SHELL

PROJECT MANUAL
& SPECIFICATIONS

ISSUED FOR CONSTRUCTION

11 February 2013

PROJECT MANUAL INCLUDING SPECIFICATIONS

ISSUED FOR CONSTRUCTION

FOR

BUILDING SHELL

DOCUMENT 00010

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Issued for Construction ~~06.18.10~~

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GENERAL CONDITIONS

1 GENERAL CONDITIONS

A. The General Conditions of the Contract for Construction as modified per the agreement between DPR and BMR, AIA Document A201 is a part of this Contract, and is incorporated herein as fully as if here set forth.

1. A copy of the General Conditions will be made available by the Owner or the Architect upon request.

END OF DOCUMENT

DOCUMENT 00800

SUPPLEMENTARY CONDITIONS

1.1 REFERENCE TO DIVISION 1 - GENERAL REQUIREMENTS

A. Where provisions of General Conditions relate to Project administration or work-related requirements of the Contract, those paragraphs are expanded in Division 1 - General Requirements of the Specifications.

B. General Conditions, Supplementary Conditions and Division 1 - General Requirements contain information necessary for completion of every part of Project.

1. Where items of Work are done under subcontracts, each item shall be subject to these conditions.

C. LEED Certification: Refer to Section 01350 – LEED Special Environmental Requirements relating to LEED Certification requirements.

1.2 SUPPLEMENTS

A. The following is subject to, and is not intended to modify the General Conditions of the Contract as indicated in Section 00700 - General Conditions.

B. Where any part of the General Conditions is modified or deleted by these supplements, unaltered provisions of the modified article, paragraph, subparagraph or clause shall remain in effect.

DEFINITIONS: ADD the following:

Approved: The terms approved, directed, selected, required, ordered, designated, accepted, acceptable and satisfactory shall require written action by Architect.

Equal, or Approved Equal: The terms equal or approved equal shall require requests for substitutions for products or manufacturers not specified; requests for substitutions shall be in accordance with requirements of Section 01630 - Product Substitution Procedures.

Furnish: The term furnish means supply and deliver to Project, unless otherwise defined in greater detail.

Install: The term install is used to describe operations at Project, from inspecting and unloading, to completion in place, ready for intended use.

Provide: The term provide means furnish and install, complete and ready for intended use, unless otherwise defined in greater detail.

END OF DOCUMENT

SECTION 01110

SUMMARY OF WORK

PART 1 - GENERAL

1.1 SUMMARY

A. Project consists of construction related to Genomatica, Building Shell and Site, Nexus Centre Drive, San Diego, CA, as indicated in Contract Documents.

1. Items noted "NIC" (Not In Contract) will be furnished and installed by Owner or under separate contract.

B. LEED Certification: Refer to Section 01350 – LEED Special Environmental Requirements relating to LEED Certification requirements.

1.2 REQUIREMENTS INCLUDED

A. This section includes general administrative provisions:

1. Work sequence.
2. Contractor use of premises.
3. Field engineering.
4. Regulatory requirements and reference standards.
5. Owner furnished, Contractor installed products.

1.3 WORK SEQUENCE

A. Coordinate construction schedule and operations with Owner and Architect.

1.4 CONTRACTOR USE OF PREMISES

A. Limit use of premises for Work and construction operations and to allow for work by other contractors.

B. Coordinate use of premises and access to site under direction of Owner and Architect.

1.5 FIELD ENGINEERING

A. Provide field engineering services; establish lines and levels by use of recognized engineering survey practices.

B. Locate and protect control and reference points.

1.6 REGULATORY REQUIREMENTS AND REFERENCE STANDARDS

A. Regulatory Requirements:

1. Architect has contacted governing authorities and reviewed design requirements of local, state and federal agencies for applicability to Project.

2. Contractor shall be responsible for contacting governing authorities directly for necessary information and decisions bearing upon performance of Work.

B. Reference Standards:

1. For Products specified by association or trade standards, comply with requirements of referenced standard, except when more rigid requirements are specified or are required by applicable codes.

2. Applicable date of each standard is that in effect as of date on proposal or date on Contract where no proposal is available, except when a specific date is specified.

1.7 OWNER FURNISHED, CONTRACTOR INSTALLED PRODUCTS

A. Select products are to be furnished and paid for by Owner and installed by Contractor:

1. Refer to Drawings.

B. Owner's Responsibilities:

1. Arrange for and deliver shop drawings, product data, and samples to Contractor.
2. Arrange and pay for product delivery to site.
3. Inspect products jointly with Contractor on delivery.
4. Submit claims for transportation damage.
5. Arrange for replacement of damaged, defective, or missing items.
6. Arrange for manufacturer's warranties, inspections, and service.

C. Contractor's Responsibilities:

1. Review shop drawings, product data, and samples.
2. Receive and unload products at site.
3. Inspect jointly with Owner for completeness and damage.
4. Handle, store, and install products.
5. Finish products as required after installation.
6. Repair or replace items damaged by Work of this Contract.

END OF SECTION

SECTION 01300

ADMINISTRATIVE REQUIREMENTS

PART 1 - GENERAL

1.1 SUMMARY

A. This section describes general procedural requirements for ongoing submittals.

1. Construction progress schedules.
2. Schedule of values.
3. Shop drawings.
4. Product data.
5. Samples.
6. Manufacturers' certificates.

B. Related Requirements:

1. Section 01350: LEED special environmental requirements.
2. Section 01400: Test reports, manufacturer's field reports, and mock-ups.
3. Section 01630: Product substitution request procedures.
4. Section 01700: Manufacturers' instructions.
5. Section 01770: Closeout requirements including Project Record Documents.
6. Section 01780: Warranties.

1.2 PROCEDURES

A. Submittals: Transmit each item under form furnished by or acceptable to Architect; where Contractor proposes to use customized submittal transmittal form or no form is furnished, submit sample to Owner and Architect for approval prior to use.

1. Identify Project, Contractor, subcontractor, major supplier.

a. Date and attach sequential identification number for each new submittal.

b. Identify each resubmittal using original submittal number and sequential identification clearly indicating item is resubmitted.

2. Identify pertinent Drawing sheet and detail number, and Specification section number as appropriate.

3. Identify deviations from Contract Documents.

4. Provide space for Contractor and Architect review stamps.

5. Contractor: Review and stamp submittals from subcontractors prior to submitting to Architect.

a. Review submittals and indicate where conflicts occur with Contract Documents and with work of other subcontractors.

b. Return submittals that vary significantly from Contract Documents for correction and resubmittal prior to submitting to Architect.

c. Submittals that vary significantly from Contract Documents and that fail to indicate thorough Contractor review prior to submission to Architect will be returned without review.

d. Cursory review and stamping of subcontractor submittal by Contractor shall not be acceptable.

B. Comply with progress schedule for submittals related to Work progress. Coordinate submittal of related items.

C. After Architect review of submittal, revise and resubmit as required, identify changes made since previous submittal.

D. Distribute copies of reviewed submittals to concerned persons. Instruct recipients to promptly report any inability to comply.

1.3 CONSTRUCTION PROGRESS SCHEDULES

A. Submit construction progress schedule with separate item for each major trade and operation, identifying first day of each week.

1. Show complete sequence of construction by activity, identifying work of separate stages and logically grouped activities.

2. Show projected percentage of completion for each item of Work as of time of each progress Application for Payment.

3. “Submittal Schedule”: Show Contractor submittal dates required for shop drawings, product data, and samples, and product delivery dates; deliver to Architect per approved “Submittal Schedule.”

a. “Submittal Schedule” may be incorporated into construction progress schedule or may be separate, Contractor option.

b. Architect’s Review Period: Architect will be expedient in review, however, Contractor shall schedule submittals recognizing possibility Architect may reject and may require resubmittal.

c. Contract extension shall not be allowed for Contractor’s failure to properly schedule submittals to allow for Architect requiring resubmittal.

B. Progress Schedule Format: Submit both horizontal bar chart and network analysis system using critical path method as approved by Owner.

1. Submit revised progress schedules with each Application for Payment reflecting changes since previous submittal, not less than monthly.

1.4 SCHEDULE OF VALUES

A. Submit typed schedule on AIA Form G703 or another Owner and Architect pre-approved 8-1/2" by 11" paper format; Contractor's standard media-driven printout will be considered on request. Submit within 15 days after award of Contract.

B. Format: Table of Contents of this Project Manual, with modifications as pre-approved by Owner and Architect; identify each line item with number and title of major Specification sections.

C. Include in each line item a directly proportional amount of Contractor overhead and profit.

D. Revise schedule to list change orders for each Application for Payment.

1.5 SHOP DRAWINGS

A. Submit six reproducible prints for Architectural shop drawings and submit eight reproducible prints for Consulting Engineer shop drawings; minimum sheet size 8-1/2" by 11".

B. After review, reproduce and distribute.

1.6 PRODUCT DATA/MANUFACTURERS' LITERATURE

A. Mark each copy to identify applicable Products, models, options, and other data; supplement manufacturers' standard data to provide information unique to the Work.

B. Include manufacturers' installation instructions only when required by Specifications or specifically requested by Architect.

1. Maintain copy of manufacturer installation instructions and recommendations in Contractor's field office for review.

C. Submit six copies for Architectural and submit eight copies for Consulting Engineer submittals; one copy to be retained by Architect.

1.7 SAMPLES

A. Submit full range of manufacturers' standard colors, textures, and patterns for Architect's selection.

B. Submit samples to illustrate functional characteristics of Product, with integral parts and attachment devices.

C. Coordinate submittal of different categories for interfacing work.

D. Include identification on each sample, giving full information.

E. Submit number of samples required by Contractor plus one to be retained by Architect.

1. Maintain one set of approved samples at Project Field Office.

F. Sizes: Provide following sizes unless otherwise specified.

1. Flat or Sheet Products: Minimum 6" square, maximum 12" by 12".
2. Linear Products: Minimum 6", maximum 12" long.
3. Bulk Products: Minimum one pint, maximum one gallon.

G. Full size samples may be used in the Work upon approval.

1.8 MANUFACTURERS' CERTIFICATES

A. Submit certificates, in duplicate in accordance with requirements of each Specification section.

END OF SECTION

SECTION 01310

PROJECT MANAGEMENT AND COORDINATION

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes: Description of Project management and coordination including but not necessarily limited to the following:

1. General Project coordination procedures.
2. Staff names.
3. Administrative and supervisory personnel.
4. Project meetings.

B. Related Sections:

1. Section 01300: Administrative requirements.
2. Section 01350: LEED special environmental requirements.
3. Section 01820: Systems demonstration.

1.2 COORDINATION

A. Coordination: Coordinate construction operations included in various Specifications sections to ensure efficient and orderly installation of each part of Work.

1. Coordinate construction operations that depend on each other for proper installation, connection, and operation.

2. Coordinate work to assure efficient and orderly sequence of installation of construction elements.

3. Make provisions for accommodating items installed by Owner or under separate contracts.

B. Prepare memoranda for distribution to each party involved as needed, outlining special procedures required for coordination.

1. Include required notices, reports, and list of attendees at meetings; include Architect and Owner in distribution.

C. Verify characteristics of interrelated operating equipment are compatible; coordinate work having interdependent responsibilities for installing, connection to, and placing such equipment in service.

D. Coordinate space requirements and installation of mechanical and electrical work indicated diagrammatically on Drawings.

1. Follow routing shown for pipes, ducts, and conduits as closely as possible; make runs parallel with lines of building.

2. Utilize spaces efficiently to maximize accessibility for other installations, for maintenance, and for repairs.

E. Conceal pipes, ducts, and wiring in finished areas unless otherwise indicated; coordinate locations of fixtures and outlets with finish elements.

F. Administrative Procedures: Coordinate scheduling and timing of administrative procedures with other construction activities and activities of other contractors to avoid conflicts and ensure orderly progress of Work.

1.3 SUBMITTALS

A. Staff Names: Immediately after receipt of notice to proceed or immediately after signing of Contract by Owner and Contractor, submit list of principal staff assignments, including superintendent and other personnel in attendance at Project site.

1. Post copies of list in Project meeting room, in temporary field office, and by each temporary telephone.

1.4 SUPERVISORY AND ADMINISTRATIVE PERSONNEL

A. Provide supervisory personnel, in addition to Project Superintendent, as required for proper and timely performance of Work and coordination of subcontracts.

B. Provide administrative staff as required to allow Project Superintendent and supervisory personnel to allocate maximum time to Project supervision and coordination.

1.5 PROJECT MEETINGS

A. Schedule and administer Project meetings throughout progress of Work:

1. Pre-construction meeting.
2. Progress meetings at weekly intervals.
3. Pre-installation conferences.
4. Coordination meetings.
5. Special meetings.

B. Make physical arrangements for meetings, prepare agenda with copies for participants, preside at meetings, record minutes and distribute copies within two days to Architect, Owner, participants, and those affected.

C. Attendance: Job superintendent, major subcontractors and suppliers as appropriate to agenda; Architect, Owner, and Owner and Architect's consultants as appropriate to agenda topics for each meeting.

D. Suggested Agenda: Review of Work progress, status of progress schedule and adjustments, delivery schedules, submittals, requests for information, maintenance of quality standards, pending changes and substitutions, and issues needing resolution.

END OF SECTION

SECTION 01350

SPECIAL LEED ENVIRONMENTAL REQUIREMENTS

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes Special Environmental Requirements: Work includes special environmental “Green” building practices related to energy efficiency, indoor air quality, and resource efficiency, including following special requirements.

1. LEED Guidelines: Project shall conform to Leadership in Energy and Environmental Design (LEED) Guidelines, as published by the US Green Building Council.

    a. LEED Green Building Rating: Silver.

    b. Design Team will share LEED “Project Checklist” as developed by Design Team and Owner for Project indicating “Points” anticipated for LEED Rating System.

2. Maximize inclusion of recycled content in materials, products, and systems.

3. Obtain wood from certified sustainably harvested sources.

4. Maintain special practices to ensure final Project indoor air quality.

5. Maximize use of reusable and recyclable packaging.

6. Maximize use of durable products.

7. Maximize use of products requiring low embodied (production, manufacturing, and transportation) energy.

B. Related Requirements:

1. Section 01565: LEED site waste management program.
2. Section 01810: LEED building commissioning.

1.2 DEFINITIONS

A. LEED: Leadership in Energy & Environmental Design as defined by the US Green Building Council.

B. Carcinogens: Materials that contain chemicals listed in following.

1. California Environmental Protection Agency, Air Resources Board (ARB), list of Toxic Air Contaminants (California Air Toxics).

2. California Health and Welfare Agency, Safe Drinking Water and Toxic Enforcement Act of 1986 (Proposition 65), which lists chemicals known to cause cancer and reproductive toxicity.

3. International Agency on Research and Cancer (IARC) List of Chemical Carcinogens.

4. National Toxicology Program carcinogen list.

1.3 ENVIRONMENTAL GOALS

A. Owner has established general environmental goals for design and for construction of Project based on LEED Green Building criteria; construction team is encouraged to participate to maximum degree possible to realize Owner's environmental goals.

1. Design team has integrated required changes into Drawings.

2. Project strategy also requires Construction team to conform to certain methods and provide documentation throughout course of Project.

a. Contractor shall become familiar with and comply to LEED Guidelines.

3. Contract Documents are not intended to limit alternative means of achieving environmental goals.

a. Suggestions from Contractor, subcontractors, suppliers, and manufacturers for implementing goals are encouraged; team approach is also encouraged.

B. Environmental Goals:

1. Refer to Project LEED's strategy and to specific Specifications sections for more detailed construction requirements related to specific materials and systems.

a. Energy Efficiency (Operations through Project Life): Materials and systems are intended to maximize energy efficiency for operation of Project throughout service life (substantial completion to demolition).

b. Indoor Air Quality: Materials are selected and processes specified, such as preconditioning and temporary ventilation, to maximize healthy indoor air quality.

c. Resource Efficiency (Project Construction): Materials and systems are to maximize environmental construction techniques, including waste recycling, reusable delivery packaging, and reusability of selected materials.

C. Use Resources Efficiently:

1. Reuse existing building materials to extent feasible within concept expressed in Contract Documents.

2. Select materials that use resources efficiently.

3. Use construction practices that achieve most efficient use of resources and materials.

4. Provide materials that utilize recycled content to maximum degree possible without being detrimental to product performance.

D. Avoid scarce, irreplaceable, and endangered resources.

1. Select materials from abundant resources.

2. Select replaceable materials, renewable materials, and materials which can be replenished.

3. Select materials that minimize damage to natural habitats and the natural environment.

E. Use durable materials.

1. Select materials with longest usable life.

2. Select materials that can be re-used or may be recycled.

F. Use resource efficient materials; consider energy use over life cycle of material including harvesting, mining, manufacturing, transport, installation, use, operations, recycling and disposal.

1. Select materials that use less energy to manufacture.

2. Select materials that save energy during building operations.

3. Select locally made materials.

G. Select materials that generate least amount of pollution; consider pollution and volatile organic compound (VOC) emissions generated during harvesting, mining, manufacturing, transport, installation, use, and disposal.

1. Avoid materials that contain ozone depleting chemicals and that emit potentially harmful volatile organic compound (VOC) emissions.

2. Employ construction practices that minimize dust production and combustion byproducts.

3. Avoid materials that can leach harmful chemicals into ground water; do not allow potentially harmful chemicals to enter sewers nor storm drains.

4. Protect soil against erosion and top soil depletion.

5. Minimize noise generation during construction; screen mechanical equipment to block noise.

6. Select materials that can be reused or recycled and materials with significant percentage of recycled content; set specific recycled content percentages for individual materials; avoid materials difficult to recycle.

7. Protect natural habitats; restore natural habitats where feasible within scope of Project.

H. Wood Products: Use woods from certified sustainably harvested sources.

1. Certified Wood Products: Wood products to be from forests certified "well-managed" by an agency accredited by Forest Stewardship Council (FSC).

1.4 SUBMITTALS

A. Resource Efficient Product Data:

1. Environmental Issues Data: Submit data and manufacturer's certifications verifying information and test data, where Project's LEED strategy and Specifications sections require data relating to environmental issues including but not limited to:

a. Project Recyclability: Submit information to assist Owner and Contractor in recycling materials involved in shipping, handling, and delivery, and for temporary materials necessary for installation of products.

b. Recycled Content: Submit information regarding product recycled content information, post industrial recycled and post consumer recycled.

c. Product Recyclability: Submit information regarding product and product's component's recyclability including potential sources accepting recyclable materials.

2. Volatile Organic Compound (VOC) Emissions: Identify volatile organic compound emissions, total (TVOC) and individual (IVOC) emissions, which have been identified as carcinogens, and identify VOC emissions that may cause reproductive toxicity.

3. MSDS: Furnish manufacturer's Materials Safety Data Sheets.

B. IAQ Data:

1. Environmental Issues Data: Furnish material safety data sheets (MSDS).

2. Environmental Issues: Submit test data by approved laboratory listing indoor air quality requirements including emissions test data on volatile organic compounds, total (TVOC) emissions and individual (IVOC) emissions.

C. Certificates:

1. Environmental Issues Certifications:

a. Submit documentation certifying accuracy of recycled content, and recyclability.

b. Submit documentation certifying cleaning materials have low volatile organic compound (VOC) emissions and have low odor.

c. Prior to Final Completion, submit certificate signed by corporate office holder (i.e. President or Vice President, or similar position of authority) of Contractor, subcontractor, supplier, or manufacturer indicating:

1) Post-industrial and post-consumer recycled content as applicable.

2) Product recyclability.

3) Indoor air quality requirements.

4) Certification shall state products and materials provided are same as, and contain same components as products and materials tested.

5) Certification shall state products and materials provided meet Project requirements for indoor air quality, for recycled content, and for recyclability.

D. Closeout Submittals: Submit data relating to environmental issues.

1. Submit environmental product certifications, in two forms:

a. Two CD-ROMs organized by CSI Format used for Project Manual.

b. Four three-ring binders organized by CSI Format used for Project Manual with Table of Contents and with dividers for each division.

1.5 QUALITY ASSURANCE

A. Environmental Project Management and Coordination: Contractor to identify one person on Contractor's staff to be responsible for environmental issues compliance and coordination.

1. Experience: Environmental project manager to have experience relating to "Green" building construction.

2. Responsibilities: Carefully review Contract Documents for environmental issues, coordinate work of trades, subcontractors, and suppliers; instruct workers relating to environmental issues; and oversee Project Environmental Goals.

3. Meetings: Discuss Environmental Goals at following meetings.

a. Pre-construction meeting.
b. Pre-installation meetings.
c. Regularly scheduled job-site meetings.

B. Environmental Issues Criteria: Comply with requirements listed in various Specification sections.

1.6 DELIVERY, STORAGE, AND HANDLING

A. Environmental Issues: Take special care to prevent accumulation of moisture on materials and within packaging during delivery, storage, and handling to prevent development of mold and mildew on packaging and on products.

B. Use packaging that is reusable or recyclable.

1.7 PROJECT CONDITIONS

A. Certifications:

1. Environmental Product Certification:

a. Include manufacturer certification indicating product contains maximum recycled content possible without being detrimental to product performance.

b. Include certification indicating cleaning materials are environmentally benign.

B. Construction Ventilation and Preconditioning:

1. Temporary Construction Ventilation: Maintain temporary ventilation of areas with materials having volatile organic compound (VOC) emissions for 24 hours before installation, continuously during installation, and for emissions after installation.

a. Period after installation to be sufficient to dissipate odors and volatile organic compounds.

b. Ventilate areas directly to outside; ventilation to other enclosed areas is not acceptable.

2. Preconditioning: Allow products which have odors and which have significant volatile organic compound emissions to off-gas in ventilated warehouse for sufficient period to dissipate odor and VOC emissions prior to delivery to Project.

a. Store products in warehouse without containers and without packaging to maximize off-gassing and to prevent contamination of containers and packaging.

b. Comply with substitution requirements for consideration of other locations for preconditioning than ventilated warehouse.

C. Protection and Packaging:

1. Protection: Take special care to prevent accumulation of moisture on materials and within packaging during delivery, storage, and handling to prevent development of molds and mildew on packaging and on products.

a. Immediately remove from site materials showing signs of mold and signs of mildew, including materials with moisture stains.

2. Packaging: Deliver materials in recyclable or in reusable packaging such as cardboard, wood, paper, or reusable blankets, which will be reclaimed by supplier or manufacturer for recycling.

    a. General: Minimize packaging materials to maximum extent possible while still ensuring protection of materials during delivery, storage, and handling.

        1) Unacceptable Packaging Materials: Polyurethane, polyisocyanurate, polystyrene, polyethylene, and similar plastic materials such as “foam” plastics and “shrink-fit” plastics.

    b. Reusable Blankets: Deliver and store materials in reusable blankets and mats that are reclaimed by manufacturers or suppliers for reuse where program exists or where program can be developed for such reuse.

    c. Pallets: Where pallets are used, suppliers shall be responsible to ensure pallets are removed from site for reuse or for recycling.

    d. Cardboard and Paper: Where paper products are used, either recycle as part of construction waste management recycling stream, or recycle for use by manufacturer or supplier where program is available for such recycling.

    e. Sealant, Paint, Primers, Adhesives, and Coating Containers: Return to supplier or manufacturer for reuse where such program is available.

1.8 SEQUENCING

A. Environmental Issues:

1. On-Site Application: Where high volatile organic compound (VOC) emitting products and where odorous products are applied on-site, apply prior to installation of porous materials.

PART 2 - PRODUCTS

2.1 MATERIALS

A. General Environmental Issues:

1. Mold and Mildew: Materials that have evidence of growth of molds or of mildew are not acceptable, including both stored and installed materials; immediately remove from site.

2. Moisture Stains: Materials that have evidence of moisture damage, including stains, are not acceptable, including both stored and installed materials; immediately remove from site.

B. Ducts: Seal ducts during construction to prevent accumulation of construction dust and construction debris inside ducts.

2.2 SUBSTITUTIONS

A. Substitutions Environmental Issues: Requests for substitutions shall comply with requirements specified in Section 01630 – Product Substitution Procedures, with following additional information required where environmental issues are specified.

1. Indicate each proposed substitution complies with requirements for volatile organic compounds, both TVOC and IVOC.

2. Owner and Architect reserve right to reject proposed substitutions where TVOC and IVOC information is not provided and where TVOC or IVOC are higher than specified materials.

3. Comply with specified recycled content and other environmental requirements.

4. Submit direct comparisons of specified products with products proposed for substitutions indicating how proposed substitution either complies with LEED requirements or improves LEED points.

a. Where substitution does not comply with or improve LEED Project requirements include reasoning of how lost points are being obtained through other methods.

PART 3 - EXECUTION

3.1 FIELD QUALITY CONTROL

A. Building Flush Out: Just prior to Substantial Completion, flush out building using 100 percent tempered outside air for minimum 14 calendar days, and up to 28 calendar days where construction schedule permits.

1. Construction schedule permits extended period where building is fully enclosed, mechanical equipment is operational, and materials producing volatile organic compound (VOC) emissions have been installed.

3.2 CLEANING

A. Final Cleaning Environmental Issues:

1. Clean surfaces; remove temporary labels, stains, and foreign substances.

a. Polish transparent and glossy surfaces using solvent-free materials low volatile organic compound (VOC) emitting materials, low odor materials, and materials environmentally benign.

b. Clean both exterior surfaces and interior surfaces that are exposed to view when doors and drawers are open.

2. Clean equipment and fixtures to sanitary condition using materials solvent free materials, low VOC emitting materials, and low odor materials.

3. Vacuum carpeted and soft surfaces with high effici
(HEPA) vacuum.

3. Clean ducts using HEPA vacuum immediately prior to Substantial Completion and prior to using ducts to circulate air.

4. Replace filters just prior to Substantial Completion.

5. Remove and properly dispose of recyclable materials using construction waste management program described in Section 01565 – LEED Site Waste Management Program.

3.3 PROTECTION

A. Environmental Issues:

1. Protect interior materials from water damage; where interior products not intended for wet applications are exposed to moisture, immediately remove from site.

2. Protect installed products using methods that do not support growth of molds and mildews.

a. Immediately remove from site materials with mold and materials with mildew.

END OF SECTION

SECTION 01400

QUALITY REQUIREMENTS

PART 1 - GENERAL

1.1 SUMMARY

A. This section describes general quality control requirements.

1. General quality control.
2. Manufacturers' field services.
3. Mock-ups.
4. Independent testing laboratory services.

B. Related Requirements:

1. Refer to applicable codes and Specifications sections for test requirements.

1.2 QUALITY CONTROL, GENERAL

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

1.3 MANUFACTURER'S FIELD SERVICES

A. When specified in respective Specification sections, require manufacturer or supplier to have qualified personnel provide on-site observations and recommendations.

1. Observe field conditions, including conditions of surfaces and installation.
2. Observe quality of workmanship.
3. Provide recommendations to assure acceptable installation and workmanship.
4. Where required, start, test, and adjust equipment as applicable.

B. Representative shall submit written report to Architect listing observations and recommendations.

1.4 MOCK-UPS

A. Erect field samples and field mock-ups at locations on site as approved in advance and in accordance with requirements where included in Specifications section.

1. Test mock-ups requiring special equipment may be erected at location having access to necessary equipment; coordinate with Architect.

2. Mockup required for the Aluminum Window Wall Subcontractor to provide a Visual Mockup on the Job site. This mockup will be for aesthetic review only, not for performance (The Aluminum Window Wall Subcontractor will also be required to perform a water test on portions of the constructed wall, at locations to be designated by the Architect).

B. Field samples and mock-ups not approved and not capable of being acceptably revised shall be removed from site.

C. Approved field samples and mock-ups may only be used as part of Project with preapproval from the architect.

1.5 TESTING LABORATORY SERVICES

A. An independent testing laboratory shall perform inspections, tests, and other services required by applicable codes and various Specification sections.

1. Owner or Architect may also require independent testing of items where doubts exists that product or system does not conform to Contract Documents.

2. Owner will employ and pay for testing laboratory to provide Project specific testing under applicable codes and Specification sections except where indicated otherwise.

a. Owner employment of testing laboratory shall not relieve Contractor of obligation to perform Work in accordance with requirements of applicable codes and Contract Documents.

1) Laboratory may not release, revoke, alter, or enlarge on requirements of Contract Documents.

b. Retesting required because of non-conformance to specified requirements shall be performed by Owner's testing laboratory.

1) Payment for retesting shall be charged to Contractor by deducting inspection and testing charges from Contract amount.

2) Contractor Option: Pay Owner's testing laboratory directly for costs of retesting where acceptable to Owner and testing laboratory.

c. Owner provided testing shall be limited to Project specific testing and shall not include general tests or approvals of materials, equipment or systems.

B. Services shall be performed in accordance with requirements of governing authorities and with specified standards.

C. Reports will be submitted to Architect in duplicate giving observations and results of tests, indicating compliance or non-compliance with specified standards and with Contract Documents.

1. Where required, testing laboratory will submit copy of test results directly to enforcing agency.

D. Contractor shall cooperate with testing laboratory personnel; furnish tools, samples of materials, design mix, equipment, storage and assistance as requested.

1. Notify Owner, Architect and testing laboratory sufficiently in advance of expected time for operations requiring testing services.

END OF SECTION

SECTION 01500

TEMPORARY FACILITIES AND CONTROLS

PART 1 - GENERAL

1.1 SUMMARY

A. This section describes temporary construction facilities and temporary controls.

1. Electricity and lighting.
2. Heat and ventilation.
3. Water and sanitary facilities.
4. Construction aids.
5. Temporary enclosures.
6. Barriers.
7. Cleaning during construction.
8. Project identification.
9. Field offices, telephone service, and storage.

B. Related Requirements:

1. Section 01350: LEED special environmental requirements.
2. Section 01565: LEED site waste management program.
3. Section 01700: Progress cleaning and final cleaning.

C. Provide temporary construction facilities and temporary controls as required to conform to applicable authorities and as required to complete Project in accordance with Contract Documents.

1. Authorities: Contact governing authorities to establish extent of temporary facilities and temporary controls required by authorities.

1.2 ELECTRICITY AND LIGHTING

A. Provide electrical service required for construction operations, with branch wiring and distribution boxes located to allow service and lighting by means of construction-type power cords.

B. Provide lighting for construction operations.

1. Permanent lighting may be used during construction; maintain lighting and make routine repairs.

1.3 HEAT AND VENTILATION

A. Provide heat and ventilation as required to maintain specified conditions for construction operation, to protect materials and finishes from damage due to temperature and humidity.

1.4 WATER AND SANITARY FACILITIES

A. Provide water service required for construction operations; extend branch piping with outlets located so water is available by use of hoses.

B. Provide and maintain required sanitary facilities and enclosures.

1.5 CONSTRUCTION AIDS

A. Noise, Dust and Pollution Control: Provide materials and equipment necessary to comply with local requirements for noise, dust and pollution control.

B. Fire Protection: Maintain on-site fire protection facilities as required by applicable authorities and insurance requirements.

C. Dewatering: Provide and operate drainage and pumping equipment; maintain excavations and site free of standing water.

1.6 ENCLOSURES

A. Temporary Closures: Provide temporary weather-tight closures for exterior openings for acceptable working conditions, for protection for materials, to protect interior materials from dampness, for temporary heating, and to prevent unauthorized entry.

1. Provide doors with self-closing hardware and locks.

1.7 BARRIERS

A. Barriers: Provide barriers as required to prevent public entry to construction areas and to protect adjacent properties from damage from construction operations.

1. Fence: Provide minimum 8 foot high commercial grade chain link or painted solid wood fence around construction site; equip with gates with locks.

B. Barricades: Provide barricades as required by governing authorities.

1.8 CLEANING DURING CONSTRUCTION

A. Control accumulation of waste materials and rubbish; recycle or dispose of off-site.

B. Clean interior areas prior to start of finish work, maintain areas free of dust and other contaminants during finishing operations.

1.9 PROJECT IDENTIFICATION

A. Project Sign: Provide minimum 32 square foot Project identification sign of wood frame and exterior grade plywood construction, painted, with exhibit lettering by professional sign painter.

1. Design: As furnished by Architect.

2. Submit to Owner and Architect additional names or changes proposed to Project sign for prior written approval.

3. Erect on site at location established by Architect.

B. Other Signs: Subject to approval of Architect and Owner.

1.10 FIELD OFFICES, TELEPHONE SERVICE, AND STORAGE

A. Office: Provide weather-tight field office, with lighting, electrical outlets, data outlets, heating, and ventilating equipment, and equipped with furniture.

1. Meeting Space: In addition, provide space for Project meetings with table and chairs to accommodate minimum six persons.

2. Telephone Service: Provide telephone service to field office.

3. Facsimile Service: Provide separate FAX line to field office with plain paper facsimile machine.

4. Copier: Provide separate plain paper copier with enlargement and reduction capability.

5. Computer: Provide desktop computer system with internet access at Project field office with e-mail capacity and software compatible with Architect word processing system; include separate e-mail line; provide plain paper printer.

a. Digital Camera: Maintain operational digital camera on-site during construction along with software allowing transmission of digital pictures taken on-site via e-mail to Owner and Architect.

B. Storage for Tools, Materials, and Equipment: Limit on-site storage to Project area; provide weather-tight storage, with heat and ventilation for products requiring controlled conditions.

1. Maintain adequate space for organized storage and access.

2. Provide lighting for inspection of stored materials.

1.11 REMOVAL

A. Remove temporary materials, equipment, services, and construction prior to Substantial Completion Inspection.

B. Clean and repair damage caused by installation or use of temporary facilities.

C. Restore existing facilities used during construction to specified or original condition.

END OF SECTION

SECTION 01565

LEED SITE WASTE MANAGEMENT PROGRAM

PART 1 - GENERAL

1.1 SUMMARY

A. Project requires special Site Waste Management Program as required to comply with LEED certification; refer to Section 01350 for LEED certification level required for Project.

1. Waste Management Goals: As required by LEED for level listed in Section 01350.
2. Provide separate itemization of costs related to Site Waste Management Program.
3. Effect optimum control of solid wastes.
4. Prevent environmental pollution and damage.

B. Related Work:

1. Section 01350: Special LEED environmental requirements.
2. Section 01500: Temporary facilities and controls.

1.2 DEFINITIONS

A. Inert Fill: A permitted facility that accepts inert waste such as asphalt and concrete exclusively.

B. Class III Landfill: A landfill that accepts non-hazardous waste such as household, commercial, and industrial waste, including construction, remodeling, repair, and demolition operations.

C. Construction and Demolition Waste: Includes solid wastes, such as building materials, packaging, rubbish, debris, and rubble resulting from construction, remodeling, repair, and demolition operations.

1. Rubbish: Includes both combustible and noncombustible wastes, such as paper, boxes, glass, crockery, metal and lumber scrap, tin cans, and bones.

2. Debris: Includes both combustible and noncombustible wastes, such as leaves and tree trimmings that result from construction or maintenance and repair work.

D. Chemical Waste: Includes petroleum products, bituminous materials, salts, acids, alkalis, herbicides, pesticides, organic chemicals and inorganic wastes.

E. Sanitary Wastes:

1. Garbage: Refuse and scraps resulting from preparation, cooking, distribution, or consumption of food.

2. Sewage: Domestic sanitary sewage.

1.3 SUBMITTALS

A. LEED Site Waste Management Program: Comply with LEED requirements for salvaging, recycling, and disposing of nonhazardous waste.

1. Prior to commencement of Work, schedule and conduct meeting with Owner and Architect to discuss proposed LEED Site Waste Management Program.

2. Develop mutual understanding relative to details of recycling, and rebate programs.

3. Prepare and submit a written and graphic LEED Site Waste Management Program including, but not limited to, the following:

a. Indicate procedures to be implemented.

b. Estimate total Project waste to be generated, and estimated cost of disposing of Project waste in landfills.

c. Estimate total cubic yards of following waste categories to be diverted from landfill.

1) Clean dimensional wood, palette wood.
2) Plywood, oriented strand board, and medium density fiberboard.
3) Cardboard, paper, packaging.
4) Other items as directed by Owner and Architect.

d. Estimate amounts of following waste categories in appropriate units (weight, feet, square yards, gallons).

1) Metals.
2) Gypsum board.
3) Carpet.
4) Paint.
5) Other items as directed by Owner and Architect.

e. Submit permit or license and location of waste disposal areas.

f. Submit procedures for recycling/re-use program.

g. Submit procedures for rebate programs.

h. Revise and resubmit Site Waste Management Program as required by Owner and Architect.

1) Review of Contractor's Site Waste Management Program will not relieve Contractor of responsibility for control of pollutants and other environmental protection measures.

B. Submit summary of solid waste generated by Project with each application for progress payment, on form acceptable to Owner and Architect; include manifests, weight tickets, receipts, and invoices identifying Project and waste delivered to following locations.

1. Recycling Centers.
2. Class III landfills.
3. Inert fills.

C. Prepare 3-ring binder with rebate information and product documentation as required for Owner to qualify for rebate programs; submit binder with final closeout submittals.

1.4 RECYCLING PROGRAM

A. Recycling: Implement recycling program that includes separate collection of waste materials of following types as applicable to Project and LEED requirements; recycling program to be applied by Contractors and subcontractors.

1. Land clearing debris.
2. Asphaltic concrete.
3. Concrete.
4. Masonry materials.
5. Ferrous metal.
6. Non-ferrous metal.
7. Clean dimensional wood and palette wood.
8. Plywood, oriented strand board, and medium density fiberboard.
9. Paper - bond.
10. Paper - newsprint.
11. Cardboard and paper packaging materials.
12. Glass.
13. Plastics.
14. Gypsum board (unpainted).
15. Paint.
16. Rigid foam.
17. Carpet and pad.
18. Beverage containers.
19. Porcelain plumbing fixtures.
20. Insulation.
21. Others as appropriate.

B. Handling: Keep materials free of dirt, adhesives, solvents, petroleum contamination, and other substances deleterious to recycling process.

1. Clean materials contaminated prior to placing in collection containers.

2. Arrange for collection by or delivery to appropriate recycling center or transfer station that accepts construction and demolition waste for purpose of recycling.

C. Participate in Re-Use Programs: Rebates, tax credits, and other savings obtained for recycled or re-used materials shall accrue to Contractor.

END OF SECTION

SECTION 01600

PRODUCT REQUIREMENTS

PART 1 - GENERAL

1.1 SUMMARY

A. This section describes basic product requirements governing material and equipment.

1. General product requirements.
2. Product list.
3. Quality assurance.
4. Delivery, storage, and handling.

B. Related Requirements:

1. Section 01300: Submittal of manufacturers' certificates.
2. Section 01630: Product substitution procedures.
3. Section 01770: Operation and maintenance data.

1.2 GENERAL PRODUCTS REQUIREMENTS

A. Products include material, equipment, and systems.

B. Comply with Specifications, referenced standards, and applicable codes and regulations as minimum requirements.

C. Provide new materials except as specifically allowed by Contract Documents.

D. Materials to be supplied in quantity within a Specification section shall be by one manufacturer, shall be the same, and shall be interchangeable.

E. Provide equipment and systems composed of materials from a single manufacturer except where otherwise recommended by equipment or systems manufacturer or where otherwise indicated in Contract Documents.

1.3 SUBMITTALS

A. Product List: Prior to submittal of second Request for Payment, submit to Architect complete list of major products which are proposed for installation, with name of manufacturer, trade name, and model.

1. Tabulate products by Specification number and title.

B. Substitutions: Refer to Section 01630 - Product Substitution Procedures.

1.4 QUALITY ASSURANCE

A. Comply with industry standards and applicable codes except when more restrictive tolerances or requirements indicate more rigid standards or precise workmanship.

B. Perform work by persons qualified to produce workmanship of specified quality.

C. Install products straight, true-to-line, and in correct relationship to adjacent materials, with hairline joints, free of rough, sharp and potentially hazardous edges.

D. Secure products in place with positive anchorage devices designed and sized to withstand stresses, vibration, and racking.

1. Seismic Anchors: Conform to code requirements.

1.5 DELIVERY, STORAGE, AND HANDLING

A. Transport products by methods to avoid product damage, deliver in undamaged condition in manufacturer's unopened containers or packaging.

B. Store products in accordance with manufacturer's instructions, with seals and labels intact and legible.

C. Store sensitive products in weather-tight enclosures; maintain within temperature and humidity ranges required by manufacturer's instructions.

D. For exterior storage of fabricated products, place on sloped supports above ground.

E. Store loose granular materials on solid surfaces in a well-drained area; prevent mixing with foreign matter.

F. Arrange storage to provide access for inspection; periodically inspect to assure products are undamaged and are maintained under required conditions.

G. Provide equipment and personnel to handle products by methods to prevent soiling and prevent damage.

H. Promptly inspect shipments to assure products comply with requirements, quantities are correct, and products are undamaged.

I. Immediately remove from Project products damaged, wet, stained, and products with mold and products with mildew.

1. Take special care to prevent absorbent products such as gypsum board and acoustical ceiling units from becoming wet.

END OF SECTION

SECTION 01630

PRODUCT SUBSTITUTION PROCEDURES

PART 1 - GENERAL

1.1 SUMMARY

A. Provide products listed in Contract Documents, products by manufacturers listed in Contract Documents, and products meeting specified requirements.

1. Contract Amount: Base on materials and products included in Contract Documents.

a. Where listed in Contract Documents, materials and products by manufacturers not listed shall not be used without Owner's and Architect's approval of Contractor's written request for substitution.

b. LEED Requirements: Comply with additional requirements related to LEED special environmental requirements in Section 01350 where LEED points might be involved.

2. Purpose: Substitutions will only be considered where Owner will receive benefit or because specified materials are no longer available due to conditions beyond Contractor control.

a. Owner benefits either from a Contractor proposed reduction of the Contract amount or from a reduction in Contract time based on acceptance of proposed substitution.

b. List proposed cost or time reductions on request for substitution.

c. Requests not including a proposed cost or time reduction will not be considered unless Contractor submits supporting information indicating specified materials are not available.

B. Procedures are described for requesting substitution of unlisted materials in lieu of materials named in Specifications or approved for use in addenda.

1.2 CONTRACTOR'S OPTIONS

A. Products Identified by Reference Standards: Select product meeting referenced standard for products specified only by reference standard.

B. Named Manufacturers and Named Products: Select products of any named manufacturer meeting Specifications for products specified by naming one or more products or manufacturers.

C. Substitutions for Named Manufacturers and Named Products: Submit request for substitution for products and for manufacturers not specifically named where products or manufacturers are named in Specifications.

D. "Or Equal" Clauses: Submit request for substitution for product or manufacturer not specifically named in Specifications where terms "or equal", "or approved equal", or similar references are made.

1.3 SUBSTITUTIONS

A. Prior to submittal of second Request for Payment Owner and Architect will consider formal requests for substitutions from Contractor as specified in 1.1 Summary.

1. Owner and Architect will consider only one request for substitution for each material; where requests are denied Contractor shall be required to provide specified materials.

2. After payments begin, requests will be considered only when a product becomes unavailable through no fault of Contractor; more than one request for substitution will be considered if necessary.

B. Submit each request with sequentially numbered “Substitution Request Transmittal” acceptable to Owner and Architect; submit separate request for each product and support each request with:

1. Product identification with manufacturer's literature and samples where applicable.

2. Name and address of similar projects on which product has been used, and date of installation.

C. Submit itemized comparison of proposed substitution with product specified and list significant variations.

D. Submit data relating to changes in construction schedule.

E. Note effect of substitution on other work, products, or separate contracts.

1. Note if acceptance of substitution could require revision of Contract Documents, Drawings, details or Specifications.

F. Include accurate cost data comparing proposed substitution with product and amount of net change in Contract price.

1. Include costs to other contractors and costs for revisions to Drawings, details or Specifications.

G. Substitutions will not be considered for acceptance when:

1. They are indicated or implied on submittals without a formal request from Contractor.

2. They are requested directly by a subcontractor or supplier.

3. Acceptance will require substantial revision of Contract Documents.

H. Substitute products shall not be ordered without written acceptance of Owner and Architect.

I. Owner and Architect will determine acceptability of proposed substitutions and reserves right to reject proposals due to insufficient information.

1.4 CONTRACTOR'S REPRESENTATION

A. Requests constitute a representation that Contractor:

1. Has investigated proposed product and determined it meets or exceeds, in all respects, specified product.

2. Will provide same warranty or longer warranty for substitution as for specified product.

3. Will coordinate installation and make other changes that may be required for Work to be complete in all respects.

4. Waives claims for additional costs that subsequently become apparent.

5. Will pay costs of changes to Contract Documents, Drawings, details and Specifications required by accepted substitutions.

1.5 ARCHITECT'S DUTIES

A. Review Contractor's requests for substitutions with reasonable promptness.

1. Architect will recommend that Owner accept or reject substitution request.

2. Upon request, Architect will provide cost for changes to Contract Documents, Drawings, details and Specifications required for substitutions.

B. Notify Contractor in writing of decision to accept or reject requested substitution.

END OF SECTION

SECTION 01700

EXECUTION REQUIREMENTS

PART 1 - GENERAL

1.1 SUMMARY

A. This section describes execution requirements.

1. Installer qualifications.
2. Examination.
3. Manufacturer's instructions.
4. Installation.
5. Cleaning.
6. Protection.

B. Related Requirements:

1. Section 01500: Cleaning during construction.
2. Section 01770: Closeout procedures.
3. Section 01820: Systems demonstration.

1.2 INSTALLER QUALIFICATIONS

A. Experienced Installers: Installers to have minimum five years successful experience installing items similar to those required for Project, except for individuals in training under direct supervision of experienced installer.

1.3 EXAMINATION

A. Acceptance of Conditions: Beginning installation of a product signifies installer has examined substrates, areas, and conditions for compliance with manufacturer requirements for tolerances and other conditions affecting performance.

B. Field Measurements: Take field measurements as required to fit Work properly; recheck measurements prior to installing each product.

1. Where portions of Work are to fit to other construction verify dimensions of other construction by field measurements before fabrication; allow for cutting and patching in order to avoid delaying Work.

C. Space Requirements: Verify space requirements and dimensions of items shown diagrammatically on Drawings.

1.4 MANUFACTURERS' INSTRUCTIONS

A. Manufacturer’s Recommendations: When work is specified to comply with manufacturers' recommendations or instructions, distribute copies to persons involved and maintain one set in field office.

1. Conform to requirements specified in Section 01300 for submittal of recommendations or instructions to Architect; submit to Architect only where specified or where specifically requested.

B. Perform work in accordance with details of recommendations and instructions and specified requirements.

1. Should a conflict exist between Specifications and recommendations or instructions consult with Architect.

C. Where manufacturer's information notes special recommendations in addition to installation instructions, comply with both recommendations and instructions.

1.5 INSTALLATION

A. Pre-Installation Meetings: Installers and suppliers are to attend pre-installation meetings scheduled by Contractor.

B. Comply with manufacturers written recommendations and installation instructions unless more restrictive requirements are specified.

C. Locate Work and components accurately, in correct alignment and elevation.

1. Make vertical work plumb and horizontal work level.

2. Install components to allow space for maintenance and ease of removal for replacement.

D. Install products at time and under conditions to ensure best possible results; maintain conditions required for product performance until Substantial Completion.

E. Conduct operations so no part of Work is subject to damaging operations or loading in excess of that expected during normal conditions.

F. Securely anchor permanent construction in place, accurately located and aligned with other portions of Work.

G. Allow for building movement including thermal expansion and contraction.

H. Make joints of uniform width; arrange joints as indicated, for best visual effect where not otherwise indicated; fit exposed connections together to form hairline joints except where otherwise indicated.

1.6 CLEANING

A. Cleaning During Construction: Specified in Section 01500 - Temporary Facilities and Controls; also comply with Section 01350 – LEED Special Environmental Requirements.

B. Progress Cleaning: Keep installed areas clean using cleaning materials specifically recommended by manufacturers of product being cleaned; where not otherwise recommended use nontoxic materials that will not damage surfaces.

1. Remove debris from concealed spaces before enclosing space.

2. Supervise construction operations to assure no part of construction, completed or in progress, is subject to harmful, dangerous, damaging, or otherwise deleterious exposure during construction period.

C. Final Cleaning: Execute final cleaning at Substantial Completion.

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

a. Vacuuming Equipment: Type with high efficiency particulate arrestor (HEPA) type filters; properly maintained.

2. Clean equipment and fixtures to a sanitary condition, clean filters of mechanical equipment, replace filters where cleaning is impractical.

a. Clean ducts.

3. Clean site; sweep paved areas.

4. Remove waste, surplus materials and rubbish from Project and site; recycle to maximum extent feasible.

1.7 PROTECTION

A. Protect products subject to deterioration with impervious cover. Provide ventilation to avoid condensation and trapping water.

B. Take care to use protective covering and blocking materials that do not soil, stain, or damage materials being protected.

C. After installation, provide coverings to protect products from damage from traffic and construction operations, remove when no longer needed.

D. Protect interior materials from water damage; immediately remove wet materials from site to prevent growth of mold and mildew on site.

END OF SECTION

SECTION 01730

CUTTING AND PATCHING

PART 1 - GENERAL

1.1 SUMMARY

A. Contractor shall be responsible for cutting, fitting and patching required to complete Work and to:

1. Make its parts fit together properly.
2. Uncover work to provide for installation of ill-timed work.
3. Remove and replace defective work.
4. Remove and replace work not conforming to Contract Documents.
5. Remove samples of installed work as required for testing.
6. Provide routine penetrations of non-structural surfaces for installation of piping and electrical conduit.

B. Related Requirements:

1. Section 01350: LEED special environmental requirements.
2. Section 01500: Temporary facilities and controls.

1.2 SUBMITTALS

A. Submit a written request to Architect well in advance of executing cutting or alteration which affects:

1. Work of Owner or separate contractor.
2. Structural value or integrity of any element of Project.
3. Integrity of weather-exposed or moisture-resistant elements.
4. Efficiency, operational life, maintenance or safety of operational elements.
5. Visual qualities of sight-exposed elements.

B. Request shall include:

1. Identification of Project and description of affected work.
2. Necessity for cutting or alteration.
3. Effect on work of Owner or separate contractor.

4. Effect on structural integrity, or weatherproof integrity of Project.

5. Alternatives to cutting and patching.

6. Cost proposal, when applicable.

7. Written permission of separate contractor whose work will be affected.

8. Description of proposed work including:

    a. Scope of cutting, patching, alteration, or excavation.
    b. Products proposed to be used.
    c. Extent of refinishing to be included.

C. Should conditions of Work or schedule indicate a change of products from original installation, Contractor shall submit request for substitution as specified in Section 01630 - Product Substitution Procedures.

D. Submit written notice to Architect designating date and time work will be uncovered.

PART 2 - PRODUCTS

2.1 MATERIALS

A. Comply with Specifications and standards for each specific product involved.

B. Where Specifications and standards have not been provided, provide materials and fabrication consistent with quality of Project and intended for commercial construction.

C. Provide new materials for cutting and patching unless otherwise indicated.

PART 3 - EXECUTION

3.1 INSPECTION

A. Inspect existing conditions of Project, including elements subject to damage or to movement during cutting and patching.

B. After uncovering work, inspect conditions affecting installation of products, or performance of work.

C. Report unsatisfactory or questionable conditions to Architect in writing; do not proceed with work until Architect has provided further instructions.

