits larger than 2 inches.

1.06 REGULATORY REQUIREMENTS

A. Furnish products listed and classified by Underwriters Laboratories, Inc. or testing firm acceptable to authority having jurisdiction] as suitable for purpose specified and shown.

1.07 FIELD SAMPLES

A. Provide under provisions of other Sections.

B. Provide field sample of conduit, two each at 2 feet long.

C. Provide field sample of expansion/deflection fitting, two each.

1.08 DELIVERY, STORAGE, AND HANDLING

A. Deliver, store, protect, and handle Products to site as recommended by the manufacturer of the item.

B. Accept conduit on site. Inspect for damage.

C. Protect conduit from corrosion and entrance of debris by storing above grade. Provide appropriate covering.

D. Protect PVC conduit from sunlight.

1.09 PROJECT CONDITIONS

A. Verify that field measurements are as shown on Drawings.

B. Verify routing and termination locations of conduit prior to rough in.

C. Conduit routing is shown on Drawings in approximate locations unless dimensioned. Route as required to complete wiring system.

PART 2 PRODUCTS

2.01 CONDUIT REQUIREMENTS

A. Minimum Size: 3/4 inch unless otherwise specified. B.

Underground Installations:

1. More than Five Feet from Foundation Wall: Use rigid steel conduit, intermediate metal conduit, concrete encased PVC Schedule 40 or as indicated on drawings.

2. Within Five Feet from Foundation Wall: Use intermediate metal conduit, concrete encased PVC Schedule 40 or as indicated on drawings.

3. In or Under Slab on Grade: Use rigid steel conduit, intermediate metal conduit, and plastic coated conduit and thickwall nonmetallic conduit.
4. Minimum Size: 3/4 inch, unless otherwise noted.

C. Outdoor Locations, Above Grade: Use rigid steel conduit, and intermediate metal conduit for locations from finished grade to 10 feet above finished grade or electrical metallic tubing may be used for locations exceeding, 10 feet above grade as indicated on drawings.

D. In Slab Above Grade:

1. Use rigid steel conduit and intermediate metal conduit.

2. Maximum Size Conduit in Slab: 3/4 inch; 1/2 inch for conduits crossing each other.

OR

3. Conduit shall not be installed in any floor slabs.

E. Wet and Damp Locations: Use rigid steel conduit, intermediate metal conduit and electrical metallic tubing.

F. Dry Locations:

1. Concealed: Use rigid steel, intermediate metal conduit, and electrical metallic tubing.

2. Exposed: Use rigid steel intermediate metal conduit, and electrical metallic tubing.

2.02 METAL CONDUIT

A. Rigid Steel Conduit: ANSI C80.1.

B. Rigid Aluminum Conduit: ANSI C80.5.

C. Intermediate Metal Conduit (IMC): Rigid steel.

D. Fittings and Conduit Bodies: ANSI/NEMA FB 1-88; all steel fittings.

2.03 PVC COATED METAL CONDUIT

A. Description: NEMA RN 1; rigid steel conduit with external PVC coating, 20 mil thick.

B. Fittings and Conduit Bodies: ANSI/NEMA FB 1-88; steel fittings with external PVC coating to match conduit.

2.04 FLEXIBLE METAL CONDUIT

A. Description: Interlocked steel construction.

B. Fittings: ANSI/NEMA FB 1-88.

2.05 ELECTRICAL METALLIC TUBING (MET)

A. Description: ANSI C80.3; galvanized tubing.

B. Fittings and Conduit Bodies: ANSI/NEMA FB 1-88; steel or malleable iron, compression indenter type.

2.06 NONMETALLIC CONDUIT

A. Description: NEMA TC 2; Schedule 40 PVC. B.

Fittings and Conduit Bodies: NEMA TC 3.

2.07 NONMETALLIC TUBING

A. Description: NEMA TC 2.

B. Fittings and Conduit Bodies: NEMA TC 3.

PART 3 EXECUTION

3.01 INSTALLATION

A. Install conduit in accordance with NECA "Standard of Installation."

B. Install nonmetallic conduit in accordance with manufacturer's instructions. C.

Arrange supports to prevent misalignment during wiring installation.

D. Support conduit using coated steel or malleable iron straps, lay-in adjustable hangers, clevis hangers, and split hangers.

E. Group related conduits; support using conduit rack. Construct rack using steel channel; provide space on each for 25 percent additional conduits.

F. Fasten conduit supports to building structure and surfaces under provisions of Section 16190.

G. Do not support conduit with wire or perforated pipe straps. Remove wire used for temporary supports

H. Do not attach conduit to ceiling support wires.

I. Arrange conduit to maintain headroom and present neat appearance. J.

Route conduit parallel and perpendicular to walls.

K. Route conduit installed above accessible ceilings parallel and perpendicular to walls. L.

Route conduit under slab from point-to-point.