3.2 PREPARATION

A. Provide adequate temporary support as necessary to assure structural value or integrity of affected portion of Work.

1. Provide services of licensed engineer for designing temporary support where required by applicable authorities for temporary supports and for shoring; submit engineering calculations directly to applicable authorities upon request.

B. Protect other portions of Project from damage.

3.3 PERFORMANCE

A. Execute cutting by methods that provide proper surfaces to receive installation of repairs and finishes.

1. Execute excavating and backfilling by methods which will prevent settlement and which will prevent damage to other work.

B. Employ same installer or fabricator to perform cutting and patching work as employed for new construction for:

1. Weather-exposed or moisture resistant elements.

2. Sight-exposed finished surfaces.

C. Execute fitting and adjustment of products to provide a finished installation to comply with specified products, functions, tolerances and finishes.

D. Restore work that has been cut or removed; install new products to provide completed Work in accordance with requirements of Contract Documents.

E. Fit work tight to pipes, sleeves, ducts, conduit and penetrations through surfaces.

F. Refinish entire surfaces as necessary to provide even finish to match adjacent finishes:

1. For continuous surfaces, refinish to nearest intersection.

2. For an assembly, refinish entire unit.

END OF SECTION

SECTION 01770

CLOSEOUT PROCEDURES

PART 1 - GENERAL

1.1 SUMMARY

A. This section describes Contract closeout procedures.

1. Substantial completion.
2. Final completion.
3. Project record documents.
4. Material and finish data.
5. Operation and maintenance data.

B. Related Requirements:

1. Section 01350: LEED special environmental requirements.
2. Section 01780: Warranties.
3. Section 01820: Systems demonstration.

1.2 SUBSTANTIAL COMPLETION

A. Immediately prior to Substantial Completion, schedule agency reviews as required for “temporary certificate of occupancy” or for “certificate of occupancy”.

B. When Contractor considers the Work or a designated portion thereof is substantially complete, submit written notice, with list of items to be completed or corrected.

1. List (“Punch List”): Format pre-approved by Owner and Architect; tabular form with each space listed required.

C. Within a reasonable time, Owner and Architect will inspect status of completion and may add to “Punch List”.

D. Should Owner and Architect determine Work is not substantially complete, Contractor will be promptly notified in writing, giving reasons.

E. Contractor shall remedy deficiencies and send a second written notice of substantial completion; Architect will reinspect Work.

1. Contractor shall pay for Architect's time and direct expenses where more than one Substantial Completion inspection is required.

F. When Architect determines Work is substantially complete, a Certificate of Substantial Completion will be prepared in accordance with General Conditions.

1.3 FINAL COMPLETION

A. When Work is complete, submit written certification indicating:

1. Work has been inspected for compliance with Contract Documents.

2. Work has been completed in accordance with Contract Documents and deficiencies listed (in 'Punch List") with Certificate of Substantial Completion have been corrected.

3. Equipment and systems have been tested in presence of Owner's representative and are operational.

4. Work is complete and ready for final inspection.

B. Special Submittals: In addition to submittals required by Contract, submit following.

1. Provide submittals required by governing authorities to governing authorities with copies included in Project Record Documents.

2. Submit final statement of accounting giving total adjusted Contract Sum, previous payments, and sum remaining due.

1.4 PROJECT RECORD DOCUMENTS

A. Keep documents current; do not permanently conceal any work until required information has been recorded.

1. Owner will provide Contractor with a separate set of Drawings to maintain for Project Record Documents.

2. Store reproducible Drawings, one set of Project Manual, and one copy of each Change Order separate from documents used for construction, for use as Project Record Documents.

3. Indicate actual work on Drawings; indicate actual products used in Project Manual, including manufacturer, model number and options.

4. Update Project Record Documents daily and allow for Architect inspection at least once a month.

B. At Contract close-out submit documents with transmittal letter containing date, Project title, Contractor's name and address, list of documents, and signature of Contractor.

C. LEED Documents: Contractor shall assist in preparation of LEED Certification documentation; refer to Section 01350 – LEED Special Environmental Requirements.

1.5 MATERIAL AND FINISH DATA

A. Provide data for primary materials and finishes.

B. Submit two sets prior to final inspection, bound in 8-1/2" by 11" three-ring binders with durable plastic covers, clearly identified regarding extent of contents.

1. Electronic Format: Where available in electronic format, submit computerized compact disk (CD's) of material and finish data.

C. Arrange by Specification division and give names, addresses, and telephone numbers of subcontractors and suppliers. List:

1. Trade names, model or type numbers.
2. Cleaning instructions.
3. Product data.

1.6 OPERATION AND MAINTENANCE DATA

A. Provide data for:

1. Electrically operated items.
2. Mechanical equipment and controls.
3. Electrical equipment and controls.

B. Submit two sets prior to final inspection, bound in 8-1/2" by 11" three-ring binders with durable plastic covers, clearly identified regarding extent of contents.

C. Provide a separate volume for each system, with a table of contents and index tabs for each volume.

D. Arrange by Specification division and gives names, addresses, and telephone numbers of subcontractors and suppliers. List:

1. Appropriate design criteria.
2. List of equipment and parts lists.
3. Operating and maintenance instructions.
4. Shop drawings and product data.

E. Electronic Format: Where available in electronic format, submit computerized compact disk (CD's) of operation and maintenance data.

END OF SECTION

SECTION 01780

WARRANTIES

PART 1 - GENERAL

1.1 SUMMARY

A. Compile required and incidental warranties required by Contract Documents.

B. These warranties shall be in addition to and not a limitation of other rights Owner may have against Contractor under Contract Documents and which may be prescribed by law, regardless of wording of warranty.

1.2 FORM OF SUBMITTAL

A. Provide duplicate copies, notarized or on Contractor and Manufacturer's letterhead.

1. Assemble documents executed by subcontractors, installers, suppliers, and manufacturers.

2. Provide table of contents and assemble in binder with durable plastic cover, clearly identified regarding extent of contents.

3. Electronic Format: Submit computerized compact disk (CD's) of warranties, in Microsoft Word.

B. Warranty Form: Use form acceptable to Owner; completed form shall not detract from or confuse interpretations of Contract Documents.

1. Manufacturer shall countersign warranty.

2. Subcontractor and installer shall countersign warranty where specified.

a. Provide required warranties for waterproofing and roofing systems countersigned by subcontractor and installer.

C. Submit final warranties prior to final application for payment.

1. For equipment put into use with Owner's permission during construction, submit within ten days after first operation.

2. For items of Work delayed materially beyond Date of Substantial Completion, provide updated submittal within ten days after acceptance, listing date of acceptance as start of warranty period.

D. Provide information for Owner's personnel regarding proper procedure in case of failure and instances that might affect validity of warranty.

E. Size: 8-1/2" by 11" for three-ring binder; fold larger sheets to fit.

1.3 WARRANTIES

A. Warranties are intended to protect Owner against failure of work and against deficient, defective and faulty materials and workmanship, regardless of sources.

B. Limitations: Warranties are not intended to cover failures that result from:

1. Unusual or abnormal phenomena of the elements.

2. Owner's misuse, maltreatment or improper maintenance of work.

3. Vandalism after substantial completion.

4. Insurrection or acts of aggression including war.

C. Related Damages and Losses: Remove and replace work which is damaged as result of failure, or which must be removed and replaced to provide access for correction of warranted work.

D. Warranty Reinstatement: After correction of warranted work, reinstate warranty for corrected work to date of original warranty expiration, but not less than half original warranty period.

E. Replacement Cost: Replace or restore failing warranted items without regard to anticipated useful service lives.

F. Rejection of Warranties: Owner reserves right to reject unsolicited and coincidental product warranties that detract from or confuse interpretations of Contract Documents.

END OF SECTION

SECTION 01820

SYSTEMS DEMONSTRATION

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes: Provide equipment and systems demonstration and instruction in accordance with Contract Documents.

1. Video record seminars and system demonstrations.

B. Related Sections:

1. Section 01310: Project management and coordination.
2. Section 01770: Contract closeout procedures.
3. Division 15: Mechanical.
4. Division 16: Electrical.

1.2 DESCRIPTION

A. Seminar Agenda and Outline:

1. Prepare a seminar agenda and outline in consultation and cooperation with Owner. Include following:

a. Equipment and systems that will be included in seminars.
b. Name of companies and representatives presenting at seminars.
c. Outline of each seminar's content.
d. Time and date allocated to each system and item of equipment.

2. Submit preliminary seminar agenda and outline for review and comment by Owner.

a. Revise and resubmit agenda and outline until all seminar requirements have been satisfied and seminar dates and presenters have been finalized.

3. Submit final seminar agenda and outline no later than eight weeks before date of Acceptance of Work.

B. Seminar Organization:

1. Contractor’s presentation leaders shall chair seminars.

a. Coordinate qualification of training personnel, seminar contents, and presentations with Owner.

2. Coordinate individual presentations and ensure manufacturer’s representatives scheduled to be at training seminars are present.

3. Arrange for presentation leaders familiar with design operation, maintenance and troubleshooting of equipment and systems.

    a. Where one person is not familiar with all aspects of equipment or system; arrange for specialists familiar with each aspect.

4. Coordinate proposed seminar dates with Owner and select mutually agreeable dates.

5. Video Recording: Arrange for video recording (audio and video) of training seminars and system demonstrations, including seminar and demonstration questions and answers.

C. Seminar Content:

1. Architect's Consultants will explain design philosophy of primary systems.

2. Include following information in presentations dealing with specific systems.

    a. An overview of how system is intended to operate.
    b. Describe design parameters, constrains and operational requirements.
    c. Describe system operation strategies.
    d. Provide information to help in identifying and troubleshooting problems.

3. Include following information in presentations dealing with equipment.

    a. Explanation of how equipment operates.
    b. Recommended preventative and routine maintenance.

D. System Demonstration:

1. Demonstrate operation of equipment and systems when specified in individual technical sections. Include following in demonstration.

    a. Start-up and shut down.
    b. Operation.
    c. Scheduled and preventative maintenance.
    d. Troubleshooting.

2. Demonstration may be conducted at time of original starting with Owner's prior approval.

E. Seminar and Demonstration Questions:

1. Be prepared to answer questions raised by Owner's personnel at demonstrations and seminars.

2. If unable to satisfactorily answer questions immediately, provide written response within three days.

F. Use manufacturer's operation and maintenance data as basis of instruction.

1.3 SUBMITTALS

A. Video Recording: Submit ten copies of each video recording in DVD format acceptable to Owner; include label on each DVD and on each container identifying Project and Seminar content.

END OF SECTION

SECTION 02820

CHAIN LINK FENCE

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes: Provide plastic coated fence framing and fabric, with accessories as required for complete fence installation.

1. Excavate for post bases and provide concrete anchorage for posts.

B. LEED General: Refer to Section 01350 LEED Special Environmental Requirements and to LEED “Checklist” indicating points Design Team has anticipated relating to specific LEED credits and LEED requirements.

C. Related Work:

1. Section 01500: Temporary construction fence.
2. Section 02825: Custom metal fence.

1.2 REFERENCES

A. Chain Link Fence Manufacturer's Institute (CLFMI): Chain Link Fence Installation Standard.

B. ASTM F567: Installation of Chain Link Fence.

1.3 SYSTEM DESCRIPTION

A. System: Provide complete system from single manufacturer including framing, fabric, and accessories.

1.4 SUBMITTALS

A. Product Data: Submit manufacturer's literature, including standard details.

B. Shop Drawings: Indicate plan layout, spacing of components, accessories, and anchorage.

C. Samples: Submit fence fabric with plastic coating.

D. LEED Certification Points: Submit information and certifications necessary to achieve maximum points for LEED certification; coordinate and cooperate with Owner and Architect in providing information necessary for required LEED rating.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

A. Anchor Fence, Inc.

B. Security Fence.

C. Boundary Fence and Rail.

D. Master Halco, Inc.

E. Substitutions: Refer to Section 01630.

2.2 MATERIALS

A. Plastic Coating: Manufacturer's standard virgin polyvinyl chloride (PVC) vinyl coating; Shore D hardness of 40 to 60; bond of coating to metal to be greater than or equal to cohesive strength of vinyl.

1. Coat factory cut ends with same vinyl material.

B. Framework: Design fence framework to comply with strength requirements conforming to ASTM F667; ASTM A1083, Schedule 40, butt weld, standard weight, hot dip galvanized to 1.8 oz/ft^2 coating; Type I weight.

1. PVC Coating: Minimum 0.010" thick PVC coating thermally bonded and adhered to cured primer applied over galvanized steel; coat framework to match mesh unless otherwise indicated.

2. Line Posts, Corner Posts, Terminal Posts, Caps, Brace Rails: Provide vinyl coated galvanized steel members.

a. End, Corner and Pull Posts: Minimum 2.875" outside diameter, and 5.79 pounds per linear foot.

b. Rails and Braces: Minimum 1.66", 1.35 lbs/lin. ft.

c. Gate Posts: Minimum 4" outside diameter; 9.1 lbs/lin. ft.

3. Types and Sizes: As indicated, where not indicated, sizes as recommended by manufacturer.

a. Fence Height: As indicated, not less than 8'-0" where not otherwise indicated.

4. Fittings: Sleeves, bands, clips, rail ends, tension bars, fasteners and fittings, vinyl coated galvanized steel.

5. Gates: ASTM F900; manufacturer's standard vinyl coated galvanized steel gates, 3'-0" wide unless otherwise indicated; welded construction.

a. Provide gates complete with vinyl coated hardware including hasp for padlock.

C. Fabric: ASTM F668, vinyl coated, 1-3/4" diamond mesh, interwoven, 9 gage top selvage twisted tight, bottom selvage knuckle end closed.

1. Vinyl Coating: Minimum Class 2a extruded and adhered or Class 2b fusion bonded PVC coating on minimum 0.3 oz/ft^2 zinc coated steel wire.

D. Concrete: ASTM C94, normal Portland cement, 2,500 psi at 28 days, 2" to 3" slump, 2 to 4 percent entrained air.

E. LEED Recycled Content: Where available provide materials with post-consumer and pre-consumer recycled content to achieve maximum LEED credits.

F. LEED Regionally Manufactured, Extracted, Harvested, or Recovered Materials: Where possible obtain materials that qualify for LEED credits for regional materials obtained within 500 miles of Project.

2.3 FABRICATION

A. Gates: Assemble gate frames by welding with both horizontal and vertical members and with diagonal cross-bracing of minimum 3/8" diameter adjustable length truss rods to ensure rigidity. Vinyl coated to match fencing.

1. Swing Gates: Conform to ASTM F900; manufacturer's standard galvanized steel gates, 3'-0" wide unless otherwise indicated; complete with hardware including hasp for padlock. Vinyl coated.

a. Gate Frames: Minimum 1.9" outside diameter; 2.60 lbs/lin. ft.; vinyl coated.

b. Hinges: Non-lift-off type, offset to permit 180 degree opening, minimum 1-1/2 pair per gate leaf; vinyl coated.

c. Accessories: Keepers, stops, and accessories as required for complete, secure fence gate installation; vinyl coated.

PART 3 - EXECUTION

3.1 INSTALLATION

A. Install line posts, corner posts, gates, top rails, bottom rails, brace rails, post caps, and fabric to provide rigid structure for fence of height indicated and in accordance with ASTM F567 and CLFMI Installation Standard.

1. Use manufacturer's standard fittings, fasteners and hardware.

B. Maximum Spacing of Posts: ASTM F567 and CLFMI Installation Standard.

C. Install line, corner, and terminal posts plumb in accordance with recommendations of ASTM F567 and CLFMI Standard for locations indicated on Drawings.

1. Coordinate imbedded post sleeves with concrete work.

D. Position bottom rail 4” above finished grade and fabric 2" above finished grade.

E. Pass top rail through line post tops to form continuous bracing; install 7" long couplings midspan at pipe ends.

F. Brace corner posts back to adjacent line post with horizontal center brace rail; install brace rail, one bay from end posts.

G. Fasten fabric to top rail, bottom rail, line posts, braces and bottom tension wire with wire ties maximum 12" centers.

H. Attach fabric to end, corner and gate posts with tension bars and tension bar clips.

I. Stretch fabric between terminal posts or at intervals of 100 feet maximum, whichever is least dimension.

J. Install gates for free, easy operation, ready for Owner supplied padlock.

END OF SECTION

SECTION 02825

CUSTOM METAL FENCE

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes: Provide custom metal fence system including motor operated sliding gates, framing, and accessories as required for complete fence installation as indicated.

1. Excavate for post bases and provide concrete anchorage for freestanding posts, provide sleeves and grout posts embedded in concrete construction.

B. LEED General: Refer to Section 01350 LEED Special Environmental Requirements and to LEED “Checklist” indicating points Design Team has anticipated relating to specific LEED credits and LEED requirements.

C. Related Sections:

1. Section 01500: Temporary construction fence.
2. Section 02820: Chain link fence.
3. Section 05500: Miscellaneous metal fabrications.

1.2 REFERENCES

A. American Welding Society (AWS): D1.1, Structural Welding Code.

1.3 SYSTEM DESCRIPTION

A. Performance Requirements: Design fence and gates to support loads as required by California Building Code.

1. In addition, design to support minimum lateral force of 50 lbs./lin. ft. uniform load and 200 lbs. at any single point without permanent set or damage; ASTM E935.

1.4 SUBMITTALS

A. Product Data: Submit product literature for gates and operators, gate hardware, grout, and manufactured items.

B. Shop Drawings: Indicate fence and gate layout, spacing of components, connections, fabrication details, accessories, and anchorage.

1. Indicate profiles, sizes, connections, and anchorage.
2. Provide templates as required for anchor installation by others.

C. Samples: Submit samples fence section with welds and finish.

D. Certificates: Submit certification signed by California registered civil or structural engineer indicating compliance with Contract Documents and applicable codes.

E. LEED Certification Points: Submit information and certifications necessary to achieve maximum points for LEED certification; coordinate and cooperate with Owner and Architect in providing information necessary for required LEED rating.

1.5 QUALITY ASSURANCE

A. Fabricator: Firm with minimum five years successful experience fabricating custom metal fences and gates similar to those required for Project.

1. Provide fence and gates by same fabricator.

PART 2 - PRODUCTS

2.1 MATERIALS

A. Steel:

1. Steel Shapes, Plates and Bars: ASTM A36; shapes and sizes as indicated on Drawings; provide weights suitable for specified loads; galvanized.

2. Structural Steel Sheet: Hot rolled, ASTM A1011; or cold rolled, ASTM A1008, Class 1; of grade required for design loading; galvanized.

3. Steel Tubing: Cold formed ASTM A500; or hot rolled, ASTM A501; minimum Grade B; seamless where exposed; galvanized.

4. Finish: Provide factory formulated polyester TGIC powder coating materials intended for powder coating application and as required to match approved sample.

a. Color: As indicated; where not otherwise indicated as selected by Architect from manufacturer's full range of available colors.

b. Finish System: System including preparation and primer shall be designed for substrates, applications indicated, and long term commercial use.

1) Type: Polyester TGIC powder coating system.

5. Color: As directed by Architect; custom color may be required.

B. Aluminum: Provide alloy and temper recommended by aluminum producer or finisher for type and use and finish indicated; sized for strength and durability consistent with application involved.

1. Finish: Comply with following finishes as designated by NAAMM "Metal Finishes Manual" and referenced standards.

a. High Performance Organic Coating: AA-C12C42R1x, prepared, pretreated, and coated with minimum two coat Kynar 500 or Hylar 5000 system; AAMA 2605; color as selected by Architect.

1) PVDF Manufacturers:

a) Arkema Group/Kynar 500.
b) Solvay Solexis/Hylar 5000.
c) Substitutions: Refer to Section 01630.

2) Paint Manufacturers:

a) PPG Industries.
b) Valspar Corp.
c) Akzo Nobel.
d) Substitutions: Refer to Section 01630.

3) Color: Custom color as selected by Architect.

2. Comply with following minimum standards for aluminum.

a. Extruded Bar and Shapes: ASTM B221, 6063-T6.
b. Extruded Pipe and Tube: ASTM B429, 6063-T6.
c. Drawn Seamless Tube: ASTM B483, 6063-T832.
d. Plate and Sheet: ASTM B209, 6061-T6.
e. Die and Hand Forgings: ASTM B247, 6061-T6.
f. Castings: ASTM B26, 356.0-T6.

C. Grout: Non-shrink meeting ASTM C1107 non-metallic, pre-mixed, factory-packaged, non-staining, non-corrosive; type specifically recommended by manufacturer as applicable to job condition.

1. Manufacturers:

a. Master Builders/Masterflow 713.
b. U.S. Grout Corp./Five Star Grout.
c. Bostik Construction Products/Upcon Grout.
d. Protex Industries, Inc./Propak.
e. Substitutions: Refer to Section 01630.

D. Fasteners and Rough Hardware: Type required for specific usage; provide zinc-coated fasteners.

E. Welding Materials: AWS D1.1, type required for materials being welded.

F. Galvanizing Repair Paint: High zinc-dust content paint for regalvanizing welds in galvanized steel.

G. Concrete: ASTM C94, normal Portland cement, 2,500 psi at 28 days, 2" to 3" slump, 2 to 4 percent entrained air.

H. LEED Recycled Content: Where available provide materials with post-consumer and pre-consumer recycled content to achieve maximum LEED credits.

I. LEED Regionally Manufactured, Extracted, Harvested, or Recovered Materials: Where possible obtain materials that qualify for LEED credits for regional materials obtained within 500 miles of Project.

2.2 FABRICATION

A. Framework: Design and fabricate fence to withstand anticipated loads, including loads from people climbing on fence; steel or aluminum construction, Contractor's option.

1. Configurations: As indicated, welded construction unless otherwise indicated.

2. Fittings: Provide fittings and accessories as required for complete installation.

B. Gates: Fabricate gates as indicated, welded construction.

1. Sliding Gates: Provide cantilever type gates which allow clear opening when gate is open; ball bearing wheels and rollers; provide guides to keep gates in-line during opening and closing cycles.

a. Hardware: Design hardware to support gates plus additional 500 lbs. live load without exceeding limits of gate operator and to allow manual opening and closing of gates during power failures.

1) Manual Operation: Maximum 50 lbs. pressure to move gate.

b. Operators: Heavy duty commercial quality sliding gate operator sized as recommended by operator manufacturer for size of gate but not less than 1 H.P. motor with internal overload protection.

c. Operation: Wire operator to allow both remote control and key operation; gates to "auto close" after adjustable preset time.

1) Key Operation: Minimum 6 pin cylinder key boxes mounted on posts at locations indicated; posts to be included in Work of this section.

2) Remote Controls: Single channel digital radio transmitters with over 1000 Owner changeable codes, using 9-volt batteries

a) Provide 50 remote controls.

3) Safety Devices: Provide as required by applicable codes, including photo electric non-contact reversing control and electric gate edge to reverse gate operator.

d. Accessories: Provide as required for complete, automatically operated secure fence gate installation in configuration indicated.

C. Fabricate items with joints neatly fitted and properly secured.

D. Grind exposed welds continuous, smooth and flush with adjacent finished surfaces, and ease exposed edges to approximate 1/32" uniform radius.

E. Exposed Mechanical Fastenings (Slide Gate Hardware Only): Flush countersunk fasteners unobtrusively located, consistent with design of structure.

F. Fit and shop assemble in largest practical sections for delivery.

G. Make exposed joints flush butt type, hairline joints where mechanically fastened.

1. Fabricate joints exposed to weather in manner to exclude water or provide weep holes where water could accumulate.

H. Supply components required for proper anchorage of custom steel fence; fabricate anchorage and related components of same material and finish as custom steel fence.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Field Measurements: Take field measurements prior to preparation of shop drawings and fabrication.

3.2 INSTALLATION

A. Install fence, gates, and accessories to provide rigid structure for configurations indicated as specified and in accordance with applicable code requirements.

B. Install line, corner, and terminal posts plumb in locations indicated on Drawings.

1. Coordinate embedded post sleeves with concrete work.
2. Grout posts solid where indicated on Drawings.

C. Install gates for free, easy operation.

D. Obtain Architect's review prior to site cutting or making adjustments that are not part of scheduled work.

E. Install components square and level, accurately fitted and free from distortion or defects detrimental to appearance or performance.

1. Supply items required to be cast into or embedded in other materials to appropriate trades.

2. Ensure alignment with adjacent construction; coordinate with related work to ensure no interruption in installation.

F. Make provision for erection stresses by temporary bracing; keep work in alignment.

G. Field bolt and weld to match standard of shop bolting and welding; hide bolts and screws whenever possible, where not hidden, use flush countersunk fastenings.

1. Perform field welding in accordance with AWS D1.1.
2. Bolting permitted for slide fence hardware only.

H. After installation, touch-up field welds and scratched and damaged surfaces; use same primer as used for shop coat.

I. Replace items damaged in course of installation and construction.

END OF SECTION

SECTION 03200

CONCRETE REINFORECEMENT

PART 1 - GENERAL

1.1 DESCRIPTION

Division 1 applies to this Section. Provide reinforcing steel complete as indicated, specified and required.

A. Work In This Section: Principal items include:

1. Reinforcing bars and mesh for cast-in-place.

1.2 QUALITY ASSURANCE

A. Source Quality Control: Refer to Quality control Section 3 of General Requirements for general testing requirements and to following paragraphs for specific procedures. Testing Laboratory shall perform following conformance testing shall select the test samples of bars, ties, and stirrups from material at the site or from place of distribution, each sampling including at least two 18" long pieces, and perform the following tests according to ASTM A615.

B. Identified Bars: If samples are obtained from bundles as delivered from the mill, identified as to the heat number, accompanied by the mill analyses and mill test reports, and properly tagged with Identification Certificate so as to be readily identified, perform one tensile and one bend test for each 25 tons or fraction thereof of each size of bars. Submit mill reports when samples are selected.

C. Unidentified Bars: When positive identification of bars cannot be made and when random samples are obtained, perform tests for each 10 tons or fraction thereof, one tensile and one bend test from each size of reinforcement. See Section 3 of General Requirements.

D. Codes: California Building Code and latest Supplements thereto and "Standard Specifications for Public Works Construction" Current Edition.

E. Standards: Current Editions (As Applicable)

1. ACI-301 - Specifications for Structural Concrete for Buildings.
2. ACI-315 - Details and Detailing of Concrete Reinforcement.
3. ACI-318 - Building Code Requirements for Reinforced Concrete.
4. ASTM A82 - Cold Drawn Steel Wire for Concrete Reinforcement.
5. ASTM A185 – Welded Wire Reinforcement for Concrete Reinforcement.
6. ASTM A497 - Welded Wire Reinforcement for Concrete Reinforcement.
7. ASTM A615 - Deformed and plain Billet-Steel Bars for Concrete Reinforcement.
8. ASTM A706 - Low-Alloy Steel deformed bars for Concrete Reinforcement.

9. AWS.D1.4 - Structural Welding Code For Reinforcing Steel.

10. CRSI - Concrete Reinforcing Steel Institute Manual of Practice.

11. CRSI-63 - Recommended Practice for Placing Reinforcing Bars.

12. CRSI-65 - Recommended Practice for Placing Bar Supports, Specifications and Nomenclature.

1.3 PRODUCT DELIVERY, STORAGE, AND HANDLING

Deliver materials in timely manner to ensure uninterrupted progress. Store materials by methods that prevent damage and permit ready access for inspection and identification.

PART 2 PRODUCTS

2.1 MATERIALS: Furnish materials meeting the test requirements of Paragraph "Source Quality Control" hereinbefore, as applicable, the requirements on the structural drawings and following requirements:

Reinforcing bars:	ASTM A 615/ A 615M grade 60, and (to be welded) ASTM A 706, Grade 60.
Welded wire reinforcement:	ASTM A 185, mesh size and gage as indicated, 60 ksi minimum tensile strength.
Tie wire:	Annealed Steel, 16 Gage Minimum
Welding electrodes:	AWS D5.1, 80 Of 90 Series, Low Hydrogen Type AWS D1.4

2.2 FABRICATION OF REINFORCING BARS:

A. Bending and Forming: Fabricate bars of the indicated sizes and bend and form to required shapes and lengths by methods not injurious to materials. Do not heat reinforcement for bending. Bars with unscheduled kinks or bends are subject to rejection. Use only tested and approved bar materials.

B. Welding: All reinforcing steel subject to welding shall conform to ASTM A 706. Perform welding, where shown or approved, by the direct electric arc process in accordance with AWS D1.4 using the specified low-hydrogen electrodes. Preheat 6" each side of joint. Protect joints from drafts during the cooling process; accelerated cooling is prohibited. Do not tack weld bars. Clean metal surfaces to be welded of all loose scale and foreign material. Clean welds each time electrode is changed and chip burned edges before placing welds. When wire brushed, the completed welds must exhibit uniform section, smooth welded metal, feather edges without undercuts or overlays, freedom from porosity and clinkers, and good fusion and penetration into the base metal. Cut out welds or parts of welds found defective with chisel and replace with proper welding. Employ only experienced certified welding operators. Prequalification of welds shall be in accordance with Code. Reinforcing bars to be welded shall have a maximum 0.75 carbon equivalent.

C. Marking and Shipping: Bundle bars, tag with identification and transport and store so as not to damage any material. Keep a sufficient supply of tested and approved bars at site to avoid delays.

PART 3 EXECUTION

3.1 INSTALLATION OF REINFORCEMENT

Provide additional bars at sleeves and openings as required. Before placing bars, and again before concrete is placed, clean bars of loose mill scale, oil, or other coating that might destroy or reduce bond.

A. Securing in Place: Accurately place bars and wire tie in precise position where bars cross. Bend ends of wire ties away from forms. Wire tie bars to corners of ties and stirrups. Support bars according to current edition of "Recommended Practice for Placing Bar Supports" of the Concrete Reinforcing Steel Institute, using approved accessories and chairs. Use precast concrete cubes with embedded wire ties to support reinforcing steel bars in concrete placed on grade and in footings.

B. Exposed Surfaces: Provide stainless steel or plastic tipped chairs, bolsters, and accessories where exposed on exterior or interior concrete surfaces not to be painted or covered.

C. Clearances: Maintain minimum clear distances between reinforcing bars and face of concrete as indicated or directed.

D. Splices: Do not splice bars at points of maximum stress except where indicated. Lap splices as shown or required to develop the full strength or stress of bars. Stagger splices in horizontal wall bars at least 48" longitudinally in alternate bars and opposite faces. Splices to be in contact or spaced one bar diameter or 1" clear and in columns 1 1/2 bar diameter or 1 1/2 clear.

E. Field Welding of Bars: As detailed on Drawings, and specified for fabrication, provide special inspection.

F. Maintaining Bars In Position: Assign a competent ironworker mechanic at every concrete placing location to inspect reinforcement and maintain all bars in the correct positions, unless permitted by Engineer, reinforcement shall not be bent after being placed in hardened concrete.

G. Welded Wire Reinforcement: Lap one full mesh plus 2" at splices, wire tie, and support the same as specified for bars.

3.2 MISCELLANEOUS CONCRETE WORK

Provide reinforcing for areaways, cast-in-place valve boxes, pits, splash blocks, bases, and other miscellaneous concrete as shown and required to complete all Work. Conform to applicable requirements herein.

3.3 FIELD QUALITY CONTROL

A. Supervision: Perform Work of this Section under the supervision of a capable superintendent.

B. Continuous Inspection: Obtain special inspection and approval of reinforcement by deputy concrete inspector before concrete is placed.

C. Welding Inspection: Welding done at the site, perform welding of reinforcing bars under continuous inspection of the Testing Laboratory Welding Inspector.

See Section 3 of General Requirements. Provide inspection reports to Engineer.

--END OF SECTION--

SECTION 03300

CAST IN PLACE CONCRETE

PART 1 - GENERAL

1.1 DESCRIPTION

Division 1 applies to this Section. Provide all Work constructed of cast-in-place concrete as INDICATED, specified, and required.

A. Work In This Section: Principal items include:

1. Furnishing, placing, patching, and initial curing of cast-in-place concrete unless otherwise specified.
2. Poured in place Concrete.
3. Site concrete.
4. Grout and dry-pack work, except as otherwise specified.
5. Placing of embedded anchor bolts and inserts.
6. Vapor barrier under interior floor slabs on grade.
7. Light weight concrete

B. Related Work Not In This Section:

1. Preparation and grading of earth sub-grade under concrete.
2. Furnishing, erection, and removal of forms.
3. Furnishing and placing reinforcing for cast-in-place concrete.
4. Final finishing and curing of cast-in-place concrete.
5. Gravel fill under interior floor slab.
6. Concrete anchors

1.2 QUALITY ASSURANCE:

A. Concrete Manufacturer: Furnish all concrete from licensed commercial ready-mix concrete plants conforming to ASTM C94 and approved by Building Official. The requirements herein govern when exceeding ASTM C94.

B. Allowable Tolerances: Construct concrete conforming to tolerances specified in ACI 301, "Specifications for Structural Concrete for Buildings", as applicable, unless exceeded by requirements of regulatory agencies or otherwise indicated or specified, including the following, unless modified by the requirements of the Contract Documents:

1. General requirements, including submittals, quality assurance, acceptance of structure, and protection of in-place concrete.
2. Formwork and form accessories
3. Steel reinforcement and supports.

4. Concrete mixtures

5. Handling, placing and constructing concrete

C. Source Quality Control: Refer to Quality Control Section 1 of General Requirements for general testing requirements and to following paragraphs for specific procedures. Concrete materials which by previous tests or actual service have shown conformance may be used without testing when approved by Engineer and Building Official. Testing Laboratory shall perform following conformance testing:

1. Portland Cement: Furnish Mill Certificates, acceptable to the Engineer and Building Official, showing conformance with ASTM C 150, Type II; except as noted otherwise, the Testing Laboratory shall test each 250 barrels of cement in accordance with ASTM C150.

2. Aggregate for Normal Weight Concrete: Test the aggregate before and after concrete mix is designed and whenever character of aggregate varies or source of material is changed. Include a sieve analysis. Obtain samples of aggregates at source of supply or at the ready-mix concrete plant in accordance with ASTM D75 and perform tests for the following properties:

Sieve analysis:	ASTM C136.
Organic impurities:	ASTM C40, fine aggregate color not darker than the reference standard color
Soundness:	ASTM C88, loss after 5 cycles not over 8% of coarse aggregate or 10% of fine aggregate
Abrasion:	ASTM C131, weight loss not more than 10-1/2% after 100 revolutions, 42% after 500 revolutions
Deleterious materials:	ASTM C33.
Materials finer than No. 200 sieve	ASTM C117, not over 1% for gravel, 1.5% for crushed aggregate, per ASTM C33
Reactivity potential:	ASTM C227, C289, and C342, ratio of silica released to reduction in alkalinity not to exceed 1.0; include full report for Engineer's evaluation
Sand equivalent:	ASTM D2419, California Sand Equivalent values not below 80 percent

1.3 CONCRETE MIX DESIGNS

Testing laboratory shall design concrete mixes for all concrete requiring 28-day compressive strength as indicated on drawings. Contractor shall bear all costs for concrete mix designs.

A. Strength Requirements: Design mixes for structural concrete for minimum 28-day compressive strengths required by Drawings and Specifications. The trial batch strength for each mix shall exceed indicated or specified strength by 750 psi or a lesser amount based on standard deviations of strength test records according to ACI 318. Refer to Quality Control for requirements pertaining to costs of mix design, see Section 1 of General Requirements.

B. Basis of Mix Designs: Design concrete mixes for workability and durability of concrete. Control mixes in accordance with Chapter 4, ACI 318 "Building Code Requirements for Reinforced Concrete". Make adjustments in cement content as necessary for required concrete strengths at the Contractor's expense. Do not exceed 0.45 absolute water-cement or cement plus fly ash ratio by weight.

C. Admixtures: Admixtures shall be used for workability and/or water reduction. The admixture may contain an air-entraining agent producing air content of 1.5% to 3% by volume and adjusted for weather conditions. Air entrainment or other admixture is not required for footing and foundation concrete. Do not use calcium chloride. Other admixtures containing material releasing nitrates in solution are limited to 0.06% by weight for the chloride ion.

1. Air-entraining Admixture: ASTM C 260
2. Water-Reducing Admixture: ASTM C494, Type A
3. High-Range, Water-Reducing Admixture: ASTM C494, Type F
4. Water Reducing And Accelerating Admixture ASTM C 494, Type E
5. Water Reducing and Retarding Admixture: ASTM C494, Type D
6. Integral color to match exterior walls of adjacent parking garage.

D. Maximum Aggregate Sizes: Not exceeding 3/4 of minimum clear space between bars and forms, no larger than 1/5 of least dimensions between the forms. Design the mixes with 3/4" maximum size, except maximum 1-1/2" size for foundations and maximum 3/8" size where congested reinforcement or thin sections occur.

1.4 SUBMITTALS

Refer to section 01300 for procedures.

A. Shop Drawings: Submit the following items:

1. Product Data. Submit manufacturer's technical data for products, methods and control procedures. Submit applicable Building Department approved reports for proposed materials and methods.
2. Design Mix: For each concrete mix indicated. Concrete mixes shall be designed by a qualified testing laboratory, bearing a registered civil engineer’s stamp, and approved by the Engineer prior to use. Submit ready-mix concrete batch tickets.
3. Integral color product information, and color sample.

1.5 PRODUCT DELIVERY, STORAGE, AND HANDLING

Deliver materials in timely manner to ensure uninterrupted progress. Store materials by

methods that prevent damage and permit ready access for inspection and identification.

1.6 JOB CONDITIONS

Do not place concrete during rain or adverse weather conditions without means to prevent any damage. Do not place concrete when temperature exceeds 90 degrees F. Conform to ACI 305 "Recommended Practice for Hot Weather Concreting" and ACI 306 "Recommended practice for Cold Weather Concreting" as required except do not use calcium chloride or accelerators.

PART 2 PRODUCTS

2.1 MATERIALS:

Furnish materials meeting the test requirements of Paragraph "Source Quality Control" hereinbefore, as applicable, and following requirements:

Portland cement:	ASTM C150, Type II, low alkali. Do not change brand without prior approval.
Stone aggregates:	ASTM C33, from approved pits, free from vegetable matter and of opaline, feldspar, and siliceous magnesium substances; clean, hard, fine-grained sound crushed rock or washed gravel; not over 5% by weight of flat, thin, elongated, friable or laminated pieces (pieces having the major dimension over 5 times average dimension) or over 2% by weight of shale or cherty material. Aggregate for walls shall match aggregate used in the adjacent parking garage.
Pozzolan:	ASTM C 618, Class N natural pozzolan, Class F Fly Ash, 18% or 100 pounds maximum per cubic yard and no more than 3% carbon
Integral Color:	As required by Drawings.
Water:	From potable domestic source
Joint filler:	ASTM D 1751 and D 1752, as specified
Curing compound:	ASTM C 309, type 1, Class B
Curing sheet:	ASTM C 171, non-staining white types
Evaporation retardant and finishing aid:	Master Builders "Confilm", or equal
Anti-spalling sealer:	Provide Deep Seal manufactured by Pacific Coatings (818) 407-0224, conforming to ASTM C672
Surface retarder:	L.M. Scofield "Lithotex Retarder", Sika Type S or B "Rugasol", Chem-Masters "Exposee H", or equal
Vapor barrier:	ASTM D2103, polyethylene sheeting, 15 mil thickness, with minimum 2" wide waterproof plastic tape, self-adhering type

Bonding and repair:

1. Bonding material shall be a polyvinyl acetate compound for use in areas not subject to moisture.
2. Epoxy adhesive shall be a two-part compound suitable for wet or dry areas.
3. Patching mortar shall be free-flowing, polymer-modified cementious coating.
4. Bonding admixture shall be a latex, non-wettable type.

Non-shrink grout: Master Builders "Embeco" 636 885, or accepted alternate, non-gas-forming type, free of oxidizing catalysts and inorganic accelerators, performance characteristics when mixed to fluid consistency meeting CRD-611 and CRD-631, non-staining type in exposed areas

2.2 CONCRETE MIXING

Furnish ready-mixed concrete from an approved commercial offsite plant. Conform to ASTM C 94, except materials, testing, and mix designs as specified herein. Use transit mixer trucks equipped with automatic devices for recording number of revolutions of drum.

A. Limitation of Mix Water: Do not deliver ready-mixed concrete to site with total amount of mixing water included. Withhold 2-1/2 gallons of water per cubic yard at the plant unless a lesser amount is approved by the Structural Engineer, then add to mix before concrete is discharged from the mixer truck under supervision of Inspector. Each mixer truck shall arrive at the site with full water tank; if the tank is not full and concrete tests to a slump greater than specified, entire load is subject to rejection.

B. Slump: Adjust quantity of water so concrete at time of placing does not exceed 4" plus/minus 1" and at the point of placing when tested according to ASTM C143. Use the minimum water necessary for workability required by part of structure being cast. The maximum slump shall not be exceeded unless approved by the Structural Engineer.

C. Provide batch ticket for each batch discharged and used in the Work, indicating Project identification name and number, date, mix type, mix time, quantity, and amount of water added. Record approximate location of final deposit in structure.

PART 3 EXECUTION

3.1 PREPARATION FOR CONCRETE PLACING

Remove free water from forms before concrete is deposited. Remove hardened concrete, debris, and all foreign materials from forms and from surfaces of mixing and conveying equipment.

A. Wetting: Wet wood forms sufficiently to tighten up cracks. Wet other materials sufficiently to reduce suction and maintain concrete workability.

B. Earth Subgrade: Lightly dampen subgrade 2 hours before placing concrete but not muddy. Re-roll where necessary for smoothness and remove loose material.

C. Gravel Fill: Recompact disturbed gravel and bring to correct elevation.

D. Vapor Barrier: Install under interior floor slabs on grade. Lap all joints 6" in the direction of concrete spreading and tape seal. Seal the joints at walls and around penetrations with tape. Cover barrier with 2" layer of clean sand.

E. Screeds: Set screeds at all walls and maximum 8-foot centers between. Set to provide level floor. Check with an instrument level, transit, or laser during placing operation to maintain level floor.

F. Screeds Over Vapor Barrier: Use weighted pad or cradle type screeds and do not drive stakes through vapor barrier. Check with instrument level, transit, or laser.

3.2 CONCRETE PLACING

A. Joints In Concrete: Locate joints only where approved. Obtain prior approval for points of stoppage of any pour. Clean and roughen surface of construction joints by removing entire surface and exposing 1/4" of clean aggregate solidly embedded in mortar matrix by sandblasting, chipping, or equal. Water and keep hardened concrete wet for not less than 24 hours before placing new concrete. Carefully control amount of moisture applied so that no free water will be present at any time.

B. Conveying and Placing: Comply with recommendations in ACI 304R for measuring, mixing, transporting, and placing concrete. Do not place concrete until reinforcing steel, forms, or metal decking have been approved by the Inspector and other authorities having jurisdiction. Do not use aluminum tubes or any aluminum equipment for pumping concrete, nor allow concrete to free fall from its point of release at mixer, hoppers, tremies, or conveying equipment more than 6 feet for concealed concrete and 3 feet for exposed concrete. Deposit concrete so that the surface is kept level throughout, a minimum being permitted to flow from one portion to another. Place concrete in horizontal layers not more than 18" thick within 45 minutes after water is first added to the batch. Place concrete by methods that prevent segregation of materials. For special exposed concrete do not use first batch of concrete at each start up.

C. Vertical Elements: Stop placement of concrete in walls and columns 1 1/2" below bottom of beams or supported slabs. Stop placement at sills and heads of wall openings in same manner. Allow concrete to be in place at least 2 hours and/or until vertical shrinkage has ceased before placing concrete for floor framing. Concrete walls shall be prepared for sand-blasting to match adjacent parking garage.

D. Consolidation: Vibrate each layer of concrete as placed with mechanical vibrators or equivalent equipment to accomplish thorough consolidation. Supplement by hand rodding or spading adjacent to forms. Vibration through forms shall be used only as approved by the Structural Engineer. Compact concrete into corners and angles of forms and around reinforcement and embedded fixtures. Recompact deep sections with heavy congestion due to reinforcing steel.

E. Operation of Vibrators: Do not transport concrete in forms with vibrators nor allow vibrators to contact forms or reinforcing. Push vibrators vertically into preceding layers that are still plastic and slowly withdraw, producing maximum obtainable density in concrete without creating voids or segregation. Under no circumstances disturb concrete that has stiffened or partially set. Vibrate at horizontal intervals not exceeding two-thirds the effective visible vibration diameter of the submerged vibrator generally at 18" on centers and at 12' on centers where concrete surfaces are exposed. Avoid excessive vibration and conform to ACI 309 "Recommended Practice For Consolidation of Concrete". Frequency of vibrator shall be not less than 7,000 impulses per minute. The Contractor shall provide a sufficient number of vibrators to properly consolidate all concrete immediately after placing. At least one standby vibrator shall be on hand at all times during placement of the concrete.

F. Re-Vibration: Place concrete containing retarding admixture by a schedule that allows layers of concrete to be in place and compacted for at least 30 minutes before the next layer of concrete is placed. Remove bleed water on the concrete surface and from forms and re-vibrate the concrete down as far as the concrete is plastic before placing the next layer. Slowly withdraw the vibrator head to draw out as many of the air bubbles as possible.

G. Correction of Segregation: Before placing next layer of concrete, and at top of last placement for vertical elements, remove concrete containing excess water or fine aggregate or showing deficiency of coarse aggregate and fill the space with compacted concrete of correct proportions.

H. Slabs: Strike off excess concrete by screeding to bring top surface to proper grade. The screed template should be removed across the concrete in a sawing manner as it is brought forward. Use a darby or bull-float after the screed operation, to eliminate high and low spots. Compact and tamp concrete, and bring 1/8" to 3/16" of coarse mortar to surface. Wood float to straightedges and screeds after water sheen has disappeared. Do not use steel or plastic floats of any kind for initial floating operations. Do not apply finishes until all surface water disappears and surface is sufficiently hardened. Remove bleed water and laitance as it appears.

1. On-Grade Slab Areas: Place with maximum 40-foot edge dimension. Generally locate slab joints along column lines, exact locations as directed or approved.

2. On-Grade Slab Construction with Contraction Joints: Use standard product type construction joints equivalent to "Key-Kold" at column lines and "Kwik-Joint" contraction joints at intermediate spacing. Power saw cut 1/8" by 3/4" deep intermediate joints where indicated or approved. Conform to approved submittal.

3. Expansion Joints: Conform to details and the approved submittal. Provide expansion joint filled finished flush with slab surface except for those joints shown to be sealed with sealant. Conform to Section 07900 where sealant sealed joints are shown or specified, including the polymer joint filler or backing.

4. All earth-supported slabs shall be reinforced as indicated in the table below unless otherwise shown or called for on the plans. Plain bar dowels shall be provided as detailed for construction and expansion joints. Such dowels shall be wrapped or greased on one side of the joints to prevent bonding.

Location Reinforcement	Minimum Reinforcing
Sidewalk slab, see Drawings for thickness	See drawings
Floor slab with resilient floor covering or carpet 6 inches thick U.N.O.	Reinf. Per drawings with 1-1/2" clear from top of slab

3.3 CURING OF CONCRETE

Cure concrete for at least 10 days, under moist conditions. Forms which are maintained tight and wet are considered adequate curing. Fresh backfill is adequate curing for footings and subgrade walls. Cure exposed concrete surfaces by application of additional procedure.

A. Horizontal Concrete and Slab-work: Commence curing during finishing of surfaces immediately after "bleed water" disappears by use of fine mist-type fog spray and continue without interruption until application of long-term curing, which must be done after final troweling when concrete has attained final permanent set and bleeding has stopped.

B. All Slab Surfaces: Slabs receiving separate finishes such as toppings or tile setting beds must be moist cured or cured with reinforced kraft paper or curing mats, maintained moist. Exposed surfaces or those receiving resilient floor finishes may be cured as specified above, or with specified liquid membrane forming curing compound, applied completely and evenly in strict accordance with manufacturer's directions in two coats, one 90 degrees to the other. Apply liquid curing compound to formed surfaces immediately upon loosening of forms.

C. Curing: Conform to ACI 308. Use proposed methods in fabricating sample panel for Engineers approval.

D. Cure concrete slabs to receive elastomeric surfaces by water curing method; curing compounds or chemical agents shall not be used unless they will completely dissipate within 28 days and are approved for use by the coating manufacturer. Allow concrete to dry minimum of 28 days.

E. Cure, Seal and Harden all exposed interior and exterior flatwork, including floor slabs, stairs, walks, pavements, parking and driving areas, etc.

3.4 PATCHING FORMED CONCRETE:

Remove fins, projections, and offsets. Cut out rock pockets, honeycomb, and other defects to sound concrete, edges of cuts straight and back-beveled. Dampen cuts and scrub with neat portland cement slurry just prior to patching, or apply an approved epoxy concrete adhesive. Saturate form tie holes with water and fill all voids and patches with flush smooth-finished mortar of same mix as concrete (less coarse aggregate), cure, and dry. Take care that patches match color and texture of surrounding wall at sandblasted, integrally colored, exposed concrete finishes.

3.5 GROUTING

Install as indicated or required except for the items grouted by other trades.

A. Mixing: Mix the approved non-shrink grout material with sufficient water per manufacturers recommendations, so it flows under its own weight for grout, and to

just moisten and bind the material together for grout.

B. Placing and Curing: Place grout by forcing and rodding to fill all voids and provide complete bearing under plates. Place fluid grout from one side only and puddle, chain, or pump for complete filling of voids; do not remove the dams or forms until grout attains initial set. Finish exposed surfaces smooth and cure with damp burlap at least 3 days.

3.6 FIELD QUALITY CONTROL

A. Supervision: Perform Work of this Section under the supervision of a capable concrete superintendent.

B. Level of Floors: Continuously monitor concrete placing operations to maintain level floor by use of an instrument level, transit, or laser.

C. Continuous Inspection: Construct all structural concrete under continuous inspection of a Registered Deputy Inspector. Obtain inspection and approval of forms and reinforcing by Building Department as required and by the Inspector before placing structural concrete.

D. Testing of Concrete: Testing Laboratory engaged by the Owner shall perform following tests:

1. Compressive Strength Tests: One composite sample from each day's concrete placing of each concrete mix and each 150 cubic yards, or fraction thereof, of each strength of structural concrete. Date test cylinders, number, and tag showing the location from which sample was taken. Indicate slump test result of each sample. Do not make more than two series of tests from any one location or batch of concrete.

2. Test Cylinders: Cast according to ASTM C31; 24 hours later, store cylinders under moist curing conditions at about 70oF. Test according to ASTM C39; one cylinder at 7 and two cylinders 28 day ages.

3. Control Test Cylinders: Cast a set of two or more cylinders for each day's placing of concrete for slabs supported on shoring. Place on slabs represented by cylinders and cure same as slabs. Test cylinders to determine proper times for removal of shores and re-shoring.

E. Core Tests: Should tests show the strength of any concrete falls below required minimum, additional testing of concrete which unsatisfactory tests represent may be required. Make core tests according to ASTM C42. Fill the core holes with dry-pack concrete of strength required for concrete. Contractor shall bear cost of tests for below-strength concrete even if such tests indicate concrete has attained required minimum compressive strength.

--END OF SECTION--

SECTION 03331

LIGHTWEIGHT CONCRETE TOPPING

PART 1 - GENERAL

1.1 SUMMARY

A. Provisions of the General and Supplementary Conditions and Division 01 apply to this section.

B. Section Includes:

1. Lightweight concrete floor fill as indicated.

C. Related Sections:

1. Section 03200: Concrete Reinforcement.

1.2 SUBMITTALS

A. Shop Drawings: Submit Shop Drawings indicating locations to receive lightweight concrete and accessories.

B. Mix Design: Submit a concrete mix design for each mix that will be provided for the Work. Include water/cement ratio, size of aggregate and types and amounts of admixtures. Predict minimum compressive strength, maximum slump and air content percentage.

C. Certificates:

1. Submit a notarized certificate that each of following conforms to standards indicated.

a. Aggregates - Refer to Section 01451: Testing and Inspection.

b. Admixtures - ASTM Standards.

c. Curing materials - ASTM Standards.

2. Manufacturer of ready-mixed concrete shall deliver to the IOR a certificate with each mixer truck. Certificate shall bear the signature of representative of the testing laboratory, and shall state quantity of cement, water, fine and coarse aggregate and admixture contained in load.

1.3 QUALITY ASSURANCE

A. Comply with the following as a minimum requirement:

1. ASTM A 185 - Welded Steel Wire Fabric for Concrete Reinforcement.

2. ASTM C 33 - Concrete Aggregates.

3. ASTM C 171 - Sheet Materials for Curing Concrete.

4. ASTM C 260 - Air-Entraining Admixtures for Concrete.

5. ASTM C 330 - Lightweight Aggregates for Structural Concrete.

1.4 DELIVERY, STORAGE AND HANDLING

A. Each gradation of lightweight aggregates shall be stockpiled in separate bins or piles. Method of storage shall minimize segregation and prevent contamination. Aggregates shall remain dry. Do not presoak.

PART 2 PRODUCTS

2.1 GENERAL

A. Designated mix shall be proportioned so as to provide concrete with a minimum compressive strength of 3,000 psi (unless otherwise noted) at 28 days, and a unit weight of 100 to 110 lbs. per cubic foot in the oven dry condition.

B. Concrete shall be designed for Project site placement, with minimum slump necessary for efficient placing and finishing. Maximum slump shall be 4 inches, with a tolerance of plus or minus 1/2 inch.

C. When an air-entrainment agent is furnished, total air content shall range between a minimum of 2 percent and a maximum of 4 percent.

2.2 MATERIALS

A. Portland Cement: Standard brand conforming to ASTM C 150.

B. Aggregates:

1. Coarse Aggregate: Lightweight aggregate conforming to ASTM C 330, and shall be sealed expanded shale such as "Rocklite", as produced by Lightweight Processing Company, or equal.

2. Fine Aggregate: Hardrock aggregate conforming to ASTM C 33, or lightweight aggregate conforming to ASTM C 330.

C. Water shall be clean and free from deleterious amounts of oils, acids, alkalis, salts, or organic materials.

D. Admixture: Air entraining agent shall conform to ASTM C 260.

E. Reinforcing Mesh: Conform to ASTM A 185.

F. Tie Wire: Fully annealed, copper-bearing steel wire, 16 gage minimum.

G. Curing Paper: Standard brand conforming to ASTM C 171 Type 1, regular.

PART 3 EXECUTION

3.1 PREPARATION

A. Screeds: Install screeds accurately to finish floor surfaces at maximum 18 feet on center (unless otherwise noted) in one direction. Screeds shall be properly secured to prevent movement. Screeds shall be centered on column centerlines if column occurs.

3.2 INSTALLATION

A. Placing and Finishing:

1. Concrete shall be placed in its final position immediately after mixing is

completed. Excessive handling of concrete for final placement shall be minimized to prevent segregation.

2. After placement, concrete shall be rodded following specified concrete placement process. Rodded concrete shall then be tamped with a grid tamper. Re-rod in see-saw method to finished elevations. After screeds and screed supports are removed, concrete in removal areas shall be re-tamped.

3. Immediately following above operation and while concrete is plastic, surface shall be bull floated to level out tamp marks and humps. After floating, wait until concrete has reached proper consistency to start steel troweling. To maintain surface in proper condition for troweling, a light film of moisture may be applied with a mist type fog sprayer. Final (second) troweling operation shall provide a hard, non-slip surface, free from defects and blemishes.

4. Finished surface shall be within a tolerance of 1/8 inch in 10 feet.

B. Curing:

1. Lightweight concrete floor fills shall be properly cured and protected against damage during construction operations.

2. Placement of curing paper shall immediately follow final troweling operation. If concrete surfaces start to dry due to high air temperatures or wind, spray concrete surface with a fine water mist.

3. Curing paper shall be lapped 3 inches and sealed. Edges shall be cemented to finish. Paper that is torn or otherwise damaged during curing period shall be immediately repaired or replaced. Paper shall remain in place for a minimum of 7 days.

4. After removal of curing paper, cement surface shall be thoroughly washed and mopped clean.

3.3 PROTECTION

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

3.4 CLEAN UP

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

-- END OF SECTION --

SECTION 03335

COLORED TOPPING SLABS

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes: Provide exterior integral colored cast-in-place concrete slabs.

B. LEED General: Refer to Section 01350 LEED Special Environmental Requirements and to LEED “Checklist” indicating points Design Team has anticipated relating to specific LEED credits and LEED requirements.

1.2 REFERENCES

A. American Concrete Institute, ACI 318: Building Code Requirements for Reinforced Concrete.

1.3 SYSTEM DESCRIPTION

A. Design Requirements: Materials for cast-in-place concrete shall be factory premixed and shall come from a single source and shall not be changed throughout Project.

1. Job-site mixing of materials not acceptable.

1.4 SUBMITTALS

A. Product Data: Submit test reports and materials certificates indicating compliance to Contract Documents.

B. Samples: Furnish 2" thick samples of each integral colored concrete finish.

C. LEED Certification Points: Submit information and certifications necessary to achieve maximum points for LEED certification; coordinate and cooperate with Owner and Architect in providing information necessary for required LEED rating.

1.5 QUALITY ASSURANCE

A. Qualification of Installer: Company with minimum five years successful experience in high quality colored cast-in-place concrete finishing.

B. Mock-Up: Erect minimum 100 square feet of integral colored concrete on site at location acceptable to Owner and Architect.

1. Approved mock-up may be incorporated into Project where maintained clean and free of damage until Substantial Completion.

PART 2 - PRODUCTS

2.1 MATERIALS

A. General: Comply with ACI 318, including referenced ASTM standards for structural characteristics of concrete.

B. Cement: ASTM C150; Type I white cement; use only one brand and type of cement.

C. Aggregates: ASTM C33, normal weight aggregates consisting of sand or crushed stone screenings, gravel or crushed stone, clean, hard, free of deleterious matter.

1. Fine Aggregates: Size, type and color to match approved sample and mock-up; washed; from single source and of same color for entire job.

2. Coarse Aggregate: Maximum 3/8" special color crushed marble or granite aggregate of type and color to provide approved sample and mock-up; washed; from a single source and of same type for entire job.

D. Integral Color Pigments: Pure, non-fading, non-staining, mineral oxides color conforming to ASTM C979 and designed and mixed to provide uniform color finish.

1. Color: As selected by Architect and as required to produce final, cured color of concrete to match Architect approved samples; custom color may be required.

2. Manufacturers:

a. L.M. Scofield Co./Chromix.
b. Davis Colors/True Tone Colors.
c. Solomon Grind-Chem Service, Inc./Solomon Colors.
d. Substitutions: Refer to Section 01630.

E. Water: Drinkable, free of foreign materials in amounts harmful to concrete and embedded steel.

F. Grout: Non-metallic, pre-mixed, shrinkage resistant, non-corrosive, non-staining product containing selected silica sands, Portland cement, shrinkage compensating agents, plasticizing and water reducing agents.

1. Grout: Same base materials, cement, aggregates and pigments, as colored concrete.

G. Plasticizers and Admixtures: Limit to types and quantities to provide concrete mix specified and to provide necessary workability; do not use calcium chlorides.

H. Forms: Size forms to resist movement during concrete placement and retain horizontal and vertical alignment until removal; use forms which are straight and free of distortions and defects.

1. Coat forms with non-staining, clear, form release agent which will not discolor or deface surface of concrete.

I. Reinforcing: Welded wire fabric, plain type, ASTM A185, plain finish.

J. Cure and Hardener: Provide clear liquid cure/hardener suitable for traffic, curing type hardener that prevents dusting, as recommended by manufacturer for applications indicated and compatible with integral color concrete materials.

1. Comply with applicable limitations for volatile organic compounds (VOC).

2. Manufacturers:

a. Sonneborn Division ChemRex, Inc.
b. L&M Construction Chemicals, Inc.
c. Hillyard, Inc.
d. Symons Corp.
e. Substitutions: Refer to Section 01630.

K. Expansion Joint Material: Preformed expansion joint fillers and sealers; minimum 1/2" asphaltic impregnated fiberboard.

L. LEED Recycled Content: Where available provide materials with post-consumer and pre-consumer recycled content to achieve maximum LEED credits.

M. LEED Regionally Manufactured, Extracted, Harvested, or Recovered Materials: Where possible obtain materials that qualify for LEED credits for regional materials obtained within 500 miles of Project.

2.2 MIXES

A. Design mix to produce concrete with following not less than 4,000 psi compressive strength at 28 days.

B. Use mixes as required to meet both structural and appearance requirements.

C. Maintain water content as consistent as possible during initial mixing, do not add water during transportation or placement of special concrete.

D. Mix in admixtures and pigments in accordance with manufacturer's recommendations.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Examine existing substrates and conditions; beginning integral color concrete work signifies acceptance of substrates and conditions.

3.2 PREPARATION

A. Remove dirt, loose material, oil, grease, paint, and other contaminants, leaving clean surface.

3.3 INSTALLATION

A. Forming: Form vertical surfaces to full depth and securely position to required lines and levels.

1. Arrange and assemble formwork to permit easy dismantling and stripping, and to prevent damage to concrete during formwork removal.

B. Reinforcing: Provide supports and maintain position of reinforcing mesh during installation of topping.

C. Expansion and Contraction Joints: Place expansion and contraction joints at locations indicated, locations as directed by Architect where not otherwise indicated, maximum 20-foot intervals.

1. When concrete abuts building, provide continuous joint filler.

2. Fit joints with filler of required profiles, set perpendicular to longitudinal axis colored concrete topping; recess 1/2" below finished concrete surface.

D. Placing Concrete: Deposit and vibrate concrete to ensure proper consolidation, elimination of unintentional cold joints, and to minimize entrapped air on exposed surfaces.

1. Cure colored concrete surfaces to minimize appearance blemishes.

2. Place concrete, screed and float surfaces to a uniform finish.

3. Broom Finish: Spread topping evenly to elevation required and strike off, bull float or darby to level surface; after concrete has stiffened float twice and broom to uniform nonslip texture.

a. Tolerance: Minimum F/F of 20 and F/L of 17, ASTM E1155.

b. Nonslip Finish: Comply with requirements of California Building Code and Americans with Disabilities Act Accessibility Guidelines for nonslip finishes.

E. Curing Concrete: Apply curing and hardening compound on surfaces immediately after placement; apply in accordance with manufacturer's recommendations.

1. Cure topping to prevent rapid drying; cure for minimum 7 days with concrete kept continuously moist and above 50 degrees F unless otherwise recommended by cure and hardener manufacturer.

F. Failure of concrete topping to bond to substrate, disintegration, and failure of topping to perform as suitable substrate for floor finishes will be considered failure of material and workmanship.

1. Failure of bond will be determined as evidenced by hollow sound when tapped.

3.4 QUALITY ASSURANCE

A. Site Tests: Provide concrete test cylinders to verify compliance with Contract Documents.

3.5 REPAIR

A. Exclude traffic for at least 14 days after placement; when construction traffic is permitted, maintain surfaces as clean as possible by removing stains and materials spillage as they occur.

3.6 PROTECTION

A. Protect work from vandalism and damage until Substantial Completion.

B. Replace vandalized and damaged work.

END OF SECTION

SECTION 04820

CONCRETE MASONRY ASSEMBLIES

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes: Provide concrete masonry unit construction, with mortar, reinforcement, anchorage, and accessories as required for complete installation.

1. Cut and fit concrete masonry for work of other trades.

B. Work Installed not Furnished: Build in items supplied by other trades and suppliers.

C. LEED General: Refer to Section 01350 LEED Special Environmental Requirements and to LEED “Checklist” indicating points Design Team has anticipated relating to specific LEED credits and LEED requirements.

1.2 SUBMITTALS

A. Product Data: Furnish manufacturer's certificate concrete masonry units conform to specified standards.

B. Shop Drawings: Furnish drawings for reinforcing; show bar schedules, diagrams of bent bars, ties and arrangements and assemblies.

C. Samples: Furnish typical exposed concrete masonry unit and colored mortar.

D. LEED Certification Points: Submit information and certifications necessary to achieve maximum points for LEED certification; coordinate and cooperate with Owner and Architect in providing information necessary for required LEED rating.

1.3 QUALITY ASSURANCE

A. Regulatory Requirements: Perform concrete unit masonry work in accordance with requirements of California Building Code except where more restrictive requirements are specified.

B. Fire Rated Materials: Provide materials and systems which have passed ASTM E119 tests and are approved for fire ratings indicated on Drawings.

C. Mock-Up: Provide minimum 4'-0" by 6'-0" sample panel of concrete masonry construction, clearly indicating joints and methods of reinforcing. Erect mock-up at Project Site, in location as approved by Architect.

1. Approved mock-up will be used for quality control as minimum standard of work acceptable for Project.

2. Approved mock-up may be incorporated into Project.

D. Pre-Installation Meeting: Convene not less than one week prior to commencing work of this section. Require attendance of parties directly affecting work of this section.

1. Review installation procedures and coordination required with related work.

1.4 SITE CONDITIONS

A. Temperature: Maintain materials to minimum 50 degrees F prior to, during and 48 hours after completion of masonry work.

1. Do not place masonry units when air temperature is below 40 degrees F.

a. During colder weather, work may continue where equipment is used to maintain constant temperature above 40 degrees F and masonry work completed and in progress is kept covered.

2. Protect masonry construction from direct wind and sun exposure when temperatures exceed 99 degrees F and relative humidity is less than 50 percent.

B. Bracing: Provide temporary bracing during erection of masonry work, maintain in place until building structure provides permanent bracing.

PART 2 - PRODUCTS

2.1 MATERIALS

A. Concrete Masonry Units: Hollow load bearing units conforming to ASTM C90.

1. Weight: Provide normal, medium, or light weight units unless specific weight classification is indicated.

a. Normal Weight, 125 pcf or more.

2. Compressive Strength: Comply with ASTM C90, with minimum 1700 psi per unit and minimum average of 1900 psi for three units, when tested in accordance with ASTM C140.

3. Size: Nominal 8" by 16" face measurement with thickness as indicated on Drawings.

4. Exposed Face Surfaces: Dense with finish as approved by Architect prior to manufacturing; uniform texture and color throughout Project.

a. Texture: Precision (smooth) as approved by Architect.
b. Color: Integral color as directed by Architect.

5. Special Shapes: Provide proper specially shaped units for bond beams, lintels, corners and jambs.

a. Exposed Special Shapes: Design bond beams, lintels, corners and jambs and fillers to match and compliment block units; where required perform cutting with masonry saw.

B. Mortar: Conform to ASTM C270, Type S, 1900 psi minimum compressive strength

1. Masonry Cement/Premix Mortar: Acceptable only if manufacturer certifies product is made of cement and lime, with no limestone or pulverized material used in lieu of hydrated lime.

C. Grout: Conform to ASTM C476; minimum compressive strength 2,000 psi.

D. Mortar and Grout Materials:

1. Portland Cement: ASTM C150, Type I.

2. Hydrated Lime: ASTM C207, Type S.

3. Aggregates: Standard masonry mortar and grout type; clean, dry and protected against dampness, freezing and foreign matter.

a. Mortar Aggregates: Conform to ASTM C144.
b. Grout Aggregates: Conform to ASTM C404.

4. Water: Clean, drinkable, free of injurious amounts of oil, alkali, organic matter or other harmful materials.

E. Reinforcement and Anchorages: Provide reinforcing and anchorages as indicated on Drawings.

1. Deformed Bars: ASTM A615, Grade 60 for bars No. 3 and larger, unless otherwise indicated.

2. Joint Reinforcement: ASTM A82, free from mill scale and excess or loose rust deposits.

F. Color Admixture: Pure mineral oxide colors conforming to ASTM C979 as required for approved color.

G. LEED Recycled Content: Where available provide materials with post-consumer and pre-consumer recycled content to achieve maximum LEED credits.

H. LEED Regionally Manufactured, Extracted, Harvested, or Recovered Materials: Where possible obtain materials that qualify for LEED credits for regional materials obtained within 500 miles of Project.

PART 3 - EXECUTION

3.1 PREPARATION

A. Supply metal anchors required for concrete masonry to appropriate trades for placement; provide in sufficient quantity and direct placement.

1. Ensure items built in by other trades are properly located and sized.

B. Establish lines, levels and coursing, protect from disturbance.

C. Clean surfaces to receive masonry free from dirt, debris, and laitance.

3.2 INSTALLATION

A. Do not wet concrete masonry units; lay units in mortar with full bed and head joints, properly jointed with other work.

1. Fully bond corners and intersections.

2. Align cells of units to maintain clear, unobstructed space for reinforcing and grout, keep cells free of mortar and debris.

B. Do not shift or tap masonry units after mortar has taken initial set, where adjustment must be made, remove mortar and replace.

C. Buttering corners of joints and deep or excessive furrowing of mortar joints is not acceptable.

D. Perform job site cutting with proper power tools to provide straight, true, unchipped edges.

E. Provide structural anchorage or retention in accordance with applicable code requirements.

F. Ensure masonry courses are of uniform height, make vertical and horizontal joints equal and of uniform thickness.

1. Lay concrete unit masonry in running bond.

2. Course one block unit and one mortar joint to equal 8".

G. Remove excess mortar and projections, take care to prevent breaking block corners.

H. Tolerances:

1. Maximum allowable variation from masonry unit to adjacent masonry unit is 1/32" where masonry units are exposed in finished construction and where waterproofing is applied over masonry units.

2. Maximum allowable variation from plane of wall is 1/4" in 10 feet, and maximum 1/2" in 20 feet or more.

3. Maximum allowable variation from plumb is 1/4" per story, non-cumulative, and maximum 1/2" in two or more stories.

4. Maximum allowable variation of level coursing is 1/8" in 3 feet, 1/4" in 10 feet and 1/2" in 30 feet.

I. Mortar Joints: Compress joints with a round or curved metal tool.

1. Compress mortar joints with jointing tool with minimum diameter three times width of mortar joint, to provide a flush surface where resilient base or waterproofing is to be applied over masonry.

J. Reinforcement and Anchorage: Fully reinforce corners and intersections. Lap splices minimum 6". Extend splices minimum 16" each side of openings.

1. Support and secure reinforcing bars to maintain within 1/2" of dimensioned position.

2. Retain vertical reinforcement in position at top and bottom of cells and at intervals not to exceed 192 bar diameters.

K. Lintels: Provide reinforced concrete masonry unit lintels over openings where steel lintels are not scheduled.

1. Use full length reinforcing bars.

L. Grouting: Place grout when concrete masonry units are surface dry; consolidate and reconsolidate by mechanical vibration.

1. Fine Grout: Use for spaces less than 2" in width using low lift grouting techniques.

2. Coarse Grout: Use for spaces 2" or more in width.

3. When grouting is stopped for more than one hour, terminate grout approximately 2" below top of upper masonry unit to form positive key for subsequent grout placement.

4. Low-Lift Grouting: Place first lift of grout at 16" and place subsequent lifts at 8" increments.

5. Hi-Lift Grouting: Use only where specifically approved by Architect and only where grout spaces are 3" or greater in width.

a. Provide minimum 4" high cleanouts at bottom of each cell to be grouted, clean out cells and inspect prior to grouting.

b. Pump grout into cells with maximum 48" lifts.

M. Built-In Work: As work progresses, build in frames, lintels, nailing strips, anchor bolts, plates, and other items supplied by other trades.

1. Build in items plumb and true.

2. Do not build in organic materials which will be subject to rot or deterioration.

3. Bed anchors of frames in mortar joints; fill frame voids solid with mortar; fill masonry cores with grout minimum 12" from framed openings.

N. Cutting and Fitting: Cut and fit for chases, pipes, conduit, sleeves, and grounds; coordinate with work of other Specification sections to ensure correct size, shape and location.

3.3 CLEANING

A. Remove excess mortar and smears upon completion of masonry work.

B. Point or replace defective mortar, match adjacent work.

C. Clean soiled surfaces using a non-acidic solution which will not harm masonry or adjacent materials, consult masonry manufacturer for acceptable cleaners.

D. Use non-metallic tools in cleaning operations.

3.4 PROTECTION

A. Maintain protective boards at exposed external corners which may be damaged by construction activities; protect without damaging completed work.

END OF SECTION

SECTION 04850

STONE ASSEMBLIES

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes: Provide mechanically fastened wall stone assemblies including anchors and accessories as required for complete installation.

1. Definition: Stone provided under this section shall be dimensional stone with nominal 1-1/2" or greater thickness.

B. LEED General: Refer to Section 01350 LEED Special Environmental Requirements and to LEED "Checklist" indicating points Design Team has anticipated relating to specific LEED credits and LEED requirements.

C. Related Sections:

1. Section 05500: Metal fabrications.

1.2 SYSTEM REQUIREMENTS

A. Design Requirements: Design, fabricate, and erect mechanically fastened stone walls to withstand anticipated loads from wind, gravity, movement of building structure, and thermally induced movement; comply with California Building Code.

1. Provide engineering services by California licensed structural engineer with not less than five years successful experience designing mechanically fastened wall stone similar to that required for Project.

2. Drawings are diagrammatic and intended to indicate external dimensions, organization of stone, profiles, conditions, and scope.

3. Provide supports as required to connect stone to structural components indicated on Drawings; provide additional support as needed where stone places unanticipated stresses on building structure.

1.3 SUBMITTALS

A. Product Data: Submit manufacturer's literature for fabricated items.

B. Shop Drawings: Submit cutting and setting drawings showing sizes, dimensions, sections and profiles of units.

1. Indicate arrangement and provisions for jointing, anchoring, fastening and supports and details for reception of other work.

2. Indicate location of each unit on setting drawings with number designation corresponding to number marked on each unit.

3. Show location of insets for anchors and supports that are to be built into substrate.

C. Samples: Indicate color, grade and finish of stone and grout type required; include full range of exposed color and texture to be expected.

D. Test Reports: Submit copies of test reports indicating slip resistance ratings of stone flooring.

E. Certification: Submit certification by a structural engineer registered in State of California, indicating stone work complies with applicable code requirements.

F. LEED Certification Points: Submit information and certifications necessary to achieve maximum points for LEED certification; coordinate and cooperate with Owner and Architect in providing information necessary for required LEED rating.

1.4 QUALITY ASSURANCE

A. Source: Obtain each stone from single quarry source with consistent color range and texture throughout work. Do not change sources or kinds of materials during course of work.

B. Fabricator Qualification: Minimum five years successful experience fabricating stone similar to quality specified in quantity shown.

C. Mock-Up: Erect full-size mock-up representative of installation of wall stone installation; minimum 100 square feet as approved by Architect.

1. Approved mock-up may be used as part of work where conforming to specified requirements and accepted by Architect.

1.5 DELIVERY, STORAGE, AND HANDLING

A. Handle material to prevent chipping, breakage, soiling or other damage.

B. Protect edges of materials with wood or other rigid materials.

C. Lift with wide-belt type slings wherever possible. If required, use wood rollers and provide cushion at end of wood slides.

D. Place and stack skids and units to distribute weight evenly and to prevent breakage and to prevent cracking.

PART 2 - PRODUCTS

2.1 MATERIALS

A. Stone: Types as indicated on Drawings; match Architect's samples for type, color, variety, grain, and other characteristics relating to aesthetic effects.

1. Quality Control: Observe stone during fabrication and ensure consistency of appearance; do not use pieces with defects and blemishes beyond normal characteristics anticipated for stone.

a. Defects and Blemishes: Contrasting spots, foreign elements, irregular color variations, and irregularities in typical characteristics shall be considered defects and blemishes.

B. Mortar and Grout Materials:

1. Portland Cement: ASTM C150, Type 1, white, non-staining.

2. Hydrated Lime: ASTM C207, Type S.

3. Sand: ASTM C144, clean, free of substances harmful to stone, mortar, and adjacent materials.

   a. Colored Mortar Aggregate: Ground marble, granite, or other sound stone, as required to match approved sample.

4. Water: Drinkable, clean, non-alkaline, free of substances harmful to stone, mortar and accessories.

5. Mortar Color Admix: ASTM C979, pure, non-fading mineral oxides designed and mixed to provide uniform color.

6. Latex Admix: Manufacturer's specific materials as recommended for installation types indicated.

   a. Manufacturers:

      1) Laticrete International Inc./Laticrete System.
      2) Bostik Construction Products/Hydroment System.
      3) Custom Building Products/Acrylic Systems.
      4) Substitutions: Refer to Section 01630.

C. Anchors and Dowels: Provide materials of sizes and strengths to support anticipated loads.

1. Stone Anchors, Anchor Bolts, Nuts and Washers: ASTM A666, Type 302 or 304 nonmagnetic corrosion resistant stainless steel where in contact with stone.

   a. Hot-dip galvanized steel anchors, ASTM A36 steel with ASTM A123 galvanizing may be used where not in direct contact with stone.

   b. Two Piece Anchors: Provide anchors designed to allow for adjustment for courses.

      1) Dur-O-Wall, Inc./Seismic Channel Slot Anchor Assembly.
      2) Heckmann Building Products Inc./Channel Slot System.
      3) Holmann & Barnard, Inc./Gripstay Channel System.
      4) Substitutions: Refer to Section 01630.

2. Setting Buttons: Lead or plastic buttons of thickness required for joint size indicated; as required to maintain uniform joint width, but softer than stone.

3. Concealed Flashing: ASTM A666, Type 304 nonmagnetic corrosion resistant stainless steel flashing, minimum 26 gage (0.015" thick); comply with requirements specified in Section 07600 for fabrication and installation.

D. Stone Sealers and General Accessories: Provide clear penetrating type sealers and general accessories as recommended by stone supplier for type of stone and application indicated.

1. Sealers shall not change appearance of stone under any lighting condition.

E. LEED Recycled Content: Where available provide materials with post-consumer and pre-consumer recycled content to achieve maximum LEED credits.

F. LEED Regionally Manufactured, Extracted, Harvested, or Recovered Materials: Where possible obtain materials that qualify for LEED credits for regional materials obtained within 500 miles of Project.

2.2 FABRICATION

A. Verify dimensions of supporting structure at site by accurate field measurements before final submittal of shop drawings and fabrication of stone.

1. Coordinate fabrication schedule with construction progress to avoid delay of work.

B. Fabricate as shown and as detailed on final shop drawings and in compliance with recommendations of referenced stone association.

1. Provide holes and sinkages cut or drilled for anchors, fasteners and supports as shown and as necessary to secure work in place.

2. Cut and back-check as required for proper fit and clearance.

C. Provide openings and similar spaces and features as required for contiguous work.

D. Cut accurately to shape and dimensions shown on final shop drawings; comply with fabrication tolerances stone association for specified finishes.

1. Dress joints (bed and vertical) straight and at 90 degree angle to face, unless otherwise shown or specified.

2. Joint Width: Cut stone to provide joint widths as indicated, or if not indicated, cut to allow for uniform 1/4" wide joints.

E. Provide units of thickness shown, saw-cut or roughly dress back surfaces concealed in finished work to approximately true planes.

1. Maximum variations in thickness from that shown not to exceed 1/16".

2.3 MIXES

A. Grout: Dense uniform color latex-cement mix to match approved samples; sand may be added for joints over 1/4” wide.

PART 3 - EXECUTION

3.1 INSPECTION

A. Examine sub-base and supporting structure for stone.

B. Start of work indicates acceptance of conditions.

3.2 PREPARATION

A. Clean stone before setting by thoroughly scrubbing with fiber brushes followed by thorough sponging with clear water.

B. Use only mild cleaning compounds that contain no caustic or harsh fillers or abrasives.

3.3 INSTALLATION

A. Do not use material with chips, cracks, voids, discolorations or other defects which might be visible or cause staining in finished work.

B. Execute work with skilled mechanics and employ skilled fitters at site to do necessary field cutting as stone is set.

C. Provide openings and other spaces as shown or required for contiguous work. Close up openings in stone after other work is in place. Use materials and set to match surrounding work.

D. Set stone in accordance with Drawings and final setting drawings.

1. Provide anchors, supports, fasteners and other attachments shown, or necessary to secure in place.

2. Shim and adjust accessories as required for proper setting.

3. Completely fill holes, slots, and sinkages for anchors, dowels, fasteners and supports with mortar.

E. Install using anchor system appropriate for type of stone and backup indicated; install anchor systems in accordance with manufacturer's recommendations.

1. Let anchors into edges of panels in sufficient quantity to secure installation.

2. Provide shims and setting buttons as required for proper setting, plumb, level and true to lines indicated.

3. Rake out joints 1/2" deep before mortar sets to allow for pointing.

4. Clean face of stone after raking.

5. After mortar is set, wet rake joints thoroughly and force pointing mortar or plaster of Paris into joints.

6. Tool joints slightly concave.

F. Site Tolerances: Specified tolerances are non-cumulative.

1. Variation From Plumb: Maximum 1/4" in 10'-0"; maximum 3/8" in 20'-0"; maximum 1/2" in 40'-0".

2. Variation From Level: Maximum 1/2" in 20'-0"; maximum 3/4" in 40'-0".

3. Variation in Line: Maximum 1/2" in 20'-0"; maximum 3/4" in 40'-0".

4. Variation in Cross-Sectional Dimension: Maximum plus 1/2", minus 1/4".

3.4 CLEANING

A. After completion of work, point open joints and replace defective work.

B. Cleaning: Use clean water and stiff bristle fiber brushes.

1. Do not use wire brushes, acid type cleaning agents, cleaning compounds with caustic or harsh fillers, or other materials or methods which could damage stone.

C. Seal stone after cleaning using penetrating type sealer.

END OF SECTION

SECTION 05120

STEEL

PART 1 - GENERAL

1.1 DESCRIPTION

Division 1 applies to this section. Provide structural steel and related items complete as indicated, specified, and required.

A. Work In This Section: Principal items include:

1. Structural steel framing.
2. Steel pipe and tube framing.
3. Shop priming and field touch-up to extent specified.

B. Related Work Not In This Section:

1. Setting of anchor bolts and inserts in concrete.
2. Reinforcing steel.
3. Sprayed fireproofing.
4. Field painting except as specified herein.
5. Miscellaneous metal fabrications including steel stairs.

1.2 QUALITY ASSURANCE

A. Reference Standards:

1. AISC Standards. Code of Standard Practice for Steel Buildings and Bridges; Specification for the Design, Fabrication and Erection of Structural Steel for Buildings; and Steel Construction Manual; as amended by Building Department.
2. AWS Standards. AWS D1.1, Structural Welding Code-Steel.
3. Structural Joint Reference Specification. The Specifications for Structural Joints Using ASTM A325 or ASTM A490 Bolts established by the Research Council On Riveted and Bolted Structural Joints of the Engineering Foundation, hereinafter referred to as Ref Spec.

B. Qualifications of Fabricator: Fabricate structural steel in shop of a licensed fabricator approved by Building Department, and a fabricator who participates in the AISC Quality Certification Program and is designated an AISC-Certified Plant, Category Sbd.

C. Requirements of Regulatory Agency: Work of this Section shall conform to Code and Title 8, CCR.

D. Source Quality Control:

1. Identified Structural Steel. Tests are waived for steel identified by heat number, accompanied by mill analyses and mill test reports, and properly tagged with Identification Certificate so as to be readily identified for

conformance with applicable ASTM.

2. Unidentified Steel. If structural steel cannot be identified or its source is questionable, not less than one tension and one bend test shall be made for each 10 tons or fractional part thereof. Additional tests may be required when deemed necessary by the Engineer, or Building Department. Contractor shall bear test costs.

E, Moment Frames: See drawings for specific requirements for moment frames.

1.3 SUBMITTALS

Refer to section 01350 for procedures.

A. Shop Drawings: Submit for Work of this Section, including welding, accessories, and fastenings. Fully detail minor connections and fastenings not indicated or specified to meet the required conditions. Include a detailed sequence plan for shop and field welding that minimizes locked-in stresses and distortion. Submit drawings in a sequential manner; typical details, anchor bolt layout, plan sheets, and member details.

B. Welding Certificates

C. Mill test reports

D. Source quality-control test reports

E. Welding procedure specifications (WPS)

F. Certificates of Compliance. The Contractor shall submit a letter stating that the manufacturers certifications and test reports have been reviewed, and that the materials being furnished for the project are in conformance with the applicable standards, specifications and project documents.

G. Welding Performance Qualifications Records (WPQR'S). Submit written welding performance qualification records for all welding-personnel under the Contractor's supervisions who will be welding on this project.

1.4 PRODUCT DELIVERY AND HANDLING

A. Protect Materials from damage during shipping, handling and storage on the site. Steel showing dents, creases, deformations, weathering, or other defects is not acceptable.

B. Welding Electrodes: Deliver to site in unbroken packages bearing manufacturer's name and label identifying the contents.

1.5 JOB CONDITIONS

A. Site Measurements: Take such field measurements as may be required. Report any major discrepancy between Drawings and field dimensions to the Engineer.

B. Protection of Floors: Exercise caution to protect floors and adjacent Work from damage. Do not overload floors. Use rubber tired equipment to handle and move steel. Do not place steel members directly on floor; use pads of timber or like material for cushioning.

C. Temporary Flooring: Provide the necessary temporary planking, scaffolding, and flooring in connection with erection of structural steel or support of erection machinery. Conform use of temporary floors or steel decking to Code.

D. Connection of Steel Decking Temporary Flooring: Temporarily weld steel decking to supports where used as a working platform. Distribute concentrated loadings from welding machines or other heavy machinery with planking or equal. Replace decking that is damaged by use as a working platform at no extra cost to Owner.

PART 2 PRODUCTS

2.1 BASIC MATERIALS: Furnish materials conforming to the following:

W-shapes and WT steel shapes:	ASTM A992, Grade 50.
Channels and Angles:	ASTM A 36, Grade 36 or ASTM A 572, Grade 50
Cold formed hollow structural sections:	ASTM A500 Grade B, structural tubing.
Steel pipe:	ASTM A53 Grade B
Bolts and nuts:	ASTM A325 N or SC per plans
Welded stud connectors:	ASTM A108, TYPE B.
Welding Electrodes:	Comply with AWS requirements.
Primer:	Sinclair No. 15 Red Oxide Primer or Equal
Grout:	ASTM C 1107, Master Builders "Embeco", or equal, non-gas-forming type, ree of oxidizing catalysts and in organic accelerators, performance characteristics when mixed to fluid consistency meeting CRD-C-79 and CRD-C-588, non-staining type in exposed areas
Anchor rods:	ASTM F 1554, Grade 36, or ASTM F 1554, Grade 55, weldable. See drawings for specific anchors at braced and moment frames
Threaded rods:	ASTM A 36, unless noted on drawings

2.2 GENERAL FABRICATION REQUIREMENTS

Conform to the approved submittals, reference standards as applicable to the work, and the requirements herein. Fabricate and assemble in shop to greatest extent possible. Fabricate according to AISC's "code of standard practice for steel buildings and bridges" and AISC's "specification for structural steel buildings-allowable stress design and plastic design" or load resistance factor design specification for structural steel buildings".

A. Cleaning and Straightening: Thoroughly wire brush material, clean of loose mill scale and rust, and straighten by methods that will not injure the steel prior to fabrication. Remove twists or bends after punching or working the component parts of a member before the parts are assembled. Produce finished members free from twists, bends, and open joints when erected.

B. Contact: Pin components parts of built-up members and rigidly maintain in close contact using clamps or temporary bolting during welding operations. Accurately mill compression bearing surfaces of joints depending on contact bearings or saw cut square to axis, or as detailed. Cut other joints straight and true.

C. Joining: Provide members of sizes, weights, shapes, and arrangements indicated, closely fitted and finished true to line and in precise position as necessary to allow proper joining of parts in the field. Drifting to enlarge unfair holes is not allowed without prior approval.

D. Drilling, Punching, and Reaming: Hole burning to make or enlarge previous holes is allowed only with prior approval. Prepare required holes in structural steel members for attachment or passage of Work of other trades. Where allowed, steel may be punched 1/16" larger than the nominal diameter of the bolt when thickness of the steel is equal to or less than the diameter of the bolt plus 1/8". Where the steel is thicker than the diameter of the bolt plus 1/8", the holes shall be drilled or sub-punched and reamed. Diameter of sub-punched holes, and the drill for sub-drilled holes, shall be 1/16" smaller than the nominal diameter of bolt to be installed. Precisely locate finished holes to ensure passage of all bolts through steel assemblies without drifting. Enlarge holes only by reaming. Poor matching of holes is cause for rejection.

E. Holes for Anchor Bolts: Punch and drill or ream the holes in base and bearing plates. Do not make or enlarge the holes by burning except for grouting holes in column bases.

F. Base Plates: Press or mill column base plates 4" thick or under for a straight contact bearing between plate and column.

G. Gas Cutting: Use of a cutting torch is allowed where the metal being cut is not stressed during the operation, and provide stresses are not transmitted through a flame-cut surface. Make gas cuts with a smooth regular contour. Deduct 1/8" from the width of gas cut edges to determine the effective width of members that are gas cut. Make the radius of reentrant gas cuts as large as possible, but 1" minimum.

2.3 CONNECTIONS

A. Common Bolts: Make connections with common bolts only where indicated.

2.4 WELDING

A. Conform to AWS D1.1, as modified by referenced AISC standards, and as indicated or noted on the drawings. Employ certified welding operators who are thoroughly trained and experienced in arc welding and produce uniformly reliable groove and fillet welds in flat, vertical, and overhead positions, and make neat and consistent welds. Weld structural steel joints by the shielded electric-arc method unless otherwise shown or specified. Provide inspection and testing of welds as required under article "field quality control" hereinafter.

B. Weld Finishing: Grind exposed welds subject to contact to smooth surfaces free of holes, slag, or other defects, flush with the adjoining surfaces. No finish treatment is required for permanently concealed welds and other exposed welds.

C. Storage and Care of Electrodes: Coatings of low-hydrogen type electrodes shall

be thoroughly dry when used. Use electrodes as taken from hermetically sealed packages within 4 hours of the time the package is opened. Electrodes not used within this 4 hour period, and electrodes that have been exposed more than one hour to air having a relative humidity of 75% or greater, shall be dried for at least two hours at a temperature of 200 to 250oF before they are used, or shall be reconditioned according to the manufacturer's recommendations. Electrodes so dried or reconditioned not used within 4 hours after drying is completed shall be redried before use. Electrodes of any class that have been wet shall not be used under any conditions.

D. Preparation: Clean surfaces to be welded of paint, grease, oil, mill scale, and all foreign matter. Clean weld each time the electrode is changed. Chip entire surface of hand guided and controlled flame cut edges before welding. Surfaces prepared with automatic or mechanically guided and controlled equipment need not be ground or chipped before welding.

E. Lamination Checking: Prior to welding, ultrasonically test column materials greater than 1-1/2" in thickness for lamination within 12" (6" on each side) of a direct groove weld from column splices and girder flange connections. Conform to the ultrasonic testing procedures specified under "Field Quality Control" hereinafter.

F. Procedures: During assembling and welding, hold components of a built-up member with adequate clamps or other means to keep parts straight and in close contact. Do no welding in wind until adequate protective screening has been set up. Cut out defective welds or parts of welds with a chisel or air arc and replace.

G. Characteristics of Welds: Completed welds shall be wire brushed and shall show uniform section, smoothness of welded metal, feather edges without undercuts or overlays, and freedom from porosity and inclusions. Visual inspection at edges and ends of fillet welds shall show good fusion and penetration into base metal.

H. Comply with AISC's "Code of Standard Practice for Steel Buildings and Bridges" and "Specification for Structural Steel Buildings-Allowable Stress Design and Plastic Design" or "Load and Resistance Factor Design Specification for Structural Steel Buildings" for bearing adequacy of temporary connections, alignment, and removal of paint on surfaces adjacent to field welds.

I. SHOP PRIMING: Clean surfaces according to AISC specifications. Apply shop coat of metal primer to minimum 1.0 mil dry film thickness. Work primer into joints. Do not prime the following:

1. Steel surfaces embedded in concrete or masonry.
2. Permanently concealed structural steel surfaces.
3. Surfaces to receive sprayed fireproofing.

PART 3 EXECUTION

3.1 ERECTION OF STRUCTURAL STEEL

A. Brace and secure structural steel until permanent connections are completed. Provide accessories and fasteners to secure steel in place as indicated and required. Conform to code, AISC standards, and erection and bracing plan and procedure.

B. General: Employ qualified riggers and plan erection to require minimum cutting. Erect members plumb, true to line and level, and in precise positions. Provide temporary bracing and guying to resist loads and stresses to which the structure may be subjected, including those due to erection equipment and its operation.

C. Damaged Members: During erection, straighten or replace members which are bent, twisted, or damaged as directed. If heating is required, perform the heating by methods that ensure a uniform temperature throughout the entire member. When directed, remove the members that are damaged to an extent impairing appearance, strength, or serviceability and replace with new members at no extra cost to the Owner.

D. Anchor Bolts: Furnish and deliver with setting drawings and templates. Verify position of bolts prior to delivery of steel; report all errors or deviation for correction.

E. Columns: Set column bases in exact position for alignment, plumb and straight, supported on adjustable bolt supports or shims until grout has set. Set center of base true to column center within 1/16" and adjust height exactly. Maintain bases at exact position and level during grouting. Fill grout space solid with grout.

F. Connections: Maintain steel in correct position during welding and bolting, and provide for dead loads, wind, and all erection stresses. Do no welding or final bolting until members have been aligned and plumbed.

1. Field Welding. Conform to requirements under Part 2 of this Section.

2. Common Bolts. Tighten and upset bolt threads to preclude loosening, or use approved self-locking nuts.

3. Welded Stud Connectors. Field install welded stud connectors.

G. Tolerances: Erect members to tolerances conforming to referenced AISC Standards and Code, except as follows:

1. Vertical Dimensions. Measured from top of beams at their connections at any column, variation not more than 1/4" plus or minus per story or, when variations are accumulative from floor to floor, not exceeding 3/8" per story exclusive of column shortening due to dead load.

H. Plumb Displacement: Center line of columns from established column line, no more than 1" toward or away from established center line.

1. Floor Elevation will be considered level if floor framing members on any one floor, measured from top of column connections, do not vary more than 1/2" plus or minus.

2. Horizontal Dimension Variances. Governed by column plumb displacement.

3.2 FIELD TOUCH-UP PAINTING

A. After erection and connections are approved, clean all connections to be painted and damage to shop painted surfaces, and apply a field touch-up coat of same metal primer used for shop coat.

3.3 QUALITY CONTROL

A. Inspection: According to Reference Standards. The Registered Deputy Inspector shall visually inspect welds, shall be present to inspect and approve all groove, multi-pass, and penetration welding, and shall inspect all erection including the grouting under base plates.

B. Tests of Welding and Bolting: The Testing Laboratory, per Section 3 of General Requirements, shall inspect all shop and field welding, conform to requirements of Code and the Building Department, and certify in writing, after completion of the Work, that all welding has been performed in accordance with the Drawings, Specifications, and Code.

--END OF SECTION--

SECTION 05300

METAL DECKING

PART 1 - GENERAL

1.1 SECTION INCLUDES

A. Provide metal deck where indicated on the Drawings, as specified, and as required for a complete and proper installation.

1.2 RELATED WORK

A. Documents affecting work of this Section include, but are not by necessity limited to, General Conditions, Supplementary Conditions, and Sections in Division 1 of this Specification.

1. Section 00330 - Cast-In-Place Concrete
2. Section 05120 - Structural Steel

1.3 QUALITY ASSURANCE

A. Codes and Standards: Perform work in accordance with latest edition of the following codes and standards specified herein as amended to date of this Specification, which by reference are hereby incorporated into this Specification.

1. California Code of Regulations (CCR):
   a. Title 24, Part 2.
2. American Iron and Steel Institute (AISI):
   a. Specifications for Design of Cold-Formed Steel Structural Members.
3. American Welding Society (AWS):
   a. Structural Welding Code
   b. Structural Welding Code - Sheet Steel
4. National Fire Protection Association (NFPA).
5. American Society for Testing and Materials (ASTM):
   a. A 446 - Steel Sheet, Zinc-Coated (Galvanized) by the Hot-Dip Process, Structural (Physical) Quality.
   b. A 525 - General Requirement for Steel Sheet, Zinc-Coated (Galvanized) by the Hot-Dip Process.
   c. A 611 - Steel, Sheet, Carbon, Cold-Rolled, Structural Quality.
6. Federal Specifications (FS):
   a. DOD-P-21035A - Galvanizing Repair Specification.
7. Steel Deck Institute (SDI):
   a. Publication No. 29, Design Manual

b. Diaphragm Design Manual, Second Edition

c. Standard Practice Details

B. Qualifications of Welders: Employ welding operators that are currently tested and certified in accordance with Code, and AWS D1.3.

C. Qualifications of Workers: Use adequate numbers of skilled workers who are thoroughly trained and experienced in the necessary crafts and who are completely familiar with the specified requirements and the methods required for proper performance of the work of this Section.

D. Fire-Resistive Construction: When the materials of this Section are used as part of an assembly indicated on the Drawings in which fire-resistive construction ratings are required, demonstrate approval by Underwriter's Laboratories, Inc. and the governmental agencies having jurisdiction.

E. Source Quality Control: Furnish decking manufacturer's certified mill analyses and test reports covering decking.

1.4 SUBMITTALS

A. General: Comply with provisions of Section 01300. Submit the following:

1. Materials list of items proposed to be provided under this Section.

2. Manufacturer's specifications and other data required to prove compliance with the specified requirements.

3. Shop Drawings showing layout of decking, with details of materials, gauges, accessories, openings, finishes, welds, and other pertinent conditions. Refer to Section 01300 regarding proposed substitutions. If metal decking of type differing from that indicated or specified is proposed, submit the manufacturer's calculations and supporting data showing that proposed decking conforms to requirements indicated and specified. Include the decking manufacturer's technical Product Data and copies of Code approvals for proposed decking system. Submit with Shop Drawings and obtain approval prior to fabrication and delivery of decking.

1.5 PRODUCT HANDLING

A. Comply with pertinent provisions of Section 01600.

PART 2 PRODUCTS

2.1 METAL DECK UNITS

A. Decking Materials: Provide pattern as indicated on the Drawings, fabricated from steel conforming to ASTM A 446.

B. Roof Decking: Type noted on the Drawings, lengths to span over at least three supports unless otherwise indicated, each panel factory slotted or having rolled-in moisture venting provisions where insulating concrete fill or elastomeric coatings are applied over decking. Galvanize in accordance with ASTM A 525, G90 designation.

C. Composite Floor Decking: Type and manufacturer noted on the Drawings, lengths to span over at least three supports unless otherwise indicated. Galvanize in accordance with ASTM A 525, G60 designation. Deck receiving concrete fill shall be vented.

2.2 ACCESSORIES

A. Provide accessories specifically designed to be used with the metal deck units supplied to the work, and as normal to the uses indicated on the Drawings and specified.

B. Furnish indicated and necessary decking accessories including, without limitation, offsets between deck units, welding washers and welding anchors, closures, transitions and filler strips, as required for complete installations. Provide bent plate closures, angles, channels and other attachments as required for openings through decking for ducts, shafts, piping and other penetrations; where decking changes direction; and at decking perimeter; fabricated of minimum 16 gage galvanized steel unless otherwise indicated. Provide roof drain and overflow sumps of minimum 14 gage galvanized steel.

C. Shear Studs: Welded shear stud connectors as manufactured by Nelson or approved alternate.

D. Provide other materials, not specifically described but required for a complete and proper installation, as selected by the Contractor subject to the acceptance of the Owner's Representative.

2.3 PAINT

A. Z.R.C. Cold Galvanizing Compound as manufactured by Z.R.C. Chemical Products Co. (213-698-6655), or similar product complying with FS DOD-P-21035A.

PART 3 EXECUTION

3.1 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. Verify dimensions and actual site conditions to ensure proper fit and installation; refer to Section 01400. Do not proceed until unsatisfactory conditions are corrected.

3.2 INSTALLATION

A. Prior to start of installation, verify that beams are in proper alignment and that surfaces are clean for welding.

B. Placing: Place metal decking on supports with full bearing, end joints centered on supports and adjust to correct final position before completing permanent attachments. Place units in straight alignment for the entire length of run of flutes with close registration of flutes and with maximum 1/8" gap between ends of units, minimum 2" bearing on the supports. Do not splice units except at supports. Conform to Code approvals and approved submittals.

C. Cutting and Fitting: Perform cutting and tight fitting at columns, perimeters,

shafts, stairs, and other openings. Provide tight fitting closures at the open uncovered ends and edges of decking and miscellaneous supports required to carry the metal decking. Closures shall conform to the deck flute profile unless otherwise specifically detailed or approved. Secure hole reinforcement to decking with fillet welds placed on both sides of reinforcing members. Place reinforcement channels or angles across flutes and to project a distance beyond sides of openings equal to the maximum size of the opening unless otherwise indicated. Perform field cutting and trimming square and neat, equal to factory cutting.

D. Use materials and methods in strict accordance with recommendations of metal decking manufacturer and approved submittals. Hold deck tight to support elements by screws or other means as directed for proper welding or crimping of edges. Conform to AWS D1.3 and to the patterns and weld types indicated, finished welds free of sharp points or edges. Field coat welds and abraded surfaces upon completion with repair material. Omit the field coating where welds or abrasions are covered by concrete fill or sprayed fireproofing.

E. Shear Studs: Install studs in accordance with the Drawings and manufacturer's recommendations.

F. Damaged Decking: Remove and replace or reinforce as directed metal decking showing denting or other damage that adversely affects the decking strength or subsequent materials.

G. Cleaning and Touch-Up: Remove surplus materials. Clean and touch-up raw edges of decking cut for openings with repair material. Leave decks ready to receive subsequent materials.

H. Install accessory items including electrical grounds in accordance with the manufacturer's recommended installation procedures.

3.3 FIELD QUALITY CONTROL

A. In addition to complying with Section 01400, comply with the following:

1. Inspection: Install metal decking under continuous inspection, welding approved by Inspector in accordance with CCR Section 2231 A.5 before being covered.

2. Inspection and Testing of Welded Stud Connectors: In accordance with CCR Section 2231A.3.

3.4 TOUCH UP

A. Upon completion of installation, and as a condition of its acceptance, visually inspect each item installed under this Section and locate surfaces where finish was damaged.