M. Do not cross conduits in slab.

N. Maintain adequate clearance between conduit and piping.

O. Maintain 12-inch clearance between conduit and surfaces with temperatures exceeding 104 degrees F.

P. Cut conduit square using saw or pipecutter; de-burr cut ends.

Q. Bring conduit to shoulder of fittings; fasten securely.

R. Join nonmetallic conduit using cement as recommended by manufacturer. Wipe nonmetallic conduit dry and clean before joining. Apply full even coat of cement to entire area inserted in fitting. Allow joint to cure for 20 minutes, minimum.

S. Use conduit hubs or sealing locknuts to fasten conduit to sheet metal boxes in damp and wet locations and to cast boxes.

T. Install no more than equivalent of three 90-degree bends between boxes. Use conduit bodies to make sharp changes in direction, as around beams. Use hydraulic one-shot bender to fabricate bends in metal conduit larger than 2-inch size.

U. Avoid moisture traps; provide junction box with drain fitting at low points in conduit system.

V. Provide suitable fittings to accommodate expansion and deflection where conduit crosses seismic, control and expansion joints.

W. Provide suitable pull string in each empty conduit except sleeves and nipples.

X. Use suitable caps to protect installed conduit against entrance of dirt and moisture.

Y. Ground and bond conduit under provisions of other Sections.

Z. Identify conduit under provisions of Section 16195.

3.02 INTERFACE WITH OTHER PRODUCTS

A. Install conduit to preserve fire resistance rating of partitions and other elements, using materials and methods under the provisions of other Sections.

B. Route conduits through roof openings for piping and ductwork or through suitable roof jack with pitch pocket.

END OF SECTION

SECTION 260548

SEISMIC CONTROLS FOR ELECTRICAL SYSTEMS

PART 1 - GENERAL

1.1 SUMMARY

A. This Section includes seismic restraints and other earthquake-damage-reduction measures for electrical components. It applies to and complements optional seismic-restraint requirements in the various electrical component Sections of these Specifications.

1.2 DEFINITIONS

A. Seismic Restraint: A fixed device (a seismic brace, an anchor bolt or stud, or a fastening assembly) used to prevent vertical or horizontal movement, or both vertical and horizontal movement, of an electrical system component during an earthquake.

B. Mobile Structural Element: A part of the building structure such as a slab, floor structure, roof structure, or wall that may move independently of other structural elements during an earthquake.

1.3 SUBMITTALS

A. Product Data: Illustrate and indicate types, styles, materials, strength, fastening provisions, and finish for each type and size of seismic-restraint component used. Include documentation of evaluation and approval of components by agencies acceptable to authorities having jurisdiction.

B. Shop Drawings: For components, physical arrangements, and installation details not defined by Drawings. Indicate materials and show calculations, design analysis, details, and layouts, signed and sealed by a professional engineer.

C. Preapproval and Evaluation Documentation: By an agency approved by authorities having jurisdiction, showing maximum ratings of restraints.

D. Qualification data.

E. Field quality-control test reports.

1.4 QUALITY ASSURANCE

A. Comply with seismic-restraint requirements in California Building Code, SBC, UBC, unless requirements in this Section are more stringent.

B. Testing Agency Qualifications: An independent testing and inspection agency, acceptable to authorities having jurisdiction, with the experience and capability to conduct the inspection indicated.

1.5 PROJECT CONDITIONS

A. Project Seismic Zone and Zone Factor as Defined in UBC.

B. Select categories and factors in first two paragraphs below in coordination with structural engineer.

C. Occupancy Category as Defined in UBC.

D. Acceleration Factor as Defined in UBC, BOCA, or SBC.

E. Project Seismic Hazard Exposure Group as Defined in BOCA or SBC.

1.6 COORDINATION

A. Coordinate layout and installation of seismic bracing with building structure, architectural features, and mechanical, fire-protection, electrical, and other building systems.

B. Coordinate concrete bases with building structural system.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

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

B. Manufacturers: Subject to compliance with requirements, provide products by one of the following:

1. Amber/Booth Company, Inc.
2. B-Line Systems, Inc.
3. Erico, Inc.
4. GS Metals Corp.
5. Loos & Company, Inc.
6. Mason Industries, Inc,
7. Powerstrut.
8. Thomas & Betts Corp.
9. Unistrut Corporation.

2.2 MATERIALS

A. Use the following materials for restraints:

1. Indoor Dry Locations: Steel, zinc plated.
2. Outdoors and Damp Locations: Galvanized steel.
3. Corrosive Locations: Stainless steel.

2.3 ANCHORAGE AND STRUCTURAL ATTACHMENT COMPONENTS

A. Strength: Defined in reports by ICBO Evaluation Service or another agency acceptable to authorities having jurisdiction.