1. Touch up galvanized surfaces with zinc-rich Z.R.C. Cold Galvanizing Compound Primer or other galvanized repair paint acceptable to the Owner's Representative.

2. Touch up other damaged surfaces as required to return the surfaces to condition commensurate with the services required.

--END OF SECTION--

SECTION 05400

COLD-FORMED METAL FRAMING

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes: Provide non-load bearing metal framing, 18 gage and heavier, with anchorage and bracing, and with accessories as required for complete installation.

B. LEED General: Refer to Section 01350 LEED Special Environmental Requirements and to LEED “Checklist” indicating points Design Team has anticipated relating to specific LEED credits and LEED requirements.

C. Related Sections:

1. Section 09220: Metal furring and lathing for plaster.
2. Section 09260: Light gage framing, 20 gage and lighter.

1.2 SYSTEM DESCRIPTION

A. Design Requirements: Calculate structural properties of metal framing system in accordance with American Iron and Steel Institute (AISI) "Specification for Design of Cold-Formed Steel Structural Members."

1. Loads: Comply with loads as required by California Building Code including loads on framing from other systems.

2. Deflection: Provide for maximum L/240 typical, L/360 where plaster or tile are indicated.

3. Seismic Requirements: Comply with code requirements for seismic bracing.

B. Performance Requirements, Fire Rated Assemblies: Provide framing approved for use in assemblies indicated to be fire rated.

1.3 REFERENCES

A. American Iron and Steel Institute (AISI): Specifications for Design of Cold-Formed Steel Structural Members.

B. National Association of Architectural Metal Manufacturers (NAAMM): Standard ML/SFA 540, Lightweight Steel Framing Systems Manual.

C. American Welding Society (AWS) D1.3: Structural Welding Code - Sheet Steel.

1.4 SUBMITTALS

A. Product Data: Submit manufacturer's literature.

B. Shop Drawings: Indicate component details, framing of openings, and welds, type and location of mechanical fasteners and accessories, and items required of other work for complete installation.

1. Detail framing layout.

C. Engineer Certificate: Provide certification by civil or structural engineer registered in California indicating compliance with Contract Documents and applicable codes.

1. Calculations: Where requested, submit calculations directly to enforcing agency.

D. Manufacturer Certification: Provide certification by manufacturer indicating compliance with Contract Documents and applicable codes.

E. LEED Certification Points: Submit information and certifications necessary to achieve maximum points for LEED certification; coordinate and cooperate with Owner and Architect in providing information necessary for required LEED rating.

1.5 QUALITY ASSURANCE

A. Welder Qualifications: Use qualified welders and comply with AWS D1.3.

B. Pre-Installation Meeting: Prior to fabrication of components, meet at Project with installers of doors, windows, mechanical, and electrical work to review areas of potential interference and conflicts.

1. Coordinate layout and support provisions for interfacing work.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

A. Dietrich Industries Inc.

B. Unimast, Inc.

C. Alabama Metal Industries Corp.

D. Substitutions: Refer to Section 01630.

2.2 MATERIALS

A. Framing Members: Sheet steel conforming to ASTM A1003, A1011, or ASTM A653, formed into "C" shaped sections; with knurled sides and faces.

1. Gages: As indicated on Drawings and as required to comply with California Building Code and specified design and performance criteria.

a. 18 Gage: Minimum 33,000 psi commercial quality steel sheet.
b. 16 Gage and Heavier: Minimum 50,000 psi structural quality steel sheet.

B. Track: Formed steel; channel shaped; same width as studs, for tight fit.

C. Bracing: Formed galvanized sheet steel; channel shaped.

D. Plates, Gussets, Clips: Galvanized steel, of formed or sheet material as required for particular use.

E. Fastenings:

1. Self-Drilling Self-Tapping Screws, Bolts, Nuts and Washers: Hot dip galvanized, ASTM A90.

2. Anchorage Devices: Powder driven or drilled expansion bolts; or screws with sleeves.

3. Welding: AWS D1.3, Structural Welding Code - Sheet Steel.

F. Finish: Galvanized, ASTM A924 and A653, minimum G60 coating.

1. Accessories: Match framing finish.

G. LEED Recycled Content: Where available provide materials with post-consumer and pre-consumer recycled content to achieve maximum LEED credits.

H. LEED Regionally Manufactured, Extracted, Harvested, or Recovered Materials: Where possible obtain materials that qualify for LEED credits for regional materials obtained within 500 miles of Project.

I. LEED Total Volatile Organic Compounds (TVOC) and Toxic Substances: Provide materials with volatile organic compound emissions and toxic substances such as urea-formaldehyde complying with LEED requirements to reduce indoor air contaminants.

2.3 FABRICATION

A. Fabricate assemblies and framed sections of sizes and profiles indicated, with joints fitted and secured, reinforced, and braced to meet design requirements.

1. Comply with fabrication and connection recommendations of NAAMM ML/SFA 540, "Lightweight Steel Framing Systems Manual."

B. Fit and assemble in largest practical sections for delivery and installation.

C. Wire tying of framing components is not acceptable.

D. Fabrication Tolerances: Fabricate panels to maximum allowable tolerance variation from plumb, level, and true to line of 1/8" in 10'-0".

PART 3 - EXECUTION

3.1 INSTALLATION

A. Install metal framing systems in accordance with manufacturer's printed instructions.

1. Comply with connection and erection recommendations of NAAMM ML/SFA 540, "Lightweight Steel Framing Systems Manual."

B. Align top and bottom tracks, locating to wall layout; secure in place with screws or welding at maximum 16" on center.

C. Place studs not more than 2" from abutting walls and at each side of openings; connect studs to tracks using clips, ties, screws or welding, in accordance with manufacturer's instructions.

D. Construct corners using minimum three studs; double studs at openings.

E. Install intermediate studs above and below openings to match wall spacing.

F. Install cross stud channels for attachment of items anchored to walls.

G. Install framing between studs for attachment of mechanical and electrical items.

H. Erect studs, brace, and reinforce to develop full strength.

I. Make provisions for erection stresses; provide temporary alignment and bracing.

J. Assure framing provides true and flat surfaces, ready to receive finish, with maximum variance of 1/8" in 10'-0".

1. Panels: Maximum step in face and jog in alignment between panels is not to exceed 1/16".

K. Touch-up protective coating damaged during handling and installation.

1. Use zinc-rich galvanizing repair paint for galvanized surfaces.

END OF SECTION

SECTION 05500

METAL FABRICATIONS

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes: Provide stock and custom fabricated metal items scheduled at end of this Section, complete in respect to function as intended.

1. Metal fabrications includes items made from iron and steel shapes, plates, bars, strips, tubes, pipes and castings which are not a part of structural steel or metal systems specified elsewhere.

B. LEED General: Refer to Section 01350 LEED Special Environmental Requirements and to LEED “Checklist” indicating points Design Team has anticipated relating to specific LEED credits and LEED requirements.

C. Related Sections:

1. Section 02825: Custom metal fence and gates.
2. Section 05510: Metal stairs and stair railings.
3. Section 05722: Ornamental glass railings (Tenant Improvements Specs).
4. Section 05810: Expansion joint cover assemblies.

1.2 SYSTEM DESCRIPTION

A. Design Requirements: Design railings to support a lateral force of 50 lbs. /lin. ft. uniform load and 200 lbs. at any single point without permanent set or damage; ASTM E935.

1. Top Rails: Design to support minimum 300 lb. concentrated single point load applied at any point vertically or horizontally.

1.3 REFERENCES

A. American Welding Society (AWS): D1.1, Structural Welding Code.

B. National Association of Architectural Metal Manufacturers (NAAMM):

1. Pipe Rail Manual.
2. Heavy Duty Metal Bar Grating Manual.

C. LEED Certification Points: Submit information and certifications necessary to achieve maximum points for LEED certification; coordinate and cooperate with Owner and Architect in providing information necessary for required LEED rating.

1.4 SUBMITTALS

A. Product Data: Submit manufacturer's literature for products used in metal fabrications, including paint, grout and manufactured items.

B. Shop Drawings: Submit for fabrication and erection of metal fabrications. Indicate profiles, sizes, connection, reinforcing and anchorage.

1. Provide templates for anchorage installation by others.

C. Certificates: Submit certification signed by California registered civil or structural engineer indicating compliance with Contract Documents and code requirements.

1.5 QUALITY ASSURANCE

A. Regulatory Requirements:

1. Access: Comply with California Building Code and Americans with Disabilities Act Accessibility Guidelines (ADAAG) requirements for access for persons with disabilities.

2. Code: Comply with requirements of applicable codes for railing design, except where more restrictive codes are specified.

PART 2 - PRODUCTS

2.1 MATERIALS

A. Steel Shapes, Plates and Bars: ASTM A36.

1. Steel Bar Grating: ASTM A36 or ASTM A1011.

B. Structural Steel Sheet: Hot rolled, ASTM A1011; or cold rolled, ASTM A1008, Class 1; of grade required for design loading.

C. Steel Pipe: ASTM A53, Type S seamless, grade as selected by fabricator and as required for design loading; minimum standard weight, STD or Schedule 40.

D. Steel Tubing: Cold formed ASTM A500; or hot rolled, ASTM A501; minimum Grade B; seamless where exposed.

E. Castings: Gray iron, ASTM A48, Class 30; malleable iron, ASTM A47.

F. Concrete Inserts: Threaded or wedge type; galvanized ferrous castings, either malleable iron ASTM A47, or cast steel ASTM A27. Provide bolts, washers and shims as required, hot-dip galvanized, ASTM A153.

G. Grout: Non-shrink meeting ASTM C1107, non-metallic, pre-mixed, factory-packaged, non-staining, non-corrosive; type specifically recommended by manufacturer as applicable to job condition.

1. Manufacturers:

a. Master Builders/Masterflow 713.
b. Five Star Products, Inc./Five Star Grout.
c. Bostik Construction Products/Upcon Grout.
d. Protex Industries, Inc./Propak.
e. Substitutions: Refer to Section 01630.

H. Fasteners and Rough Hardware: Type required for specific usage; provide zinc-coated fasteners for exterior use or where built into exterior walls.

I. Welding Materials: AWS D1.1, type required for materials being welded.

J. Paint: Provide primers as recommended by paint manufacturers for substrates and paints specified in Section 09900 – Paints and Coatings.

1. Galvanizing Repair Paint: High zinc-dust content paint for regalvanizing welds in galvanized steel.

K. LEED Recycled Content: Where available provide materials with post-consumer and pre-consumer recycled content to achieve maximum LEED credits.

L. LEED Regionally Manufactured, Extracted, Harvested, or Recovered Materials: Where possible obtain materials that qualify for LEED credits for regional materials obtained within 500 miles of Project.

M. LEED Total Volatile Organic Compounds (TVOC) and Toxic Substances: Provide materials with volatile organic compound emissions and toxic substances such as urea-formaldehyde complying with LEED requirements to reduce indoor air contaminants.

2.2 FABRICATION

A. Fabricate items with joints neatly fitted and properly secured.

B. Grind exposed welds continuous, smooth and flush with adjacent finished surfaces, and ease exposed edges to approximate 1/32" uniform radius.

C. Exposed Mechanical Fastenings: Flush countersunk fasteners unobtrusively located, consistent with design of structure.

D. Fit and shop assemble in largest practical sections for delivery.

E. Make exposed joints flush butt type, hairline joints where mechanically fastened.

1. Fabricate joints exposed to weather in manner to exclude water or provide weep holes where water could accumulate.

F. Supply components required for proper anchorage of metal fabrications; fabricate anchorage and related components of same material and finish as metal fabrication.

G. Railings: Comply with California and ADAAG access requirements and NAAMM "Pipe Railing Manual"; welded construction; cap exposed ends.

1. Handrails: Seamless steel tube rails, 1-1/2" outside diameter, continuous railings conforming to applicable code and design requirements.

2. Wall Rail Brackets: Castings as approved by Architect.

3. Wall Returns: 90° elbow return with 1/4" maximum clearance unless otherwise indicated.

    a. Provide wall plates only where indicated and where required by applicable codes.

H. Ladders: Comply with requirements of ANSI A14.3 and Cal/OSHA; Contractor option steel or aluminum.

1. Rungs: Fit in centerline of side rails, plug weld and grind smooth on outer rail faces; provide non-slip surface on top of rung, similar to epoxy resin and aluminum oxide granules surface.

I. Steel Grating: Comply with requirements of NAAMM "Heavy Duty Metal Bar Grating Manual"; work to dimensions accepted on shop drawings, using proven details of fabrication and support.

1. Type: Welded with a plain traffic surface.

2. Loads: Design for minimum 100 psf.

J. Steel Bollards: Minimum Schedule 80 seamless steel piping, filled with minimum 2000 psi concrete.

K. Cast-In-Place Concrete Stair Nosing: One piece cast aluminum nonslip stair nosing, contrasting color to stair treads, 2” nosing full tread width.

1. Provide at each tread and landing for exterior cast-in-place concrete stairs, at upper approach and last tread for interior cast-in-place concrete stairs.

2. Comply with California Building Code Requirements.

L. Pre-Engineered Support Systems: Provide manufactured pre-engineered support system consisting of minimum 12 gage ”C” channel supports with anchors, attachments, and accessories as required for complete installation.

1. Manufacturers:

    a. Unistrut Inc./Unistrut.
    b. Grinnell Corp./PowerStrut.
    c. Thomas & Betts, Inc./Superstrut.
    d. Substitutions: Refer to Section 01630.

2. Finish: Manufacturer’s standard prime paint finish for channel supports; galvanized or similar plated anchors and fasteners; hot dip galvanized where at exterior and exterior exposed applications.

M. Finishes: Galvanize and prime paint exterior work and prime paint interior work unless otherwise noted in Schedule; comply with requirements of Section 09900 - Paints and Coatings for preparation and priming.

1. Thoroughly clean surfaces of rust, scale, grease and foreign matter prior to applying finish.

2. Do not shop prime surfaces in contact with concrete or requiring field welding; shop prime in one coat.

3. Galvanized Coating: Provide coating comparable to ASTM A924 and A653, minimum G90 hot dip galvanized coating.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Field Measurements: Take field measurements prior to preparation of shop drawings and fabrication, where possible; do not delay job progress; allow for trimming and fitting where necessary.

3.2 ERECTION

A. Obtain Architect's review prior to site cutting or making adjustments which are not part of scheduled work.

1. Perform necessary cutting and altering for installation and coordination with other work.

B. Install items square and level, accurately fitted and free from distortion or defects detrimental to appearance or performance.

1. Supply items required to be cast into or embedded in other materials to appropriate trades.

2. Ensure alignment with adjacent construction; coordinate with related work to ensure no interruption in installation.

C. Make provision for erection stresses by temporary bracing; keep work in alignment.

D. Field bolt and weld to match standard of shop bolting and welding; hide bolts and screws whenever possible, where not hidden, use flush countersunk fastenings.

1. Perform field welding in accordance with AWS D1.1.

E. After installation, touch-up field welds and scratched and damaged surfaces; use primer consistent with shop coat or recommended for galvanized surfaces, as applicable.

F. Replace items damaged in course of installation and construction.

3.3 SCHEDULE

A. Supply and install metal fabrications listed in Schedule, complete with anchorage and attachments necessary for installation.

1. Schedule lists principal items only, refer to Drawings for items not listed.

B. Schedule:

1. Miscellaneous angles, plates and attachments to be set in concrete or masonry for anchorage of other items.

2. Iron and steel shapes, sleeves, anchors, connectors and fastenings required to complete construction work, and which are not provided in other Specification sections.

    a. Rough hardware, including bolts, fabricated plates, anchors, hangers, dowels and miscellaneous metals.

    b. Ledge and shelf angles, channels and plates not attached to structural steel, and for support of metal decking.

    c. Angle and channel frames for doors and wall openings.

    d. Beams of structural shapes, not supported by structural steel.

    e. Steel angle corner guards.

    f. Elevator sill support angles, and metal fabrications sized on Architectural Drawings not typically provided as part of structural work.

3. Guard rails and handrails, other than stair railings.

4. Ladders.

5. Steel bar gratings; galvanized finish.

6. Steel bollards.

7. Cast-in-place concrete stair nosings.

8. Pre-engineered support systems.

END OF SECTION

SECTION 05510

METAL STAIRS

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes: Provide steel stairs and landings, with stair handrails, and including plates, angles, hangers and struts for securing to building structure.

1. Metal stair systems include metal support systems with precast concrete stair treads.

2. Provide additional steel as required for support of stairs and not otherwise indicated on Architectural or Structural Drawings.

3. Provide laminated glass risers and wood treads where indicated.

B. LEED General: Refer to Section 01350 LEED Special Environmental Requirements and to LEED “Checklist” indicating points Design Team has anticipated relating to specific LEED credits and LEED requirements.

C. Related Work:

1. Section 05500: Metal handrails other than steel stair rails.

1.2 SYSTEM DESCRIPTION

A. Design Requirements: Design stairs and railings to support following minimum loads.

1. Stairs: 100 lbs./sq.ft. loads, with individual stair treads designed to support a 300 pound concentrated load placed in a position which would cause maximum stress.

2. Railings: Support a lateral force of 50 lbs./lin. ft. uniform load and 200 lbs. at any single point without permanent set or damage; ASTM E935.

a. Top Rails: Design to support minimum 300 lb. concentrated single point load applied at any point vertically or horizontally.

1.3 REFERENCES

A. American Welding Society (AWS): D1.1, Structural Welding Code.

B. National Association of Architectural Metal Manufacturers (NAAMM):

1. Metal Stairs Manual.
2. Pipe Rail Manual.

1.4 SUBMITTALS

A. Product Data: Submit manufacturer's literature for products used in stair and rail fabrications, including paint, grout, and rail brackets.

B. Shop Drawings: Submit for fabrication and erection of stairs and handrails. Indicate profiles, sizes, connection, reinforcing, and anchorage.

1. Provide templates for anchorage installation by others.

C. Certificates: Submit certification signed by California registered civil or structural engineer indicating compliance with Contract Documents and code requirements.

D. LEED Certification Points: Submit information and certifications necessary to achieve maximum points for LEED certification; coordinate and cooperate with Owner and Architect in providing information necessary for required LEED rating.

1.5 QUALITY ASSURANCE

A. Regulatory Requirements:

1. Access: Comply with California Building Code and Americans with Disabilities Act Accessibility Guidelines (ADAAG) requirements for access for persons with disabilities.

2. Building Codes: Comply with requirements of applicable codes for stair and railing design, except where more restrictive codes are specified.

PART 2 - PRODUCTS

2.1 MATERIALS

A. Steel Sections, Plates, Shapes and Bars: ASTM A36.

B. Structural Steel Sheet: Hot rolled, ASTM A1011; or cold rolled, ASTM A1008, Class 1; or grade required for design loading.

C. Steel Pipe: ASTM A53, Type S seamless, grade as selected by fabricator and as required for design loading; minimum standard weight, STD or Schedule 40.

D. Steel Tubing: Cold formed ASTM A500; or hot rolled, ASTM A501; minimum Grade B; seamless where exposed.

E. Castings: Gray iron, ASTM A48, Class 30; malleable iron, ASTM A47.

F. Concrete Inserts: Threaded or wedge type; galvanized ferrous castings, either malleable iron ASTM A47, or cast steel ASTM A27. Provide bolts, washers and shims as required, hot-dip galvanized, ASTM A153.

G. Grout: Non-shrink meeting ASTM C1107, non-metallic, pre-mixed, factory-packaged, non-staining, non-corrosive; type specifically recommended by manufacturer as applicable to job condition.

1. Manufactures:

a. Master Builders/Masterflow 713.
b. Five Star Products, Inc./Five Star Grout.
c. Bostik Construction Products/Upcon Grout.
d. Protex Industries, Inc./Propak.
e. Substitutions: Refer to Section 01630.

H. Fasteners and Rough Hardware: Type required for specific usage; provide zinc-coated fasteners for exterior use or where built into exterior walls.

I. Welding Materials: AWS D1.1, type required for materials being welded.

J. Paint: Provide primers as recommended by paint manufacturers for substrates and paints specified in Section 09900 – Paints and Coatings.

1. Galvanizing Repair Paint: High zinc-dust content paint for regalvanizing welds in galvanized steel.

K. LEED Recycled Content: Where available provide materials with post-consumer and pre-consumer recycled content to achieve maximum LEED credits.

L. LEED Regionally Manufactured, Extracted, Harvested, or Recovered Materials: Where possible obtain materials that qualify for LEED credits for regional materials obtained within 500 miles of Project.

M. LEED Total Volatile Organic Compounds (TVOC) and Toxic Substances: Provide materials with volatile organic compound emissions and toxic substances such as urea-formaldehyde complying with LEED requirements to reduce indoor air contaminants.

2.2 FABRICATION

A. Stairs: Comply with requirements of NAAMM "Metal Stair Manual", including components required for proper anchorage of metal stairs.

1. Types of Stairs: Refer to Drawings.

2. Stair Class: NAAMM Architectural Class.

3. Pan Stairs and Landings (Utility Types, Interior Locations): Fabricate stairs with landings and treads of pan construction with treads, landings and risers from sheet stock.

a. Secure tread pans to stringers with clip angles welded in place.

b. Provide minimum 3000 psi concrete fill for treads and landings, with non-slip fused aluminum oxide or crushed emery finish.

4. Steel Plate Stairs and Landings (Exterior Locations): Form treads and landings of minimum 3/16" thick formed non-slip steel floor plate, form risers of minimum 14 gage sheet stock.

5. Wood Finished Pan Stairs and Landings with Laminated Glass Risers (Architectural Stairs, Interior Locations where Indicated): Fabricate stairs with landings and treads of pan construction.

    a. Treads and landings to be designed to accept concrete fill and then receive wood treads and landings. Secure tread pans to stringers with clip angles welded in place.

        1) Provide minimum 3000 psi concrete fill for treads and landings, with non-slip fused aluminum oxide or crushed emery finish.

        2) Wood Treads and Landings: Architectural Woodwork Standards, First Edition, 2009, Premium Grade solid stock wood as indicated on Drawings, with Premium Grade acrylic urethane wood floor finish.

            a) Include contrasting color wood strips inset in stair treads and at landings to conform to California Building Code requirements for stair striping.

    b. Risers: Laminated glass, ASTM C1172, Kind LA, two sheets of clear float glass laminated with polyvinyl buteral film, safety glass; laminated layers shall be free of air pockets and foreign substances.

        1) Glass Thickness: Nominal 1/2", unless otherwise indicated.
        2) Polyvinyl Buteral Core Thickness: Minimum 60 mil.

6. Metal Stairs (Steel Plate and Utility Pan): Provide with abrasive nosing, 2" wide, contrasting color to tread.

B. Stair Railings: Comply with California and ADAAG access requirements and with NAAMM "Pipe Railing Manual"; welded construction; cap exposed ends.

1. Handrail: Seamless steel tube, 1-1/2" outside diameter, continuous railings conforming to applicable code and design requirements.

2. Wall Rail Brackets: Castings as approved by Architect.

3. Wall Returns: 90° elbow return with 1/4" maximum clearance unless otherwise indicated.

    a. Provide wall plates only where indicated and where required by applicable codes.

C. Fabricate stairs, landings and component connections to support live loads specified.

1. Provide closed riser stairs with nosing joined flush to riser.

2. Maximum Allowable Deflection:

    a. Standard: Maximum L/240.
    b. Wood Treads: Maximum L/360.

3. Stringers: As indicated on Drawings; Contractor option where not otherwise indicated.

4. Reinforce underside of landings.

    a. Concrete Fill Landings: Provide smooth soffit surfaces unless suspended finish is indicated below landing.

D. Fabricate items with joints neatly fitted and properly secured.

E. Grind exposed welds continuous, smooth and flush with adjacent finished surfaces, and ease exposed edges to approximate 1/32" uniform radius.

F. Exposed Mechanical Fastenings: Flush countersunk fasteners unobtrusively located, consistent with design of structure.

G. Fit and shop assemble in largest practical sections for site delivery.

H. Make exposed joints flush butt type, hairline joints where mechanically fastened.

1. Fabricate joints exposed to weather in manner to exclude water or provide weep holes where water could accumulate.

I. Supply components required for proper anchorage of metal stairs.

J. Fabricate anchorage and related components of same material and finish as metal stairs and rails.

K. Thoroughly clean surfaces of rust, scale, grease and foreign matter prior to applying finish.

L. Supply components required for proper anchorage of metal fabrications; fabricate anchorage and related components of same material and finish as metal fabrication.

M. Finishes: Thoroughly clean surfaces of rust, scale, grease and foreign matter prior to applying finish. Do not shop prime surfaces in contact with concrete or requiring field welding; shop prime in one coat.

1. Interior Stairs and Rails: Prime paint.

2. Exterior Stairs and Rails: Hot dip galvanize and prime paint.

    a. Provide minimum ASTM A123 or A924 and A653 G90 galvanized coating; iron and steel hardware galvanized conforming to ASTM A153.

3. Prime Painting: Comply with requirements of Section 09900 - Paints and Coatings for preparation and priming.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Field Measurements: Take field measurements prior to preparation of shop drawings and fabrication, where possible; do not delay job progress; allow for trimming and fitting where necessary.

1. Verify clearances are sufficient, including code required head height clearances.

3.2 ERECTION

A. Obtain Architect's review prior to site cutting or making adjustments which are not part of scheduled work.

1. Perform necessary cutting and altering for installation of work of other sections.

2. Wood Treads and Landings: Comply with Architectural Woodwork Standards, First Edition, 2009, Premium Grade installation requirements.

3. Laminated Glass Risers: Comply with Glass Association of North America (GANA) “Glazing Manual”; glass shall not touch metal or wood; use silicone glazing sealants and setting blocks.

B. Install steel stairs and railings square and level, plumb and free from distortion or defects detrimental to appearance and performance.

C. Make provision for erection stresses by temporary bracing; keep work in alignment.

D. Ensure alignment with adjacent construction; coordinate with related work to ensure no interruption in installation.

E. Field bolt and weld to match standard of shop bolting and welding; hide bolts and screws whenever possible, where not hidden, use flush countersunk fastenings.

1. Perform field welding in accordance with AWS D1.1.

F. After installation, touch-up field welds and scratched and damaged surfaces; use primer consistent with shop coat or recommended for galvanized surfaces, as applicable.

G. Replace items damaged in course of installation and construction.

END OF SECTION

SECTION 05722

ORNAMENTAL GLASS RAILINGS

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes: Provide freestanding tempered glass handrailing system, including rail caps, handrails, and accessories as required for complete, finished installation.

B. LEED General: Refer to Section 01350 LEED Special Environmental Requirements and to LEED “Checklist” indicating points Design Team has anticipated relating to specific LEED credits and LEED requirements.

1.2 REFERENCES

A. National Association of Architectural Metal Manufacturers: Metal Finishes Manual.

B. Builders Hardware Manufacturers Association (BHMA): BHMA 1301/ ANSI A156.18 Standard for Materials and Finishes.

1.3 SYSTEM DESCRIPTION

A. Design Requirements: Design railings to support following minimum loads.

1. Railings: Support a lateral force of 50 lbs./lin. ft. uniform load and 200 lbs. at any single point without permanent set or damage; ASTM E935.

a. Top Rails or Handrail if No Top Rail: Design to support minimum 300 lb. concentrated single point load applied at any point vertically or horizontally.

2. Access: Comply with California Building Code and Americans with Disabilities Act Accessibility Guidelines requirements for railing design to provide access for persons with disabilities.

3. Code: Comply with requirements of applicable codes for railing design, except where more restrictive codes are specified.

1.4 SUBMITTALS

A. Product Data: Furnish manufacturer's literature, including recommendations for cleaning.

B. Shop Drawings: Show detailing including profiles, sizes, connection, anchorage, accessories, and supporting members.

C. Samples: Submit samples of handrail & base channel.

D. Certificates: Submit California licensed civil or structural engineer certification indicating railings comply with Contract Documents and code requirements.

E. LEED Certification Points: Submit information and certifications necessary to achieve maximum points for LEED certification; coordinate and cooperate with Owner and Architect in providing information necessary for required LEED rating.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

A. Livers Bronze Co./Struct-U-Rail.

B. C.R. Laurence Co./Glass Railings.

C. Substitutions: Refer to Section 01630.

2.2 MATERIALS

A. Glass: ASTM C1048, Kind FT, select glazing quality clear tempered glass; 1/2" thick; safety glass; edges polished prior to tempering.

1. Tong Marks: Provide tempered glass with no tong marks; upon special approval by Architect, tong marks fully concealed in finish construction may be permitted.

B. Handrails: Bronze finished to match Chemetal #925 Brushed Medium Bronze nonmagnetic corrosion resistant; ASTM A269 seamless tubing or ASTM A666 for sheet and plate.

a. Finish: BHMA 630 (US32D) satin bronze or NAAMM Number 4, directional polished satin finished bronze.

C. Steel Components: ASTM A36.

D. Concrete Inserts: Threaded or wedge type; galvanized ferrous castings, either malleable iron ASTM A47, or cast steel ASTM A27. Provide bolts, washers and shims as required, hot-dip galvanized, ASTM A153.

E. Grout: Non-shrink meeting ASTM C1107, non-metallic, pre-mixed, factory-packaged, non-staining, non-corrosive; type specifically recommended by manufacturer as applicable to job condition.

1. Manufacturers:

a. Master Builders/Masterflow 713.
b. U.S. Grout Corp./Five Star Grout.
c. Bostik Construction Products/Upcon Grout.
d. Protex Industries, Inc./Propak.
e. Substitutions: Refer to Section 01630.

F. Brackets and Anchors: Unexposed steel plates, angles and supports shall be steel; exposed items satin finished aluminum.

G. Brackets and Anchors: Unexposed plates, angles and supports may be steel; exposed items to match ornamental metal type and finish.

H. Fasteners: Type required for specific usage; provide concealed fasteners except where specifically approved; where exposed match type and finish of metal being fastened.

I. Bituminous Paint: Cold applied asphalt mastic conforming with SSPC-P12.

J. LEED Recycled Content: Where available provide materials with post-consumer and pre-consumer recycled content to achieve maximum LEED credits.

K. LEED Regionally Manufactured, Extracted, Harvested, or Recovered Materials: Where possible obtain materials that qualify for LEED credits for regional materials obtained within 500 miles of Project.

L. LEED Total Volatile Organic Compounds (TVOC) and Toxic Substances: Provide materials with volatile organic compound emissions and toxic substances such as urea-formaldehyde complying with LEED requirements to reduce indoor air contaminants.

2.3 FABRICATION

A. Design system with glass panels removable for replacement without dismantling entire railing assembly.

B. Select materials for straightness, free of defects and irregularities.

1. Exposed-to-view surfaces exhibiting pitting, seams, stains, dicolorations, and imperfections on finished units are not acceptable.

C. Fabricate component connections to support specified design loads.

D. Make exposed joints flush butt type, hairline joints where mechanically fastened; provide concealed connection devices with hidden fasteners.

1. Fabricate continuous items with joints neatly fitted and secured.

2. Ease exposed metal edges to approximate 1/32" uniform radius.

E. Comply with AWS for recommended practices in welding each type of material; provide welds behind finished surfaces without distortion or discoloration on exposed side; dress exposed and contact surfaces.

F. Exposed Mechanical Fastenings: Flush countersunk fasteners unobtrusively located, consistent with design of structure.

G. Fit and shop assemble in largest practical sections for site delivery.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Field Measurements: Take field measurements prior to preparation of shop drawings and fabrication, where possible; do not delay job progress; allow for trimming and fitting where necessary.

3.2 PREPARATION

A. Coordinate setting of anchorages that are to be embedded in substrates.

3.3 INSTALLATION

A. Install glass railings in accordance with manufacturer's instructions and approved shop drawings.

B. Install plumb, true and in correct relation to adjacent work, free from distortion or defects detrimental to appearance and performance.

C. Prior to securing continuous items, adjust to ensure proper matching at butt joints and correct alignment throughout their length.

1. Separate concealed surfaces subject to corrosion with heavy coat of bituminous paint.

3.4 REPAIR

A. Repair or replace finishes damaged during installation and construction period to match undamaged materials.

END OF SECTION

SECTION 05810

EXPANSION JOINT COVER ASSEMBLIES

PART 1 - GENERAL

1.1 SUMMARY:

A. Work included:
   1. Interior floor expansion joint covers
   2. Interior wall expansion joint covers
   3. Interior ceiling expansion joint covers
   4. Roof expansion joint covers
   5. Exterior wall expansion joint covers
   6. Fire rated assemblies

B. Related work specified elsewhere includes:
   1. Cast-in-place concrete
   2. Precast concrete
   3. Unit masonry
   4. Sealants and caulking
   5. Cement plaster
   6. Gypsum wallboard systems
   7. Acoustical ceilings
   8. Fire stopping

1.2 REFERENCES:

COORDINATE REFERENCE SELECTION WITH MATERIAL SELECTION IN PART TWO.

A. Reference standards; as referenced herein
   1. American Society for Testing and Materials (ASTM)
   2. American Iron and Steel Institute (AISI)
   3. Council of American Building Officials (CABO)

1.3 SYSTEM DESCRIPTION:

A. Joint cover systems shall allow unrestrained movement of joint without disengagement of cover.

B. Joint size/movement range: As indicated on drawings.

1.4 SUBMITTALS:

A. Product data: Submit manufacturer's product description indicating compliance with specified requirements. Include installation instructions for each type of expansion control material.

B. Shop drawings: Submit detailed shop drawings for expansion control conditions. ** Include requirements for blockouts. Submit prior to concrete placement or other construction adjacent to expansion joints.

C. Samples: Submit one 6" sample of each specified system style.

D. Submit certification or copies of independent test reports, by CABO approved testing/listing agency, indicating compliance with ** fire resistance rating and ** specified performance requirements.

1.5 QUALITY ASSURANCE:

A. Manufacturer: Furnish assemblies from one manufacturer with a minimum of five years experience in the design and fabrication of expansion joint cover assemblies.

B. Installer: Firm with a minimum of five years experience in installation of systems similar to those required by this project and acceptable to manufacturer.

1.6 PROJECT/SITE CONDITIONS:

A. Deliver joint covers to jobsite in new, clean, unopened containers of size and strength to protect materials during shipping.

B. Store materials in original containers in dry location.

1.7 WARRANTY:

A. Provide manufacturer's standard one-year material and workmanship warranty.

B. Finish warranty: Warrant fluoropolymer coating to remain free, under normal atmospheric conditions, from peeling, checking, cracking, chalking in excess of numerical rating of 8 when measured in accord with ASTM D4214-89, of fading in excess of 5 N. B. S. units during warranty period. Warranty period shall be 5 years.

C. Warranties shall begin at Date of Substantial Completion.

PART 2 - PRODUCTS

2.1 MANUFACTURER:

A. MM Systems Corporation, 50 MM WAY, PENDERGRASS, Georgia 30567; 1-800-241-3460 or 706-824-7501 www.mmsystemscorp.com

THE FOLLOWING PARAGRAPH IS OPTIONAL AT SPECIFIER'S DISCRETION.

B. Expansion control systems of similar design and construction, as manufactured by other manufacturers, may be submitted for Architect's consideration. Acceptance is subject to compliance with specified design criteria, as evidenced by submittal of specified product data. Submittals shall comply with requirements of Product Options and Substitutions section.

2.2 MATERIALS:

A. Aluminum: Alloys meeting ASTM B221-95a
   1. Extrusions: 6063-T5 alloy
   2. Plates: 6061-T6 alloy
   3. Sheet: 5052-H32 alloy

B. Bronze:
   1. Extrusions: CDA Alloy C385, Architectural Bronze
   2. Sheet: CDA Alloy C280, Muntz Metal.
   3. Tube, pipe and strip: Half hard brass, UNS, Alloy C2600 (CDA Alloy 260, Cartridge Brass).

C. Stainless steel: AISI Type 302/304, 2B finish

D. Visual seal: System manufacturer's standard elastomeric seal. Color as selected by Architect from manufacturer's standard selection range.

E. Filler/gasket: Elastomeric. Color shall be as selected by Architect from manufacturer's standard color range. Custom color as selected by Architect.

F. Fire barrier material: In accord with test reports and listing agency requirements.

G. Finish for exposed aluminum components:
   1. Aluminum floor: Mill finish.

   2. Aluminum wall and ceiling:
      a. Pretreatment: Provide factory applied seven-step chromate conversion coating for application of field-applied paints.
      b. Fluoropolymer coating system: Super-cote I.
         1) Two-coat, shop-applied, baked-on 70% fluoropolymer coating system based on Elf Atochem, Inc., Kynar 500 or Ausimont U.S.A., Inc., Hylar 5000 resin (polyvinylidene fluoride, PVDF), formulated by a licensed manufacturer and applied by manufacturer's approved applicator, to meet AAMA 605.2-90.
         2) Coating system shall provide minimum 1.2 mil dry film thickness consisting of 0.2 to 0.4 mil primer and

minimum 1.0 mil color coat, baked on at 450 degrees F. metal temperature.

3) Color: ** Selected by Architect from manufacturer's standard color selection. **Custom color as selected by Architect.

OR

2.3 FIRE-RATED SYSTEMS:

A. Acceptable products:
   1. One-hour rated walls and floors:
      Pyro-Flex 1000F, with specified cover for floors
      Pyro-Flex 1000W, with specified cover for walls
   2. Two-hour rated walls and floors:
      Pyro-Flex 2000F, with specified covers for floors
      Pyro-Flex 2000W, with specified cover for walls

B. Characteristics:
   1. Prefabricated fire barrier assemblies shall have ratings not less than the rating of adjacent construction when tested in accord with, UL 263, ANSI A2.1, NFPA 251, ASTM E119-95a and ASTM E1399-91 including hose stream test for walls.
   2. System shall be capable of anticipated movement while maintaining fire rating.
   3. Coverless applications shall maintain fire rating without joint cover system.

2.9 STANDARD INTERIOR WALL AND CEILING SYSTEMS:

A. Acceptable products:
   1. FX-K-8-4 Stud Series at wall/wall conditions
   2. FX-K-8-4 Stud Series at gyp. ceiling to gyp. ceiling conditions

THE FOLLOWING ARE FOR USE IN SUSPENDED GRID T-BAR SYSTEMS.

A. Acceptable products: VSG, Series at ** ceiling/ceiling ** and ** ceiling/wall ** conditions.

A. Acceptable products: DX Series at ** ceiling/ceiling ** and ** ceiling/wall ** conditions with dual durometer white filler.

SELECT FILLER COLOR FOR USE WITH CX, KX AND SX SERIES.

B. Characteristics: Extruded aluminum frame with ** grey ** black ** white ** filler.

2.10 SEISMIC FLOOR AND WALL JOINTS:

A. Acceptable floor products:
   1. LASB-NBR-8-4-.5R Series at floor/floor conditions
   2. LASB Series at floor/wall conditions

B. Characteristics:
   1. Base and frame material: Extruded aluminum.
   2. Provide cover with centering bar in floor/floor systems.

2.12 EXTERIOR ALUMINUM AND ELASTOMERIC WALL AND ROOF SYSTEMS:

A. Acceptable products:
   1. VSS-800-1 Series at wall/wall conditions.

B. Characteristics:
   1. Frame material: Extruded aluminum.
   2. Visual seal: ** Elastoprene ** Silicone ** with continuous retainers. ** Black color. ** Custom color as selected by Architect.
   3. Pantograph: Stainless steel, spaced as necessary to comply with wind load conditions.
   4. Weather seal: Continuous elastomeric sheet.

C. Acceptable product:
   1. RWSS Series at roof/wall conditions.

D. Characteristics:
   1. Frame material: Extruded aluminum.
   2. Bellows: ** Elastoprene; ** Silicone; ** black color.

2.17 FABRICATION:

A. Factory fabricates expansion joint components to greatest extent practicable. Manufacturer, based on minimum and maximum size of joints indicated, shall determine size of joint components.

B. Fabricate units in single length without intermediate joints where practicable.

C. Aluminum protection: Treat surfaces in contact with concrete with a factory applied chromate conversion coating for corrosion resistance.

D. Apply protective tape for wall expansion joint covers.

PART 3 - EXECUTION

3.1 SURFACE PREPARATION:

A. Prepare surfaces to receive expansion joint systems in accordance with manufacturer's product data and approved shop drawings.

B. Clean surfaces adjacent to and including joints prior to installation. Repair surfaces as required to provide a smooth, even sound surface. Surfaces shall be free of debris, oils, dust or other deleterious materials.

C. Install blockouts for expansion joint systems in accordance with approved shop drawings and manufacturer's product data. Coordinate installation of blockouts with cast-in-place concrete work.

D. Shim only as approved by manufacturer.

3.2 APPLICATION:

A. Install manufactured expansion control assemblies in accordance with approved shop drawings and manufacturer's product data, except where more stringent requirements are specified herein. Cover and protect expansion joint cover assemblies from construction traffic.

B. Fire-rated systems: Install fire-resistant barriers in conjunction with expansion joint covers to achieve the specified fire rated system in accordance with manufacturer's fire barrier product data or installation instructions.

C. Compression seals:
   1. Apply adhesive to ** armored ** joint blockouts.
   2. Position seal over joint and compress into joint as directed by manufacturer's product data.
   3. Splice, miter and bond seals in accordance with manufacturer's product data as required for installation.
   4. Install seal to align flush with adjacent surfaces when compressed.

D. Aluminum frame/cellular seal system:
   1. Mechanically fasten frames to substrates. Set frames in same sealant as specific for horizontal traffic joints in Sealant and Caulking Section. Top edges of frames shall be flush with adjacent surfaces. Fill blockouts with concrete, flush with top edge of frames and adjacent surfaces.

2. Install adhesive in channel of frames to receive seals. Do not allow adhesive to set.
3. Install neoprene seal in channels of frames. Place cover plate over each edge of seal and screw in place.

E. Aluminum compression seal with frames:
   1. Install adhesive in channel of frames to receive seals. Do not allow adhesive to set.
   2. Install seal in channels of frames.

F. Heavy-duty traffic joints:
   1. Blockouts shall be smooth level and sound. Do not shim heavy-duty traffic joints.
   2. Mechanically fasten each side of frame to blockouts in substrates; top edges of frames shall be flush with adjacent surfaces.
   3. Install expansion plate and bolt frame cover to frames.
   4. Install watertight vinyl gutter system.

G. Interior joints:
   1. Secure joint assembly in place with anchors spaced at maximum of 2'-0" o.c..
   2. Level floor joints to top of joint with flooring material or Architect approved grout.

H. Exterior expansion systems: Mechanically fasten frames to each side of joint and attach interior and exterior seals.

I. Roof joint covers: Attach to curbs and substrates at 2'-0" o.c. maximum.

J. Remove excess and misplaced sealants as work progresses.

K. Remove protective film or coverings from expansion joint covers upon completion of adjacent construction.

END OF SECTION

SECTION 06105

MISCELLANEOUS ROUGH CARPENTRY

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes: Provide miscellaneous wood blocking and plywood, including blocking for roofing system and related flashing.

1. Provide plywood panel boards.
2. Preservative treat wood members as indicated.
3. Provide Epi wood decking at bridge.

B. LEED General: Refer to Section 01350 LEED Special Environmental Requirements and to LEED “Checklist” indicating points Design Team has anticipated relating to specific LEED credits and LEED requirements.

C. Related Sections:

1. Section 05510: Wood stair treads and landings.

1.2 REFERENCES

A. Forest Products Society (FPS): National Design Specification for Stress Grade Lumber and its Fastening.

1.3 SUBMITTALS

A. Product Data: Submit wood treatment certifications and instructions for proper use of each type of treated material.

B. LEED Certification Points: Submit information and certifications necessary to achieve maximum points for LEED certification; coordinate and cooperate with Owner and Architect in providing information necessary for required LEED rating.

C. Wood Product Certification: Furnish certification indicating wood products are from “well-managed” forests.

1.4 QUALITY ASSURANCE

A. Lumber Grades: Provide visible grade stamp of an agency certified by FPS.

B. Lumber Standard: Comply with US Product Standard PS20 for each indicated use, including moisture content and actual sizes related to indicated nominal sizes.

C. Plywood Standard: Comply with PS1 (ANSI A199.1).

D. Certified Wood Products: Wood products to be from forests certified “well-managed” by an agency accredited by Forest Stewardship Council (FSC).

PART 2 - PRODUCTS

2.1 MATERIALS

A. Blocking: Provide dimensional lumber graded in accordance with FPS Grading Rules; Construction Grade, Douglas Fir; minimum S-Dry.

B. Plywood: Provide minimum APA C-D exterior (CDX) plywood; stress rated where spanning between supporting members; fire retardant treated; minimum 3/4" thick unless otherwise indicated.

C. Plywood Panel Boards: Provide panel boards for electrical and communication panel boards; APA C-D plugged, interior type plywood with exterior glue, fire retardant treated; minimum 1/2" thick.

D. Decking at Bridge: Epi, comparable to Architectural Woodwork Standards, First Edition, 2009, Premium Grade, S4S, shop fabricated for bridge decking; provide Premium Grade natural preservative finish that does not discolor wood.

1. Fasteners: Corrosion resistant non-magnetic stainless steel, either recessed or flush with wood surface, type suitable for long term commercial applications.

E. Nails, Spikes and Staples: Galvanized; size and type to suit application.

F. Bolts, Nuts, Washers, Lags, Pins and Screws: Medium carbon steel; galvanized; size and type to suit application.

G. Fasteners: Provide fasteners as required for complete, secure installation of miscellaneous rough carpentry.

1. Solid Masonry or Concrete: Expansion shield and lag bolt type.
2. Steel: Bolts or powder activated type.

H. LEED Recycled Content: Where available provide materials with post-consumer and pre-consumer recycled content to achieve maximum LEED credits.

I. LEED Regionally Manufactured, Extracted, Harvested, or Recovered Materials: Where possible obtain materials that qualify for LEED credits for regional materials obtained within 500 miles of Project.

J. LEED Total Volatile Organic Compounds (TVOC) and Toxic Substances: Provide materials with volatile organic compound emissions and toxic substances such as urea-formaldehyde complying with LEED requirements to reduce indoor air contaminants.

2.2 FABRICATION

A. Wood Preservation: Treat lumber and plywood to comply with applicable requirements of American Wood Preservers Association.

1. Decay Resistance Treatment: Pressure treat following items with water-borne preservatives for above ground use with AWPA C-2.

a. Treat wood members in connection with roofing, flashing, vapor barriers and waterproofing.

b. Treat wood members in contact with masonry, with concrete, and below grade.

c. Kiln-dry wood to a maximum moisture content of 19% after treatment with water-borne preservative.

2. Fire Retardant Treatment: Comply with AWPA standards for pressure impregnation with fire-retardant chemicals to achieve flame-spread rating of not more than 25 in accordance with ASTM E84 or UL Test 723.

a. Treat interior wood and plywood complying with AWPA C20 and C27, Interior Type A, and identify with FRTW.

1) Exterior Type: Where indicated for exterior applications, provide fire treated wood passing ASTM D2898 rain test.

b. Provide UL label on each piece of fire-retardant wood and plywood.

c. Kiln-dry treated items to maximum moisture content of 19%.

3. Complete fabrication of treated items prior to treatment, wherever possible; if cut after treatment, coat cut surfaces with heavy brush coat of same chemical used for treatment.

4. Inspect each piece after drying and discard damaged and defective pieces.

PART 3 - EXECUTION

3.1 PLACEMENT

A. Place miscellaneous rough carpentry true to lines and levels.

B. Correlate location so attached work will comply with design requirements and be properly located.

C. Construct members of continuous pieces of longest possible lengths.

D. Fit carpentry work to other work; scribe and cope as required for accurate fit.

E. Shim with metal or slate for bearing on concrete and masonry.

F. Securely attach carpentry work to substrates by anchoring and fastening as required by recognized standards.

1. Provide washers under bolt heads and nuts in contact with wood.

G. Wood Blocking: Provide blocking of S4S lumber not less than 1-1/2" wide and of thickness required to provide adequate support or to properly locate attached material.

1. Provide attachment to other work; form to shapes shown.
2. Countersink bolts and nuts flush with surfaces.
3. Remove temporary blocking when no longer needed.

4. Anchor to formwork before concrete placement.
5. Build into masonry as work progresses, cutting to fit masonry unit size involved.

H. Plywood: Comply with recommendations of American Plywood Association (APA) for fabrication and installation of plywood work.

I. Wood Decking: Comply with Architectural Woodwork Standards, First Edition, 2009, for Premium Grade installation in configurations indicated.

END OF SECTION

SECTION 07160

CRYSTALLINE WATERPROOFING

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes: Provide crystalline type waterproofing system applied to interior (negative) side of concrete surfaces.

1. Locations: Apply at elevator pits.

B. LEED General: Refer to Section 01350 LEED Special Environmental Requirements and to LEED “Checklist” indicating points Design Team has anticipated relating to specific LEED credits and LEED requirements.

C. Related Sections:

1. Section 07260: Slab-on-grade vapor retarder.
2. Section 09300: Waterproofing integral with tile installations.

1.2 SUBMITTALS

A. Product Data: Submit manufacturer's literature.

B. Certificates: Submit manufacturer's representative's certification work has been installed in accordance with manufacturer's recommendations.

C. LEED Certification Points: Submit information and certifications necessary to achieve maximum points for LEED certification; coordinate and cooperate with Owner and Architect in providing information necessary for required LEED rating.

1.3 QUALITY ASSURANCE

A. Qualification of Installers: Minimum five years successful experience in projects of similar scope.

1.4 SITE CONDITIONS

A. Do not apply waterproofing during inclement weather or when air temperature is below 40 degrees F.

B. Do not apply waterproofing to dirty, dusty, or otherwise unsuitable surfaces.

1.5 WARRANTY

A. Special Warranty: Provide for repairing waterproofing which fails to resist penetration of water, except where failures are result of structural failures of building. Hairline cracking due to temperature or shrinkage is not considered structural failure.

1. Repair waterproofing and pay for or replace any damaged materials or surfaces.
2. Special Warranty Period: Two years.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

A. Xypex/Concentrate, with the "Architectural Finish".

B. Vandex, Inc./Super.

C. Kryton Group of Companies/Krystol T1 and T2.

D. Substitutions: Refer to Section 01630.

2.2 MATERIALS

A. Waterproofing: Crystalline type waterproofing designed to resist water penetration when applied to wall or floor negative side (side away from water pressure).

1. Provide system with integral finish or capable of being painted.

2. Floor applications shall be designed for pedestrian traffic.

3. Finish: Manufacturer's standard, white where available.

B. Accessory Materials: Provide accessory materials as required and recommended by waterproofing manufacturer to assure complete, watertight installation.

C. LEED Recycled Content: Where available provide materials with post-consumer and pre-consumer recycled content to achieve maximum LEED credits.

D. LEED Regionally Manufactured, Extracted, Harvested, or Recovered Materials: Where possible obtain materials that qualify for LEED credits for regional materials obtained within 500 miles of Project.

E. LEED Total Volatile Organic Compounds (TVOC) and Toxic Substances: Provide materials with volatile organic compound emissions and toxic substances such as urea-formaldehyde complying with LEED requirements to reduce indoor air contaminants.