1. Structural Safety Factor: Strength in tension and shear of components shall be at least twice the maximum seismic forces for which they are required to be designed.

B. Concrete and Masonry Anchor Bolts and Studs: Steel-expansion wedge type.

C. Concrete Inserts: Steel-channel type.

D. Through Bolts: Structural type, hex head, high strength. Comply with ASTM A 325.

E. Welding Lugs: Comply with MSS SP-69, Type 57.

F. Beam Clamps for Steel Beams and Joists: Double sided. Single-sided type is not acceptable.

G. Bushings for Floor-Mounted Equipment Anchors: Neoprene units designed for seismically rated rigid equipment mountings, and matched to the type and size of anchor bolts and studs used.

H. Bushing Assemblies for Wall-Mounted Equipment Anchorage: Assemblies of neoprene elements and steel sleeves designed for seismically rated rigid equipment mountings, and matched to the type and size of attachment devices used.

2.4 SEISMIC-BRACING COMPONENTS

A. Slotted Steel Channel: 1-5/8-by-1-5/8-inch (41-by-41-mm) cross section, formed from 0.1046-inch- (2.7-mm-) thick steel, with 9/16-by-7/8-inch (14-by-22-mm) slots at a maximum of 2 inches (50 mm) o.c. in webs, and flange edges turned toward web.

1. Materials for Channel: ASTM A 570, GR 33.
2. Materials for Fittings and Accessories: ASTM A 575, ASTM A 576, or ASTM A 36.
3. Fittings and Accessories: Products of the same manufacturer as channels and designed for use with that product.
4. Finish: Baked, rust-inhibiting, acrylic-enamel paint applied after cleaning and phosphate treatment, unless otherwise indicated.

B. Channel-Type Bracing Assemblies: Slotted steel channel, with adjustable hinged steel brackets and bolts.

C. Hanger Rod Stiffeners: Slotted steel channels, installed vertically, with internally bolted connections to hanger rod.

PART 3 - EXECUTION

3.1 INSTALLATION

A. Install seismic restraints according to applicable codes and regulations and as approved by authorities having jurisdiction, unless more stringent requirements are indicated.

B. Install structural attachments as follows:

1. Use bolted connections with steel brackets, slotted channel, and slotted-channel fittings to spread structural loads and reduce stresses.
2. Attachments to New Concrete: Bolt to channel-type concrete inserts or use expansion anchors.
3. Attachments to Existing Concrete: Use expansion anchors.
4. Holes for Expansion Anchors in Concrete: Drill at locations and to depths that avoid reinforcing bars.
5. Attachments to Solid Concrete Masonry Unit Walls: Use expansion anchors.
6. Attachments to Hollow Walls: Bolt to slotted steel channels fastened to wall with expansion anchors.
7. Attachments to Wood Structural Members: Install bolts through members.

8. Attachments to Steel: Bolt to clamps on flanges of beams or on upper truss chords of bar joists.

C. Install electrical equipment anchorage as follows:

1. Anchor panelboards, motor-control centers, motor controls, switchboards, switchgear, transformers, unit substations, fused power-circuit devices, transfer switches, busway, battery racks, static uninterruptible power units, power conditioners, capacitor units, communication system components, and electronic signal processing, control, and distribution units as follows:

   a. Anchor equipment rigidly to a single mobile structural element or to a concrete base that is structurally tied to a single mobile structural element.
   b. Size concrete bases so expansion anchors will be a minimum of 10 bolt diameters from the edge of the concrete base.
   c. Concrete Bases for Floor-Mounted Equipment: Use female expansion anchors and install studs and nuts after equipment is positioned.
   d. Bushings for Floor-Mounted Equipment Anchors: Install to allow for resilient media between anchor bolt or stud and mounting hole in concrete.
   e. Anchor Bolt Bushing Assemblies for Wall-Mounted Equipment: Install to allow for resilient media where equipment or equipment-mounting channels are attached to wall.
   f. Torque bolts and nuts on studs to values recommended by equipment manufacturer.

D. Install seismic bracing as follows:

1. Install bracing according to spacings and strengths indicated by approved analysis.
2. Expansion and Contraction: Install to allow for thermal movement of braced components.
3. Attachment to Structure: If specific attachment is not indicated, anchor bracing to the structure at flanges of beams, upper truss chords of bar joists, or at concrete members.

E. Accommodation of Differential Seismic Motion: Make flexible connections in raceways, cables, wireway, cable trays, and busway where they cross expansion- and seismic-control joints, where adjacent sections or branches are supported by different structural elements, and where they terminate at electrical equipment anchored to a different mobile structural element from the one supporting them.

3.2 FIELD QUALITY CONTROL

A. Testing Agency: Owner will engage a qualified testing and inspection agency to inspect seismic-control installation for compliance with indicated requirements.

B. Testing Agency: Engage a qualified testing and inspection agency to inspect seismic-control installation for compliance with indicated requirements.

C. Reinspection: Correct deficiencies and verify by re-inspection that work complies with requirements.

D. Provide written report of tests and inspections.

END OF SECTION

SECTION 260553

ELECTRICAL IDENTIFICATION

PART 1 GENERAL

1.01 SECTION INCLUDES

A. Nameplates and labels.

B. Wire and cable markers.

C. Conduit markers.

1.02 REFERENCES

A. ANSI/NFPA 70 - National Electrical Code.

1.03 SUBMITTALS

A. Submit under provisions of other Sections.

B. Product Data: Provide catalog data for nameplates, labels, and markers.

C. Manufacturer's Instructions: Indicate application conditions and limitations of use stipulated by Product testing agency specified under regulatory requirements. Include instructions for storage, handling, protection, examination, preparation and installation of Product.

1.04 REGULATORY REQUIREMENTS

A. Conform to requirements of ANSI/NFPA 70.

B. Furnish products listed and classified by Underwriters Laboratories, Inc. or testing firm acceptable to authority having jurisdiction as suitable for purpose specified and shown.

1.05 EXTRA MATERIALS

A. Furnish under provisions of other Sections.

PART 2 PRODUCTS

2.01 NAMEPLATES AND LABELS

A. Nameplates: Engraved three-layer laminated plastic, white letters on black background.

B. Locations:

1. Each electrical distribution and control equipment enclosure.

2. Communication cabinets.

C. Letter Size:

1. Use 1/8-inch letters for identifying individual equipment and loads.

2. Use 1/4-inch letters for identifying grouped equipment and loads.

2.02 WIRE MARKERS

A. Description: Tape, split sleeve, or tubing type wire markers.

B. Locations: Each conductor at panelboard gutters, pull boxes, outlet and junction boxes, and each load connection.

C. Legend:

1. Power and Lighting Circuits: Branch circuit or feeder number indicated on drawings.

2. Control Circuits: Control wire number indicated on schematic and interconnection diagrams on drawings or shop drawings.

2.03 CONDUIT MARKERS

A. Location: Furnish markers for each conduit longer than 6 feet.

B. Spacing: 20 feet on center.

C. Color:

1. 480 Volt System:

2. 208 Volt System:

3. Fire Alarm System: Red.

4. Telephone System:

D. Legend:

1. 480 Volt System:

2. 208 Volt System:

3. Fire Alarm System:

4. Telephone System:

2.04 UNDERGROUND WARNING TAPE

A. Description: 4 inch wide plastic tape, detectable type, colored yellow with suitable warning legend describing buried electrical lines.

PART 3 EXECUTION

3.01 PREPARATION

A. Degrease and clean surfaces to receive nameplates and labels.

3.02 APPLICATION

A. Install nameplate and label parallel to equipment lines.

B. Secure nameplate to equipment front using screws, rivets, or adhesive.

C. Secure nameplate to inside surface of door on panelboard that is recessed in finished locations.

D. Identify conduit using field painting under provisions of Section 09900.

E. Paint colored band on each conduit longer than 6 feet.

F. Paint bands 20 feet on center.

G. Color:

1. 480 Volt System:

2. 208 Volt System:

3. Fire Alarm System: Red

4. Telephone System:

H. Identify underground conduits using underground warning tape. Install one tape per trench at 6 inches below finished grade.

END OF SECTION

SECTION 262726

WIRING DEVICES

PART 1 - GENERAL

1.1 SUMMARY

A. This Section includes:

1. Receptacles.
2. Connectors.
3. Switches.
4. Finish plates.
5. Multi-outlet assemblies.
6. Poke-through floor service outlets and fittings.
7. Telephone/power poles.

1.2 SUBMITTALS

A. Product Data: For each product indicated.

B. Samples: For devices, device plates, multioutlet assemblies, poke-through floor service outlets, and telephone/power poles for finish and color selection, and evaluation of technical features.

C. Field quality-control test reports.

1.3 QUALITY ASSURANCE

A. Electrical Components, Devices, and Accessories: Listed and labeled as defined in NFPA 70, Article 100, by a testing agency acceptable to authorities having jurisdiction, and marked for intended use.

B. Comply with NEMA WD 1.

C. Comply with NFPA 70.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

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

B. Manufacturers: Subject to compliance with requirements, provide products by one of the following

1. Wiring Devices:

a. Bryant Electric, Inc.
b. Eagle Electric Manufacturing Co., Inc.
c. GE Company; GE Wiring Devices.

d. Hubbell, Inc.; Wiring Devices Div.
e. Killark Electric Manufacturing Co.
f. Leviton Manufacturing Co., Inc.
g. Pass & Seymour/Legrand; Wiring Devices Div.
h. Pyle-National, Inc.; an Amphenol Co.
i. Lutron (dimmer and wall switch devices)

2. Multioutlet Assemblies:

a. Airey-Thompson Co.
b. Wiremold.