PART 3 - EXECUTION

3.1 PREPARATION

A. Ensure sleeves, curbs, and projections that pass through waterproofing are properly and rigidly installed.

B. Ensure surfaces are free of cracks, depressions, waves or projections which may be detrimental to proper installation of waterproofing.

1. Repair surfaces as required by manufacturer's representative.

C. Seal cracks and expansion joints as recommended.

D. Clean surfaces of dust, dirt and foreign matter detrimental to proper installation of waterproofing.

3.2 INSTALLATION

A. Apply waterproofing in accordance with manufacturer's recommendations and installation instructions for watertight installation.

B. Seal items projecting through waterproofing.

3.3 FIELD QUALITY CONTROL

A. Manufacturer's Field Services: Manufacturer’s representative to inspect work of Project and provide certification waterproofing has been installed in accordance with manufacturer's recommendations.

1. Provide unobstructed access to waterproofing work for inspection.

2. Correct defects and irregularities as advised by manufacturer's representative.

END OF SECTION

SECTION 07170

BENTONITE WATERPROOFING

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes: Provide preformed composite bentonite waterproofing system with accessories as required for complete watertight system at retaining walls and as indicated on Drawings.

B. LEED General: Refer to Section 01350 LEED Special Environmental Requirements and to LEED “Checklist” indicating points Design Team has anticipated relating to specific LEED credits and LEED requirements.

C. Related Work:

1. Section 07160: Crystalline waterproofing at elevator pits and as indicated.
2. Section 09300: Waterproofing integral with tile systems.

1.2 SUBMITTALS

A. Product Data: Submit manufacturer's literature for waterproofing system.

B. Shop Drawings: Indicate flashings, joints, sealing at openings, projections and waterproofing of holes, slots and sleeves.

C. Certificates: Manufacturer's representative's certification work has been installed in accordance with manufacturer's recommendations.

D. Samples: Submit sample of waterproofing panel.

E. LEED Certification Points: Submit information and certifications necessary to achieve maximum points for LEED certification; coordinate and cooperate with Owner and Architect in providing information necessary for required LEED rating.

1.3 QUALITY ASSURANCE

A. Qualification of Installer: Minimum five years successful experience in projects of similar scope.

B. Mock-Up: Install sample 100 sf panel to illustrate intended installation method; after inspection by Architect, backfill against panel and compact backfill to simulate actual site conditions.

C. Pre-Installation Meeting: Convene not less than one week prior to commencing work of this section. Require attendance of parties directly affecting work of this section.

1. Review installation procedures and coordination required with related work.

1.4 DELIVERY, STORAGE, AND HANDLING

A. Store bentonite products in dry area; protect with polyethylene or other waterproof covers.

B. Store materials on platforms raised above surface water or dampness.

1.5 SITE CONDITIONS

A. Do not apply waterproofing during inclement weather.

1.6 WARRANTY

A. Special Warranty: Provide for correcting failure of waterproofing to resist penetration of water, except where failures are result of structural failures of building. Hairline cracking due to temperature or shrinkage is not considered structural failure.

1. Repair waterproofing and pay for or replace damaged materials and surfaces.

2. Special Warranty Period: Two years.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

A. Tremco-Mameco International/Paramount Paraseal Waterproofing Systems.

B. Carlisle Coatings & Waterproofing Inc./CCW Clay Mat System.

C. CETCO/Voltex Waterproofing System.

D. Substitutions: Refer to Section 01630.

2.2 MATERIALS

A. Primary Waterproofing System: Manufacturer's standard sheet membrane as listed in manufacturer's literature for Project applications, with granular bentonite as primary waterproofing component.

1. System: Manufacturer's standard composite material with bentonite formed into flexible sheets with polypropylene, polyethylene, or geotextile fabric.

B. Granular Bentonite: Bentonite clay of 90% montmorillonite, maximum 10% native sediments.

1. Approximate Chemical Analysis: Silica 60%, alumina 20%, iron oxide 5%, magnesia 3%, soda 3% and lime 1%; chemically bound water 6%, minor impurities 2%.

C. Bentonite Accessories: Manufacturer’s standard bentonite based products for penetrations and joints, as recommended by manufacturer for specific applications and conditions.

D. Fasteners: Galvanized nails; types and sizes as recommended by waterproofing system manufacturer.

E. Adhesive: Manufacturer's recommended type.

F. Protective Material: Polyethylene sheet, minimum 6 mil thick.

G. Accessories: Provide tapes, drain strips, waterstops, termination bars, and accessories as recommended by waterproofing system manufacturer and as required for complete, watertight installation.

1. Drainage Composite: Formed plastic with filter fabric designed to allow penetration and drainage of water while retaining silts, soils, and similar particulate matter.

a. Manufacturers:

1) Cobond, Inc./Enkadrain.
2) TC MiraDRI/Miradrain.
3) W.R. Grace/Hydroduct Drainage Composite.
4) Substitutions: Refer to Section 01630.

H. LEED Recycled Content: Where available provide materials with post-consumer and pre-consumer recycled content to achieve maximum LEED credits.

I. LEED Regionally Manufactured, Extracted, Harvested, or Recovered Materials: Where possible obtain materials that qualify for LEED credits for regional materials obtained within 500 miles of Project.

PART 3 - EXECUTION

3.1 PREPARATION

A. Remove fins, projections and form ties; fill holes and penetrations.

B. Repair holes, cracks, honeycombs and voids with bentonite calk, gel or mastic, minimum 1/8" thick, extending minimum 3" beyond defect.

C. Seal construction joints and through-wall projections with joint seal or as otherwise recommended by manufacturer.

3.2 INSTALLATION

A. Install waterproofing system in strict accordance with manufacturer's recommendations and installation instructions as required for watertight installation.

1. Seal penetrations.

2. Apply waterproofing system with masonry nails or adhesive, starting at wall base.

3. Lap adjoining sheets minimum 4" unless otherwise recommended by system manufacturer.

4. Stagger vertical joints on succeeding courses.

5. Seal juncture of wall and footing with waterproofing materials as recommended by system manufacturer; secure to prevent shifting.

B. Construction Control Joints: Apply bentonite calk, packing, mastic, or additional bentonite at construction control joints as recommended by manufacturer for watertight installation.

3.3 FIELD QUALITY CONTROL

A. Field Inspection: Manufacturer's representative shall inspect work of Project on regular basis and provide certification waterproofing has been installed in accordance with manufacturer's recommendations.

1. Provide unobstructed access to waterproofing work.

2. Correct defects and irregularities as advised by manufacturer's representative.

3.4 PROTECTION

A. Protect installed waterproofing from precipitation and ground water in accordance with manufacturer's requirements until backfilling is completed.

B. Protect waterproofing from damage by backfilling and other causes.

C. Replace waterproofing materials damaged by precipitation and other causes before and during backfilling.

END OF SECTION

SECTION 07210

BUILDING INSULATION

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes: Provide insulation and accessories as required for complete installation.

1. Provide thermal batt insulation with integral vapor retarder.
2. Provide thermal board insulation with integral vapor retarder.

B. LEED General: Refer to Section 01350 LEED Special Environmental Requirements and to LEED “Checklist” indicating points Design Team has anticipated relating to specific LEED credits and LEED requirements.

C. Related Work:

1. Section 07815: Sprayed fireproofing.
2. Section 07840: Firestopping.
3. Section 09260: Acoustical insulation concealed in gypsum board systems.

1.2 SUBMITTALS

A. Product Data: Furnish manufacturer's literature for each type of insulation.

1. Submit Underwriter's Laboratory approval numbers for required fire ratings; approvals of other laboratories contingent upon acceptance of applicable authorities.

B. LEED Certification Points: Submit information and certifications necessary to achieve maximum points for LEED certification; coordinate and cooperate with Owner and Architect in providing information necessary for required LEED rating.

PART 2 - PRODUCTS

2.1 MATERIALS

A. Thermal Batt Insulation (Typical): Preformed slag mineral or glass fiber with thermosetting resin binders, conforming to ASTM C665; formaldehyde-free.

1. Manufacturers:

a. USG Interiors, Inc./Thermafiber FS25 Insulation.
b. Johns Manville/FSK-25 Thermal-Shield Insulation.
c. Owens-Corning Fiberglas Corp./Fiberglas FS-25 Insulation.
d. Substitutions: Refer to Section 01630.

2. R-Value: Minimum R-19 at walls, R-30 at horizontal surfaces, unless otherwise indicated.

3. Flame Spread/Smoke Density Rating: Maximum 25/450, ASTM E84.

4. Vapor Retarder: Type III, aluminum vapor retarder on one side.

5. Vapor Retarder Tape: Minimum 2" wide self-adhering type designed to maintain vapor retarder integrity and complying with fire resistance ratings as required by applicable codes.

6. Penetration Type Insulation Supports: Galvanized or electroplated steel penetration supports with adhesive attachment to substrate and support disc.

B. Thermal Board Insulation (At Glass Spandrels at Curtain Wall): Preformed slag mineral or glass fiber with thermosetting resin binders forming rigid board, conforming to ASTM C612; with either black color or black face to glass.

1. Manufacturers:

a. USG Interiors, Inc./Curtain Wall Insulation.
b. Johns Manville/Insul-Shield Insulation.
c. Owens-Corning Fiberglas Corp./Fiberglas 700 Series Insulation.
d. Substitutions: Refer to Section 01630.

2. Thickness: Minimum 2" unless otherwise indicated; fill furring channel space between wall and gypsum board.

3. Flame Spread/Smoke Density Rating: Maximum 25/450, ASTM E84.

4. Vapor Retarder: Type III: Aluminum vapor retarder on one side.

C. Accessories: Furnish as recommended by insulation manufacturer for insulation types, substrates, and conditions involved.

1. Fasteners and Attachment Devices: Comply with insulation and roofing material manufacturer recommendations for attachment of insulation to deck.

2. Fasteners to withstand loads specified for system.

D. LEED Recycled Content: Where available provide materials with post-consumer and pre-consumer recycled content to achieve maximum LEED credits.

E. LEED Regionally Manufactured, Extracted, Harvested, or Recovered Materials: Where possible obtain materials that qualify for LEED credits for regional materials obtained within 500 miles of Project.

F. LEED Total Volatile Organic Compounds (TVOC) and Toxic Substances: Provide materials with volatile organic compound emissions and toxic substances such as urea-formaldehyde complying with LEED requirements to reduce indoor air contaminants.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Verify substrate and adjacent materials are dry and ready to receive insulation; beginning installation signifies acceptance of conditions.

B. Ensure mechanical and electrical items affecting work are properly placed, complete, and have been inspected by Architect prior to commencement of installation.

3.2 INSTALLATION

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

1. Install insulation with integral vapor retarder with vapor retarder toward inside of building.

B. Cut and trim insulation neatly, to fit spaces.

1. Backed Insulation: Use insulation free of ripped backs and edges.

C. Fit insulation tight within spaces and tight to and behind mechanical and electrical services within insulation plane; leave no gaps or voids; maintain integrity of thermal barrier.

D. Friction fit batt insulation in place; use tape or penetration supports as necessary to assure permanent installation.

1. Taping: Tape joints and tears in integral vapor retarder, including joints between insulation and surrounding construction, to ensure vapor-tight installation.

2. Penetration Supports: Cut or bend pins in locations accessible to maintenance personnel, to eliminate potential hazards from exposed pin points.

E. Secure board insulation to glass as recommended by insulation manufacturer for application indicated using methods that do not show through glass.

END OF SECTION

SECTION 07260

SLAB-ON-GRADE VAPOR RETARDER

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes: Provide vapor retarder system for slab-on-grade concrete, including sealing joints and protrusions through vapor retarder and sand bed below vapor retarder.

B. LEED General: Refer to Section 01350 LEED Special Environmental Requirements and to LEED “Checklist” indicating points Design Team has anticipated relating to specific LEED credits and LEED requirements.

1.2 SUBMITTALS

A. Product Data: Submit manufacturer's literature.

B. LEED Certification Points: Submit information and certifications necessary to achieve maximum points for LEED certification; coordinate and cooperate with Owner and Architect in providing information necessary for required LEED rating.

1.3 PROJECT CONDITIONS

A. Do not apply vapor retarder during inclement weather or when air temperature is below 40 degrees F.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

A. W.R. Meadows/Perminator (15 mil).

B. Fortifiber Corp./Ultra 15.

C. Stego Industries, Inc./Stego Wrap (15 mil).

D. Raven Industries, Inc./Vapor Block # VB 15 (15 mil Blue).

E. Substitutions: Refer to Section 01630.

2.2 MATERIALS

A. Vapor Retarder: ASTM E1745, Class A vapor retarder consisting of 15 mil polyolefin film.

1. Permeance: Maximum 0.025 perms, ASTM F1249 and E154 tests.

2. Resistance to Puncture: Minimum 2200 grams, ASTM D1709, Method B.

3. Tear Resistance: Minimum 8.74 lbs., ASTM D1004.

4. Tensile Strength: Minimum 35 lbs/in., ASTM E154, Section 9, Method D-882, in both directions.

B. Joint Sealer: Pressure sensitive tape as recommended by vapor retarder manufacturer and providing comparable permeance to vapor retarder.

C. Sand Bed: Clean natural sand; free from silt, clay, loam, friable or soluble materials, and organic matter.

D. LEED Recycled Content: Where available provide materials with post-consumer and pre-consumer recycled content to achieve maximum LEED credits.

E. LEED Regionally Manufactured, Extracted, Harvested, or Recovered Materials: Where possible obtain materials that qualify for LEED credits for regional materials obtained within 500 miles of Project.

F. LEED Total Volatile Organic Compounds (TVOC) and Toxic Substances: Provide materials with volatile organic compound emissions and toxic substances such as urea-formaldehyde complying with LEED requirements to reduce indoor air contaminants.

PART 3 - EXECUTION

3.1 PREPARATION

A. Ensure sleeves, curbs and projections that pass through vapor retarder are properly and rigidly installed.

B. Ensure substrate is free of projections and irregularities that may be detrimental to proper installation of vapor retarder.

3.2 INSTALLATION

A. Spread and roll sand to provide smooth, even bed for vapor retarder.

B. Apply vapor retarder in accordance with manufacturer's recommendations and installation instructions and in accordance with ASTM E1643; comply with most restrictive where conflicts occur.

1. Seal items projecting through vapor retarder with pressure sensitive tape.

C. Seams: Minimum 6" overlap, sealed with pressure sensitive tape for vapor tight seal.

D. Lay vapor retarder membrane smooth with no fishmouths or bunches of material.

E. Inspect and repair vapor retarder prior to application of concrete slab; tape tears and repair damage.

END OF SECTION

SECTION 07265

BUILDING ENVELOPE UNDERLAYMENT

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes:

1. Portland Cement Plaster (Stucco) Underlayment: Provide Grade D building paper underlayment and flashing for lath and plaster applications, with related concealed metal flashings and accessories as required for complete watertight installation.

2. Flashings and Sheet Metal Underlayment: Provide self-adhering sheet membrane underlayment at flashings and sheet metal, with accessories as required for complete watertight installation.

3. Self-Adhering Sheet Membrane (SASM) Flashing at Penetrations: Provide SASM flashing for around penetrations through building paper including windows and doors, with accessories as required for complete watertight installation.

4. Sheet Membrane at Walls: Limit self-adhering sheet membrane at walls to areas around penetrations through building paper (including doors and window penetrations) and at metal flashings.

   a. Do not apply vapor retardant type self-adhering sheet membranes at areas indicated to receive foil faced insulation; application of vapor retarder on both interior and exterior surface results in vapor lock which is detrimental to building.

B. LEED General: Refer to Section 01350 LEED Special Environmental Requirements and to LEED “Checklist” indicating points Design Team has anticipated relating to specific LEED credits and LEED requirements.

C. Related Sections:

1. Section 07600: Exposed metal flashing.

1.2 SUBMITTALS

A. Product Data: Furnish manufacturer’s literature for each type of underlayment.

B. Shop Drawings: Submit for metal flashings, as related to underlayment.

1. Clearly indicate general construction, configurations, jointing methods and locations, fastening methods and locations and installation details.

C. Samples: Furnish samples of each material.

D. LEED Certification Points: Submit information and certifications necessary to achieve maximum points for LEED certification; coordinate and cooperate with Owner and Architect in providing information necessary for required LEED rating.

1.3 QUALITY ASSURANCE

A. Pre-Installation Meeting: Convene one week prior to commencing work; require attendance of parties directly affecting underlayment.

1. Review procedures and coordination required with related work.

1.4 WARRANTY

A. Special Warranty: Provide for correcting failure of underlayment to resist penetration of water. Repair underlayment and pay for or replace damaged materials or surfaces.

1. Special Warranty Period: Two years.

PART 2 - PRODUCTS

2.1 MATERIALS

A. Portland Cement Plaster Underlayment: Provide Grade D water-vapor permeable kraft building paper conforming with Fed Spec UU-B-790a, Type I, Style 2, Grade D with 60 minute water resistance rather than 10 minutes.

1. Manufacturers:

a. Fortifiber Building Systems Group.
b. Davis Wire.
c. Hal Industries.
d. Substitutions: Refer to Section 01630.

B. Sheet Metal and Flashing Underlayment: Self-adhering rubberized sheet membrane with primers and seam sealers as required for complete watertight installation; type as recommended by manufacturer for substrate and for applications indicated.

1. Manufacturers:

a. Grace Construction Products.
b. Henry Company.
c. Carlisle Corp.
d. Protecto Wrap Company.
e. Substitutions: Refer to Section 01630.

C. Self-Adhering Sheet Membrane (SASM) Flashing at Penetrations: SASM with primers and seam sealers as required for complete watertight installation; type as recommended by manufacturer for substrate and for applications indicated.

1. Manufacturers:

a. Grace Construction Products.

b. Henry Company.
c. Carlisle Corp.
d. Protecto Wrap Company.
e. Substitutions: Refer to Section 01630.

D. Concealed Metal Flashings Integral with Underlayments: Minimum 26 gage thick steel with minimum 0.90 oz/sq.ft. galvanized coating; ASTM A653.

1. Fasteners: Standard round wire type of hot dipped galvanized steel; minimum 19/64" head diameter and 0.104" shank diameter; minimum 7/8" long.

E. Bituminous Paint: Acid and alkali resistant type; black color.

F. Accessories: Provide as recommended by underlayment manufacturers for specific applications.

1. Plastic Cement: Cutback asphaltic type with mineral fiber components, for sealing and coating flashings; free of toxic solvents and free of asbestos. Capable of setting within 24 hours at temperatures of approximately 75 degrees F and 50% R.H.

G. LEED Recycled Content: Where available provide materials with post-consumer and pre-consumer recycled content to achieve maximum LEED credits.

H. LEED Regionally Manufactured, Extracted, Harvested, or Recovered Materials: Where possible obtain materials that qualify for LEED credits for regional materials obtained within 500 miles of Project.

I. LEED Total Volatile Organic Compounds (TVOC) and Toxic Substances: Provide materials with volatile organic compound emissions and toxic substances such as urea-formaldehyde complying with LEED requirements to reduce indoor air contaminants.

J. State Volatile Organic Compound (VOC) Emissions: Provide materials conforming to applicable air quality management district limitations on volatile organic compound (VOC) emissions.

2.2 FLASHING FABRICATION

A. Fabricate metal flashings as recommended by Sheet Metal and Air Conditioning Contractors National Association (SMACNA) "Sheet Metal Manual".

B. Form flashings to drain water to exterior at roofing and siding construction for penetrations, sill and header flashings.

C. Form sections square, true and accurate to size, in maximum possible lengths and free from distortion and other defects detrimental to appearance or performance.

D. Hem exposed edges of metal flashings minimum 1/4" on underside.

E. Apply bituminous paint on concealed surfaces of metal flashings.

PART 3 - EXECUTION

3.1 PREPARATION

A. Install underlayment over surfaces that are dry, free of ridges, warps and voids that could damage paper.

B. Coordinate installation with installation of components and items projecting through underlayment.

3.2 FLASHINGS INSTALLATION

A. Install flashings as recommended by Sheet Metal and Air Conditioning Contractors National Association (SMACNA) "Sheet Metal Manual".

B. Weatherlap joints minimum 2" and seal with plastic cement; secure in place.

C. Fastenings: Concealed in completed installation.

3.3 UNDERLAYMENT INSTALLATION

A. Install underlayment in accordance with recommendations of underlayment manufacturer and of manufacturer's of products to cover underlayment; comply with applicable code requirements.

1. Layers: Weatherlap joints as recommended by system manufacturer, not less than 2” at building paper.

    a. Portland Cement Plaster: Provide two layers building paper underlayment.
    b. Other Areas: Provide one layer self-adhering sheet membrane underlayment.

2. Secure underlayment in place, stagger joints between layers; lap ends minimum 6"; stagger end joints.

3. Apply layer of self-adhering sheet membrane extending minimum 18" from penetrations, including windows and doors; start at bottom of penetration and weatherlap joints; apply top layer over metal flashing to direct water to exterior.

B. Apply plastic cement to substrate prior to application of underlayment starter strips to prevent capillary movement of water back up beneath underlayment.

C. Weatherlap items projecting through underlayment and seal with plastic cement at building paper underlayment, with sealer recommended by sheet membrane underlayment manufacturer at sheet membrane underlayment.

END OF SECTION

SECTION 07 2727
FLUID-APPLIED MEMBRANE AIR BARRIERS, VAPOR PERMEABLE
Grace Perm-A-Barrier® VPO

PART 1 GENERAL

1.01 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 1 Specification Sections, apply to this Section.

1.02 SUMMARY

A. This Section includes the following:

1. Materials and installation methods for fluid-applied, vapor permeable air barrier membrane system located in the non-accessible part of the wall.
2. Materials and installation methods to bridge and seal air leakage pathways in roof and foundation junctions, window and door openings, control and expansion joints, masonry ties, piping and other penetrations through the wall assembly.

B. Related Sections include the following:

1. Section 033000 – Cast-In-Place Concrete
2. Section 042000 – Unit Masonry
3. Section 061643 - Gypsum Sheathing
4. Section 071113 – Bituminous Dampproofing
5. Section 071325 – Self-Adhering Sheet Waterproofing
6. Section 075300 – Elastomeric Membrane Roofing
7. Section 076200 – Sheet Metal Flashing and Trim
8. Section 079200 – Joint Sealants

1.03 DEFINITIONS

A. Air Barrier Assembly: The collection of air barrier materials and auxiliary materials applied to an opaque wall, including joints and junctions to abutting construction, to control air movement through the wall.

1.04 PERFORMANCE REQUIREMENTS

A. General: Air barrier shall be capable of performing as a continuous vapor-permeable air barrier and as a liquid-water drainage plane flashed to discharge to the exterior incidental condensation or water penetration. Air barrier assemblies shall be capable of accommodating substrate movement and of sealing substrate expansion and control joints, construction material changes, and transitions at perimeter conditions without deterioration and air leakage exceeding specified limits.

B. The building envelope shall be designed and constructed with a continuous air barrier to control air leakage into, or out of the conditioned space. An air barrier shall also be provided for interior partitions between conditioned space and space designed to maintain temperature or humidity levels which differ from those in the conditioned space by more than 50% of the difference between the conditioned space and design ambient conditions. The air barrier shall have the following characteristics:

1. It must be continuous, with all joints made airtight.
2. It shall have an air permeability not to exceed 0.004 cfm/sq. ft. under a pressure differential of 0.3 in. water (1.57 psf) (equal to 0.02 L/s. x sq. m. @ 75 Pa), when tested in accordance with ASTM E2178.
3. It shall have an air permeability not to exceed 0.04 cfm/sq. ft. under a pressure differential of 0.3 in. water (1.57 psf) (equal to 0.2 L/s. x sq. m. @ 75 Pa), when tested in accordance with ASTM E2357.
3. It shall be capable of withstanding positive and negative combined design wind, fan and stack pressures on the envelope without damage or displacement, and shall transfer the load to the structure. It shall not displace adjacent materials under full load.

4. It shall be durable or maintainable.
5. The air barrier shall be joined in an airtight and flexible manner to the air barrier material of adjacent systems, allowing for the relative movement of systems due to thermal and moisture variations and creep. Connection shall be made between:
   a. Foundation and walls
   b. Walls and windows or doors
   c. Different wall systems
   d. Wall and roof
   e. Wall and roof over unconditioned space
   f. Walls, floor and roof across construction, control and expansion joints
   g. Walls, floors and roof to utility, pipe and duct penetrations
6. All penetrations of the air barrier and paths of air infiltration/exfiltration shall be made airtight.

1.05 REFERENCES

A. The following standards and publications are applicable to the extent referenced in the text. The most recent version of these standards is implied unless otherwise stated.

B. American Society for Testing and Materials (ASTM)

1. ASTM C1193 Guide for Use of Joint Sealants
2. ASTM D412 Standard Test Methods for Rubber Properties in Tension
3. ASTM D570 Test Method for Water Absorption of Plastics
4. ASTM D903 Standard Test Method for Peel or Stripping Strength of Adhesive Bonds
5. ASTM D1004 Test Method for Initial Tear Resistance of Plastic Film and Sheeting
6. ASTM D1876 Test Method for Peel Resistance of Adhesives
7. ASTM D1938 Test Method for Tear Propagation Resistance of Plastic Film and Sheeting
8. ASTM D1970 Standard Specification for Self-Adhering Polymer Modified Bituminous Sheet Materials Used as Steep Roofing Underlayment for Ice Dam Protection
9. ASTM D4258 Practice for Surface Cleaning Concrete for Coating
10. ASTM D4263 Test Method for Indicating Moisture in Concrete by the Plastic Sheet Method
11. ASTM E96 Test Methods for Water Vapor Transmission of Materials
12. ASTM E154 Test Methods for Water Vapor Retarders Used in Contact with Earth Under Concrete Slabs, on Walls, or as Ground Cover
13. ASTM E1186 Practice for Air Leakage Site Detection in Building Envelopes and Air Retarder Systems
14. ASTM E2178 Standard Test Method for Air Permeance of Building Materials
15. ASTM E2357 Standard Test Method for Determining Air Leakage of Air Barrier Assemblies

1.06 SUBMITTALS

A. Product Data: Include manufacturer's written instructions for evaluating, preparing, and treating substrate; technical data; and tested physical and performance properties of air barrier.

B. Shop Drawings: Show locations and extent of air barrier. Include details for substrate joints and cracks, counterflashing strip, penetrations, inside and outside corners, terminations, and tie-ins with adjoining construction.

1. Include details of interfaces with other materials that form part of air barrier
2. Include details of mockups

C. Samples: Submit representative samples of the following for approval:

1. Fluid-Applied membrane
2. Self-Adhered Transition Membrane
3. Self-Adhered Through Wall Flashing

D. Product Certificates: For air barriers, certifying compatibility of air barrier and accessory materials with Project materials that connect to or that come in contact with the barrier; signed by product manufacturer.

E. Qualification Data: For Applicator.

F. Product Test Reports: Based on evaluation of comprehensive tests performed by a qualified testing agency, for air barriers, submit certified test report showing compliance with requirements specified for ASTM E2178.

G. Warranty: Submit a sample warranty identifying the terms and conditions stated in Article 1.10.

1.07 QUALITY ASSURANCE

A. Manufacturer: Air barrier systems shall be manufactured and marketed by a firm with a minimum of 20 years experience in the production and sales of waterproofing and air barriers. Manufacturers proposed for use, but not named in these specifications shall submit evidence of ability to meet all requirements specified, and include a list of projects of similar design and complexity completed within the past five years.

B. Source Limitations: Obtain primary air-barrier material and through wall flashing through one source from a single manufacturer. Should project require a vapor permeable and a vapor impermeable air barrier on same project, obtain vapor-permeable and vapor impermeable air barrier and through wall flashing from one source from a single manufacturer. See specification Section 07270 for fully-adhered vapor impermeable air barrier.

C. Applicator Qualifications: A firm experienced in applying air barrier materials similar in material, design, and extent to those indicated for this Project, whose work has resulted in applications with a record of successful in-service performance.

D. Mockups: Before beginning installation of air barrier, provide air barrier work for exterior wall assembly mockups, incorporating backup wall construction, external cladding, window, door frame and sill, insulation, and flashing to demonstrate surface preparation, crack and joint treatment, and sealing of gaps, terminations, and penetrations of air barrier membrane.
   1. Coordinate construction of mockup to permit inspection by Owner's testing agency of air barrier before external insulation and cladding is installed
   2. If Architect determines mockups do not comply with requirements, reconstruct mockups and apply air barrier until mockups are approved

E. Pre-Installation Conference: A pre-installation conference shall be held prior to commencement of field operations to establish procedures to maintain optimum working conditions and to coordinate this work with related and adjacent work. Preinstallation conference shall include the Contractor, installer, Architect, and system manufacturer's field representative. Agenda for meeting shall include Review of submittals
   1. Review of surface preparation, minimum curing period and installation procedures
   2. Review of special details and flashings
   3. Sequence of construction, responsibilities and schedule for subsequent operations
   4. Review of mock-up requirements
   5. Review of inspection, testing, protection and repair procedures

1.08 DELIVERY, STORAGE, AND HANDLING

A. Deliver materials and products in labeled packages. Store and handle in strict compliance with manufacturer’s instructions, recommendations and material safety data sheets. Protect from damage from sunlight, weather, excessive temperatures and construction operations. Remove damaged material from the site and dispose of in accordance with applicable regulations.

B. Do not double-stack pallets of fluid applied membrane components on the job site. Provide cover on top and all sides, allowing for adequate ventilation.

C. Protect fluid-applied membrane components from freezing and extreme heat.

D. Sequence deliveries to avoid delays, but minimize on-site storage.

1.09 PROJECT CONDITIONS

A. Environmental Limitations: Apply air barrier within the range of ambient and substrate temperatures recommended by air barrier manufacturer. Protect substrates from environmental conditions that affect performance of air barrier. Do not apply air barrier to a wet substrate or during snow, rain, fog, or mist.

1.10 WARRANTY

A. Material Warranty: Manufacturer's standard form in which manufacturer agrees to replace fluid-applied air barrier membrane materials that fail within specified warranty period when installed and used in strict conformance with written manufacturer's instructions.
   1. Failures include, but are not limited to, the following:
      a. Failure to maintain air permeance rating not to exceed 0.004 cfm/sq. ft. under a pressure differential of 0.3 in. water (1.57 psf) (equal to 0.02 L/s. x sq. m. @ 75 Pa), when tested per ASTM E2178, within specified warranty period.
      b. Failure to maintain a vapor permeance rating greater than 10 perms when tested in accordance with ASTM E96, Method B.
   2. Warranty Period: Five years from date of Substantial Completion

PART 2 PRODUCTS

2.01 FLUID-APPLIED, VAPOR PERMEABLE MEMBRANE AIR BARRIER

A. FLUID-APPLIED AIR BARRIER MEMBRANE: Perm-A-Barrier® VPO, as manufactured by Grace Construction Products, 62 Whittemore Avenue, Cambridge, MA; a fluid-applied, vapor permeable, acrylic membrane that cures to form a resilient, monolithic, fully bonded elastomeric membrane when applied to construction surfaces. The membrane provides superior protection against the damaging effects of air and liquid water ingress on the building structures. Product shall have the following minimum physical properties:
   1. Membrane Air Permeance: ASTM E2178: Not to exceed 0.0004 cfm/sq. ft. under a pressure differential of 0.3 in. water (1.57 psf) (equal to 0.002 L/s. x sq. m. @ 75 Pa)
   2. Assembly Performance: Provide a continuous air barrier assembly that has an air leakage not to exceed 0.0008 cfm/sq. ft. of surface area under a pressure differential of 0.3 in. water (1.57 psf) (equal to 0.004 L/s. x sq. m. of surface area at 75 Pa) when tested in accordance with ASTM E2357.
   3. Membrane Vapor Permeance: ASTM E96, Method B: 11.2 perms
   4. Peel Adhesion: ASTM D903: min. 5 pli or substrate failure to glass faced wall board, min. 20 pli to concrete/CMU
   5. UV Exposure Limit: Not more than 180 calendar days

B. TRANSITION MEMBRANE: Perm-A-Barrier Detail Membrane manufactured by Grace Construction Product; a 0.9 mm (36 mils) of self-adhesive rubberized asphalt integrally bonded to 0.1 mm (4 mil) of cross-laminated, high-density polyethylene film to provide a min. 1.0 mm (40 mil) thick membrane. Membrane shall be interleaved with disposable silicone-coated release paper until installed, conforming with the following:
   1. Water Vapor Transmission: ASTM E96, Method B: 0.05 perms (2.9 ng/Pa s. sq. m.) max.
   2. Air Permeance at 75 Pa (0.3 in. water) pressure difference: 0.0006 L/s. sq. m (0.00012 cfm/ sq. ft.) max.
   3. Puncture Resistance: ASTM E154: 178 N (40 lbs.) min.
   4. Lap Adhesion at -4ºC (25ºF): ASTM D1876: 880 N/m (5.0 lbs./in.) of width
   5. Low Temperature Flexibility: ASTM D1970: Unaffected to -43ºC (-45ºF)
   6. Tensile Strength: ASTM D412, Die C Modified: min. 2.7 MPa (400 psi)

7. Elongation, Ultimate Failure of Rubberized Asphalt: ASTM D412, Die C: min. 200%

C. TRANSITION ALUMINUM MEMBRANE: Perm-A-Barrier Aluminum flashing manufactured by Grace Construction Products; a 0.9 mm (35 mils) of self-adhesive rubberized asphalt integrally bonded to 0.1 mm (5 mil) of aluminum film to provide a min. 1.0 mm (40 mil) thick membrane. Membrane shall be interleaved with disposable silicone-coated release paper until installed, conforming with the following:
   1. Water Absorption: ASTM D570: max 0.1% by weight
   2. Puncture Resistance: ASTM E154: 355N (80 lbs) min.
   3. Lap Adhesion at -4ºC (25ºF): ASTM D1876 Modified: 880 N/m (5.0 lbs./in.) of width
   4. Low Temperature Flexibility: ASTM D1970 Modified: Unaffected to -26ºC (-15ºF)
   5. Tensile Strength: ASTM D412, Die C Modified: min. 4.1 MPa (600 Psi)
   6. Elongation, Ultimate Failure of Rubberized Asphalt: ASTM D412, Die C Modified: min. 200%

D. FLEXIBLE MEMBRANE WALL FLASHING: Perm-A-Barrier Wall Flashing manufactured by Grace Construction Products; a 0.8 mm (32 mils) of self-adhesive rubberized asphalt integrally bonded to 0.2 mm (8 mil) of cross-laminated, high-density polyethylene film to provide a min. 1.0 mm (40 mil) thick membrane. Membrane shall be interleaved with disposable silicone-coated release paper until installed, conforming with the following:
   1. Water Vapor Transmission: ASTM E96, Method B: 0.05 perms (2.9 ng/ Pa s. sq. m.) max.
   2. Water Absorption: ASTM D570: max. 0.1% by weight
   3. Puncture Resistance: ASTM E154: 356 N (80 lbs.) min.
   4. Tear Resistance
      a. Initiation ASTM D1004: min. 58 N (13.0 lbs.) M.D.
      b. Propagation ASTM D1938: min. 40 N (9.0 lbs.) M.D.
   5. Lap Adhesion at -4ºC (25ºF): ASTM D1876: 880 N/m (5.0 lbs./in.) of width
   6. Low Temperature Flexibility: ASTM D1970: Unaffected to -43ºC (-45ºF)
   7. Tensile Strength: ASTM D412, Die C Modified: min. 5.5 MPa (800 psi)
   8. Elongation, Ultimate Failure of Rubberized Asphalt: ASTM D412, Die C: min. 200%

[Spec. Note: Perm-A-Barrier Aluminum Flashing is not to be used when materials that could cause corrosion of aluminum, such as stucco, are to be in direct contact with the aluminum facing of the Perm-A-Barrier Aluminum Flashing]

2.02 PRIMERS

A. Wall Primer for Self-adhered transition membrane and Self-adhered flexible membrane wall flashing: Perm-A- Barrier WB Primer manufactured by Grace Construction Products; a water-based primer which imparts an aggressive, high tack finish on the treated substrate.
   1. Flash Point: No flash to boiling point
   2. VOC Content: Not to exceed 10 g/L
   3. Application Temperature: -4°C (25°F) and above
   4. Freezing point (as packaged): -7°C (21°F)

B. Primer for Primary Self-adhered air barrier membrane: Perm-A-Barrier Primer Plus manufactured by Grace Construction Products; a water-based primer which imparts an aggressive, high tack finish on the treated substrate. Product shall have the following minimum physical properties:
   1. Color: Milky White (wet), Clear (dry)
   2. Weight: 8.25 lbs./gal.
   3. Solids Content (by wt.): 53-57%
   4. Solvent Type: Water
   3. VOC Content: Not to excess 1 g/L
   4. Application Temperature: 4°C (40°F) and above

2.03 PENETRATIONS & TERMINATION SEALANT

A. Liquid Membrane for Details and Terminations: Bituthene Liquid Membrane manufactured by Grace Construction Products; a two-part, elastomeric, trowel grade material designed for use with fluid-applied membranes, self-adhered membranes and tapes. 10 g/L max. VOC content.
B. Substrate Patching Membrane: Bituthene Liquid Membrane manufactured by Grace Construction Products; a two- part, elastomeric, trowel grade material designed for use with fluid-applied membraces, self-adhered membranes and tapes. 10 g/L max. VOC content.
C. Joint Sealant: Refer to sealant manufacturer's recommendations.

PART 3 EXECUTION

3.01 EXAMINATION

A. Verify that substrates and conditions are ready to accept the Work of this section. Notify [engineer] [architect] [consultant] in writing of any discrepancies. Commencement of the Work or any parts thereof shall mean acceptance of the prepared substrates.
B. All surfaces must be sound, dry, clean and free of oil, grease, dirt, excess mortar or other contaminants detrimental to the adhesion of the membranes. Fill voids, gaps and spalled areas in substrate to provide an even plane. Strike masonry joints full-flush.
Curing compounds or release agents used in concrete construction must be resin based without oil, wax or pigments.

3.02 SURFACE PREPARATION

A. Refer to manufacturer's literature for requirements for preparation of substrates. Surfaces shall be sound and free of voids, spalled areas, loose aggregate and sharp protrusions. Remove contaminants such as grease, oil and wax from exposed surfaces. Remove dust, dirt, loose stone and debris. Use repair materials and methods that are acceptable to manufacturer of the fluid-applied air barrier assembly.
B. Exterior sheathing panels: Ensure that the boards are sufficiently stabilized with corners and edges fastened with appropriate screws. Pre-treat all board joints with 50 – 75 mm (2-3 in.) wide, manufacturer's recommended mesh-style wallboard tape. Gaps greater than 6 mm (1/4 in.) should be filled with mastic or caulk, allowing sufficient time to fully cure before application of the mesh-style wallboard tape and fluid applied air barrier system.
C. Masonry Substrates: Apply air and vapor barrier over concrete block and brick with smooth trowel-cut mortar joints, struck full and flush. Fill all voids and holes, particularly in the mortar joints, with a lean mortar mix, non-shrinking grout or parge coat.
D. Related Materials: Treat construction joints and install flashing as recommended by manufacturer.
E. Clean, prepare, treat, and seal substrate according to manufacturer's written instructions. Provide clean, dust-free, and dry substrate for air barrier application.
F. Mask off adjoining surfaces not covered by air barrier to prevent spillage and overspray affecting other construction.
G. Remove grease, oil, bitumen, form-release agents, paints, curing compounds, and other penetrating contaminants or film-forming coatings from concrete.
H. Remove fins, ridges, mortar, and other projections and fill honeycomb, aggregate pockets, holes, and other voids in concrete with substrate patching membrane.
I. Remove excess mortar from masonry ties, shelf angles, and other obstructions.
J. At changes in substrate plane, apply sealant or Bituthene Liquid Membrane at sharp corners and edges to form a smooth transition from one plane to another.
K. Cover gaps in substrate plane and form a smooth transition from one substrate plane to another with stainless-steel sheet mechanically fastened to structural framing to provide continuous support for air barrier.

3.03 JOINT TREATMENT

A. Concrete and Masonry: Prepare, treat, rout, and fill joints and cracks in substrate according to ASTM C1193 and air barrier manufacturer's written instructions. Remove dust and dirt from joints and cracks complying with ASTM D4258 before coating surfaces.

1. Prime substrate as required.

B. Gypsum Sheathing: Fill joints greater than 1/4 inch (6 mm) with sealant according to ASTM C1193 and with air barrier manufacturer's written instructions. Apply mesh-style wallboard tape to joint prior to installing fluid air barrier membrane.

3.04 AIR BARRIER MEMBRANE INSTALLATION

A. Apply air barrier membrane to achieve a continuous air barrier according to air barrier manufacturer's written instructions.
B. Apply air barrier membrane within manufacturer's recommended application temperature ranges.
C. Apply a continuous unbroken air barrier to substrates according to the following minimum thickness. Apply membrane in full contact around protrusions such as masonry ties.
    1. Vapor-Permeable Membrane Air Barrier: 90-mil (2.4-mm) wet film thickness, 42~45-mil (1.2-mm) dry film thickness.
D. Do not cover air barrier until it has been tested and inspected by Owner's testing agency.
E. Correct deficiencies in or remove air barrier that does not comply with requirements; repair substrates and reapply air barrier components.

3.05 TRANSITION MEMBRANE INSTALLATION

A. Install strips, transition membrane, and auxiliary materials according to air barrier manufacturer's written instructions to form a seal with adjacent construction and maintain a continuous air barrier.
B. Apply primer to substrates to receive transition membrane at required rate and allow to dry. Limit priming to areas that will be covered by transition tape in same day. Re-prime areas exposed for more than 24 hours.
    1. Prime glass-fiber-surfaced gypsum sheathing not covered with air membrane material with number of prime coats needed to achieve required bond, with adequate drying time between coats.
C. Connect and seal exterior wall air barrier membrane continuously to roofing membrane air barrier, concrete below-grade structures, floor-to floor construction, exterior glazing and window systems, glazed curtain-wall systems, storefront systems, exterior louvers, exterior door framing, and other construction used in exterior wall openings, using accessory materials.
D. At end of each working day, seal top edge of strips and transition membrane to substrate with termination sealant.
E. Apply joint sealants forming part of air barrier assembly within sealant manufacturer's recommended application temperature ranges. Consult sealant manufacturer when sealant cannot be applied within these temperature ranges.
F. Wall Openings: Prime concealed perimeter frame surfaces of windows, curtain walls, storefronts, and doors. Apply transition membrane so that a minimum of 3 inches (75 mm) of coverage is achieved over both substrates.
    1. Transition Membrane: Roll firmly to enhance adhesion.
G. Fill gaps in perimeter frame surfaces of windows, curtain walls, storefronts, and doors, and miscellaneous penetrations of air barrier membrane with foam sealant.
H. Repair punctures, voids, and deficient lapped seams in strips and transition membrane. Slit and flatten fish-mouths and blisters. Patch with transition membrane extending 6 inches (150 mm) beyond repaired areas in strip direction.

3.06 FIELD QUALITY CONTROL

A. Testing Agency: Owner may engage a qualified testing agency to perform tests and inspections and prepare test reports.
B. Inspections: Air barrier materials and installation are subject to inspection for compliance with requirements. Inspections may include the following:
    1. Continuity of air barrier system has been achieved throughout the building envelope with no gaps or holes

2. Continuous structural support of air barrier system has been provided
3. Masonry and concrete surfaces are smooth, clean and free of cavities, protrusions, and mortar droppings
4. Site conditions for application temperature and dryness of substrates have been maintained
5. Maximum exposure time of materials to UV deterioration has not been exceeded
6. Surfaces have been primed, if applicable
7. Laps in strips and transition membrane have complied with minimum requirements and have been shingled in the correct direction (or mastic has been applied on exposed edges), with no fish-mouths
8. Termination sealant has been applied on cut edges
9. Strips and transition membrane have been firmly adhered to substrate
10. Compatible materials have been used
11. Transitions at changes in direction and structural support at gaps have been provided.
12. Connections between assemblies (membrane and sealants) have complied with requirements for cleanliness, preparation and priming of surfaces, structural support, integrity, and continuity of seal
13. All penetrations have been sealed

C. Tests: Testing to be performed will be determined by Owner's testing agency from among the following tests:
    1. Qualitative Testing: Air barrier assemblies will be tested for evidence of air leakage according to ASTM E1186.
D. Remove and replace deficient air barrier components and retest as specified above.

3.07 CLEANING AND PROTECTION

A. Protect air barrier system from damage during application and remainder of construction period, according to manufacturer's written instructions.
B. Protect air barrier from exposure to UV light and harmful weather exposure as required by manufacturer. Remove and replace main air barrier material exposed for more than 180 days.
C. Clean spills, stains, and soiling from construction that would be exposed in the completed work using cleaning agents and procedures recommended by manufacturer of affected construction.
D. Remove masking materials after installation.

END OF SECTION 07 2727

SECTION 074213 –
METAL COMPOSITE MATERIAL WALL PANELS

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. Metal composite material wall panels at roof at entry.
B. Related Sections:
   1. Section 074214 "Formed Metal Wall Panels" for concealed-fastener metal wall panels.

1.3 PREINSTALLATION MEETINGS

A. Preinstallation Conference: Conduct conference at Project site.

1.4 ACTION SUBMITTALS

A. Product Data: For each type of product.
   1. Include construction details, material descriptions, dimensions of individual components and profiles, and finishes for each type of panel and accessory.
B. Shop Drawings:
   1. Include fabrication and installation layouts of metal composite material panels; details of edge conditions, joints, panel profiles, corners, anchorages, attachment assembly, trim, flashings, closures, and accessories; and special details.
   2. Accessories: Include details of the flashing, trim and anchorage, at a scale of not less than 1-1/2 inches per 12 inches.
C. Samples for Initial Selection: For each type of metal composite material panel indicated with factory-applied color finishes.
   1. Include similar Samples of trim and accessories involving color selection.
D. Samples for Verification: For each type of exposed finish required, prepared on Samples of size indicated below.
   1. Metal Composite Material Panels: 12 inches long by actual panel width. Include fasteners, closures, and other metal composite material panel accessories.

1.5 INFORMATIONAL SUBMITTALS

A. Qualification Data: For Installer.
B. Product Test Reports: For each product, tests performed by a qualified testing agency.
C. Sample Warranties: For special warranties.

1.6 CLOSEOUT SUBMITTALS

A. Maintenance Data: For metal composite material panels to include in maintenance manuals.

1.7 QUALITY ASSURANCE

A. Installer Qualifications: An entity that employs installers and supervisors who are trained and approved by manufacturer.

1.8 DELIVERY, STORAGE, AND HANDLING

A. Deliver components, metal composite material panels, and other manufactured items so as not to be damaged or deformed. Package metal composite material panels for protection during transportation and handling.
B. Unload, store, and erect metal composite material panels in a manner to prevent bending, warping, twisting, and surface damage.
C. Stack metal composite material panels horizontally on platforms or pallets, covered with suitable weathertight and ventilated covering. Store metal composite material panels to ensure dryness, with positive slope for drainage of water. Do not store metal composite material panels in contact with other

materials that might cause staining, denting, or other surface damage.

D. Retain strippable protective covering on metal composite material panels during installation.

1.9 FIELD CONDITIONS

A. Weather Limitations: Proceed with installation only when existing and forecasted weather conditions permit assembly of metal composite material panels to be performed according to manufacturers' written instructions and warranty requirements.

1.10 COORDINATION

A. Coordinate metal composite material panel installation with rain drainage work, flashing, trim, construction of soffits, and other adjoining work to provide a leakproof, secure, and noncorrosive installation.

1.11 WARRANTY

A. Special Warranty: Manufacturer's standard form in which manufacturer agrees to repair or replace components of metal composite material panel systems that fail in materials or workmanship within specified warranty period.
   1. Failures include, but are not limited to, the following:
      a. Structural failures including rupturing, cracking, or puncturing.
      b. Deterioration of metals and other materials beyond normal weathering.
   2. Warranty Period: Two years from date of Substantial Completion.

B. Special Warranty on Panel Finishes: Manufacturer's standard form in which manufacturer agrees to repair finish or replace metal composite material panels that show evidence of deterioration of factory-applied finishes within specified warranty period.
   1. Exposed Panel Finish: Deterioration includes, but is not limited to, the following:
      a. Color fading more than 5 Hunter units when tested according to ASTM D 2244.
      b. Chalking in excess of a No. 8 rating when tested according to ASTM D 4214.
      c. Cracking, checking, peeling, or failure of paint to adhere to bare metal.
   2. Finish Warranty Period: 20 years from date of Substantial Completion.

PART 2 - PRODUCTS

2.1 PERFORMANCE REQUIREMENTS

A. Structural Performance: Provide metal composite material panel systems capable of withstanding the effects of the following loads, based on testing according to ASTM E 330:
   1. Wind Loads: As indicated on Drawings.
   2. Other Design Loads: As indicated on Drawings.
   3. Deflection Limits: For wind loads, no greater than 1/240 of the span.

B. Thermal Movements: Allow for thermal movements from ambient and surface temperature changes by preventing buckling, opening of joints, overstressing of components, failure of joint sealants, failure of connections, and other detrimental effects. Base calculations on surface temperatures of materials due to both solar heat gain and nighttime-sky heat loss.
   1. Temperature Change (Range): 120 deg F, ambient; 180 deg F, material surfaces.

2.2 METAL COMPOSITE MATERIAL WALL PANELS

A. Metal Composite Material Wall Panel Systems: Provide factory-formed and -assembled, metal composite material wall panels fabricated from two metal facings that are bonded to a solid, extruded thermoplastic core; formed into profile for installation method indicated. Include attachment assembly components, panel stiffeners, and accessories required for weathertight system.
   1. Basis-of-Design Product: Subject to compliance with requirements, provide Alucobond as manufactured by 3A Composites USA, Inc or comparable product by one of the following:
      a. Alcoa Inc.
      b. CENTRIA Architectural Systems.
      c. Citadel Architectural Products, Inc.
      d. Firestone Metal Products, LLC.
      e. Protean Construction Products, Inc.

B. Aluminum-Faced Composite Wall Panels: Formed with 0.020-inch- thick, coil-coated aluminum sheet facings.
   1. Panel Thickness: 4mm.
   2. Core: Standard.
   3. Exterior Finish: Three-coat fluoropolymer.
      a. Color: As selected by Architect from manufacturer's full range.
C. Attachment Assembly Components: Formed from extruded aluminum.
D. Attachment Assembly: Manufacturer's standard.

2.3 MISCELLANEOUS MATERIALS

A. Miscellaneous Metal Subframing and Furring: ASTM C 645, cold-formed, metallic-coated steel sheet ASTM A 653/A 653M, G90 coating designation or ASTM A 792/A 792M, Class AZ50 aluminum-zinc-alloy coating designation unless otherwise indicated. Provide manufacturer's standard sections as required for support and alignment of metal composite material panel system.
B. Panel Accessories: Provide components required for a complete, weathertight panel system including trim, copings, fasciae, mullions, sills, corner units, clips, flashings, sealants, gaskets, fillers, closure strips, and similar items. Match material and finish of metal composite material panels unless otherwise indicated.
C. Flashing and Trim: Provide flashing and trim formed from same material as metal composite material panels as required to seal against weather and to provide finished appearance. Locations include, but are not limited to, bases, drips, sills, jambs, corners, endwalls, framed openings, fasciae, soffits, reveals, and fillers. Finish flashing and trim with same finish system as adjacent metal composite material panels.
D. Panel Fasteners: Self-tapping screws designed to withstand design loads. Provide exposed fasteners with heads matching color of metal composite material panels by means of plastic caps or factory-applied coating. Provide EPDM or PVC sealing washers for exposed fasteners.
E. Panel Sealants: Joint Sealant Type 1 as indicated in Section 079200 Joint Sealants.