3. Poke-through Assemblies, Floor Service Outlets and Telephone/Power Poles:

a. American Electric.
b. Hubbell, Inc.; Wiring Devices Div.
c. Pass & Seymour/Legrand; Wiring Devices Div.
d. Square D Co.
e. Wiremold.

2.2 RECEPTACLES

A. Straight-Blade and Locking Receptacles: Heavy-Duty grade.

B. GFCI Receptacles: Feed-through type, with integral NEMA WD 6, Configuration 5-20R duplex receptacle arranged to protect connected downstream receptacles on same circuit. Design units for installation in a 2-3/4-inch- (70-mm-) deep outlet box without an adapter.

2.3 SWITCHES

A. Snap Switches: Heavy-duty, quiet type.

B. Dimmer Switches: Modular, full-wave, solid-state units with integral, quiet on/off switches and audible and electromagnetic noise filters.

1. Control: Continuously adjustable slide. Single-pole or three-way switch to suit connections.
2. Incandescent Lamp Dimmers: Modular, 120 V, 60 Hz, single pole with soft tap or other quiet switch; electromagnetic filter to eliminate audible noise, and RF, and TV interference.
3. Fluorescent Lamp Dimmers: Modular; compatible with dimmer ballasts; trim potentiometer to adjust low-end dimming; dimmer-ballast combination capable of consistent dimming to a maximum of one percent of full brightness.

2.4 FINISH COLOR FOR RECEPTACLES AND SWITCHES

A. Color: matte finish, unless otherwise indicated or required by Code.

2.5 WALL PLATES

A. Single and combination types match corresponding wiring devices.

1. Plate-Securing Screws: Metal with head color to match plate finish.

2. Material: Dimmer switches; Lutron, New Architectural Style, matte finish, square corners, beveld edges and screwless. Switches and Receptacles; Lutron, Claro series.

2.6 FLOOR SERVICE FITTINGS

A. Type: Modular, flush-type dual-service units suitable for wiring method used.

B. Compartmentation: Barrier separates power and signal compartments.

C. Housing Material: Die-cast aluminum, satin finished.

D. Power Receptacle: NEMA WD 6, Configuration 5-20R, gray finish, unless otherwise indicated.

E. Signal Outlet: Blank cover with bushed cable opening, unless otherwise indicated.

2.7 POKE-THROUGH ASSEMBLIES

A. Description: Factory-fabricated and -wired assembly of below-floor junction box unit with multichannel, through-floor raceway/firestop unit and detachable matching floor service-outlet assembly.

1. Size: Selected to fit nominal 3-inch (75-mm) cored holes in floor and matched to floor thickness.
2. Fire Rating: Unit is listed for fire rating of floor-ceiling assembly.
3. Closure Plug: Arranged to close unused 3-inch (75-mm) cored openings and reestablish fire rating of floor.
4. Minimum Wiring Capacity: Three No. 12 AWG power and ground conductors; one 75-ohm coaxial telephone/data cable; and one four-pair, 75-ohm telephone/data cable.

2.8 MULTIOUTLET ASSEMBLIES

A. Components of Assemblies: Products from a single manufacturer designed for use as a complete, matching assembly of raceways and receptacles.

B. Raceway Material: Metal, with manufacturer's standard finish.

C. Wire: No. 12 AWG.

2.9 TELEPHONE/POWER SERVICE POLES

A. Description: Factory-assembled and -wired units to extend power, telephone, and data service from distribution wiring concealed in ceiling to devices or outlets in pole near floor.

1. Poles: Nominal 2.5-inch- (65-mm-) square cross section with height adequate to extend from floor to at least 6 inches (150 mm) above ceiling, and separate channels for power and signal wiring.
2. Mounting: Ceiling trim flange with concealed bracing arranged for positive connection to ceiling supports, and pole foot with carpet pad attachment.
3. Finish: Ivory
4. Wiring: Sized for three No. 12 AWG power and ground conductors; one 75-ohm coaxial telephone/data cable; and one four-pair, 75-ohm telephone/data cable.

5. Power Receptacles: Two single; 20-A; heavy-duty; NEMA WD 6, Configuration 5-20R units.
6. Signal Outlets: Blank insert with bushed cable opening.

PART 3 - EXECUTION

3.1 INSTALLATION

A. Install devices and assemblies plumb and secure.

B. Install wall plates when painting is complete.

C. Install wall dimmers to achieve indicated rating after derating for ganging as instructed by manufacturer.

D. Do not share neutral conductor on load side of dimmers.

E. Arrangement of Devices: Unless otherwise indicated, mount flush, with long dimension vertical, and grounding terminal of receptacles on top. Group adjacent switches under single, multigang wall plates.

F. Protect devices and assemblies during painting.

G. Adjust locations at which floor service outlets and telephone/power service poles are installed to suit arrangement of partitions and furnishings.

3.2 FIELD QUALITY CONTROL

A. Test wiring devices for proper polarity and ground continuity. Operate each device at least six times.

B. Test GFCI operation with both local and remote fault simulations according to manufacturer's written instructions.

C. Replace damaged or defective components, and prepare written report of tests.

END OF SECTION

SECTION 262816

ENCLOSED SWITCHES AND CIRCUIT BREAKERS

PART 1 - GENERAL

1.1 SUMMARY

A. This Section includes individually mounted enclosed switches and circuit breakers, rated 600 V and less, used for disconnecting and protection functions.

B. See Division 26 Section "Fuses" for fuses for fusible disconnect switches.

1.2 SUBMITTALS

A. Product Data: For each type of switch and circuit breaker indicated.

B. Shop Drawings: Include wiring diagrams for shunt-tripped circuit breakers.

C. Field quality-control test reports.

D. Operation and maintenance data.

1.3 QUALITY ASSURANCE

A. Electrical Components, Devices, and Accessories: Listed and labeled as defined in NFPA 70, Article 100, by a testing agency acceptable to authorities having jurisdiction, and marked for intended use.

B. Source Limitations: Obtain switches and circuit breakers through one source from a single manufacturer.

C. Comply with NFPA 70.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

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

B. Manufacturers: Subject to compliance with requirements, provide products by one of the following:

1. Eaton Corp.; Cutler-Hammer Products.
2. General Electric Co.; Electrical Distribution & Control Division.
3. Siemens Energy & Automation, Inc.
4. Square D Co.

2.2 ENCLOSED SWITCHES

A. Enclosed, Nonfusible Switch: NEMA KS 1, Type HD, with lockable handle, interlocked with cover.

B. Enclosed, Fusible Switch, 800 A and Smaller: NEMA KS 1, Type HD, with clips to accommodate specified fuses, and lockable handle, interlocked with cover.

2.3 ENCLOSED CIRCUIT BREAKERS

A. Molded-Case Circuit Breaker: NEMA AB 1, with interrupting capacity to meet available fault currents.

1. Thermal-Magnetic Circuit Breakers: Inverse time-current element for low-level overloads, and instantaneous magnetic trip element for short circuits. Adjustable magnetic trip setting for circuit-breaker frame sizes 250 A and larger.
2. Adjustable Instantaneous-Trip Circuit Breakers: Magnetic trip element with front-mounted, field-adjustable trip setting.
3. Current-Limiting Circuit Breakers: Frame sizes 400 A and smaller; let-through ratings less than NEMA FU 1, RK-5.
4. GFCI Circuit Breakers: Single- and two-pole configurations with 30-mA trip sensitivity.

B. Molded-Case Circuit-Breaker Features and Accessories: Standard frame sizes, trip ratings, and number of poles.

1. Lugs: Suitable for number, size, trip ratings, and material of conductors.
2. Application Listing: Appropriate for application; Type SWD for switching fluorescent lighting loads; Type HACR for heating, air-conditioning, and refrigerating equipment.
3. Ground-Fault Protection: Integrally mounted relay and trip unit with adjustable pickup and time-delay settings, push-to-test feature, and ground-fault indicator.
4. Shunt Trip: 120-V trip coil energized from separate circuit, set to trip at 75 percent of rated voltage.

2.4 ENCLOSURES

A. Listed for environmental conditions of installed locations, including:

1. Outdoor Locations: NEMA 250, Type 3R.
2. Food Service Areas: NEMA 250, Type 4X, stainless steel.
3. Other Wet or Damp Indoor Locations: NEMA 250, Type 4.

PART 3 - EXECUTION

3.1 INSTALLATION

A. Temporary Provisions: Remove temporary lifting provisions and blocking of moving parts.

B. Identify components; provide warning signs as specified in Division 16 Section "Basic Electrical Materials and Methods, Electrical Identification."

3.2 FIELD QUALITY CONTROL

A. Testing: After installing disconnect switches and circuit breakers and after electrical circuits have been energized, demonstrate product capability and compliance with requirements.

B. Inspections and Tests for Switches and Circuit Breakers: Make internal and external inspections and perform tests, including the following:

1. Inspect for freedom from physical damage, proper unit rating, mechanical condition, enclosure integrity, cover operation, unit anchorage, clearances, and tightness of electrical connections. If a loose electrical connection is observed on any unit, check each electrical connection for each switch and circuit breaker with a torque wrench for compliance with manufacturer's torquing instructions.
2. Test insulation resistance of each pole, phase-to-phase, and phase-to-ground, following manufacturer's written instructions. Test insulation resistance of shunt trip circuits. Use 500-V minimum test voltage for units and circuits rated up to 250 V, 1000-V minimum test voltage for units rated more than 250 V. Measured insulation resistance must be 25 megohms, minimum, for switches rated up to 250 V, and 100 megohms, minimum, for switches rated more than 250 V.
3. Test cover and other interlocks and interlock release devices for proper operation.