2.4 FABRICATION

A. General: Fabricate and finish metal composite material panels and accessories at the factory, by manufacturer's standard procedures and processes, as necessary to fulfill indicated performance requirements demonstrated by laboratory testing. Comply with indicated profiles and with dimensional and structural requirements.
B. Fabricate metal composite material panel joints with factory-installed captive gaskets or separator strips that provide a weathertight seal and prevent metal-to-metal contact, and that minimize noise from movements.
C. Sheet Metal Flashing and Trim: Fabricate flashing and trim to comply with manufacturer's recommendations and recommendations in SMACNA's "Architectural Sheet Metal Manual" that apply to design, dimensions, metal, and other characteristics of item indicated.
   1. Form exposed sheet metal accessories that are without excessive oil canning, buckling, and tool marks and that are true to line and levels indicated, with exposed edges folded back to form hems.
   2. Seams for Aluminum: Fabricate nonmoving seams with flat-lock seams. Form seams and seal with epoxy seam sealer. Rivet joints for additional strength.
   3. Seams for Other Than Aluminum: Fabricate nonmoving seams in accessories with flat-lock seams. Tin edges to be seamed, form seams, and solder.
   4. Sealed Joints: Form non-expansion, but movable, joints in metal to accommodate sealant and to comply with SMACNA standards.
   5. Conceal fasteners and expansion provisions where possible. Exposed fasteners are not allowed on faces of accessories exposed to view.
   6. Fabricate cleats and attachment devices from same material as accessory being anchored or from compatible, noncorrosive metal recommended in writing by metal panel manufacturer.
      a. Size: As recommended by SMACNA's "Architectural Sheet Metal Manual" or metal wall panel manufacturer for application but not less than thickness of metal being secured.

2.5 FINISHES

A. Protect mechanical and painted finishes on exposed surfaces from damage by applying a strippable, temporary protective covering before shipping.

B. Appearance of Finished Work: Variations in appearance of abutting or adjacent pieces are acceptable if they are within one-half of the range of approved Samples. Noticeable variations in same piece are not acceptable. Variations in appearance of other components are acceptable if they are within the range of approved Samples and are assembled or installed to minimize contrast.

C. Aluminum Panels and Accessories:

1. Three-Coat Fluoropolymer: AAMA 620. Fluoropolymer finish containing not less than 70 percent PVDF resin by weight in both color coat and clear topcoat. Prepare, pretreat, and apply coating to exposed metal surfaces to comply with coating and resin manufacturers' written instructions.

PART 3 - EXECUTION

3.1 EXAMINATION

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

1. Examine wall sheathing to verify that sheathing joints are supported by framing or blocking and that installation is within flatness tolerances required by metal composite material wall panel manufacturer.

a. Verify that air- or water-resistive barriers have been installed over sheathing or backing substrate to prevent air infiltration or water penetration.

B. Examine roughing-in for components and assemblies penetrating metal composite material panels to verify actual locations of penetrations relative to seam locations of metal composite material panels before installation.

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

3.2 PREPARATION

A. Miscellaneous Supports: Install subframing, furring, and other miscellaneous panel support members and anchorages according to ASTM C 754 and metal composite material panel manufacturer's written recommendations.

3.3 METAL COMPOSITE MATERIAL PANEL INSTALLATION

A. General: Install metal composite material panels according to manufacturer's written instructions in orientation, sizes, and locations indicated on Drawings. Install panels perpendicular to supports unless otherwise indicated. Anchor metal composite material panels and other components of the Work securely in place, with provisions for thermal and structural movement.

1. Shim or otherwise plumb substrates receiving metal composite material panels.
2. Flash and seal metal composite material panels at perimeter of all openings. Fasten with self-tapping screws. Do not begin installation until air- or water-resistive barriers and flashings that will be concealed by metal composite material panels are installed.
3. Install screw fasteners in predrilled holes.
4. Locate and space fastenings in uniform vertical and horizontal alignment.
5. Install flashing and trim as metal composite material panel work proceeds.
6. Locate panel splices over, but not attached to, structural supports. Stagger panel splices and end laps to avoid a four-panel lap splice condition.
7. Align bottoms of metal composite material panels and fasten with blind rivets, bolts, or self-tapping screws. Fasten flashings and trim around openings and similar elements with self-tapping screws.
8. Provide weathertight escutcheons for pipe- and conduit-penetrating panels.

B. Fasteners:

1. Aluminum Panels: Use aluminum or stainless-steel fasteners for surfaces exposed to the exterior; use aluminum or galvanized-steel fasteners for surfaces exposed to the interior.

C. Metal Protection: Where dissimilar metals contact each other or corrosive substrates, protect against

galvanic action as recommended in writing by metal composite material panel manufacturer.

D. Attachment Assembly, General: Install attachment assembly required to support metal composite material wall panels and to provide a complete weathertight wall system, including subgirts, perimeter extrusions, tracks, drainage channels, panel clips, and anchor channels.
   1. Include attachment to supports, panel-to-panel joinery, panel-to-dissimilar-material joinery, and panel-system joint seals.

E. Installation: Attach metal composite material wall panels to supports at locations, spacings, and with fasteners recommended by manufacturer to achieve performance requirements specified.
   1. Wet Seal Systems: Seal horizontal and vertical joints between adjacent metal composite material wall panels with sealant backing and sealant. Install sealant backing and sealant according to requirements specified in Section 079200 "Joint Sealants."

F. Clip Installation: Attach panel clips to supports at locations, spacings, and with fasteners recommended by manufacturer. Attach routed-and-returned flanges of wall panels to panel clips with manufacturer's standard fasteners.
   1. Seal horizontal and vertical joints between adjacent panels with sealant backing and sealant. Install sealant backing and sealant according to requirements specified in Section 079200 "Joint Sealants."
   2. Seal horizontal and vertical joints between adjacent metal composite material wall panels with manufacturer's standard gaskets.

G. Accessory Installation: Install accessories with positive anchorage to building and weathertight mounting, and provide for thermal expansion. Coordinate installation with flashings and other components.
   1. Install components required for a complete metal composite material panel assembly including trim, copings, corners, seam covers, flashings, sealants, gaskets, fillers, closure strips, and similar items. Provide types indicated by metal composite material panel manufacturer; or, if not indicated, provide types recommended in writing by metal composite material panel manufacturer.

H. Flashing and Trim: Comply with performance requirements, manufacturer's written installation instructions, and SMACNA's "Architectural Sheet Metal Manual." Provide concealed fasteners where possible, and set units true to line and level as indicated. Install work with laps, joints, and seams that are permanently watertight.
   1. Install exposed flashing and trim that is without buckling and tool marks and that is true to line and levels indicated, with exposed edges folded back to form hems. Install sheet metal flashing and trim to fit substrates and to result in waterproof performance.
   2. Expansion Provisions: Provide for thermal expansion of exposed flashing and trim. Space movement joints at a maximum of 10 feet with no joints allowed within 24 inches of corner or intersection. Where lapped expansion provisions cannot be used or would not be sufficiently waterproof, form expansion joints of intermeshing hooked flanges, not less than 1 inch deep, filled with mastic sealant (concealed within joints).

3.4 ERECTION TOLERANCES

A. Installation Tolerances: Shim and align metal composite material wall panel units within installed tolerance of 1/4 inch in 20 feet, non-accumulative, on level, plumb, and location lines as indicated, and within 1/8-inch offset of adjoining faces and of alignment of matching profiles.

3.5 CLEANING AND PROTECTION

A. Remove temporary protective coverings and strippable films, if any, as metal composite material panels are installed, unless otherwise indicated in manufacturer's written installation instructions. On completion of metal composite material panel installation, clean finished surfaces as recommended by metal composite material panel manufacturer. Maintain in a clean condition during construction.

B. After metal composite material panel installation, clear weep holes and drainage channels of obstructions, dirt, and sealant.

C. Replace metal composite material panels that have been damaged or have deteriorated beyond successful repair by finish touchup or similar minor repair procedures.

END OF SECTION 074213

SECTION 07422 - FORMED METAL WALL

PANELS 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. Concealed-fastener, lap-seam metal wall panels.

B. Related Sections:
   1. Section 074213 "Metal Composite Material Wall Panels" for metal-faced composite wall panels.

1.3 PREINSTALLATION MEETINGS

A. Preinstallation Conference: Conduct conference at Project site.
   1. Meet with Owner, Architect, Owner's insurer if applicable, metal panel Installer, metal panel manufacturer's representative, structural-support Installer, and installers whose work interfaces with or affects metal panels, including installers of doors, windows, and louvers.
   2. Review and finalize construction schedule and verify availability of materials, Installer's personnel, equipment, and facilities needed to make progress and avoid delays.
   3. Review methods and procedures related to metal panel installation, including manufacturer's written instructions.
   4. Examine support conditions for compliance with requirements, including alignment between and attachment to structural members.
   5. Review flashings, special siding details, wall penetrations, openings, and condition of other construction that affect metal panels.
   6. Review governing regulations and requirements for insurance, certificates, and tests and inspections if applicable.
   7. Review temporary protection requirements for metal panel assembly during and after installation.
   8. Review of procedures for repair of metal panels damaged after installation.
   9. Document proceedings, including corrective measures and actions required, and furnish copy of record to each participant.

1.4 ACTION SUBMITTALS

A. Product Data: For each type of product.
   1. Include construction details, material descriptions, dimensions of individual components and profiles, and finishes for each type of panel and accessory.

B. LEED Submittals:
   1. Product Data for Credit MR 4: For products having recycled content, documentation indicating percentages by weight of postconsumer and preconsumer recycled content. Include statement indicating cost for each product having recycled content.

C. Shop Drawings:
   1. Include fabrication and installation layouts of metal panels; details of edge conditions, joints, panel profiles, corners, anchorages, attachment system, trim,

flashings, closures, and accessories; and special details.

2. Accessories: Include details of the flashing, trim, and anchorage systems, at a scale of not less than 1-1/2 inches per 12 inches.

D. Samples for Initial Selection: For each type of metal panel indicated with factory-applied finishes.

1. Include Samples of trim and accessories involving color selection.

E. Samples for Verification: For each type of exposed finish, prepared on Samples of size indicated below:

1. Metal Panels: 12 inches long by actual panel width. Include fasteners, closures, and other metal panel accessories.

1.5 INFORMATIONAL SUBMITTALS

A. Qualification Data: For Installer.
B. Product Test Reports: For each product, for tests performed by a qualified testing agency.
C. Field quality-control reports.
D. Sample Warranties: For special warranties.

1.6 CLOSEOUT SUBMITTALS

A. Maintenance Data: For metal panels to include in maintenance manuals.

1.7 QUALITY ASSURANCE

A. Installer Qualifications: An entity that employs installers and supervisors who are trained and approved by manufacturer.

B. UL-Certified, Portable Roll-Forming Equipment: UL-certified, portable roll-forming equipment capable of producing metal panels warranted by manufacturer to be the same as factory-formed products. Maintain UL certification of portable roll-forming equipment for duration of work.

C. Mockups: Build mockups to verify selections made under Sample submittals and to demonstrate aesthetic effects and set quality standards for fabrication and installation.

1. Build mockup of typical metal panel assembly as shown on Drawings, including corner, supports, attachments, and accessories.
2. Water-Spray Test: Conduct water-spray test of metal panel assembly mockup, testing for water penetration according to AAMA 501.2.
3. Approval of mockups does not constitute approval of deviations from the Contract Documents contained in mockups unless Architect specifically approves such deviations in writing.
4. Subject to compliance with requirements, approved mockups may become part of the completed Work if undisturbed at time of Substantial Completion.

1.8 DELIVERY, STORAGE, AND HANDLING

A. Deliver components, metal panels, and other manufactured items so as not to be damaged or deformed. Package metal panels for protection during transportation and handling.

B. Unload, store, and erect metal panels in a manner to prevent bending, warping, twisting, and surface damage.

C. Stack metal panels horizontally on platforms or pallets, covered with suitable weathertight and ventilated covering. Store metal panels to ensure dryness, with positive slope for drainage of water. Do not store metal panels in contact with other materials that might cause staining, denting, or other surface damage.

D. Retain strippable protective covering on metal panels during installation.

E. Copper Panels: Wear gloves when handling to prevent fingerprints and soiling of surface.

1.9 FIELD CONDITIONS

A. Weather Limitations: Proceed with installation only when existing and forecasted weather conditions permit assembly of metal panels to be performed according to manufacturers' written instructions and warranty requirements.

1.10 COORDINATION

A. Coordinate metal panel installation with rain drainage work, flashing, trim, construction of soffits, and other adjoining work to provide a leakproof, secure, and noncorrosive installation.

1.11 WARRANTY

A. Special Warranty: Manufacturer's standard form in which manufacturer agrees to repair or replace components of metal panel systems that fail in materials or workmanship within specified warranty period.
   1. Failures include, but are not limited to, the following:
      a. Structural failures including rupturing, cracking, or puncturing.
      b. Deterioration of metals and other materials beyond normal weathering.
   2. Warranty Period: Two years from date of Substantial Completion.

B. Special Warranty on Panel Finishes: Manufacturer's standard form in which manufacturer agrees to repair finish or replace metal panels that show evidence of deterioration of factory- applied finishes within specified warranty period.
   1. Exposed Panel Finish: Deterioration includes, but is not limited to, the following:
      a. Color fading more than 5 Hunter units when tested according to ASTM D 2244.
      b. Chalking in excess of a No. 8 rating when tested according to ASTM D 4214.
      c. Cracking, checking, peeling, or failure of paint to adhere to bare metal.
   2. Finish Warranty Period: 20 years from date of Substantial Completion.

PART 2 - PRODUCTS

2.1 PERFORMANCE REQUIREMENTS

A. Structural Performance: Provide metal panel systems capable of withstanding the effects of the following loads, based on testing according to ASTM E 1592:
   1. Wind Loads: As indicated on Drawings.
   2. Other Design Loads: As indicated on Drawings.
   3. Deflection Limits: For wind loads, no greater than 1/240 of the span.

B. Air Infiltration: Air leakage of not more than 0.06 cfm/sq. ft. when tested according to ASTM E 283 at the following test-pressure difference:
   1. Test-Pressure Difference: 6.24 lbf/sq. ft.

C. Water Penetration under Static Pressure: No water penetration when tested according to ASTM E 331 at the following test-pressure difference:
   1. Test-Pressure Difference: 6.24 lbf/sq. ft.

D. Thermal Movements: Allow for thermal movements from ambient and surface temperature changes by preventing buckling, opening of joints, overstressing of components, failure of joint sealants, failure of connections, and other detrimental effects. Base calculations on surface temperatures of materials due to both solar heat gain and nighttime-sky heat loss.
   1. Temperature Change (Range): 120 deg F, ambient; 180 deg F, material surfaces.

2.2 CONCEALED-FASTENER, LAP-SEAM METAL WALL PANELS

A. General: Provide factory-formed metal panels designed to be field assembled by lapping and interconnecting side edges of adjacent panels and mechanically attaching through panel to supports using concealed fasteners in side laps. Include accessories required for weathertight installation.

B. Flush-Profile, Concealed-Fastener Metal Wall Panels: Formed with vertical panel edges and a flat pan between panel edges; with flush joint between panels.

1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
   a. AEP Span; a BlueScope Steel company.
   b. Architectural Metal Systems; a Nucor company. c. Berridge Manufacturing Company.
   d. CENTRIA Architectural Systems. e. Fabral.
   f. MBCI; a division of NCI Building Systems, L.P.
2. Aluminum Sheet: Coil-coated sheet, ASTM B 209, alloy as standard with manufacturer, with temper as required to suit forming operations and structural performance required.
   a. Thickness: 0.032 inch.
   b. Surface: Smooth, flat finish.
   c. Exterior Finish: Three-coat fluoropolymer.
   d. Color: As selected by Architect from manufacturer's full range.
3. Panel Coverage: As indicated.
4. Panel Height: As indicated.

2.3 MISCELLANEOUS MATERIALS

A. Miscellaneous Metal Subframing and Furring: ASTM C 645, cold-formed, metallic-coated steel sheet, ASTM A 653/A 653M, G90 coating designation or ASTM A 792/A 792M, Class AZ50 aluminum-zinc-alloy coating designation unless otherwise indicated. Provide manufacturer's standard sections as required for support and alignment of metal panel system.

B. Panel Accessories: Provide components required for a complete, weathertight panel system including trim, copings, fasciae, mullions, sills, corner units, clips, flashings, sealants, gaskets, fillers, closure strips, and similar items. Match material and finish of metal panels unless otherwise indicated.

1. Closures: Provide closures at eaves and rakes, fabricated of same metal as metal panels.
2. Backing Plates: Provide metal backing plates at panel end splices, fabricated from material recommended by manufacturer.
3. Closure Strips: Closed-cell, expanded, cellular, rubber or crosslinked, polyolefin-foam or closed-cell laminated polyethylene; minimum 1-inch- thick, flexible closure strips; cut or premolded to match metal panel profile. Provide closure strips where indicated or necessary to ensure weathertight construction.

C. Flashing and Trim: Provide flashing and trim formed from same material as metal panels as required to seal against weather and to provide finished appearance. Locations include, but are not limited to, bases, drips, sills, jambs, corners, endwalls, framed openings, rakes, fasciae, parapet caps, soffits, reveals, and fillers. Finish flashing and trim with same finish system as adjacent metal panels.

D. Panel Fasteners: Self-tapping screws designed to withstand design loads. Provide exposed fasteners with heads matching color of metal panels by means of plastic caps or factory-applied coating. Provide EPDM or PVC sealing washers for exposed fasteners.

E. Panel Sealants: Provide sealant type recommended by manufacturer that are compatible with panel materials, are nonstaining, and do not damage panel finish.
   1. Sealant Tape: Pressure-sensitive, 100 percent solids, gray polyisobutylene compound sealant tape with release-paper backing. Provide permanently elastic, nonsag, nontoxic, nonstaining tape 1/2 inch wide and 1/8 inch thick.
   2. Joint Sealant: ASTM C 920; elastomeric polyurethane or silicone sealant; of type, grade, class, and use classifications required to seal joints in metal panels and remain weathertight; and as recommended in writing by metal panel manufacturer.
   3. Butyl-Rubber-Based, Solvent-Release Sealant: ASTM C 1311.

2.4 FABRICATION

A. General: Fabricate and finish metal panels and accessories at the factory, by manufacturer's standard procedures and processes, as necessary to fulfill indicated performance requirements demonstrated by laboratory testing. Comply with indicated profiles and with dimensional and structural requirements.

B. On-Site Fabrication: Subject to compliance with requirements of this Section, metal panels may be fabricated on-site using UL-certified, portable roll-forming equipment if panels are of same profile and warranted by manufacturer to be equal to factory-formed panels. Fabricate according to equipment manufacturer's written instructions and to comply with details shown.

C. Provide panel profile, including major ribs and intermediate stiffening ribs, if any, for full length of panel.

D. Fabricate metal panel joints with factory-installed captive gaskets or separator strips that provide a weathertight seal and prevent metal-to-metal contact, and that minimize noise from movements.

E. Sheet Metal Flashing and Trim: Fabricate flashing and trim to comply with manufacturer's recommendations and recommendations in SMACNA's "Architectural Sheet Metal Manual" that apply to design, dimensions, metal, and other characteristics of item indicated.
   1. Form exposed sheet metal accessories that are without excessive oil canning, buckling, and tool marks and that are true to line and levels indicated, with exposed edges folded back to form hems.
   2. Seams for Aluminum: Fabricate nonmoving seams with flat-lock seams. Form seams and seal with epoxy seam sealer. Rivet joints for additional strength.
   3. Sealed Joints: Form nonexpansion, but movable, joints in metal to accommodate sealant and to comply with SMACNA standards.
   4. Conceal fasteners and expansion provisions where possible. Exposed fasteners are not allowed on faces of accessories exposed to view.
   5. Fabricate cleats and attachment devices from same material as accessory being anchored or from compatible, noncorrosive metal recommended in writing by metal panel manufacturer.
      a. Size: As recommended by SMACNA's "Architectural Sheet Metal Manual" or metal wall panel manufacturer for application but not less than thickness of metal being secured.

2.5 FINISHES

A. Protect mechanical and painted finishes on exposed surfaces from damage by applying a strippable, temporary protective covering before shipping.

B. Appearance of Finished Work: Variations in appearance of abutting or adjacent pieces are acceptable if they are within one-half of the range of approved Samples. Noticeable variations in same piece are not acceptable. Variations in appearance of other components

are acceptable if they are within the range of approved Samples and are assembled or installed to minimize contrast.

C. Aluminum Panels and Accessories:
   1. Three-Coat Fluoropolymer: AAMA 620. Fluoropolymer finish containing not less than70 percent PVDF resin by weight in both color coat and clear topcoat. Prepare, pretreat, and apply coating to exposed metal surfaces to comply with coating and resin manufacturers' written instructions.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Examine substrates, areas, and conditions, with Installer present, for compliance with requirements for installation tolerances, metal panel supports, and other conditions affecting performance of the Work.
   1. Examine wall framing to verify that furring channels and other structural panel support members and anchorage at concrete masonry unit walls have been installed within alignment tolerances required by metal wall panel manufacturer.
   2. Examine wall sheathing to verify that sheathing joints are supported by framing or blocking and that installation is within flatness tolerances required by metal wall panel manufacturer.
      a. Verify that air- or water-resistive barriers have been installed over sheathing or backing substrate to prevent air infiltration or water penetration.

B. Examine roughing-in for components and systems penetrating metal panels to verify actual locations of penetrations relative to seam locations of metal panels before installation.

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

3.2 PREPARATION

A. Miscellaneous Supports: Install subframing, furring, and other miscellaneous panel support members and anchorages according to ASTM C 754 and metal panel manufacturer's written recommendations.

3.3 METAL PANEL INSTALLATION

A. General: Install metal panels according to manufacturer's written instructions in orientation, sizes, and locations indicated. Install panels perpendicular to supports unless otherwise indicated. Anchor metal panels and other components of the Work securely in place, with provisions for thermal and structural movement.
   1. Shim or otherwise plumb substrates receiving metal panels.
   2. Flash and seal metal panels at perimeter of all openings. Fasten with self-tapping screws. Do not begin installation until air- or water-resistive barriers and flashings that will be concealed by metal panels are installed.
   3. Install screw fasteners in predrilled holes.
   4. Locate and space fastenings in uniform vertical and horizontal alignment.
   5. Install flashing and trim as metal panel work proceeds.
   6. Locate panel splices over, but not attached to, structural supports. Stagger panel splices and end laps to avoid a four-panel lap splice condition.
   7. Align bottoms of metal panels and fasten with blind rivets, bolts, or self-tapping screws. Fasten flashings and trim around openings and similar elements with self-tapping screws.
   8. Provide weathertight escutcheons for pipe- and conduit-penetrating panels.

B. Fasteners:
   1. Aluminum Panels: Use aluminum or stainless-steel fasteners for surfaces exposed to the exterior; use aluminum or galvanized-steel fasteners for surfaces exposed to the interior.

C. Metal Protection: Where dissimilar metals contact each other or corrosive substrates, protect against galvanic action as recommended in writing by metal panel manufacturer.

D. Lap-Seam Metal Panels: Fasten metal panels to supports with fasteners at each lapped joint at location and spacing recommended by manufacturer.
   1. Install screw fasteners with power tools having controlled torque adjusted to compress washer tightly without damage to washer, screw threads, or panels. Install screws in predrilled holes.
   2. Flash and seal panels with weather closures at perimeter of all openings.

E. Watertight Installation:
   1. Apply a continuous ribbon of sealant or tape to seal lapped joints of metal panels, using sealant or tape as recommend by manufacturer on side laps of nesting-type panels; and elsewhere as needed to make panels watertight.
   2. Provide sealant or tape between panels and protruding equipment, vents, and accessories.

F. Accessory Installation: Install accessories with positive anchorage to building and weathertight mounting, and provide for thermal expansion. Coordinate installation with flashings and other components.
   1. Install components required for a complete metal panel system including trim, copings, corners, seam covers, flashings, sealants, gaskets, fillers, closure strips, and similar items. Provide types indicated by metal wall panel manufacturer; or, if not indicated, provide types recommended by metal panel manufacturer.

G. Flashing and Trim: Comply with performance requirements, manufacturer's written installation instructions, and SMACNA's "Architectural Sheet Metal Manual." Provide concealed fasteners where possible, and set units true to line and level as indicated. Install work with laps, joints, and seams that are permanently watertight.
   1. Install exposed flashing and trim that is without buckling and tool marks, and that is true to line and levels indicated, with exposed edges folded back to form hems. Install sheet metal flashing and trim to fit substrates and achieve waterproof performance.
   2. Expansion Provisions: Provide for thermal expansion of exposed flashing and trim. Space movement joints at a maximum of 10 feet with no joints allowed within 24 inches of corner or intersection. Where lapped expansion provisions cannot be used or would not be sufficiently waterproof, form expansion joints of intermeshing hooked flanges, not less than 1 inch deep, filled with mastic sealant (concealed within joints).

3.4 FIELD QUALITY CONTROL

A. Testing Agency: Engage a qualified testing agency to perform tests and inspections.

B. Water-Spray Test: After installation, test area of assembly as directed by Architect for water penetration according to AAMA 501.2.

C. Manufacturer's Field Service: Engage a factory-authorized service representative to test and inspect completed metal wall panel installation, including accessories.

D. Remove and replace metal wall panels where tests and inspections indicate that they do not comply with specified requirements.

E. Additional tests and inspections, at Contractor's expense, are performed to determine compliance of replaced or additional work with specified requirements.

F. Prepare test and inspection reports.

3.5 CLEANING AND PROTECTION

A. Remove temporary protective coverings and strippable films, if any, as metal panels are installed, unless otherwise indicated in manufacturer's written installation instructions. On completion of metal panel installation, clean finished surfaces as recommended by metal panel manufacturer. Maintain in a clean condition during construction.

B. After metal panel installation, clear weep holes and drainage channels of obstructions, dirt, and sealant.
C. Replace metal panels that have been damaged or have deteriorated beyond successful repair by finish touchup or similar minor repair procedures.

END OF SECTION 074214

SECTION 07465

MINERAL FIBER CEMENT SIDING

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes: Provide mineral fiber reinforced cement siding with accessories for complete weathertight installation.

B. LEED General: Refer to Section 01350 LEED Special Environmental Requirements and to LEED “Checklist” indicating points Design Team has anticipated relating to specific LEED credits and LEED requirements.

C. Related Sections:

1. Section 05400: Metal stud framing.
2. Section 05500: Miscellaneous metal fabrications.

1.2 SUBMITTALS

A. Product Data: Furnish manufacturer's literature.

B. Shop Drawings: Indicate fabrication details, connection details, pertinent dimensions, and erection support points.

1. Show precise locations of exposed fasteners, including drawings scaled to indicate exposed fastener patterns.

C. Samples: Submit sample of each type of panel with finish required.

D. LEED Certification Points: Submit information and certifications necessary to achieve maximum points for LEED certification; coordinate and cooperate with Owner and Architect in providing information necessary for required LEED rating.

1.3 QUALITY ASSURANCE

A. Qualification of Installer: Firm with minimum five years successful experience installing architectural mineral fiber building panels.

1.4 DELIVERY, STORAGE, AND HANDLING

A. Deliver and store in manufacturer's wrapping and crating.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

A. James Hardie Building Products, Hardiboard.

B. Certainteed Corporation.

C. Eternit, Inc.

D. Substitutions: Refer to Section 01630.

2.2 MATERIALS

A. Mineral Panels: Provide both plank and panel systems as indicated on Drawings.

1. Mineral Panel System: Totally inorganic fiber-reinforced cement panels, with no asbestos content.

a. Thickness: Preformed nominal 7 mm (5/16") thick.

b. Finish: Smooth surface.

c. Size: 4'-0" width by lengths appropriate for application, including 8', 9', and 10' lengths as required to minimize joints.

B. Fasteners: Corrosion resistant non-magnetic stainless steel; types as recommended by system manufacturer.

1. Exposed Fastener Heads: Type as approved by Architect.

C. Accessories: Provide as indicated, as recommended by panel manufacturer and as required for complete finished siding installation.

D. LEED Recycled Content: Where available provide materials with post-consumer and pre-consumer recycled content to achieve maximum LEED credits.

E. LEED Regionally Manufactured, Extracted, Harvested, or Recovered Materials: Where possible obtain materials that qualify for LEED credits for regional materials obtained within 500 miles of Project.

F. LEED Total Volatile Organic Compounds (TVOC) and Toxic Substances: Provide materials with volatile organic compound emissions and toxic substances such as urea-formaldehyde complying with LEED requirements to reduce indoor air contaminants.

PART 3 - EXECUTION

3.1 INSTALLATION

A. Provide for installation procedures, temporary bracing and induced loads during erection; maintain temporary bracing in place until final support is provided.

1. Coordinate with building paper installation in Section 07265; take special care not to damage building paper beyond required penetrations for fasteners.

B. Erect units in accordance with manufacturer recommendations and installation instructions, without damage to panel, panel shape or finish.

1. Carefully locate exposed fasteners to conform to Architectural Drawings and approved shop drawings; exposed fasteners to provide uniform pattern as approved.

C. Erect level, plumb, square, and true within allowable tolerances.

D. Align and maintain uniform horizontal and vertical joints, as erection progresses.

E. Securely fasten units in place.

F. Seal exposed fastener heads using materials matching mineral fiber cement siding and strike flush to match adjacent surfaces.

G. Site Tolerances: Maintain following joint tolerances of erected mineral fiber units:

1. Face Width of Joint: Maximum plus or minus 1/16" (total 1/8").
2. Jog in Alignment of Edges: Maximum 1/8".

3.2 CLEANING

A. Clean marks, debris, and dirt from exposed surfaces of mineral fiber units using manufacturer recommended cleaning materials and procedures which do not stain nor damage panels or fasteners.

END OF SECTION

SECTION 07510

BUILT-UP BITUMINOUS ROOFING

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes: Provide multiple ply asphaltic bitumen and glass fiber reinforced roofing membrane and mineral surfaced cap sheet, with base and cant flashings and accessories as required for complete weathertight system.

1. Provide roof insulation, multiple layer application, as required.
2. Provide tapered insulation, as required.
3. Provide perlite fiber cants.
4. Provide walkway/runway.

B. LEED General: Refer to Section 01350 LEED Special Environmental Requirements and to LEED “Checklist” indicating points Design Team has anticipated relating to specific LEED credits and LEED requirements.

C. Related Sections:

1. Section 06105: Miscellaneous rough carpentry.
2. Section 07210: Building Insulation.
3. Section 07600: Metal Flashings.
4. Section 07900: Joint Sealers.

1.2 REFERENCES

A. National Roofing Contractors Association (NRCA): The NRCA Roofing and Waterproofing Manual, Fourth or Fifth Edition.

1.3 SYSTEM DESCRIPTION

A. Cool Roof System: Comply with California Title24 requirements for “Cool Roof” system.

1. Reflectance: Not less than 0.70 Reflectance.
2. Thermal Emittance: Not less than 0.75 Thermal Emittance.
3. Label: System to have Cool Roof Rating Council (CRRC) label.

B. Fire and Wind Resistance: Conform to California Building Code requirements for Underwriters Laboratory (UL) Class A roof system, with UL Class 90 wind resistance classification.

1. Provide a certified fire extinguisher of adequate size located at the asphalt heating equipment and at each work area.

2. Materials: Provide built-up roofing system materials by a single manufacturer, except where materials of other manufacturers are specified or approved by Architect.

3. Materials: Provide built-up roofing system materials by a single manufacturer, except where materials of other manufacturers are specified or approved by Architect.

1.4 SUBMITTALS

A. Product Data: Provide literature for roofing system and each type of material; list each material proposed for use on Project.

B. Shop Drawings: Include plans, elevations, sections, details, R-value calculations and attachments to other work

1. Base flashings, cants, and membrane terminations.

2. Locations and pull-out values of pull-out tests performed on cellular concrete.

3. Base sheet, insulation boards, and base flashings fastening patterns.

C. Samples: Furnish samples of mineral surface cap sheet including Cool Roof finish.

D. Manufacturer Certificates:

1. Submit certification installer is approved for roof system installation.

2. Submit certification materials and components furnished conform to Specification requirements and are compatible with each other, roof substrate, and related work.

E. LEED Certification Points: Submit information and certifications necessary to achieve maximum points for LEED certification; coordinate and cooperate with Owner and Architect in providing information necessary for required LEED rating.

1.5 QUALITY ASSURANCE

A. Installer Qualifications: Roofing manufacturer certified or approved.

B. Supervisor: Installer to maintain full-time supervisor/foreman who is on jobsite during built-up roofing work who is experienced in installation of roofing system specified.

C. Pre-Installation Meeting: Convene not less than one week prior to commencing work of this section. Require attendance of parties directly affecting roofing work.

1. Review procedures and coordination required with related work.

1.6 PROJECT CONDITIONS

A. Do not apply roofing membrane during inclement weather or when air temperature may fall below 40 degrees F, taking into consideration added wind chill factor.

1. Do not allow materials to be exposed to moisture during transportation, storage, handling or installation.

2. Mark damp or wet materials, including felts which froth or foam during installation, and remove from site within 24 hours.

B. Do not apply roofing membrane to damp, frozen or unsuitable deck surface.

1. Allow sufficient time for moisture from previous precipitation, fog or dew to evaporate before proceeding with roofing work.

C. Do not expose materials vulnerable to water or sun damage in quantities greater than can be weatherproofed during same day.

1.7 WARRANTY

A. Special Warranty: Provide for correcting failure of roofing system to resist penetration of water and damage from wind.

1. Special Warranty Period: Twenty (20) years.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

A. Johns Manville Corp.

B. GAF Building Materials Corp.

C. Certainteed Corporation.

D. Substitutions: Refer to Section 01630.

1. Manufacturers listed under specific products are acceptable in addition to primary roofing material manufacturers.

2.2 MATERIALS

A. Asphalt Bitumen and Glass Fiber Reinforced Roofing: Manufacturer's standard products for systems specified and conforming to requirements of NRCA Roofing Manual.

1. System: Provide standard asphalt and glass fiber reinforced roof membrane with mineral cap sheet surfacing.

a. NRCA Specification: Comply with following for minimum requirements, in addition to manufacturer's system.

1) Insulated Deck: BU-I-A-G(3)-M, three ply plus cap sheet.

b. Manufacturers:

1) Johns Manville/4 G I C.

2) GAF/I-B-4-M or I-0-4-M.
3) Certainteed/M-C-B4.
4) Substitutions: Refer to Section 01630.

2. Asphalt: Minimum ASTM D312, type recommended for application.

3. Glass Felts: Minimum ASTM D2178, Type IV or Type VI

4. Composition Flashing System: Manufacturer's premium quality glass felt and asphalt base, wall, and penetration flashing system. Other systems subject to Architect approval.

B. Mineral Cap Sheet: ASTM D3909; manufacturer's standard mineral surfaced cap sheet for type of roof specified.

1. Cool Roof Rating: Provide either integral or applied coating as required to achieve rating.

C. Bottom Layers Insulation: ASTM C1289, Type II, Class 1, Grade 2 glass fiber faced isocyanurate, with ASTM C1303 Long Term Thermal Resistance (LTTR) not less than R-29.

1. Manufacturers:

a. Johns Manville/UltraGard.
b. GAF/Isotherm.
c. CertainTeed/FlintBoard ISO.
d. Substitutions: Refer to Section 01630.

D. Top Layer Insulation: ASTM C728 perlite board insulation; 1/2" nominal thickness, with nominal R-1.

1. Manufacturers:

a. Johns Manville/Fesco Board Roof Insulation.
b. GAF/EnergyGuard Roof Insulation.
c. Koppers Inc./Perlite Roof Insulation.
d. Substitutions: Refer to Section 01630.

E. Tapered Insulation: Conform to ASTM C728.

1. Manufacturers:

a. Johns Manville/Fesco or UltraGard Tapered Roof Insulation.
b. GAF/EnergyGuard Tapered Roof Insulation.
c. CertainTeed/FlintBoard ISO Tapered Roof Insulation.
d. Koppers Inc./Perlite Tapered Roof Insulation.
e. Substitutions: Refer to Section 01630.

F. Cant and Edge Strips: Conform to ASTM C208.

1. Manufacturers:

a. Johns Manville/Fesco Cant & Edge Strips.
b. GAF/EnergyGuard Cant and Edge Strips.
c. Koppers Inc./Perlite Cant and Edge Strips.
d. Substitutions: Refer to Section 01630.

G. Accessories

1. Mechanical Fasteners: As recommended by insulation manufacturer and meeting recommendations of NRCA and specified Quality Assurance requirements for fire rating and wind blowoff resistance.

2. Flashing Cement: ASTM D4586.

3. Roof Traffic Pads:

a. Material: Asphaltic or rubberized pad with textured surface, ¾ inch thick by 4 foot wide minimum.

b. Manufacturers:

1) Johns Manville “J-Walk”; or

2) Humane “Roof-Gard”; or

3) W.R. meadows “Whitewalk”; or

4) Approved equal.

4. Nailers: Pressure-treated wood. Do not use oil-based preservatives.

H. LEED Recycled Content: Where available provide materials with post-consumer and pre-consumer recycled content to achieve maximum LEED credits.

I. LEED Regionally Manufactured, Extracted, Harvested, or Recovered Materials: Where possible obtain materials that qualify for LEED credits for regional materials obtained within 500 miles of Project.

J. State Volatile Organic Compounds (VOC) Emissions: Provide materials with volatile organic compound emissions within limits set by applicable air quality management district.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Inspect roof deck to ensure deck is clean and smooth, free of depressions, waves or projections, and is properly sloped to drains, valley, or eaves.

B. Ensure roof openings and curbs, and pipes, sleeves, ducts or vents through roof are solidly set, cant strips and reglets in place and nailing strips located.

C. Inspect roofing materials to ensure they are dry at time of installation.

D. Apply roofing over clean, dry, and warm surfaces during fair weather.

E. Do not perform roofing operations when water is present on the deck such as rain, dew, ice, or frost

3.2 PREPARATION

A. Protect surrounding surfaces against damage from roofing work.

B. Where hoisting is necessary, hang tarpaulins to protect walls.

3.3 INSTALLATION

A. Insulation Application: Provide double layer insulation with plastic insulation separated from built-up roofing by glass or perlite board insulation.

1. Attach first layer of insulation in accordance with insulation manufacturer's instructions and NRCA recommendations for installation of specified insulation on deck indicated.

a. Steel Deck: NRCA Specification INS-S Steel.
b. Concrete Deck: NRCA Specification INS-C Concrete.

2. Embed additional layers of insulation into flood coat mopping of hot bitumen in accordance with insulation manufacturer's instructions and NRCA recommendations.

3. Stagger joints between layers of insulation.

4. Total insulation shall provide a minimum R-value of 30.

5. Lay insulation boards to moderate contact without forcing joints.

6. Cut insulation to fit neatly to perimeter blocking and around projections through roof.

7. Install tapered insulation, cants and edge strips in accordance with manufacturer's instructions and NRCA recommendations, to a minimum slope of ¼ inch per foot.

8. Leave no insulation exposed at end of day's work, apply glaze coat of hot bitumen and two plies of felt over insulation and install cut-off weather-tight.

B. Roof Membrane Application: Apply roofing membrane in accordance with manufacturer's instructions and recommendations and NRCA recommendations for roof type specified.

1. General:

a. Apply each glass fiber plysheets in a solid, continuous asphalt mopping weighing 25 lbs. Per Sq. Ft.

b. Lay plies straight and flat, free from wrinkles and tears.

c. Apply all ply sheets so they are properly shingled to the flow of water.

d. Provide enough overlap so that every cross section will have the required number of plies.

e. Stagger all laps at least 12 inches.

f. Install one extra ply sheet, 36 inches wide, at all waterways.

g. Carry felts up cant strips to vertical surfaces and secure to nailing strips and reglets.

h. Do not blanket composition flashing plys, install each ply separately with end laps staggered between plys.

C. Cap Sheet Application

1. Roof surface shall be clean, free of dust, dirt and moisture when cap sheet is applied.

2. Lightly prime with asphalt primer if any surface oxidation has occurred.

3. Apply free of buckles, wrinkles, blisters, fishmouths or voids of any type between the sheet and mopping asphalt.

4. Apply over and parallel to the underlying roofing and lap so that the flow of water is over or parallel to, but never against the laps.

5. Lap width 2 inch sidelaps and 4 inch end laps.

6. End laps shall be broken not less than 3 feet apart.

7. Embed cap sheet in hot steep asphalt.

8. Cut cap sheet into 12 foot to 18 foot lengths and allow to “relax” prior to application.

9. “Flop” cap sheet into place. Place tension on the ends of the cap sheet lengths as they are flopped into place to ensure that the sheet lays flat in the asphalt.

10. “Broom” in cap sheet to ensure bond between asphalt and sheet.

11. For clean, finished surface, embed loose granules into overrun of hot asphalt at side and end laps while asphalt is still hot.

12. Comply with manufacturer’s recommendations for installation of composition type base, wall and field flashings.

a. Mechanically fasten and three course seal top edge.

13. Mechanically fasten and three-course seal top edge (delete where roofing is counterflashed with SAF (typical)).

14. Cover composition flashings not otherwise covered or coated with coat of asphalt-base emulsion.

D. Roof Traffic Pads

1. Space pads 2 inches apart in asphalt to allow for water flow.

2. Over Cap Sheet Roofing: Set each pad in a 5 spot application of roof cement over final surfacing.

E. Flashing

1. General

a. Do not apply flashing until built-up roofing (excluding surfacing) has been laid. Provide temporary seal at ply terminations until installation of flashing.

b. Counterflashing shall not be less than 12 inches nor more than 15 inches above roof line.

c. Prime all sheet metal that will come into contact with bituminous materials with an asphaltic primer and allow to dry before applying bitumen.

d. Apply all other flashings not specifically detailed herein in accordance with manufacturer's recommendations and approved by the Architect.

2. Base Flashing

a. install cant strips at the juncture of all vertical surfaces and roof. Nail cant strips to vertical surface or set into hot, steep asphalt over secured base sheet or insulation.

b. Embed one ply sheet into a solid mopping of steep asphalt over junctures, extending 8 inches to 10 inches up the curb or wall. Extend ply 3 inches beyond cant at top edge.

c. Apply modified bitumen flashing membrane into a solid mopping of asphalt per manufacturer's specifications. The flashing membrane shall be of sufficient width to extend from the top edge of the flashing surface to a minimum of 6 inches past the toe of the cant strip onto the roof or at least 3 inches further onto the roof than the preceding ply.

d. Do not extend the base flashing less than 8 inches nor more than 12 inches up the curb or wall.

e. Fasten the top edge of the base flashing approximately every 4 inches to 6 inches on center with appropriate fasteners through 1 inch diameter metal discs.

Cap sheet surfacing may receive this specified nailing pattern as it terminates on vertical surfaces parallel to previously installed modified bitumen base flashing.

f. Seal all inside and outside corners with plastic roofing cement with open weave glass fabric.

g. Completely bond all flashings to the underlying surface without any looseness, bubbles or voids. Remove and replace any loose flashing materials.

3. Roof Drain Flashing:

a. Remove drain rings prior to built-up roofing application.

b. Provide gradual taper to roof drains.

c. Extend roof plies (excluding surface sheet) into the drain under the clamping ring.

d. Set a primed four pound lead sheet into a solid coating of roof cement over the installed plies. Extend the flashing sheet at least 6 inches beyond the outside of the drain bowl. Shape the sheet to conform snugly to the underlying taper. Cover with two stripping plies with the first extending at least 6 inches beyond the first. Cover stripping plies with granule surfaced modified flashing of sufficient size to cover the entire sump area. Extend field cap sheet to overlap at least 4 inches onto the modified flashing.

e. Set the drain ring into roofing cement and tighten. Install a cast iron guard screen over the roof drains.

4. Flanged Sleeves and Accessories:

a. Set primed flanges into a full bed of plastic roof cement over the installed roof plies. Prime with asphalt primer, let dry and fasten securely to the underlying deck or wood nailers (fastening is not required for lead flanges).

b. Prime and flash all flanges, including pipe flashing sleeves, flanged units, scuppers, on the roof with at least 2 plies of ply sheet embedded into asphalt. The first ply shall extend a minimum of 6 inches beyond the flange onto the roof. The second ply shall extend a minimum of 6 inches further onto the roof than the first ply.

5. Cant Strips: At vertical intersections of curbs, parapet walls, platforms, and other similar conditions, install 4 inch cant strips. Hand nail at each end and 12 inches on center with 1 inch head ringed or shank nails which penetrates into nailer or deck ¾ inch or more.

6. Tapered Edge Strips: Provide minimum 12 inch wide and proper height tapered edge strips at locations under 8 inch vertical surface rise and at all drain sump transitions under 4 inch vertical drop. Nail to deck with 1 inch head ringed shank nails.

7. Mechanical Equipment Curbs: Curbs above deck minimum 8 inches unslope of adjacent roof (inclusive of adjacent cricket elevation). Install new fiber cant strips, roof membrane, and modified bitumen base flashing. Hand nail 4 inches on center.

Three-course seal to top interior edge of horizontal curb surface and down over previously nailed base flashing. Install fire treated wood cant and vertical wood nailers as required for proper elevation of roof membrane transition at vertical surfaces.

F. Coating Installation

1. Apply coatings to roofing membrane according to manufacturer's written instructions, by spray, roller, or other suitable application method.

G. Miscellaneous

1. Do not use rotary drum type felt layer for application of roofing products

2. No vapor retarder materials shall bridge expansion joints.

3. Coordinate metal flashings and counterflashing.

4. "Brooming in" shall be required to ensure bond between asphalt and sheet.

3.4 FIELD QUALITY CONTROL

A. Heat bitumen in accordance with manufacturer's recommendations, but do not heat asphalt to a temperature greater than 100 degrees F above its equiviscous temperature (EVT).

1. Maintain bitumen within manufacturer and NRCA recommended EVT range at point of application.

2. Maintain roofing equipment in proper working order.

3.5 CLEANING

A. Remove bituminous markings from finished surfaces, including bitumen run-throughs into building.

B. In areas where finished surfaces are soiled by bitumen or other source of soiling caused by roofing work, consult manufacturer of finished surfaces for recommended cleaning methods.

C. Leave completed roof free from debris and uniform in appearance.

3.6 PROTECTION

A. Where work must continue over finished roofing membrane, protect surface with plywood sheets.

END OF SECTION

SECTION 07600

FLASHING AND SHEET METAL

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes: Provide metal flashings and sheet metal including accessories as required for complete weathertight installation.

1. Flashing and sheet metal includes scuppers, reglets, and similar fabricated components.

2. Provide concealed sealants used in conjunction with installation of metal flashing and sheet metal.

3. Provide miscellaneous sheet metal flashing and reglets not provided by other trades or suppliers.

a. Where reglets are to be installed in conjunction with other work, provide in adequate time for installation.

b. Where reglets are to be surface applied, provide continuous gasket between reglet and surface.

B. LEED General: Refer to Section 01350 LEED Special Environmental Requirements and to LEED “Checklist” indicating points Design Team has anticipated relating to specific LEED credits and LEED requirements.

C. Related Sections:

1. Section 05810: Expansion joint cover assemblies at roofing.
2. Section 06105: Miscellaneous rough carpentry.
3. Section 07265: Concealed metal flashing integral with building paper.
4. Section 10210: Metal wall louvers.

1.2 SYSTEM DESCRIPTION

A. Design Requirements: Allow for movement of components without causing buckling, failure of joint seals, undue stress on fasteners or other detrimental effects, when subject to 100 year seasonal temperature ranges.

1.3 REFERENCES

A. Sheet Metal and Air Conditioning Contractors National Association (SMACNA): Architectural Sheet Metal Manual, Fifth Edition.

1.4 SUBMITTALS

A. Product Data: Furnish literature for manufactured products.

B. Shop Drawings: Clearly indicate dimensioning, layout, general construction details including closures, flashings, locations and types of sealants, anchorages, and method of anchorage.

C. Samples: Furnish samples of typical metal flashing fabrication indicating standard soldered joints and edge conditions.

D. LEED Certification Points: Submit information and certifications necessary to achieve maximum points for LEED certification; coordinate and cooperate with Owner and Architect in providing information necessary for required LEED rating.

1.5 QUALITY ASSURANCE

A. Installer Qualifications: Engage an experiences installer who has completed sheet metal flashing and trim work similar in material, design, and extent to that indicated for this project and with a record of successful in-service performance.

B. Mockups: prior to installing sheet metal flashing and trim, construct mockups indicated to verify selections made under sample submittals and to demonstrate aesthetic effects as well as qualities of materials and execution. Build mockups to comply with the following requirements:

1. Locate mockups onsite in the locations and of the size indicated or, if not indicated, as directed by the Architect.

2. Notify Architect one week in advance of the dates and times when mockups will be constructed.

3. Construct mockups for the following:

a. Gutters and downspouts.

b. Conductor heads.

c. Scuppers.

d. Exposed trim, gravel stops, and fasciae

4. Obtain Architect’s approval of mockups.

Retain and maintain mockups during construction in an undisturbed condition as standard for judging the completed work.

1.6 WARRANTY

A. Special Warranty: Provide for correcting failure of metal flashing system to resist penetration of water and damage from wind.

1. Special Warranty Period: Two years.

PART 2 - PRODUCTS

2.1 MATERIALS

A. Flashing and Sheet Metal:

1. Prefinished High-Performance Coated Aluminum: Manufacturer's standard two coat thermocured fluoropolymer system containing not less than 70 percent polyvinylidene fluoride resin by weight; AAMA 605.2 and AA-C12C42R1x.

   a. Manufacturers:

      1) Merchant & Evans Industries, Inc./Customform.
      2) Moncrief-Lenoir Manufacturing Co./Molenco.
      3) Vincent Brass and Aluminum Co./Color Klad.
      4) Substitutions: Refer to Section 01630.

   b. Color and Gloss: As selected by Architect from manufacturer's full range of nonmetallic colors.

   c. Touch-up Paint for Prefinished Sheet Metal: Type recommended by fluoropolymer manufacturer for field touch-up.

2. Mill Finished or Clear Anodized Aluminum Flashing and Sheet Metal: Provide where indicated as aluminum.

   a. Mill Finished Aluminum: ASTM B209, 3003-H14, minimum thickness 0.040" unless otherwise indicated.

   b. Anodized Aluminum Sheet: ASTM B209, 5005-H14, with minimum thickness of 0.050" unless otherwise indicated; clear anodized unless otherwise indicated.

   c. Extruded Aluminum: ASTM B221, alloy 6063-T52, with minimum thickness of primary legs 0.080" unless otherwise indicated; clear anodized unless otherwise indicated.

   d. Clear Anodized Coating: AAMA 607.1 clear anodized, Architectural Class I 0.018mm or thicker coating.