C. Additional Inspections and Tests for Switches: Include the following:

1. Inspect for proper rating and fuse provisions.
2. Check adequacy and integrity of fuseholders by removing and installing fuses.
3. Check integrity of phase barriers.
4. Inspect blade alignment visually while operating switch to observe adequacy of blade pressure.

D. Additional Inspections and Tests for Circuit Breakers: Include the following:

1. Inspect for proper frame, trip, and fault current interrupting rating.
2. Test shunt trip devices, circuits, and actuating components for proper operation.

E. Correct defective and malfunctioning units on-site, where possible, and re-inspect and retest to demonstrate compliance; otherwise, remove and replace with new units and retest.

END OF SECTION

SECTION 262817

DISCONNECT SWITCHES

PART 1 GENERAL

1.01 WORK INCLUDED

A. Disconnect

switches. B. Fuses.

C. Enclosures.

1.02 REFERENCES

A. ANSI/UL 198C - High-Interrupting Capacity Fuses; Current Limiting

Types. B. ANSI/UL 198E - Class R Fuses.

C. FS W-F-870 - Fuseholders (For Plug and Enclosed Cartridge

Fuses). D. FS W-S-865 - Switch, Box, (Enclosed), Surface-

Mounted.

E. NEMA KS 1 - Enclosed Switches.

PART 2 PRODUCTS

2.01 ACCEPTABLE MANUFACTURERS - DISCONNECT SWITCHES

A. Square D.

B. Cutler

Hammer

C. Siemens

ITE.

D. General Electric.

2.02 DISCONNECT SWITCHES

A. Fusible Switch Assemblies: NEMA KS 1; FS W-S-865; quick-make, quick-break, load interrupter enclosed knife switch with externally operable handle interlocked to prevent opening front cover with switch in ON position. Handle lockable in OFF position. Fuse Clips: FS W-F- 870.

B. Nonfusible Switch Assemblies: NEMA KS 1; Type HD; FS W-S-865; quick-make, quick-break, load interrupter enclosed knife switch with externally operable handle interlocked to prevent opening front cover with switch in ON position. Handle

lockable in OFF position.

C. Enclosures: NEMA KS 1; Type 1, for interior dry locations; Type 3R for exterior or wet locations.

D. Switch Ratings: Number of poles, voltage, current and horsepower rating as required for particular installation.

2.03 ACCEPTABLE MANUFACTURERS - FUSES

A. Littelfuse.

B. Gould

Shawmut. C.

Bussman.

2.04 FUSES

A Fuses 600 Amperes and Less: ANSI/UL 198C, Class J; ANSI/UL 198E, Class RK1;
current limiting, one-time fuse, 250, 600

volt. B. Interrupting Rating: 200,000 rms

amperes.

C. Size fuses based on motor nameplate rating.

PART 3 EXECUTION

3.01 INSTALLATION

A. Install disconnect switches where indicated on Drawings.

B. Install fuses in fusible disconnect switches, otherwise required by Code.

C. Properly align switches and support independent of the connecting raceway.

END OF SECTION

SECTION 265100

INTERIOR LIGHTING

PART 1 - GENERAL

1.1 SUMMARY

A. This Section includes interior lighting fixtures, lighting fixtures mounted on exterior building surfaces lamps, ballasts, emergency lighting units, and accessories.

1.2 SUBMITTALS

A. Product Data: For each type of lighting fixture and lamp indicated. Include illustrations and dimensions of fixtures, and showing photometric performance.

B. Shop Drawings: Show details of nonstandard and custom fixtures. Indicate dimensions, weights, components, features, accessories, and methods of field assembly and mounting.

1. Wiring Diagrams: Power, signal, and control wiring.

C. Product Certificates: Include the following:

1. Photometric Performance Certificates: For fixture type-lamp combinations for which certification is required in schedule or details, furnish results of laboratory tests.
2. Dimming Ballast Compatibility Certificates: Signed by manufacturer of ballast certifying that ballasts are compatible with dimming systems and equipment with which they are used.
3. Air and Thermal Performance Certificates: For air-handling fixtures. Furnish data required in "Submittals" Article in Division 15 Section "Diffusers, Registers, and Grilles."
4. Sound Performance Certificates: For air-handling fixtures. Indicate sound power level and sound transmission class in test reports certified according to ADC.