3. Galvanized Steel: ASTM A924 and A653 G90 galvanized steel; minimum 24 gage.

   a. Mill phosphatized where indicated to be field painted.

   b. Location (Concealed): Where indicated, if not otherwise indicated, provide where flashing will not be exposed to view from exterior of building and where not exposed to view from spaces within building.

4. Accessories: Provide strainers, screens, baffles, and accessories as required for a complete system and complying with SMACNA Manual.

5. Provide heavier gage metal where recommended by SMACNA Manual for size of component.

B. Manufactured Reglets: Snap-on type, for two piece flashing; metal to match flashing and sheet metal.

1. Manufacturers:

a. Fry Reglet Corp./Springlok System.
b. MM Systems Corp./Snap-Tite System.
c. W.P. Heckman Co./The Leading Edge Drive Lock System.
d. Substitutions: Refer to Section 01630.

C. Solder and Fasteners: As recommended by SMACNA and complying with applicable codes and regulations; hot dipped galvanized minimum coating comparable to G90.

D. Concealed Sealant: Butyl type for use in conjunction with sheet metal; non-staining; non-corrosive; non-shrinking and non-sagging; ultra-violet and ozone resistant for exterior concealed applications.

E. Bituminous Paint: Acid and alkali resistant type; black color; asbestos free.

F. Plastic Cement: Cutback asphaltic type; asbestos free.

G. Sealing Compound: Type recommended by roofing manufacturer; asbestos free.

H. LEED Recycled Content: Where available provide materials with post-consumer and pre-consumer recycled content to achieve maximum LEED credits.

I. LEED Regionally Manufactured, Extracted, Harvested, or Recovered Materials: Where possible obtain materials that qualify for LEED credits for regional materials obtained within 500 miles of Project.

2.2 FABRICATION

A. Fabricate sheet metal in accordance with SMACNA Architectural Sheet Metal Manual.

B. Form sections square, true and accurate to size, free from distortion and other defects detrimental to appearance or performance.

1. Fabricate corners and intersections in shop with solder joints; watertight fabrication.

C. Form sections in maximum 10'-0" lengths; make allowance for expansion at joints.

D. Hem exposed edges on underside 1/2".

E. Backpaint flashings with heavy bodied bituminous paint where in contact with cementitious materials or dissimilar metals.

F. Form pitch pans watertight, with minimum 4" upstand and 4" flanges; form pans minimum 6" wider than item passing through roof membrane.

G. Form umbrella flashings with minimum 2" overhang, to shed water away from pitch pans.

H. Seams: Fabricate non-moving seams in sheet metal with flat-lock seams.

I. Expansion: Provisions: Space movement joints at maximum of 10 feet with no joint allowed within 24 inches of a corner or intersection. Where lapped or bayonet-type expansion provisions in work cannot be used or would not be sufficiently weatherproof and waterproof, form expansion joints of intermeshing hooked flanges, not less than 1 inch deep, filled with mastic sealant (concealed within joints).

PART 3 - EXECUTION

3.1 EXAMINATION

A. Examine substrates and conditions under which sheet metal flashing and trim are to be installed and verify that work may properly commence. Do not proceed with installation until all unsatisfactory conditions have been corrected.

3.2 INSTALLATION

A. Install metal flashing and sheet metal in accordance with SMACNA Architectural Sheet Metal Manual.

1. Install tight in place, with corners square, surfaces true and straight in planes, and lines accurate to profiles as indicated on Drawings.

2. Lap joints in direction of water flow.

B. Exercise care when cutting materials on site, to ensure cuttings do not remain on finished surfaces.

C. Provide for thermal expansion of exposed sheet metal work and expansion joints concealed within system.

D. Use concealed fasteners, continuous cleat type, except where specifically approved by Architect.

1. Exposed fasteners may be used, where clearly indicated on shop drawings and approved by Architect, at areas not exposed at exterior walls nor in sight of interior spaces.

E. Apply sealing compound at junction of metal flashing and felt flashing.

F. Lock seams and end joints; fit flashing tight in place; make corners square, surfaces true and straight in planes, and lines accurate to profiles.

G. Counter-flash mechanical and electrical items projecting through roof membrane.

H. Install sealants where required to prevent direct weather penetration.

I. Completed installation shall be free of rattles, noise due to thermal and air movement, and wind whistles.

J. Install pitch pans and fill with plastic cement.

K. Install umbrella flashing with draw band collars with sheet metal sealant between penetrating member and flashing; use wood blocking at angle type penetrations and cover blocking with sealant.

L. Install splash blocks at locations to interrupt fall of water and direct water flow as indicated on drawings.

M. Soldered Joints: Clean surfaces to be soldered, removing oils and foreign matter.

N. Sealed Joints: Form non-expansion, but moveable, joints in metal to accommodate elastomeric sealant to comply with SMACNA Standards. Fill joint with sealant and form metal to completely conceal sealant.

1. Use joint adhesive for non-moving joints specified not to be soldered.

O. Seams: fabricate non-moving seams in sheet metal with flat-lock seams.

P. Separations: Separate metal from non-compatible metal or corrosive substrates by coating concealed surface at locations of contact, with asphalt mastic or other permanent separation as recommended by manufacturer.

1. Underlayment: Where installing stainless steel or aluminum directly on cementitious or wood substrates, install a slip sheet and a course of underlayment.

2. Bed flanges of work in a thick coat of roofing cement where required for waterproof performance.

Q. Install reglets to receive counterflashing.

R. Counterflashing: Coordinate installation of counterflashings with installation of assemblies to be protected by counterflashing. Install counterflashings in reglets or receivers. Secure in a waterproof manner by means of snap-in installation and sealant, lead wedges and sealant, interlocking folded seam, or blind rivets and sealant.

S. Roof Drainage System: Install drainage items fabricated from sheet metal with straps, adhesives, and anchors recommended by SMACNA's manual or the item manufacturer, to drain roof in the most efficient manner. Coordinate roof drain flashing installation with roof drainage system installation.

T. Roof Penetration Flashing: Coordinate roof penetration flashing installation with roofing and installation of items penetrating roof. Install flashing as follows:

1. Turn lead flashing down inside of vent piping, being careful not to block vent piping with flashing.

2. Seal and clamp flashing to pipes penetrating roof, other than lead flashing or vent piping.

U. Install continuous gutter screens on gutters with non-corrosive fasteners, arranged as hinged units to swing open for cleaning gutters.

3.3 CLEANING

A. Remove protective coating from shop finished sheet metal when no longer required to protect roofing and flashing from construction.

B. Touch-up scratched and damaged finish to match new; remove and replace sheet metal units that cannot be repaired to look identical to adjacent sheet metal when viewed from 15'-0" away.

END OF SECTION

SECTION 07815

SPRAYED-ON FIREPROOFING

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes: Provide sprayed-on type fireproofing with accessories as required for complete code compliant installation.

1. Fire Rating: Provide materials capable of attaining fire ratings as required for Type II, Fire Resistive construction.

B. LEED General: Refer to Section 01350 LEED Special Environmental Requirements and to LEED “Checklist” indicating points Design Team has anticipated relating to specific LEED credits and LEED requirements.

C. Related Sections:

1. Section 07840: Firestopping.

1.2 REFERENCES

A. Underwriters Laboratories (UL): Fire Resistant Directory.

1.3 SYSTEM DESCRIPTION

A. Performance Requirements: Provide materials listed by UL or independent testing and inspection agency acceptable to applicable authorities.

1. Fire Resistance Ratings: Comply with required ratings based on tests in accordance with ASTM E119.

2. Surface Burning Characteristics: Maximum 25 flame spread and 25 smoke density when tested in accordance with ASTM E84.

1.4 SUBMITTALS

A. Product Data: Submit manufacturer's literature.

B. Test Reports: Submit following certified test reports.

1. Bond strength of fireproofing, ASTM E736, tested to provide minimum average bond strength of 200 psf and individual bond strength of 150 psf.

2. Fire test reports of fireproofing application to substrate similar to conditions expected on Project.

3. Reports of independent testing agencies indicating conformance to ASTM E119 and ASTM E84.

4. Compressive Strength: Maximum deformation of 10% when subjected to compressive forces of 1000 psf, ASTM E761.

    a. Air Erosion: Maximum allowable weight loss of fireproofing material shall be 0.005 gm per sq. ft. when tested in accordance with ASTM E859.

    b. Mold Resistance: Materials to show resistance to mold growth, ASTM C665 or ASTM G21.

    c. Combustibility: Maximum total heat release of 20 MJ/m^2 ten minutes after exposure to radiant heat flux of 75 KW/m^2, ASTM E1354.

5. Enforcement Agency Approvals: Submit information required by enforcing agencies to establish acceptance of materials in general and for specific applications.

C. Certificates: Furnish manufacturer certificate of applicator acceptability and of material compliance with applicable codes and Contract Documents.

D. LEED Certification Points: Submit information and certifications necessary to achieve maximum points for LEED certification; coordinate and cooperate with Owner and Architect in providing information necessary for required LEED rating.

1.5 QUALITY ASSURANCE

A. Qualification of Applicator: Firm acceptable to manufacturer of fireproofing materials, with minimum five years successful experience on projects of similar scope.

1.6 PROJECT CONDITIONS

A. Ensure structure to which fireproofing is applied is not enclosed and surfaces are open to view until application is reviewed.

B. Do not apply fireproofing when temperature of substrate material and surrounding air is below 40 degrees F.

C. Provide ventilation in areas to receive fireproofing during and after application in accordance with manufacturer recommendations, to properly dry material and maintain nontoxic, unpolluted working area.

D. Do not begin application of fireproofing to underside of steel decking until concrete work above steel decking is completed.

E. Complete roofing applications and roof mounted equipment installation prior to application of fireproofing to underside of roof decking and supporting beams and joists.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

A. W.R. Grace/Monokote MK-6.

B. Isolatek International/Cafco 300.

C. Southwest Vermiculite Co., Inc./Type 5 Cementitious Fireproofing.

D. Albi Manufacturing Division, Stanchem, Inc./Duraspray.

E. Carboline Corp./Pyrolite I.

F. Substitutions: Refer to Section 01630.

2.2 MATERIALS

A. Sprayed-On Fireproofing: Mill mixed cementitious formulation for sprayed-on application.

1. Materials: Blended for even texture; with no asbestos.

B. Water: Clean, free of materials harmful to fireproofing.

C. Hard Coat: Provide manufacturer's standard hard-coat topping system or special hard system for applications subject to abuse.

D. Sealer: Provide manufacturer's standard material recommended for use on applications of sprayed-on fireproofing exposed to exterior and high humidity, applied topping or integral system, Contractor’s option.

E. LEED Recycled Content: Where available provide materials with post-consumer and pre-consumer recycled content to achieve maximum LEED credits.

F. LEED Regionally Manufactured, Extracted, Harvested, or Recovered Materials: Where possible obtain materials that qualify for LEED credits for regional materials obtained within 500 miles of Project.

G. LEED Total Volatile Organic Compounds (TVOC) and Toxic Substances: Provide materials with volatile organic compound emissions and toxic substances such as urea-formaldehyde complying with LEED requirements to reduce indoor air contaminants.

PART 3 - EXECUTION

3.1 PREPARATION

A. Comply with manufacturer's recommendations and installation instructions for preparation of surfaces to receive sprayed-on fireproofing.

B. Protect adjacent surfaces and equipment from damage by over-spray, fallout, and dusting; mask adjacent work as required.

1. Take special care to protect from over-spray concrete and other surfaces that are to remain permanently exposed.

C. Provide temporary enclosure to prevent spray from contaminating air.

D. Close off and seal duct work in areas where fireproofing is being applied.

E. Clean substrate of dirt, grease, oil, loose material, paints, primers, and other matter which affects bond of sprayed fireproofing.

F. Remove incompatible materials that affect bond by scraping, brushing, scrubbing or sand blasting.

G. Verify bond requirements and compatibility of surfaces to receive fireproofing before application of sprayed-on fireproofing.

H. Ensure ducts, piping, equipment and items that could interfere with application of fireproofing are not positioned until fireproofing work is completed.

I. Ensure clips, hangers, support sleeves and other attachments required to penetrate fireproofing are in place prior to application of fireproofing.

3.2 APPLICATION

A. Mix and apply fireproofing in strict accordance with manufacturer's recommendations and installation instructions.

B. Apply fireproofing in sufficient thickness and density to achieve required fire ratings.

C. Apply fireproofing over substrate, building to required thickness with as many passes or stages necessary to cover with monolithic blanket of uniform density and texture.

D. Provide protective hard coat or hard system at surfaces subject to damage by abrasion and damage by vandalism.

E. Provide exterior quality material or sealer at fireproofing exposed to exterior and to high humidity.

3.3 FIELD QUALITY CONTROL

A. Site Tests: Inspection and testing will be required to ensure applied thickness and density meets fire rating requirements and reviewed test reports.

1. Correct unacceptable work and pay for further testing if required to prove acceptability of installation.

2. Patch test areas as required to re-establish fireproofing integrity.

3.4 CLEANING

A. Remove excess and over-spray, droppings, and debris.

B. Remove fireproofing from materials and surfaces not required to be fireproofed.

1. Surfaces in exposed areas are to be left clean of fireproofing. Surfaces in concealed areas shall be left in a scraped clean condition.

3.5 PROTECTION

A. Protect applied fireproofing from damage by subsequent operations.

B. Repair damaged fireproofing before fireproofing is enclosed.

END OF SECTION

SECTION 07840

FIRESTOPPING

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes: Provide firestopping as required to maintain effective barrier against spread of flame, smoke and gases, and to retain integrity of time-rated construction as indicated and at following types of locations.

1. Provide at fire rated system perimeters, and at duct, conduit, piping penetrations through time-rated construction, and as required by applicable codes.

2. Coordinate requirements for firestopping with work involving penetrations through fire rated assemblies.

a. Review Project and Contract Documents to ascertain extent of penetrations in fire rated assemblies and methods included in other sections for maintaining fire ratings.

B. LEED General: Refer to Section 01350 LEED Special Environmental Requirements and to LEED “Checklist” indicating points Design Team has anticipated relating to specific LEED credits and LEED requirements.

1.2 SYSTEM DESCRIPTION

A. Design Requirements: Provide materials tested in accordance with following standards, unless otherwise specified.

1. American Society for Testing and Materials (ASTM) Publications:

a. ASTM E84, Surface Burning Characteristics of Building Materials.
b. ASTM E119, Fire Tests of Building Construction and Materials.
c. ASTM E814, Fire Tests of Through-Penetration Fire Stops.

1.3 SUBMITTALS

A. Product Data: Submit manufacturer's literature including data for materials and prefabricated devices, including descriptions sufficient to identify materials and devices on job.

1. Submit Underwriter's Laboratory approval numbers for required fire ratings; approval of other laboratories contingent upon acceptance of applicable authorities.

B. Shop Drawings: Submit manufacturer's installation details.

C. Certificates of Compliance: Submit certificates, accompanied by classifications, indicating material or combination of materials used meets requirements specified for flame spread and fire resistance.

1. Certificates to be by nationally recognized testing authority or otherwise satisfactory to authorities.

D. Manufacturer's Instructions: Maintain copy of manufacturer's installation instructions and recommendations at each work area.

E. LEED Certification Points: Submit information and certifications necessary to achieve maximum points for LEED certification; coordinate and cooperate with Owner and Architect in providing information necessary for required LEED rating.

1.4 QUALITY ASSURANCE

A. Regulatory Requirements: Comply with California Building Code, Chapter 7 requirements for firestopping, including both F Ratings and T Ratings as applicable.

1.5 DELIVERY, STORAGE, AND HANDING

A. Deliver materials in their original unopened packages and store in location providing protection from damage and exposure to elements.

B. Damaged or deteriorated materials shall be removed from site.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

A. 3M Fire Protection Products Div./3M Fire Barrier Products.

B. Specified Technologies, Inc. (STI)/SpecSeal and Pensil Firestopping.

C. Hilti, Corp./Hilti Firestop Systems.

D. W.R. Grace & Co./Flamesafe Products.

E. Substitutions: Refer to Section 01630.

2.2 MATERIALS

A. General: Choose products and methods meeting applicable codes and Specification requirements for each firestopping application, subject to Architect's acceptance.

B. Firestopping Materials: Furnish materials for penetrations in time-rated floor, wall, and partition assemblies capable of preventing passage of flame, smoke, and hot gases.

1. Penetration Test: Furnish materials passing ASTM E814 for penetration fire stopping indicating maintenance of time-rated adjacent assemblies.

a. Additional Tests: Where required by applicable authorities, provide materials passing ASTM E119 time-temperature fire conditions for fire ratings indicated for assemblies.

2. Flame Spread: ASTM E84 flame spread rating of 25 or less.

3. Smoke Density: ASTM E84 smoke density rating of 450 or less.

C. Firestopping: Maintain fire rating of assembly in which firestopping is installed, such as floor, partition, or wall, in accordance with ASTM E119 tests.

D. LEED Recycled Content: Where available provide materials with post-consumer and pre-consumer recycled content to achieve maximum LEED credits.

E. LEED Regionally Manufactured, Extracted, Harvested, or Recovered Materials: Where possible obtain materials that qualify for LEED credits for regional materials obtained within 500 miles of Project.

F. LEED Total Volatile Organic Compounds (TVOC) and Toxic Substances: Provide materials with volatile organic compound emissions and toxic substances such as urea-formaldehyde complying with LEED requirements to reduce indoor air contaminants.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Examine surfaces and conditions receiving or affecting the work. Do not proceed until unsuitable conditions are corrected.

3.2 INSTALLATION

A. Install firestopping in accordance with manufacturer's recommendations and installation instructions.

B. Completely fill void space with firestopping materials regardless of geometric configuration, subject to tolerances established by firestopping manufacturer.

C. Apply firestopping materials at penetrations of pipes, conduits, and ducts prior to application of insulation.

1. Remove insulation already in place at penetration prior to application of firestopping materials.

a. Insulation which meets requirements for fire ratings are excepted from this requirement.

3.3 FIELD QUALITY CONTROL

A. Inspection: Keep area of work available for inspection by Architect and applicable authorities before and after application of firestopping.

3.4 REPAIR AND CLEAN-UP

A. Repair damage caused by work of this section; clean exposed surfaces soiled by work and leave work ready to receive following work.

B. On completion of work, remove debris, excess materials, and equipment from site.

END OF SECTION

SECTION 07900

JOINT SEALERS

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes: Provide joint sealers, for interior and exterior joints not specified elsewhere, with backing rods and accessories as required for complete installation.

1. Joint sealers include sealants and calking as indicated.

B. LEED General: Refer to Section 01350 LEED Special Environmental Requirements and to LEED “Checklist” indicating points Design Team has anticipated relating to specific LEED credits and LEED requirements.

C. Related Sections:

1. Section 07600: Flashing and sheet metal concealed sealants.
2. Section 08915: Aluminum Window Walls.
3. Section 09260: Sealants used for acoustical treatment at gypsum board.

1.2 SYSTEM DESCRIPTION

A. Performance Requirements:

1. Select materials for compatibility with joint surfaces and indicated exposures.

2. Where not indicated, select modulus of elasticity and hardness or grade recommended by manufacturer for each application indicated.

3. Comply with applicable limitations on volatile organic compound (VOC) emissions.

4. Provide elastomeric joint sealants that establish and maintain watertight and airtight continuous joint seals without staining or deteriorating joint substrates.

1.3 SUBMITTALS

A. Product Data: Furnish manufacturer's descriptive literature, for each joint sealant product indicated.

B. Samples: Furnish samples of each type of exposed joint sealer in required colors.

C. Certifications:

1. Furnish manufacturer's certification joint sealers comply with Contract Documents and are suitable for Project applications.

2. Furnish certification indicating installers are trained in proper use of specified products, qualified, and familiar with proper installation techniques.

D. Compatibility and Adhesion Test Reports: From sealant manufacturer indicating the following:

1. Materials forming joint substrates and joint sealant backings have been tested for compatibility and adhesion with joint sealants.

2. Interpretation of test results and written recommendations for primers and substrate preparation needed for adhesion.

E. LEED Certification Points: Submit information and certifications necessary to achieve maximum points for LEED certification; coordinate and cooperate with Owner and Architect in providing information necessary for required LEED rating.

1.4 QUALITY ASSURANCE

A. Installer Qualifications: Firm with minimum five years successful experience on projects of similar type and size, using specified products.

1. Installers shall be familiar with proper application procedures to ensure maximum joint sealer expansion and contraction capabilities.

B. Source limitations: Obtain each type of joint sealant through one source from a single manufacturer.

C. Preconstruction compatibility and adhesion testing.

D. Preconstruction field adhesion testing.

E. Mockups: Build mockups incorporating sealant joints, as follows, to verify selections made under sample submittals and to demonstrate aesthetic effects and set quality standards for materials and execution:

1. Joints in mockup of assemblies specified in other sections that are indicated to receive elastomeric joint sealants, which are specified by reference to this section.

1.5 DELIVERY, STORAGE, AND HANDLING

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

B. Store and handle materials in compliance with manufacturers written instruction to prevent deterioration or damage due to moisture, high or low temperatures or other causes.

1.6 SITE CONDITIONS

A. Do not proceed with installation of joint sealers under unfavorable weather conditions.

B. Install elastomeric sealants when temperature is in lower third of temperature range recommended by manufacturer.

1.7 WARRANTY

A. Special Warranty: Repair or replace joint sealers which fail to perform as intended, because of leaking, crumbling, hardening, shrinkage, bleeding, sagging, staining, loss of adhesion, and loss of cohesion.

1. Special Warranty Period: Ten (10) years for exterior sealants, two (2) years for interior sealants.

PART 2 - PRODUCTS

2.1 MATERIALS

A. Elastomeric Sealants:

1. Single Component Low Modulus Silicone Sealant: ASTM C920 Type S, Class 25, Grade NS; minimum 50% expansion and compaction capability.

a. Provide at exterior locations not exposed to traffic.

b. Manufacturers:

1) General Electric Co./Silpruf, Silglaz or GESIL.
2) Dow Corning Corp./790 or 795.
3) Substitutions: Refer to Section 01630.

2. Multi-Component Polyurethane Sealant: ASTM C920, Type M, Grade P, Class 25, self-leveling; minimum 25% expansion and compaction capability.

a. Provide at traffic bearing locations.

b. Manufacturers:

1) Pecora Corp./NR-200 Urexpan.
2) Tremco/Vulkem 245.
3) Sonneborn Division of ChemRex /SL 2
4) Substitutions: Refer to Section 01630.

3. Mildew-Resistant Silicone Rubber Sealant: ASTM C920, Type S, Grade NS, Class 25, compounded with fungicide, specifically for mildew resistance and recommended for interior joints in wet areas.

a. Provide at interior joints in wet areas.

b. Manufacturers:

1) General Electric Co./SCS 1702 Sanitary Sealant.
2) Dow Corning Corp./786 Bathtub Caulk.
3) Pecora Corp./898 Sanitary Mildew Resistant Sealant.

4) Tremco/Tremsil 200.

4. Substitutions: Refer to Section 01630.

B. Non-Elastomeric Sealants:

1. Acrylic-Emulsion Sealant: ASTM C834 acrylic or latex-rubber-modified acrylic sealant, permanently flexible, non-staining and non-bleeding; recommended for general interior exposure; compatible with paints specified in Section 09900.

a. Provide at general interior applications.

b. Manufacturers:

1) Pecora Corp./AC-20.
2) Sonneborn Division of ChemRex/Sonolac.
3) Tremco/Ultrem 1500
4) Substitutions: Refer to Section 01630.

C. Miscellaneous Materials:

1. Primers/Sealers: Non-staining types recommended by joint sealer manufacturer for joint surfaces to be primed or sealed.

2. Joint Cleaners: Non-corrosive types recommended by joint sealer manufacturer; compatible with joint forming materials.

3. Bond Breaker Tape: Polyethylene tape as recommended by joint sealer manufacturer where bond to substrate or joint filler must be avoided for proper performance of joint sealer.

4. Sealant Backer Rod: Compressible polyethylene foam rod or other flexible, permanent, durable non-absorptive material as recommended by joint sealer manufacturer for compatibility with joint sealer.

a. Oversize backer rod minimum 30% to 50% of joint opening.

D. Colors: Provide colors indicated or as selected by Architect from manufacturer's full range of colors.

1. Custom Colors: Custom colors may be required at exterior walls.

E. LEED Recycled Content: Where available provide materials with post-consumer and pre-consumer recycled content to achieve maximum LEED credits.

F. LEED Regionally Manufactured, Extracted, Harvested, or Recovered Materials: Where possible obtain materials that qualify for LEED credits for regional materials obtained within 500 miles of Project.

G. LEED Total Volatile Organic Compounds (TVOC) and Toxic Substances: Provide materials with volatile organic compound emissions and toxic substances such as urea-formaldehyde complying with LEED requirements to reduce indoor air contaminants.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Examine joints indicated to receive joint sealants for compliance with requirements for joint configuration, installation, tolerances, and other conditions affecting joint sealant performance.

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

3.2 PREPARATION

A. Prepare joint surfaces in accordance with ASTM C1193 and as recommended by joint sealer manufacturer.

B. Clean joint surfaces immediately before installation of joint sealer; remove dirt, insecure materials, moisture and other substances which could interfere with bond of joint sealer.

C. Prime or seal joint surfaces where recommended by joint sealer manufacturer; do not allow primer/sealer to spill or migrate onto adjoining surfaces.

D. Ensure protective coatings on surfaces in contact with joint sealers have been completely stripped.

E. Use bond breaker tape where required to prevent contact of sealant with adjoining surfaces. Remove tape immediately after tooling without disturbing joint seal.

3.3 INSTALLATION

A. Comply with manufacturer's printed instructions and ASTM C1193, except where more stringent requirements are shown or specified.

B. Set sealant backer rods at proper depth or position in joint to coordinate with other work, including installation of bond breakers and sealant; do not leave voids or gaps between ends of backer rods.

1. Do not stretch, twist, puncture or tear backer rods.

2. Do not stretch, twist, puncture or tear backer rods.

3. Remove absorbent sealant backings that have become wet before sealant application and replace them with dry materials.

C. Install bond breaker tape as required to avoid three-sided bond of sealant to substrate and where required by manufacturer's recommendations to ensure joint sealers will perform properly.

D. Size materials to achieve required width/depth ratios.

E. Employ installation techniques that will ensure joint sealers are deposited in uniform, continuous ribbons without gaps or air pockets, with complete "wetting" of bond surfaces equally on opposite sides.

F. Joint Configuration: Fill sealant joint to a slightly concave surface, slightly below adjoining surfaces, unless otherwise indicated.

G. Where horizontal joints are between a horizontal surface and vertical surface, fill joint to form a slight cove, so that joint will not trap moisture or dirt.

H. Install joint sealers to depths recommended by joint sealer manufacturer but within the following general limitations, measured at center (thin) section of bead.

1. Horizontal Joints: 75% width with minimum depth of 3/8".
2. Elastomeric Joints: 50% width with minimum depth of 1/4".
3. Non-Elastomeric Joints: 75% to 125% of joint width.

I. Spillage: Do not allow sealants or compounds to overflow or spill onto adjoining surfaces, or to migrate into voids of adjoining surfaces.

1. Clean adjoining surfaces by whatever means may be necessary to eliminate evidence of spillage.

J. Cure joint sealers in compliance with manufacturer's instructions and recommendations to obtain high early bond strength, internal cohesive strength and surface durability.

K. Maintain finished joints free of embedded matter, ridges and sags.

3.4 FIELD QUALITY CONTROL

A. Field Adhesion Testing

1. Provide field adhesion tests to determine adhesion to all substrates.

2. Repeat as necessary to achieve required adhesion.

3. Manufacturer to provide clarification of priming and preparation of all substrates.

3.5 CLEANING

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

3.6 PROTECTION

A. Protect joint sealants during and after curing period from contact with contaminating substances and from damage resulting from construction operation or other causes so sealants are without deterioration or damage at time of Substantial Completion. If despite such protection, damage or deterioration occurs, cut out and remove

damaged or deteriorated joint sealants immediately so installations with repaired areas are indistinguishable from the original work.

END OF SECTION

SECTION 08110

STEEL DOORS AND FRAMES

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes: Provide full flush steel doors and pressed steel frames, including anchors and silencers.

B. LEED General: Refer to Section 01350 LEED Special Environmental Requirements and to LEED “Checklist” indicating points Design Team has anticipated relating to specific LEED credits and LEED requirements.

C. Related Sections:

1. Section 08700: Hardware for doors.

1.2 REFERENCES

A. Steel Door Institute (SDI): SDI-100 (ANSI/SDI A250.8) - Recommended Specifications - Standard Steel Doors and Frames.

B. National Association of Architectural Metal Manuf. (NAAMM): Hollow Metal Manual.

C. Underwriters Laboratories: Standards as applicable to fire rated doors and frames.

1. Materials tested, labeled and inspected by Warnock Hersey International are acceptable upon approval of authorities.

1.3 SUBMITTALS

A. Product Data: Submit manufacturers' literature.

B. Shop Drawings: Indicate general construction, configuration, jointing methods, reinforcements, anchorage methods, hardware locations, and locations of cut-outs.

C. LEED Certification Points: Submit information and certifications necessary to achieve maximum points for LEED certification; coordinate and cooperate with Owner and Architect in providing information necessary for required LEED rating.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

A. The Ceco Corporation.

B. Curries.

C. Amweld Building Products Inc.

D. Pioneer Industries Division, Core Industries, Inc.

E. Substitutions: Refer to Section 01630.

2.2 MATERIALS

A. Doors: Hollow metal flush steel door, 1-3/4" thick.

1. Typical: Full flush with steel channel or welded edge; close top & bottom with flush end closer treatment, steel stiffened core, insulated at exterior doors.

2. Interior Doors: Minimum 18 gage.

3. Exterior Doors: Minimum 16 gage.

B. Frames:

1. Exterior Frames: Welded (pre-assembled) type.

2. Interior Frames: Knockdown (field-assembled) type.

3. Gage: Minimum 16 gage.

4. Door Silencers: Manufacturer's standard resilient type; removable for replacement.

5. Mortar Guard Boxes: Minimum 22 gage mortar guard boxes welded in place; provide where frames may be grouted.

C. Fire Rated Units: Construct in accordance with requirements for fire rating, NFPA 252 or UL 10C, and NFPA 80.

1. Labels: Place fire rating labels where visible when doors and frames are in installed, opened position.

2. Fire Ratings: Refer to Drawings for fire rating requirements.

3. Temperature Rise Rating: Provide doors with maximum 450°F Temperature Rise Rating in 30 minute fire exposure period at doors into exit enclosures and as required by applicable codes and regulations.

2.3 FABRICATION

A. Conform to requirements of SDI (ANSI A250 Series) or NAAMM.

B. Reinforce and prepare doors and frames to receive hardware.

1. Refer to Section 08700 for hardware requirements.

C. Frames:

1. Welded Frames: Accurately form and cut mitered corners of welded type frames; continuously weld on inside surfaces (fully welded); grind welded joints to smooth uniform finish.

2. Knocked Down Frames: Accurately form and miter interlocking joints of knocked down frames to maintain hairline alignment of parts when field assembled.

3. Head Reinforcement: Reinforce frames wider than 4'-0" with minimum 12 gage formed steel channels welded in place, flush with top of frames.

D. Door Silencers:

1. Place minimum three single bumpers on single door frames; space equally along strike jambs.

2. Place minimum of two single bumpers on double door frames; place on frame heads.

E. Provide jamb anchors per SDI-100 (ANSI/SDI 250.8) and NAAMM; weld floor jamb anchors in place.

F. Provide double doors tested and approved without astragals.

G. Edge Clearances:

1. Between Doors and Frames: Maximum 1/8" at head and jambs.
2. Door Sills (No Threshold): Maximum 3/8".
3. Door Sills (Threshold): Maximum 3/4" above finished floor.
4. Between Edges of Pairs of Doors: Maximum 1/8".
5. Fire Rated Doors: As required for fire ratings.

H. Finish: Comply with requirements of Section 09900 for primer including application and compatibility with specified finishes.

1. Interior Units: Prime paint.

2. Exterior Exposed Units: Apply minimum A60 non-spangle galvanized coating, ASTM A924 and A653.

a. Surface treat after galvanizing to remove oils and prepare for painting and apply one coat of primer; comply with requirements in Section 09900 – Paints and Coatings.

I. LEED Recycled Content: Where available provide materials with post-consumer and pre-consumer recycled content to achieve maximum LEED credits.

J. LEED Regionally Manufactured, Extracted, Harvested, or Recovered Materials: Where possible obtain materials that qualify for LEED credits for regional materials obtained within 500 miles of Project.

K. LEED Total Volatile Organic Compounds (TVOC) and Toxic Substances: Provide materials with volatile organic compound emissions and toxic substances such as urea-formaldehyde complying with LEED requirements to reduce indoor air contaminants.

PART 3 - EXECUTION

3.1 INSTALLATION

A. Install doors and frames in accordance with SDI-100 (ANSI/SDI A250.8) and ANSI/SDI A250.11 or NAAMM "Hollow Metal Manual" and with manufacturer's recommendations and installation instructions.

1. Install fire rated units in conformance with fire label requirements and NFPA 80.

B. Install doors and frames plumb and square, and with maximum diagonal distortion of 1/16".

1. Coordinate hardware installation with requirements of Section 08700.

C. Remove and replace doors and frames damaged during delivery, storage, installation and construction.

1. Paste filler repair shall not be permitted.

D. After installation, touch-up scratched paint surfaces.

END OF SECTION

SECTION 08330

OVERHEAD COILING DOORS

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes: Provide overhead coiling (roll-up) door systems with curtains, guides, counterbalance, hardware, and accessories as required for complete, operational installation.

1. Provide electrical wiring from make-up box to electrical operators and control stations at electrically operated units.

B. LEED General: Refer to Section 01350 LEED Special Environmental Requirements and to LEED “Checklist” indicating points Design Team has anticipated relating to specific LEED credits and LEED requirements.

C. Related Sections:

1. Section 05500: Steel frames at openings.

2. Division 16: Electrical service to make-up box located on electric door operators; empty conduit from control stations to door operators.

1.2 SYSTEM DESCRIPTION

A. Wind Loading (Exterior Doors): Design and reinforce to withstand minimum 20 psf positive and 15 psf negative wind force.

1.3 SUBMITTALS

A. Product Data: Submit manufacturer's literature.

B. Shop Drawings: Indicate pertinent dimensioning, general construction, component connections and details, anchorage methods, and hardware locations.

C. LEED Certification Points: Submit information and certifications necessary to achieve maximum points for LEED certification; coordinate and cooperate with Owner and Architect in providing information necessary for required LEED rating.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

A. The Cookson Co.

B. Overhead Door Corp.

C. Wayne Dalton Corp, North American Door Corp.

D. Cornell Iron Works.

E. Substitutions: Refer to Section 01630.

2.2 MATERIALS

A. Overhead Coiling Doors: Fabricate doors of continuous length for width of door without splices.

1. Electrically Operated Doors: Provide complete assembly with electric motor sized as recommended by door manufacturer for size and application indicated.

a. Power Failure Backup: Provide overhead concealed crank socket for operation in case of power failure; provide removable crank.

2. Finish: Prime painted; primer compatible with paint system specified in Section 09900 – Paints and Coatings.

B. Components:

1. Curtain: Flat-faced interlocking slats, ends of alternate slats fitted with end locks; bottom fitted with angles to provide reinforcement and positive contact with floor when curtain is closed.

a. Slats: Galvanized steel; ASTM A653, Grade A, with G90 zinc coating, ASTM A924 and A653, phosphate treated before fabrication.

2. Curtain Guides: Formed steel angles of required sizes and configurations.

3. Roller Shaft (Counterbalance): Steel pipe and helical steel spring system capable of producing sufficient torque to assure easy operation of curtain from any position; adjustable spring tension.

4. Housing: Minimum 24 gage steel, internally reinforced to maintain rigidity and form.

5. Weatherstripping (Exterior Doors): Waterproof and rotproof, resilient type; located along jamb edges, bottom of curtain, and within housing.

6. Metal Finish: Hot dip galvanize minimum G90 and prime paint; do not shop prime surfaces in contact with concrete or requiring field welding; shop prime in one coat; comply with requirements of Section 09900 – Paints and Coatings.

a. Touch up field welds with zinc-rich primer.

b. Other methods of providing protective zinc coating on steel surfaces comparable to G90 hot dip galvanizing will be acceptable.

C. Hardware: Manufacturer's standard hardware for door types specified.

D. Electric Operators: UL approved; minimum 3/4 HP Class A insulated electric motor; fully enclosed magnetic cross-line reversing starter; with overload protection; voltage as indicated on Electrical Drawings.

1. Speed: Minimum 2/3' per second, maximum 1' per second.

2. Control Station: Card key control (open-close-stop) type, for each electric operator; 24 volt circuit; flush mounted.

    a. Card Key System: Coordinate with Owner's security consultants.

3. Brake System: Adjustable friction clutch double-shoe brake system actuated by independent full line voltage solenoid controlled by motor starter.

4. Safety Switches: Located at bottom of doors, full width; electromechanical type; wired to stop or reverse door upon striking object; neoprene covered to provide weather seal.

E. LEED Recycled Content: Where available provide materials with post-consumer and pre-consumer recycled content to achieve maximum LEED credits.

F. LEED Regionally Manufactured, Extracted, Harvested, or Recovered Materials: Where possible obtain materials that qualify for LEED credits for regional materials obtained within 500 miles of Project.

G. LEED Total Volatile Organic Compounds (TVOC) and Toxic Substances: Provide materials with volatile organic compound emissions and toxic substances such as urea-formaldehyde complying with LEED requirements to reduce indoor air contaminants.

PART 3 - EXECUTION

3.1 INSTALLATION

A. Install overhead coiling doors, complete, in accordance with manufacturer's instructions and recommendations.

1. Coordinate installation of electric operators and controls with electrical service.

B. Fit, align, lubricate, and adjust complete door assemblies level and plumb. Provide smooth operation.

END OF SECTION

SECTION 08450

ALL-GLASS ENTRANCES AND STOREFRONTS

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes: Provide frameless all-glass entrances and storefronts, including safety glass doors, related hardware, adjacent glazing and accessories as required for complete, operational installation.

B. LEED General: Refer to Section 01350 LEED Special Environmental Requirements and to LEED “Checklist” indicating points Design Team has anticipated relating to specific LEED credits and LEED requirements.

C. Related Work:

1. Section 08915: Aluminum framed window walls including aluminum and glass entrances.

2. Section 08700: Cylinders for door locks.

3. Section 08970: Structural glass curtain walls including integral all-glass entrances.

1.2 REFERENCES

A. Glass Association of North America (GANA): Glazing Manual.

B. Builders Hardware Manufacturers Association (BHMA): BHMA 1301/ ANSI A156.18, Standards for Materials and Finishes.

1.3 SYSTEM DESCRIPTION

A. Performance Requirements: Provide assemblies capable of withstanding minimum uniform test pressure of 30 psf inward and outward pressure when tested in accordance with ASTM E330.

1.4 SUBMITTALS

A. Product Data: Furnish manufacturer's literature.

B. Shop Drawings: Indicate component details, materials, finishes, dimensions, hardware and fittings, and method of anchorage.

C. Samples: Furnish samples of metal finish.

D. LEED Certification Points: Submit information and certifications necessary to achieve maximum points for LEED certification; coordinate and cooperate with Owner and Architect in providing information necessary for required LEED rating.

1.5 QUALITY ASSURANCE

A. Installer Qualifications: Firm with minimum five years successful experience in installation of entrances similar to those specified; approved by system manufacturer.

B. Regulatory Requirements: Comply with requirements of California Building Code and Americans with Disabilities Act Accessibility Guidelines (ADAAG) to ensure access to persons with disabilities.

1.6 PROJECT CONDITIONS

A. Check openings by field measurements before fabrication to ensure proper fitting and tight joints; coordinate fabrication with shop drawings of adjacent construction where necessary to avoid delays.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

A. Blumcraft of Pittsburgh.

B. C.R. Laurence Co., Inc.

C. DORALCO.

D. Substitutions: Refer to Section 01630.

2.2 MATERIALS

A. All-Glass Entrance Systems: Provide complete system.

1. Glass: Minimum 1/2" select glazing quality clear tempered glass complying with ASTM C1048, Kind FT.

a. Safety Glass: Conform to California Building Code and pass ANSI Z97.1.

b. Provide horizontally tempered glass without tong marks; vertical tempering permitted only where tong marks can be totally concealed in finished installation.

c. Polish side edges to be exposed or to receive sealant; cut glass to tolerances necessary to provide even, 1/8" joints within plus or minus 1/16".

2. Door Rails: Styles as shown on Drawings.

a. Finish: BHMA 630 (US32D), satin stainless steel.

3. Frameless Glass Door Hardware: Manufacturer's standard metal and finish to match door rails, unless otherwise indicated.

a. Closer/Pivots: ASTM A156.4 Grade 2, center pivot set, floor closer with pivot set, with 105 degree positive stop; adjustable for maximum 5 lb. opening pressure.

b. Lock: Overhead concealed electro-magnetic lock wired to Owner provided card-key access system.

c. Push/Pulls: Custom designs as indicated, as directed by Architect where not otherwise indicated.

d. Floor Plate: Provide floor plate cover for closer; metal to match door rails unless otherwise directed by Architect.

4. Anchorages and Fastenings: Manufacturer's standard types, concealed except as otherwise required; finish exposed fasteners to match adjacent metal surfaces.

5. Sealant: High modulus structural silicone designed for structural glazing.

a. Sealant Color: Black.

b. Manufacturers:

1) Dow Corning/Silicone Rubber Sealant 999.
2) General Electric/Silicone Construction SCS 1200 Sealant.
3) Pecora/863 glazing silicone.
4) Tremco/Proglaze silicone.
5) Substitutions: Refer to Section 01630.

6. Sidelight Glazing Channels: Anodized aluminum sized as indicated and as required to support glass;

a. Exposed Finish: Match finish for door system.

B. LEED Recycled Content: Where available provide materials with post-consumer and pre-consumer recycled content to achieve maximum LEED credits.

C. LEED Regionally Manufactured, Extracted, Harvested, or Recovered Materials: Where possible obtain materials that qualify for LEED credits for regional materials obtained within 500 miles of Project.

D. LEED Total Volatile Organic Compounds (TVOC) and Toxic Substances: Provide materials with volatile organic compound emissions and toxic substances such as urea-formaldehyde complying with LEED requirements to reduce indoor air contaminants.

2.3 FABRICATION

A. Locate and provide holes and cutouts to receive hardware before tempering glass; do not permit cutting, drilling or other glass alterations after tempering.

1. Polish exposed ends of glass; round edges slightly.

B. Fabricate all-glass entrance system to accommodate required hardware and accessory items.

C. Install hardware at fabrication plant; remove only as required for final finishing operations, and for delivery and installation of work at Project site.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Examine areas and conditions under which work is to be installed.

B. Beginning installation signifies acceptance of conditions.

3.2 INSTALLATION

A. Comply with manufacturer's recommendations and installation instructions.

1. Install glazing in accordance with manufacturer's instructions and GANA Glazing Manual.

B. Set units plumb, level and true to line, without warp or rack; anchor securely in place.

C. Separate aluminum and other corrodible metal surfaces from sources of corrosion or electrolytic action at points of contact with other materials.

3.3 ADJUSTING

A. Adjust operating hardware to ensure proper operation.

3.4 CLEANING

A. Clean surfaces using manufacturer's recommended cleaning methods.

END OF SECTION

SECTION 08700

HARDWARE

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes: Provide hardware for hollow metal doors.

1. Provide cylinders for doors fabricated with hardware.

B. LEED General: Refer to Section 01350 LEED Special Environmental Requirements and to LEED “Checklist” indicating points Design Team has anticipated relating to specific LEED credits and LEED requirements.

C. Related Sections:

1. Section 08110: Steel door silencers.
2. Section 08450: All-glass door hardware except cylinders.
3. Section 08915: Aluminum and glass door hardware, except cylinders.
4. Review other sections for doors fabricated with hardware.

1.2 REFERENCES

A. ANSI A115 Series: Door and Frame Preparation Standards.

B. ANSI A156.1 through A156.20: Standards for various hardware items.

C. National Fire Protection Association: NFPA 80, Fire Doors and Windows.

D. California Building Code: California Code of Regulations, Title 24, Part 2.

E. Americans with Disabilities Act Accessibility Guidelines (ADAAG).

1.3 SYSTEM DESCRIPTION

A. Products: Provide each type of hardware (hinges, pivots, locksets, latchsets, closers, trim) from single manufacturer unless otherwise indicated in Hardware Schedule.

1. Provide products by manufacturers specified and manufacturers listed in Hardware Schedule, with references to catalog numbers and designations.

B. Fire Rated Doors: Comply with requirements of Uniform Building Code Standard 7-2, NFPA 80 and applicable codes for fire rated door hardware; provide hardware bearing Underwriters Laboratory (UL) labels.

1. Doors indicated in fire rated partitions and walls shall be positive latching and self closing, with smoke gaskets.

2. Smoke Control in Pressurized Areas: Provide automatic door bottoms in addition to standard smoke gaskets for fire and smoke rated doors in pressurized areas such as stair wells; comply with applicable code requirements.

C. Access for Persons with Disabilities: Comply with California Building Code and Americans with Disabilities Act Accessibility Guidelines (ADAAG).

1.4 SUBMITTALS

A. Product Data: Submit catalog cuts for each type of hardware.

B. Shop Drawings: Indicate locations and mounting heights of hardware.

1. Supply templates to door and frame manufacturers for proper and accurate sizing and locations of cut-outs for hardware.

C. Samples: Indicate required style and finish of exposed door hardware.

D. Keying Schedule: Coordinate directly with Owner's Representative.

E. Closeout Submittal: Record actual locations of installed cylinders and master key codes on Project Record Documents.

F. LEED Certification Points: Submit information and certifications necessary to achieve maximum points for LEED certification; coordinate and cooperate with Owner and Architect in providing information necessary for required LEED rating.

1.5 QUALITY ASSURANCE

A. Supplier Qualifications: Recognized builder’s hardware supplier with minimum five year’s successful experience in scheduling and furnishing hardware.

1. Provide services of architectural hardware consultant to supervise hardware supply.

B. Pre-Installation Meeting: Convene pre-installation meeting prior to commencing work of this section. Include persons involved with installation of doors, frames, and hardware.

1.6 DELIVERY, STORAGE, AND HANDLING

A. Deliver hardware in manufacturer's original packages, marked for intended opening and use.

B. Pack complete with necessary screws, bolts, keys, instructions, and installation template, if necessary, for spotting mortising tools.

C. Upon delivery, furnish complete list of hardware for checking, clearly marked to correspond with marking on each package.

1. Review list for completeness and accuracy.

1.7 MAINTENANCE

A. Provide manufacturer's parts list and maintenance instructions for each type of hardware supplied and necessary wrenches and tools required for proper maintenance of hardware.

PART 2 - PRODUCTS

2.1 MATERIALS

A. General: Review Drawings for hardware group locations and door types; where not fully covered in Hardware Schedule, comply with following general requirements; inform Architect where conflicts occur.

1. Provide hardware items with accessories complete to function as intended.

B. Hinges and Butts: ANSI A156.1; comply with following unless otherwise indicated.

1. Manufacturers:

a. Hager Hinge Co.
b. Lawrence Brothers Inc.
c. McKinney Products Co., Division of Essex Industries.
d. Stanley Hardware Division of Stanley Works.
e. Substitutions: Refer to Section 01630.

2. Doors 1-3/4" Thick: 4-1/2" heavy weight, extra heavy weight ball or oilite bearing where over 40" wide.

a. Provide widths sufficient to clear trim projection when door swings 180 degrees.

3. Provide minimum 3 hinges to 90" high, 4 hinges to 120" high for each door leaf, unless otherwise indicated.

4. Provide nonferrous butts with non-removable pins at exterior and locked outswinging doors, non-rising at interior doors.

5. Provide ball bearing or oilite bearing hinges at doors with closers.

6. Tips: Flat button tips with matching plug.

C. Locking Devices: Provide of metal matching specified finish; interior parts of steel and zinc-dichromate plating, to resist rusting and corrosion; do not supply plastic, die-cast or aluminum mechanisms.

1. Manufacturers:

a. Schlage Lock Co.
b. Sargent Manufacturing Co., Division of Essex Industries.
c. Yale Security, Inc.
d. Best Access Systems a Stanley Company.
e. Von Duprin, Inc.
f. Substitutions: Refer to Section 01630.

2. Types, As Indicated on Hardware Schedule: Not less than following.

a. Mortise Locksets: ANSI A156.13, Series 1000, Grade 1, Mortise Type with 6 pin tumbler cylinders, except where otherwise indicated in Hardware Schedule.

b. Cylindrical Locksets: ANSI A156.2, Series 4000, Grade 1, Bored Type (cylindrical) with 6 pin tumbler cylinders, except where otherwise indicated in Hardware Schedule.

c. Exit/Panic Devices: ANSI A156.3, Grade 1, with 6 pin tumbler cylinders, except where otherwise indicated in Hardware Schedule.

1) Type: Mortise device with concealed vertical rods unless otherwise indicated.

2) Style: Modern.

3. Lockset and Latchset Design: Solid lever with rose, as selected by Architect.

4. Backset: 2-3/4".

5. Strikes: Furnish standard strikes with extended lips where required to protect trim from being marred by latch bolt; verify type of cutouts provided in metal frames.

D. Cylinders, Keys, and Keying: Hardware manufacturers shall provide for grand master, master key alike or key different keying as directed by Owner.

1. Manufacturer: Provide cylinders by lockset manufacturer unless otherwise indicated.

2. Provide cylinders of extruded brass bar material.

3. Provide construction cylinders for doors requiring locking during construction; construction cylinders shall be removed and replaced just prior to Owner occupancy.

4. Submit keys for final use to Owner; provide not less than two keys for each lockset, six of each type and level of masterkey, two grand master keys, and 5% extra blanks.

5. Hardware manufacturers shall key and register lock cylinders.

6. Key Control System: Provide complete key control system with identification and storage capacity suitable for Project.

E. Closers: ANSI A156.4, furnish products of one manufacturer; full rack and pinion type with steel spring and non-freezing hydraulic fluid.

1. Manufacturers:

a. LCN Closers Division Schlage Lock Co./4000 Series.
b. Norton Division, Yale Security, Inc./7500 Series.
c. Dorma Door Controls/8900 Series Full Cover.
d. Substitutions: Refer to Section 01630.

2. Provide controls for regulating closing, latching, speeds and back check.

3. Arm types shall suit individual conditions, as approved; supply parallel-arm closers at reverse bevel doors and where doors swing full 180 degrees.

4. Mount closers on room side or pull side unless otherwise indicated.

5. Sizes: Adjustable to following maximum door operating pressures:

   a. Typical Doors: 5 pounds.
   b. Fire Rated Doors: 15 pounds.
   c. Make labeled doors self-closing.
   d. Closers shall be adjusted by factory representative.

6. Design: ANSI Modern Type with Cover, unless otherwise indicated.

F. Thresholds, Stops, Trim, and Miscellaneous Hardware: Provide as indicated, as specified, as included in Hardware Schedule, and as required for complete installation.