1.3 QUALITY ASSURANCE

A. Electrical Components, Devices, and Accessories: Listed and labeled as defined in NFPA 70, Article 100, by a testing agency acceptable to authorities having jurisdiction, and marked for intended use.

B. Comply with NFPA 70.

1.4 COORDINATION

A. Fixtures, Mounting Hardware, and Trim: Coordinate layout and installation of lighting fixtures with ceiling system and other construction.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

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

1. Available Products: Subject to compliance with requirements, products that may be incorporated into the Work include, but are not limited to, the products specified.
2. Products: Subject to compliance with requirements, provide one of the products specified.

2.2 LIGHTING FIXTURES, GENERAL

A. Air-Handling Fixtures: Arranged for use with plenum ceiling for air return and heat extraction and for attaching an air-diffuser boot assembly specified in Division 15 Section "Diffusers, Registers, and Grilles."

1. Sound-Pressure Levels: Certified according to ADC.
2. Air-Movement Performance Requirements: Certified according to ADC.
3. Supply Units: Equip with slots in one or both side trims and join with air-diffuser boot assemblies.
4. Heat Removal Units: An air path through lamp cavity.
5. Dampers: Operable from outside fixture for control of return-air volume.
6. Static Fixtures: Supply slots are blanked off, and fixture appearance matches active units.

2.3 EXIT SIGNS

A. General Requirements: Comply with UL 924 and the following:

1. Sign Colors and Lettering Size: Comply with authorities having jurisdiction

B. Internally Lighted Signs: Features as follows:

1. Lamps for AC Operation: Two or more for each fixture; LED.
2. Internal Source for Self-Powered Exit Signs (Battery Type): Integral automatic charger in a self-contained power pack.

   a. Battery: Sealed, maintenance-free, nickel-cadmium type.
   b. Charger: Fully automatic, solid-state type with sealed transfer relay.
   c. Operation: Relay automatically energizes lamp from unit when circuit voltage drops to 80 percent of nominal or below. When normal voltage is restored, relay disconnects lamps, and battery is automatically recharged and floated on charger.

C. Self-Powered Exit Signs (Luminous-Source Type): Licensed for public use by the U.S. Nuclear Regulatory Commission. Signs have solid-state tritium gas energy source and provide legibility in total darkness at 100 feet (30 m) after 10 years of service.

2.4 LIGHTING FIXTURES

A. Fixture Type: REFER TO LIGHTING FIXTURE SCHEDULE ON SHEET E-1.

2.5 FIXTURE SUPPORT COMPONENTS

A. Comply with Division 16 Section "Basic Electrical Materials and Methods," for channel- and angle-iron supports and nonmetallic channel and angle supports.

B. Single-Stem Hangers: 1/2-inch (12-mm) steel tubing with swivel ball fitting and ceiling canopy. Finish same as fixture.

C. Rod Hangers: 3/16-inch- (5-mm-) minimum diameter, cadmium-plated, threaded steel rod.

D. Hook Hangers: Integrated assembly matched to fixture and line connection and equipped with threaded attachment cord and locking-type plug.

2.6 FINISHES

A. Fixtures: Manufacturer's standard, unless otherwise indicated.

1. Paint Finish: Applied over corrosion-resistant treatment or primer, free of defects.
2. Metallic Finish: Corrosion resistant.

PART 3 - EXECUTION

3.1 INSTALLATION

A. Support for Fixtures in or on Grid-Type Suspended Ceilings: Support fixture using grid plus the following:

1. Install a minimum of four ceiling support system rods or wires for each fixture. Locate not more than 6 inches (150 mm) from fixture corners.
2. Support Clips: Fasten to fixtures and to ceiling grid members at or near each fixture corner.
3. Fixtures of Sizes Less Than Ceiling Grid: Arrange as indicated on reflected ceiling plans or center in acoustical panel, and support fixtures independently of panel, with at least two 3/4-inch (20-mm) metal channels spanning and secured to ceiling tees.

B. Suspended Fixture Support:

1. Stem-Mounted, Single-Unit Fixtures: Suspend with two separate stem hangers.
2. Continuous Rows: Use stem for wiring at one point and stem for suspension for each unit length of fixture chassis, including one at each end.
3. Bracing for Pendants and Rods: If longer than 48 inches (1200 mm), brace to limit swinging.

C. Air-Handling Fixtures: Install with dampers closed.

3.2 FIELD QUALITY CONTROL

A. Tests:

1. Verify normal operation of each fixture after installation.
2. Emergency Lighting: Interrupt electrical supply to demonstrate proper operation. Verify normal transfer to battery source and retransfer to normal.
3. Report results in writing.

B. Defective and Malfunctioning Fixtures and Components: Replace or repair, then retest. Repeat procedure until units are acceptable.

C. Report test results in writing.

3.3 ADJUSTING

A. Adjust aim-able fixtures to provide required light intensities.

END OF SECTION