1. Manufacturers:

   a. Builders Brass Works Corp.
   b. Glynn-Johnson Co.
   c. H.B. Ives.
   d. National Guard Products.
   e. Pemko Mfg. Co.
   f. Quality Hardware Mfg. Co., Inc.
   g. Richard Wilcox.
   h. Rixson-Firemark Sub., Yale Security, Inc.
   i. Trimco, Triangle Brass Mfg. Co.
   j. Zero International, Inc.
   k. Substitutions: Refer to Section 01630.

2. Weather-Stripping: Provide continuous weather-stripping at top and sides of exterior doors.

3. Fire Rated Gaskets: Provide continuous fire rated gaskets at top and sides of fire rated doors.

4. Kick Plates: Height indicated by 1" less than door width; minimum 0.050" thick.

5. Pulls: Provide with bolts to secure from opposite door face; provide with pull plates unless otherwise indicated.

G. LEED Recycled Content: Where available provide materials with post-consumer and pre-consumer recycled content to achieve maximum LEED credits.

H. LEED Regionally Manufactured, Extracted, Harvested, or Recovered Materials: Where possible obtain materials that qualify for LEED credits for regional materials obtained within 500 miles of Project.

I. LEED Total Volatile Organic Compounds (TVOC) and Toxic Substances: Provide materials with volatile organic compound emissions and toxic substances such as urea-formaldehyde complying with LEED requirements to reduce indoor air contaminants.

2.2 ACCESSORIES

A. General: Provide complete hardware with accessories as required for doors and applications indicated.

B. Templates: Furnish templates or physical hardware items to manufacturers concerned sufficiently in advance to avoid delay in Work.

C. Reinforcing Units: Furnished by door manufacturer, coordinated by hardware manufacturer.

D. Fasteners: Furnish as recommended by manufacturer and as required to install secure hardware.

1. Finish: Match hardware.

2. Furnish screws for items applied on gypsum board sufficiently long to provide solid connection to framing or backing

E. Through Bolts: Through bolts and grommet nuts shall be avoided on door faces in highly visible areas, unless no alternative is possible, as directed and approved, and shall not be used for solid wood core doors.

F. Electrical and Mechanical: Make provisions and coordinate requirements for mechanical and electrical devices in connection with hardware.

2.3 FINISHES

A. General: Provide following finishes except where otherwise indicated.

B. Typical: BHMA 630 (US32D), satin finished stainless steel.

C. Closers: BHMA 600 (USP), primed.

D. Thresholds: BHMA 628 (US28), satin aluminum, clear anodized.

E. Other Items: Provide manufacturer's standard finishes matching similar hardware types on same door, and maintain acceptable finish considering anticipated use.

PART 3 - EXECUTION

3.1 INSTALLATION

A. Install finish hardware specified under this section; coordinate with manufacturer and installation of doors and frames.

B. Fit hardware prior to painting. Remove for painting of doors and frames before final installation of hardware.

C. Install hardware in accordance with manufacturer's instructions.

D. No extra cost will be allowed because of changes or corrections necessary to facilitate installation of hardware.

3.2 MOUNTING POSITIONS

A. Heights given are center line heights from finished floor.

1. Locks and Latches: 38" to center of lever.

2. Door Pulls: 42" to center of grip.

3. Push Plate: 42"; coordinate with pull location.

4. Push-Pull Bar: 42" to center of bar.

5. Top Hinge: To jamb manufacturer's standard, but not greater than 10" from head of frame to center line of hinge.

6. Bottom Hinge: To jamb manufacturer's standard, but not greater than 12-1/2" from floor to center line of hinge.

7. Intermediate Hinges: Equally spaced between top and bottom hinges and from each other.

8. Hinge Mortise on Door Leaf: 1/4" to 5/16" from stop side of door.

9. Dead Bolt: Not more than 44" from floor to operating lever.

B. Comply with recommendations of Builders Hardware Manufacturers Association, subject to approval, for heights of items not indicated.

3.3 ADJUSTING

A. Qualified hardware supplier's or manufacturer's representatives shall inspect installation and make adjustments.

1. Adjust closers, locks, and critical operational hardware.

2. Deliver instructions for maintenance and future adjustments to Owner's Representative.

3.4 HARDWARE SCHEDULE

A. The Hardware Schedule establishes a type and standard of quality.

B. Examine Drawings and Specifications and furnish proper hardware for door openings, whether listed or not.

C. Bring omissions to attention of Architect prior to bid opening for instructions; otherwise, list will be considered complete; no extras will be allowed.

Manufacturers Abbreviations (Mfr.)

GLY	=	Glynn-Johnson Corporation	Overhead Door Stops
IVE	=	Ives	Hinges, Bolts, Coordinators, Dust Proof Strikes, Push / Pull & Kick Plates, Coat Hooks & Door Stops & Silencers
LCN	=	LCN	Door Closers
NGP	=	National Guard	Thresholds, Gasketing, Weather-stripping & Astragals
SCH	=	Schlage Lock Company	Locks, Latches & Cylinders
VON	=	Von Duprin	Exit Devices & Power Supplies

END OF SECTION

(Refer to Hardware Schedule Following This Section)

SECTION 08915

ALUMINUM WINDOW WALLS

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes: Provide factory finished aluminum window wall systems including glazing, structural anchors, attachments and shims.

1. Window wall systems include pre assembled storefront systems, unitized curtain wall systems, fixed and operable windows, and aluminum and glass entry door systems, including glazing and hardware.

B. LEED General: Refer to Section 01350 LEED Special Environmental Requirements and to LEED “Checklist” indicating points Design Team has anticipated relating to specific LEED credits and LEED requirements.

C. Related Work:

1. Section 01450 Mockups and Testing
2. Section 07600 Flashing and Sheet Metal
3. Section 07840 Fire Stopping
4. Section 07900 Joint Sealants
5. Section 08450: All-glass entrances
6. Section 08700: Key cylinders.
7. Section 08970: Structural glass curtain walls

1.2 SYSTEM DESCRIPTION

A. Design Requirements: Provide complete system with joints, gaps, and penetrations made watertight.

1. Coordinate methods for making junctures with adjacent surfaces watertight with Section 07900 – Joint Sealers.

B. Performance Requirements:

1. Strength: Design system to withstand loads as required by California Building Code but not less than following minimum loads.

a. Wind: Uniform pressures of 30 psf inward and outward wind pressures.

b. Seismic: Conform to applicable code requirements.

2. Deflections and Thermal Movements: Size primary members for deflection limitations and temperature variations as follows; fabricate, assemble and erect work to maintain limitations.

a. Normal-to-wall deflection of L/175 of span; except L/250 of span for glass supporting members.

b. Parallel-to-wall deflection of less than 75% of glass edge clearances.

c. Thermal expansion and contraction movements resulting from not less than ambient temperature range of 100 degrees F, which may cause a material temperature range of 160 degrees F.

3. Water and Air Leakage: Installed system shall be free of significant leakage of both water and air.

a. Water leakage is defined as uncontrolled penetration of water (not including condensation) to interior of building.

b. Air leakage is defined as infiltration of air at any area of window wall, at a rate in excess of 0.06 cfm/sf of area when tested at 6.24 PSF, based on measurement of single complete module of system.

4. Condensation: Design system to prevent excessive condensation on indoor faces, with heating and ventilating system in operation, and under following conditions.

a. Outdoor: Ambient temperature 20 degrees F; 15 mph wind.

b. Indoor: Ambient temperature 75 degrees F; relative humidity of 25%.

c. Excessive Condensation: Visible water on more than 10% of interior exposed surface of any section, or accumulation or uncontrolled flow of water from condensation at any location.

1.3 REFERENCES

A. American Architectural Manufacturers Association (AAMA): Metal Curtain Wall, Window, Store Front and Entrance Guide Specifications Manual.

B. Glass Association of North America (GANA): Glazing Manual and Sealant Manual.

C. National Association of Architectural Metal Manuf. (NAAMM): Metal Finishes Manual.

D. Definitions: National Association of Architectural Metal Manufacturers (NAAMM), Glossary of Architectural Metal Terms.

1.4 SUBMITTALS

A. Product Data: Submit manufacturer's specifications and product data for window wall system, glass, and major manufactured components.

B. Shop Drawings: Indicate pertinent dimensioning, clearances, general construction, anchorage locations, and typical details.

1. Include elevations at 1/4 scale, typical unit elevations at 1" scale and half or full size detail sections of typical composite members.

2. Indicate joint systems, expansion provisions and glazing details.

3. Provide a separate Shop Drawing submittal for the Mockup.

C. Samples:

1. Aluminum: Where color range can be anticipated, submit two sets of range samples indicating anticipated variance in finish.

2. Glass: Submit each type specified except clear glass.

3. Frame: Submit corner construction indicating profile, size and joining method of a mullion and sill at a glass panel.

D. Test Reports: Submit laboratory reports of tests run on typical section of custom window wall system.

1. Test for Air Infiltration: ASTM E283 at 6.24 psf pressure difference.

2. Test for Water Penetration under Static Pressure: ASTM E331 using static air pressure difference of minimum 20% of inward acting design wind load pressure, but not less than 15 psf.

3. Test for Water Penetration under Dynamic Pressure at 15 PSF: AAMA 501.1.

4. Test for Structural Performance: ASTM E330. Minimum test loads shall be those specified.

a. Minimum ultimate loads shall be loads specified multiplied by factors of safety specified in California Building Code.

b. Measure deflections at member center lines and other critical points as deemed appropriate.

c. Safety Factor: Design for specified pressures with no glass breakage, no permanent damage to fasteners, and no permanent deformation of framing in excess of 0.2% of member clear span.

1) Glass safety factor relates to testing procedure, not occurrence of glass breakage in final installation.

E. Structural Certificates: Provide certification by civil or structural engineer registered in California indicating system complies with Contract Documents and applicable codes.

F. LEED Certification Points: Submit information and certifications necessary to achieve maximum points for LEED certification; coordinate and cooperate with Owner and Architect in providing information necessary for required LEED rating.

1.5 VISUAL MOCKUP

A. Prior to placement of any glass or aluminum order, provide a visual mockup at the project site, or other location designated by the Architect, for review by the Architect and Client.

1.6 QUALITY CONTROL MOCKUP

A. The Subcontractor shall coordinate with the General Contractor to provide all necessary materials, labor and equipment to install, finish and clean the Exterior Cladding for a partial wall area as identified by the Architect, to a full level of completeness, at which point the Architect shall review for approval of materials, finish, workmanship, and general compliance with the Contract Documents. This area of work will be a portion of the Building's final Exterior Cladding.

B. This quality control mockup shall be fully protected for the duration of the project. The approved works are to be used as a standard for all other exterior cladding works. The mockup shall be completed substantially earlier than other scheduled works at a time designated by the Architect, and coordinated with the General Contractor.

1.7 QUALITYASSURANCE

A. Regulatory Requirements, Safety Glass: Comply with California Building Code, CPSC 16 CFR 1201, and pass ANSI Z97.1.

B. California Title 24 CEC Regulatory Requirements: Comply with California Energy Commission requirements regarding energy performance of window wall.

1. Manufacturer shall be responsible for providing information required by authorities necessary to verify conformance.

2. Entire assembly, including glass and glazing, shall be certified by National Fenestration Rating Council (NFRC) and shall bear NFRC Label indicating energy performance technical information.

C. Mock-Up: Install visual mock-up of aluminum window wall system as indicated on Drawings for aesthetic review only, no testing will be required.

1. Remove mock-up when in-place aluminum window wall has been approved.

1.8 WARRANTY

A. Special Warranty:

1. Repair or replace units which fail in materials or workmanship.

a. Excessive air infiltration.
b. Water penetration.
c. Excessive deflections.
d. Deterioration of finish and deterioration of metal.
e. Defects in weather-stripping.

f. Defects in glass.

2. Warranty Periods (to begin no sooner than Substantial Completion):

a. Material and workmanship of Aluminum Window Wall Systems: Five (5) Years

b. Water-tightness of Aluminum Window Wall Systems: Ten (10) Years

c. Sealants and gaskets within Aluminum Window Wall Systems: Ten (10) Years

d. Aluminum Finishes: Ten (10) Years

e. Weatherseal and structural sealants: Refer to Section 07900

3. Provide manufacturer's single source warranty for fabrication including insulated, coated, and ceramic frit.

PART 2 - PRODUCTS

2.1 MATERIALS

A. Aluminum Window Wall Systems: Provide single source custom unitized and pre assembled systems (stick or field assembly not allowed) including finish, fabrication, assembly, & installation with profiles as indicated on Drawings. Drawings are based on a customized version of Kawneer Company/1600.

1. Manufacturers:
   a. Kawneer Company, Inc.
   b. Vision Systems, Inc.
   c. Wausau Window & Door
   d. Substitutions: Refer to Section 01630.

2. Provide thicknesses to comply with loading requirements.

3. Provide alloy and temper as recommended by aluminum manufacturer and processor to comply with requirements of performance, fabrication, application of finish and finish continuity.

4. Finish: Fluoropolymer system based on Kynar 500 or Hylar 5000, and conforming to NAAMM Metal Finishes Manual and AAMA 605.2.

a. Color: Custom color as directed by Architect; three coat metallic system, metallic finishes to be based on mica chips in paint, not metallic.

B. Glass: Provide minimum thicknesses specified, but no less than thicknesses required based on window size and configuration and anticipated wind loading.

1. Manufacturers:

a. Viracon.
b. Guardian Industries Corp.

c. PPG Industries, Inc., Glass Group.
d. Pilkington Glass, Ltd.
e. Substitutions: Refer to Section 01630.

2. Insulated Glass: Preassembled units consisting of organically sealed panes of glass enclosing a hermetically sealed dehydrated air space with -20 degree F dew point.

a. Performance Classification: ASTM E774, Class A.

b. System: Manufacturer's standard dual seal system compatible with glazing system, and including spacers, desiccant, and standard corner construction.

c. Glass:

1) Float Glass (Typical): Select glazing quality, clear heat strengthened float glass, ASTM C1036; nominal thickness 1/4".

2) Heat Treatment of Float Glass:

a) Heat processed glass shall be produced in compliance with the conditions set forth in ASTM standard C1048 as herein qualified:

(1) Maximum peak to valley roller wave distortion shall be .003” as measured in accordance with ASTM C1651.

(2) Bow and warp tolerance shall be one half of criteria stated in ASTM C1048

3) Tempered Glass (Where Indicated and Where Safety Glazing is Required): Select glazing quality, clear float glass, fully tempered, ASTM C1048; nominal thickness 1/4"; safety glass.

4) Green Vision Glass: Match Viracon VRE2-46. Provide 1” insulated glass units comprised of 1/4” Green glass, 1/2” space, 1/4” Clear glass.

a) Low Emissivity Coating: Provide high performance low e coating similar to PPG Solarban 60 VRE2-46 on Number 2 surface.

5) Green Spandrel Glass: Match Viracon VRE2-46. Provide 1” insulated glass units comprised of 1/4” Green glass, 1/2” space, 1/4” Clear glass.

a) Low Emissivity Coating: Provide high performance low e coating similar to PPG Solarban 60 VRE2-46 on Number 2 surface.

b) Reflective Coating: Provide reflective coating on Number 3 surface. Glazing vendor shall work with Architect to obtain desired reflectance.

6) Translucent Glass: Match Advanced Glazing Ltd. Solera L. Provide 1” insulated glass units comprised of 1/4” Clear glass, 1/2” space, 1/4” Clear glass.

a) Frosted Film: Provide film with an LDP of 0.80 or better on Number 2 surface. Glazing vendor shall work with Architect to ensure even illumination, individual lights shall not telegraph thru translucent glass.

7) Glass Films: Provide where indicated on Drawings, types as indicated on Finish Schedule; comply with manufacturer recommendations for application to glass, film free of air bubbles, tears, overlaps, and other irregularities.

C. Doors, Frames and Hardware: Barrier-free doors meeting code requirements for providing access for people with physical disabilities; by window wall and storefront manufacturer.

1. Type: Medium stile (nominal 3.5”) with 10" bottom rail.

2. Aluminum Type: Extruded aluminum, ASTM B221; 6061 or 6063 alloy and T5 or T6 temper.

3. Finish: Match window wall system.

4. Hardware: Provide complete hardware system except as indicated; match window wall system finish unless otherwise directed by Architect. Coordinate with Section 08700 – Hardware.

a. Hinges: Extra heavy duty ball bearing full mortise (butt) hinges complying with requirements specified in Section 08700.

b. Closers: Concealed adjustable type closer, maximum 5 pound operating pressure when installed in final application.

c. Security Locks: Manufacturer's standard.

1) Cylinders: Provided under Section 08700.

d. Push/Pulls: Custom types as indicated, as directed by Architect; match finish of similar hardware as specified in Section 08700 - Hardware.

e. Weather-Stripping, Sweep Strips: Manufacturer's recommended standard type, to suit application.

f. Thresholds: Maximum 1/2" height above adjacent surfaces, with maximum 1/4" vertical section and remainder maximum 1:2 slope.

D. Glazing Materials: Of type recommended by system manufacturer to suit security locations and applications for glazing installation; designed to maintain glass in place and prevent movement.

1. Setting Blocks: Silicone, 80-9070 Shore A durometer hardness; 4" long by 3/8" thick by 1/4" high; ASTM C864.

2. Spacer Shims: Neoprene or EPDM; 45-55 Shore A durometer hardness; 3" long by 3/32" thick by 1/4" high; ASTM C864.

3. Edge Blocks: Silicone, 60-70 Shore A durometer hardness; 4" long with minimum two per jamb located at top and bottom edges of glass; ASTM C864.

4. Glazing Gaskets: Exterior neoprene or EDPM; interior neoprene, EPDM or vinyl; miter corner joints at exterior applications; conform to ASTM C509 or C864.

5. Glazing Sealants: ASTM C920, Type S, Grade NS, elastomeric one-component silicone glazing sealants as recommended by sealant manufacture for application involved.

    a. Manufacturers:

        1) Dow Corning Corp.
        2) General Electric Co.
        3) Pecora Corp.
        4) Tremco Inc.
        5) Substitutions: Refer to Section 01630.

    b. Structural Glazing for unitized shop assembly: Provide high-modulus 2-part structural silicone glazing materials (Dow Corning 983) recommended by sealant manufacturer for applications where sealant bonds glass to metal system.

    c. Color: As selected by Architect from manufacturer's full range of available colors.

E. Miscellaneous Materials:

1. Fasteners: Aluminum or non-magnetic stainless steel of type which will not cause electrolytic action or corrosion.

    a. Do not use exposed fasteners except where unavoidable for assembly or for application of hardware.

    b. Indicate exposed fasteners on shop drawings for specific approval; exposed fasteners shall be Phillips flat-head screws or Allen screws with finish matching item fastened.

    c. Provide concealed fasteners for glazing stops.

2. Steel Reinforcement and Brackets: Manufacturer's standard with minimum 2 oz. hot-dip zinc coating, ASTM A123, applied after fabrication.

3. Bituminous Paint: Cold-applied mastic, SSPC Paint 12, compounded for 30 mil thickness per coat.

4. Flashing: Provide sub-sill flashing members for fixed exterior framing; minimum 22 gage sheet aluminum of sizes and shapes indicated and required to drain water to exterior.

a. Finish: Match adjacent aluminum primary members.

5. Anchoring Devices: Corrosion resistant type capable of supporting window wall system and superimposed design loads; design to allow adjustments of system prior to being permanently fastened in place.

F. LEED Recycled Content: Where available provide materials with post-consumer and pre-consumer recycled content to achieve maximum LEED credits.

G. LEED Regionally Manufactured, Extracted, Harvested, or Recovered Materials: Where possible Obtain materials to qualify for LEED credits for regional materials obtained within 500 miles of Project for all curtain wall window wall assemblies including aluminum, fabrication, assembly and glazing.

H. LEED Total Volatile Organic Compounds (TVOC) and Toxic Substances: Provide materials with volatile organic compound emissions and toxic substances such as urea-formaldehyde complying with LEED requirements to reduce indoor air contaminants.

2.2 FABRICATION

A. Fabricate systems to allow for adequate clearances around perimeter and to enable proper installation; allow for thermal movement within window wall construction.

B. Fabricate components allowing for accurate and rigid fit of joints and corners; match components carefully ensuring continuity of line and color, with joints and connections flush, hairline and weatherproof.

C. Provide structural reinforcing within framing members where required to maintain rigidity and as required to accommodate design loads.

D. Allow moisture entering joints and condensation occurring within framing members to drain to exterior.

1. Design drainage system to hold maximum anticipated moisture for 100 year rain cycle without overflowing.

E. Complete cutting, fitting, forming, drilling and grinding of metal work prior to cleaning, finishing, treatment, and application of coating.

F. Finishing: After fabrication, prepare surfaces for finishing in accordance with recommendations of aluminum producer and finish manufacturer.

G. Weld by methods recommended by metal manufacturer and AWS; grind exposed welds smooth and restore mechanical finish; remove arises from cut edges and corners to a radius of approximately 1/64".

H. Fit and assemble work at shop to greatest extent possible; disassemble only as required for shipment and erection.

I. Reinforce work as necessary for performance requirements and for support.

1. Provide internal reinforcing for hardware.

J. Separate dissimilar materials with bituminous paint or preformed separators which will prevent corrosion.

K. Separate metal surfaces at moving joints with plastic inserts or other non-abrasive concealed inserts which permanently prevent "freeze-up" of joint.

L. Fabricate doors and apply hardware in shop. Disassemble only as required for transportation and installation.

PART 3 - EXECUTION

3.1 INSTALLATION

A. Install system in accordance with manufacturer's recommendations, to achieve weather-tight installation.

B. Ensure assembly is plumb, level and free of warp or twist; maintain dimensional tolerances and alignment with adjacent work.

C. Tolerances: Accurately align and locate components to column lines and floor levels; adjust work to conform to following tolerances.

1. Plumb: 1/8" in 10'-0"; 1/4" in 40'-0"; non-cumulative.

2. Level: 1/8" in 20'-0"; 1/4" in 40'-0"; non-cumulative.

3. Alignment: Limit offset to 1/16" where surfaces are flush or less than 1/2" out of flush, and separated by less than 2" (by reveal or protruding work); otherwise limit offsets to 1/8".

4. Location: 3/8" maximum deviation from measured theoretical location (any member, and location).

D. Install sufficient anchorage devices to securely and rigidly fasten system to building.

E. Provide anchors to be installed in other work, and setting details, in time for proper installation by trades concerned; verify correct placement.

F. Set sill members and similar members in bed of compound, joint fillers or gaskets to provide weather-tight construction.

G. Install hardware in accordance with manufacturer's recommendations, using proper templates.

1. Install doors to operate freely and smoothly, with a maximum operating pressure of 5 pounds in accordance with California Building Code, Chapter 11B, Division III, Section 1133B2.5.

2. Coordinate installation of cylinders with Section 08700 - Hardware.

3. Install sill members and thresholds in bed of compound, joint fillers or gaskets to provide weather-tight construction.

H. Install glass in accordance with glass manufacturer's instructions and with GANA "Glazing Manual" and "Sealant Manual."

1. Do not allow glass to touch metal surfaces.

3.2 CLEANING AND PROTECTION

A. The Aluminum Window Wall Contractor shall remove from the installed work all mastic smears or other unsightly marks caused by their workmen, and shall be responsible for any damage to or disfigurement of the work caused at any time by other trades, as well as final cleaning and washing of glass and aluminum.

B. The Aluminum Window Wall Contractor shall advise the Contractor of proper and adequate protection and cleaning procedures during remainder of construction period so that system will be without damage and deterioration at time of acceptance.

C. Clean aluminum surfaces promptly after installation of components, exercising care to avoid damage of finish.

D. Remove excess sealant compounds, dirt and other foreign substances.

E. Clean debris and excess fireproofing debris from behind wall and exterior wall system secondary gutters during erection. Provide temporary closures to prevent accumulation.

F. Mark glass after installation by crossed streamers attached to framing and held away from glass; do not apply markers to surface of glass.

G. Remove nonpermanent labels immediately after sealant cures; cure sealants for high early strength and durability.

3.3 ACCEPTANCE

A. Installed materials which are damaged, or which in the opinion of the Architect do not conform to the Contract Documents, shall be removed and replaced with acceptable material at no additional cost to the Owner.

B. Remove and replace glass that has been broken, chipped, cracked, abraded or damaged during construction period, including natural causes, accidents and vandalism.

C. Demonstrate proper cleaning methods and materials to Owner’s personnel.

D. Provide As-Built shop drawings and maintenance manuals per requirements of the Contract Documents.

E. Prior to installation of any insulation, the secondary gutter system shall be inspected for cleanliness. The insulation shall not be installed until the Architect or the Owner’s representative accepts the condition of the gutter system.

3.4 FIELD QUALITY CONTROL

A. Site Tests: Conduct tests for air and water infiltration with window wall manufacturer's representative present; correct units failing tests; independent laboratory subject to Architect approval.

1. Air Infiltration: Conduct in accordance with ASTM E783 with static difference of specified and with maximum infiltration of 1.5 times amount specified.

2. Water Penetration: Conduct in accordance with ASTM E1105 at static pressure of not less than 15 psf, with no uncontrolled water penetration.

3. Water Spray Test: Conduct in accordance with AAMA 501.2 on lower two floors of building with minimum 75 lineal feet of units.

END OF SECTION

SECTION 08970

STRUCTURAL GLASS CURTAIN WALLS

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes: Provide structural glass curtain wall system including glass and glazing, structural anchors, attachments, shims, and accessories as required for complete, weathertight installation.

1. Provide all-glass entrances integral with structural glass curtain wall system.

B. LEED General: Refer to Section 01350 LEED Special Environmental Requirements and to LEED “Checklist” indicating points Design Team has anticipated relating to specific LEED credits and LEED requirements.

C. Related Sections:

1. Section 03300 Cast-in-place Concrete: to receive glass fin structure.
2. Section 05500 Structural Steel: Steel Structural Frame to receive glass fin structure.
3. Section 08450: All-glass entrances not integral with structural glass system.
4. Section 08915: Aluminum window walls.

1.2 SYSTEM DESCRIPTION

A. System Description: Type of Glass Structure.

1. Glass mainplate vertical panels stabilized and supported with perpendicular glass fins attached with metal connector fittings. Glass fins shall extend full height of mainplate panels.

B. Design Requirements: Provide complete system with joints, gaps, and penetrations made watertight. Design, structural engineering, and fabrication for structural glass curtain wall shall be sole responsibility of single manufacturer.

1. Provide support framing, glass, connectors, fittings, anchors, and installation accessories, gaskets and sealants within curtain wall system, and other components required for complete, functional structural glass curtain wall.

2. Coordinate methods for making junctures with adjacent surfaces watertight with Section 07900 – Joint Sealers.

C. Performance Requirements:

1. Strength: Design system to withstand loads as required by applicable codes, but not less than following minimum loads.

a. Wind: Uniform pressures of 30 psf inward and outward wind pressures.
b. Seismic: In accordance with applicable codes.

2. Movement and Deflections: Design system for anticipatable thermal movement and deflections of structure.

3. Water and Air Leakage: Installed system shall be free of leakage of both water and air.

   a. Water leakage is defined as penetration of water (not including condensation) to interior of building.

   b. Air leakage is defined as infiltration of air at any area of glass wall, at a rate in excess of 0.06 cfm/ft^2 of area, based on measurement of single complete module of system.

1.3 REFERENCES

A. Glass Association of North America (GANA): Glazing Manual and Sealant Manual.

B. National Association of Architectural Metal Manufacturers (NAAMM): Metal Finishes Manual.

C. Definitions: National Association of Architectural Metal Manufacturers (NAAMM), Glossary of Architectural Metal Terms.

1.4 SUBMITTALS

A. Product Data: Submit manufacturer's specifications, recommendations and product data for window wall system, glass and each manufactured component.

B. Shop Drawings: Indicate pertinent dimensioning, clearances, general construction, anchorage locations, and typical details.

   1. Include elevations at 1/4 scale, typical unit elevations at 1" scale and half or full size detail sections of typical members.

   2. Indicate joint systems, expansion provisions and glazing details.

C. Samples: Furnish samples of the following:

   1. 12 by 12 inches minimum size for each type glass, indicating finished edge.

   2. Glass fittings.

   3. Exposed Metal finishes.

   4. Sealant colors.

D. Laboratory Tests: Provide laboratory reports of tests specified under performance requirements indicating compliance with performance requirements.

E. Tests Reports: Provide laboratory reports of tests run on typical section of structural glass wall system.

   1. Test for Air Infiltration: ASTM E283 at 6.24 psf pressure difference.

2. Test for Water Penetration under Static Pressure: ASTM E331 using static air pressure difference of minimum 20% of inward acting design wind load pressure, but not less than 6.24 psf.

3. Test for Water Penetration under Dynamic Pressure: AAMA 501.1.

4. Test for Structural Performance: ASTM E330; minimum test loads shall be those specified.

   a. Minimum ultimate loads shall be loads specified multiplied by factors of safety specified in California Building Code.

   b. Measure deflections at member center lines and other critical points as deemed appropriate.

   c. Safety Factor: Design for pressures with no glass breakage, no permanent damage to fasteners, and no permanent deformation of framing in excess of 0.2% of member clear span.

F. Manufacturer Certification: Provide certification by manufacturer indicating system complies with Contract Documents and applicable codes.

G. Structural Certification: Provide certification by civil or structural engineer registered in California indicating system complies with Contract Documents and applicable codes.

H. LEED Certification Points: Submit information and certifications necessary to achieve maximum points for LEED certification; coordinate and cooperate with Owner and Architect in providing information necessary for required LEED rating.

1.5 QUALITY ASSURANCE

A. Installer Qualifications: Manufacturer or firm with minimum five years successful experience in installation of system specified and approved by system manufacturer.

B. Single source responsibility: Design, structural engineering, and custom fabrication for glass fin structure and supply of all components, materials, and products shall be sole responsibility of single manufacturer. Provision of products from numerous sources for site assembly without complete single source design and supply responsibility is not acceptable.

C. Regulatory Requirements, Safety Glass: Comply with California Building Code, CPSC 16 CFR 1201, and pass ANSI Z97.1.

D. Mock-Up: Install visual mock-up of structural glass curtain wall system as indicated on Drawings for aesthetic review only, no testing will be required.

   1. Remove mock-up when in-place wall has been approved.

E. Pre-Installation Conference: Convene one week prior to commencing work; require attendance of parties directly affecting structural glass curtain wall.

   1. Review installation procedures with related work.

1.6 WARRANTY

A. Special Warranty: Repair or replace units which fail in materials or workmanship including (but not limited to):

1. Excessive leakage or air infiltration.
2. Water penetration.
3. Excessive deflections.
4. Deterioration of finish or metal.
5. Defects in structural glazing materials.
6. Defects in glass.

B. Warranty Periods:

1. 10 year warranty to cover replacement of insulating sealed glass units: in event of seal failure and interpane dusting, misting, and filming.

2. 5 year warranty to cover replacement of laminated glass units in event of delamination, edge separation, and blemishes.

3. Installer's 5 years warranty to cover installation against defects and failure to perform and remain weathertight. Warranty to provide for required repairs.

PART 2 - PRODUCTS

2.1 ACCEPTABLE MANUFACTURER

A. Innovative Structural Glass, Inc. 40220 Pierce Drive, Three Rivers, CA 93271 Phone (559) 561-7000 /Glass Fin System.

B. Substitutions: Approved equal permitted.

2.2 MATERIALS

A. Glass: Provide manufacturer's premium quality structural glazing system suitable for configurations indicated; glass thickness as determined by system manufacturer for sizes and applications indicated.

1. Glass: ASTM C1036, select glazing quality clear float glass; provide where permitted by applicable codes and standards and as recommended by system manufacturer.

2. Safety Glass: Select glazing quality, clear float glass, fully tempered, meeting ASTM C1048, Kind FT; safety glass; provide where required by applicable codes and standards and as recommended by system manufacturer.

3. For glass panels to be installed with mechanical connectors and fittings, provide holes to receive bolts and fitting pins. Holes shall be drilled prior to tempering glass.

B. Metal Connector and Exposed Metal Components: Fittings with accessories as required for complete installation.

1. Provide types and numbers of fittings to comply with loading requirements.

2. Provide alloy and temper as recommended by manufacturer and processor to comply with requirements of performance, fabrication, application of finish and finish continuity.

3. Finish: ASTM A666 and A276, Type 316 non-magnetic corrosion resistant stainless steel.

    a. Polish: NAAMM Number 8, mirror polished stainless steel.

C. Glazing Materials: Of types recommended by system manufacturer to suit security locations and applications for glazing installation.

1. Structural Glazing Sealant: ASTM C920 high modulus structural silicone glazing sealants designed for structural glazing, ultraviolet resistant, as recommended by system manufacturer but not less than following.

    a. Dow Corning/Silicone Rubber Sealant 795 or 983.
    b. General Electric/Silicone Construction SCS 1200 Sealant.
    c. Substitutions: Refer to Section 01630.

2. Glazing Sealant Color: As directed by Architect, not limited to “clear”.

D. Miscellaneous Materials:

1. Concealed Suspension Brackets and Fasteners: Non-magnetic stainless steel of type which will not cause electrolytic action or corrosion.

2. Bituminous Paint: Cold-applied mastic, SSPC Paint 12, compounded for 30 mil thickness per coat.

3. Anchoring Devices: Corrosion resistant type capable of supporting suspended glass system and superimposed design loads; design to allow adjustments of system prior to being permanently fastened in place.

4. Exposed Fasteners: Manufacturer's standard fasteners designed to match exposed metal finish.

5. Setting Blocks: ASTM C864, neoprene or EPDM.

6. Edge Blocks: Elastomeric material of hardness required to limit lateral movement of glass.

7. Gaskets: Molded or extruded elastomeric type of profile and hardness required to maintain weathertight seal; comply with ASTM C509, C864, and C1115.

8. Glazing Tape: Preformed butyl compound, non-staining, non-migrating in contact with non-porous surfaces, coiled on release paper; ASTM C1281.

9. Accessories: Provide glazing accessories, anchors, and fasteners of type recommended by glass fin structure manufacturer and as required for complete, functional, weathertight installation.

E. All-Glass Entrance Systems integral With Structural Glass Curtain Wall: Provide complete system where integral with curtain wall matching all-glass entrances specified in Section 08450.

1. Glass: Same thickness as adjacent structural glass curtain wall glass, select glazing quality clear tempered safety glass complying with ASTM C1048, Kind FT.

a. Provide horizontally tempered glass without tong marks; vertical tempering permitted only where tong marks can be totally concealed in finished installation.

b. Polish side edges to be exposed or to receive sealant; cut glass to tolerances necessary to provide even, 1/8" joints within plus or minus 1/16".

2. Door Rails: Styles as shown on Drawings.

a. Finish: Polished stainless steel to match structural glass curtain wall metal components.

3. Frameless Glass Door Hardware: Match door rails, unless otherwise indicated.

a. Closer/Pivots: ASTM A156.4 Grade 2, center pivot set, floor closer with pivot set, with 105 degree positive stop; adjustable for maximum 5 lb. opening pressure.

b. Lock: Overhead concealed electro-magnetic lock wired to Owner provided card-key access system.

c. Push/Pulls: Custom designs as indicated, as directed by Architect where not otherwise indicated.

d. Floor Plate: Provide floor plate cover for closer; metal to match door rails unless otherwise directed by Architect.

2.3 FABRICATION

A. Locate and provide holes and cutouts to receive hardware before tempering glass; do not permit cutting, drilling or other glass alterations after tempering.

1. Polish exposed ends of glass; round edges slightly.

B. Fabricate system to allow for adequate clearances around perimeter and to enable proper installation.

C. Fabricate components allowing for accurate and rigid fit of joints and corners; match components carefully ensuring continuity of line and color, with joints and connections flush and weatherproof.

D. Complete cutting, fitting, forming, drilling and grinding of metal work prior to cleaning, finishing, treatment, and application of coating.

E. Weld by methods recommended by metal manufacturer and AWS; grind exposed welds smooth and restore mechanical finish; remove arises from cut edges and corners to a radius of approximately 1/64".

F. Fit and assemble work at shop to greatest extent possible; disassemble only as required for shipment and erection.

G. Separate dissimilar materials with bituminous paint or preformed separators which will prevent corrosion.

H. Fabricate all-glass entrance doors integral with structural glass curtain wall to accommodate required hardware and accessory items.

1. Install hardware at fabrication plant; remove only as required for final finishing operations, and for delivery and installation of work at Project site.

I. LEED Recycled Content: Where available provide materials with post-consumer and pre-consumer recycled content to achieve maximum LEED credits.

J. LEED Regionally Manufactured, Extracted, Harvested, or Recovered Materials: Where possible obtain materials that qualify for LEED credits for regional materials obtained within 500 miles of Project.

K. LEED Total Volatile Organic Compounds (TVOC) and Toxic Substances: Provide materials with volatile organic compound emissions and toxic substances such as urea-formaldehyde complying with LEED requirements to reduce indoor air contaminants.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Examine areas and conditions under which work is to be installed.

B. Prior to delivery of glass panels to site, verify that wall openings, support framing, and Substrates are ready to receive glass fin structure. Verify alignment, support dimensions, and tolerances are correct.

C. Report unacceptable conditions and deficiencies. Do not proceed with installation until corrective action has been performed.

D. Inspect glass panels for chipped edges, scratches, abrasions, and other damage. Remove damaged panels from site and replace.

E. Beginning installation signifies acceptance of conditions.

3.2 INSTALLATION

A. Install system in accordance with manufacturer's recommendations and installation instructions, to achieve weathertight installation.

1. Do not allow glass to touch metal surfaces.

2. Do not allow glass to be supported directly on glass surface.

B. Damaged glass: Do not install glass with edge damage or other imperfections.

C. Allow for settling, expanding, and contracting to occur without breaking glass.

D. Do not field cut or alter structural framing without written approval from manufacturer and Architect.

E. Ensure assembly is plumb, level and free of warp or twist; maintain dimensional tolerances and alignment with adjacent work.

F. Tolerances: Accurately align and locate components to lines and levels; adjust work to conform to following tolerances.

1. Plumb: 1/8" in 10'-0"; 1/4" in 40'-0"; non-cumulative.

2. Level: 1/8" in 20'-0"; 1/4" in 40'-0"; non-cumulative.

3. Alignment: Limit offset to 1/16".

4. Location: 3/8" maximum deviation from measured theoretical location (any member, and location).

G. Install sufficient anchorage devices to securely and rigidly fasten system to building.

H. Provide anchors to be installed in other work, and setting details, in time for proper installation by trades concerned; verify correct placement.

I. Seal glass in accordance with system and sealant manufacturer instructions; sealant joints to be smooth, even joints free of irregularities noticeable from 3'-0".

J. Protect adjacent surfaces sealants and glazing materials with masking tape or other means.

K. Install setting blocks and spacers as recommended by glass fin structure manufacturer and indicated on approved shop drawings.

3.3 FIELD QUALITY CONTROL

A. Site Tests: Conduct tests for air and water infiltration with structural glass curtain wall manufacturer's representative present; correct units failing tests; independent laboratory subject to Architect approval.

1. Air Infiltration: Conduct in accordance with ASTM E783 with static difference of specified and with maximum infiltration of 1.5 times amount specified.

2. Water Penetration: Conduct in accordance with ASTM E1105 at static pressure of 6.24 psf, with no uncontrolled water penetration.

3. Water Spray Test: Conduct in accordance with AAMA 501.2 on lower two floors of building with minimum 75 lineal feet of units.

3.4 CLEANING AND PROTECTION

A. Clean metal and glass surfaces promptly after installation of components, exercising care to avoid damage of finish. Use solvents or other cleaners recommended by manufacturer.

B. Remove excess sealant compounds, dirt and other foreign substances.

C. Mark glass after installation by methods which do not damage glass.

D. Remove nonpermanent labels immediately after sealant cures; cure sealants for high early strength and durability.

E. Remove protective material from prefinished surfaces.

F. Remove and replace glass which is broken, chipped, cracked, abraded or damaged during construction period, including natural causes, accidents and vandalism.

G. Final Cleaning: Refer to Section 01700 – Contract Closeout.

END OF SECTION

SECTION 09220

PORTLAND CEMENT PLASTER

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes: Provide three coat Portland cement plaster (stucco) with metal lath and accessories as required for complete finished system.

1. Provide metal suspension system for suspended Portland cement plaster.

B. LEED General: Refer to Section 01350 LEED Special Environmental Requirements and to LEED “Checklist” indicating points Design Team has anticipated relating to specific LEED credits and LEED requirements.

C. Related Sections:

1. Section 05400: Cold formed metal framing, 18 gage and heavier.
2. Section 07265: Building envelope underlayment.
3. Section 09217: Lime wash plaster interior finish (Tenant Improvement Specs).
4. Section 09260: Metal studs, 20 gage and lighter.
5. Section 09900: Painting of stucco.

1.2 REFERENCES

A. ASTM C926: Application of Portland Cement Based Plaster.

B. ASTM C1063: Installation of Lathing and Furring for Portland Cement Plaster.

1.3 SUBMITTALS

A. Product Data: Submit manufacturer's product information for each lathing material and accessory, and for plaster materials.

B. Shop Drawings: Indicate locations of control and expansion joints where not shown on Drawings.

C. Samples: Furnish 24” by 24” samples using materials and methods specified including lath.

D. LEED Certification Points: Submit information and certifications necessary to achieve maximum points for LEED certification; coordinate and cooperate with Owner and Architect in providing information necessary for required LEED rating.

1.4 QUALITY ASSURANCE

A. Mock-Up: Provide mock-up of plaster, minimum 100 sf.

1.5 PROJECT CONDITIONS

A. Take precautionary measures to ensure plaster is not subjected to excessive sun and wind which could cause uneven and excessive evaporation, premature dehydration, or cracking.

B. Cold-Weather Requirements: Do not apply plaster unless minimum ambient temperature of 40 degrees F has been and continues to be maintained for minimum 48 hours prior to application and until plaster is cured.

PART 2 - PRODUCTS

2.1 MATERIALS

A. Portland Cement Plaster: Provide either neat or ready-mixed (where applicable) materials, at Contractor's option, complying with ASTM C926.

1. Basecoat Materials:

a. Cement: Normal Type 1 or 1A Portland cement, ASTM C150.
b. Hydrated Lime: Special finishing hydrated lime, Type S, ASTM C206.
c. Aggregate: Natural sand, conforming to ASTM C897 or C144.

2. Brown Coat Water Acrylic Admix: Acrylic polymer specifically manufactured for use in Portland Cement Plaster (Stucco) applications and which will not detrimentally affect finish.

a. Manufacturers:

1) Larsen Products Corp./Acrylic Admix 101.
2) Thoro System Products, Inc./Acryl 60.
3) Chem-Masters Corp./Cretelox.
4) Substitutions: Refer to Section 01630.

3. Finishing Materials: Same as basecoat with acrylic admix. Factory premix finish coat is acceptable; as required to achieve “Santa Barbara” finish acceptable to Architect.

4. Water: Clean, fresh and free from injurious amounts of oil, acid, alkali, organic matter or other deleterious substances.

B. Metal Components: Comply with requirements of ASTM C1063.

1. Manufacturers:

a. Unimast Inc.
b. Phillips Manufacturing Co. (formerly National Gypsum).
c. Alabama Metal Industries Corp.
d. Western Metal Lath Co.
e. Substitutions: Refer to Section 01630.

2. Exterior Components: Hot-dip galvanized finish; ASTM A924 and A653 minimum G90 for 18 gage and lighter formed metal products, ASTM A123 galvanized after fabrication for 16 gage and heavier products.

    a. Exposed Exterior Components: Zinc accessories unless fully concealed in plaster.

3. Suspension System: Size to comply with referenced standards.

    a. Main Runners: Hot or cold-rolled steel.

        1) Main Carrying Channels: Minimum 16 gage, 1-1/2" by 1/2".
        2) Furring Channels: Minimum 16 gage, 3/4" by 1/2".

    b. Hangers: Size and type to suit application and to rigidly secure system in place, with maximum deflection of L/360.

        1) Hanger Wire: ASTM A641, Class 1 galvanized.
        2) Hanger Rods and Flats: Mild steel.

    c. Lateral Bracing: Minimum 16 gage cold-rolled steel.

    d. Anchorage and Fastening: Approved devices of type and size to suit application and to rigidly secure suspension system.

4. Exterior Metal Lath: Expanded diamond mesh; minimum 2.5 lbs per square yard at vertical applications, 3.4 lbs per square yard at horizontal applications.

    a. Backing: Building paper specified in Section 07265.

    b. Self-Furring: Where over solid substrate, provide “V” groove type to hold lath approximately 1/4" from supporting base.

    c. Tie Wire: ASTM A641, soft temper, Class 1 zinc coated; minimum 16 gage for tying metal lath to furring channels and metal lath to metal lath.

5. Inside Corner Mesh: Minimum 26 gage steel; perforated or expanded flanges or clips shaped to permit complete embedding in plaster; minimum 2" x 2" size.

C. Accessories: Provide as indicated, as recommended by referenced standards, and as required for complete installation.

1. Manufacturers:

    a. Keene Products from Metalex, a Division of The Koller Group.
    b. Delta Star, Inc., Superior Metal Trim.
    c. Lath manufacturers.
    d. Substitutions: Refer to Section 01630.

2. Casing Beads and Base Screeds: Minimum 26 gage, square edges at casing beads, drip type base screeds; provide with expanded flanges.

3. Expansion Joints: Two-piece slip type joints; commonly referred to as No. 40.

4. Control Joints: One piece metal joint designed to interlock with plaster similar to Keene/XJ15-3.

5. Aluminum Vent Strips and Channel Screeds: Extruded 6063 alloy, T5 or T6 temper aluminum, minimum 0.05" thick; with manufacturer's standard baked-on finish.

   a. Manufacturers:

      1) Fry Reglet Corp./Plaster Moldings.
      2) MM Systems Corp./Dura-Trim.
      3) Gordon Inc./Final Forms II.
      4) Substitutions: Refer to Section 01630.

   b. Color: As selected by Architect.

D. Anchorages: Tie wire, nails, screws and other approved metal supports, of type and size to suit application.

E. LEED Recycled Content: Where available provide materials with post-consumer and pre-consumer recycled content to achieve maximum LEED credits.

F. LEED Regionally Manufactured, Extracted, Harvested, or Recovered Materials: Where possible obtain materials that qualify for LEED credits for regional materials obtained within 500 miles of Project.

2.2 PLASTER MIXES

A. Provide plaster mixes in accordance with ASTM C926 as appropriate to the substrate indicated and the approved samples.

B. Mix only as much plaster as can be used in one hour.

C. Mix materials dry, to uniform color and consistency, before adding water.

D. Protect mixes from frost, dust and evaporation.

E. Do not retemper mixes after initial set has occurred.

PART 3 - EXECUTION

3.1 PREPARATION

A. Coordinate suspended work with structural work to ensure inserts and structural anchorage provisions have been installed to receive hangers.

   1. Coordinate location of hangers with other work.

B. Prior to application ensure mechanical and electrical services behind surfaces to receive cement plaster have been tested and approved.

C. Ensure metal framing has been properly installed and rigidly secured.

3.2 INSTALLATION

A. Erect furring and lath in accordance with ASTM C1063.

B. Install work true to lines and levels and to provide surface flatness with maximum variation of 1/8" in 10'-0" in any direction.

C. Isolation: Isolate lathing and metal support system where it abuts building structure horizontally, and where partition/wall work abuts overhead structure, to prevent transfer of building loads into plaster.

1. Install slip or cushion type joints to absorb deflections but maintain lateral support.

D. Frame both sides of expansion joints independently unless otherwise indicated, do not bridge joints with furring and lathing or accessories.

E. Fixture Support Framing: Install supplementary framing, blocking and bracing where work is indicated to support fixtures, equipment, services and similar work requiring attachment and support.

F. Coordinate installation of anchors, blocking, electrical and mechanical work which is to be placed in or behind framing; allow such items to be installed after framing is complete.

G. Install expansion and control joints so plaster areas do not exceed 120 ft^2, and with area sides having a maximum one to two and a half (1:2-1/2) ratio, unless otherwise approved by Architect.

H. Suspension System: Install to heights indicated on Drawings.

1. Install independent of walls, columns and overhead work.

2. Use hangers spaced maximum 4'-0" on center.

3. Space main carrying channels maximum 4'-0" on center and not more than 6" from perimeter walls; lap splices minimum 12" and secure together 2" from each end of splice.

4. Securely fix carrying channels to hangers to prevent turning or twisting and to develop full strength of hangers.

5. Place furring channels perpendicular to carrying channels, not more than 2" from perimeter walls; rigidly secure to carrying channels.

6. Lap splices minimum 8" and secure together 1" from each end of splice.

7. Reinforce openings in suspension system which interrupt main carrying channels or furring channels, with lateral channel bracing; extend bracing minimum 24" past openings.

8. Laterally brace suspension system as required to resist seismic loads, including uplift.

I. Metal Lathing: Apply lath taut, with long dimension perpendicular to supports; secure end laps with tie wire where they occur between supports; lap sides minimum 1-1/2"; secure with tie wires.

1. Continuously reinforce internal angles.

2. Place 6" wide x 12" long strips of metal lath diagonally at corners of openings; secure rigidly in place.

3. Place 6" wide strips of metal lath at junctions of dissimilar materials; place parallel with dissimilar materials; secure rigidly in place.

J. Installation of Metal Accessories:

1. Fasten in place true to line and in correct relation to adjacent materials and as required to prevent dislodging and misalignment by subsequent operations.

2. Fasten at both ends and at maximum 12" on center along sides.

3. Bring grounding edge of accessories to true lines, plumb, level, and straight.

4. Install accessories to provide required depth of plaster and to bring plaster surface to required plane.

5. Install continuous corner reinforcement for full length of external corners.

6. Install sill and drip screeds with paper sheathing and lath installed over attachment flange of screeds.

7. Beads: Use single length of metal beads wherever length of run does not exceed longest standard stock length available; miter or cope corners.

a. Provide casing beads where plaster abuts dissimilar construction and at perimeter of openings where edges of plaster will not be concealed by other work.

K. Portland Cement Plaster: Conform to ASTM C926.

1. Apply three coat cement plaster system, scratch, brown, and finish coats.

2. Apply each base coat (scratch and brown) to minimum thickness of 3/8"; allow each coat to moist cure for minimum period of 48 hours;

a. Moist cure first base coat (scratch coat) during 48 hour period.

3. Allow base coats to cure for minimum 7 days prior to application of finish coat.

4. Evenly dampen base coat, to ensure uniform suction, and apply finish coat; apply thickness sufficient to secure required texture but in no case less than 1/8".

a. Apply pre-mixed finish coat in accordance with manufacturer's recommendations.

5. Maintain surface flatness, with maximum variation of 1/8" in 10'-0".

6. Avoid excessive working of surface, delay trowelling as long as possible to avoid drawing excess fines to surface.

L. Finish: Provide surfaces with special “Santa Barbara” finish; match approved sample panel.

3.3 CUTTING AND PATCHING

A. Cut, patch, point, and repair plaster as necessary to accommodate other work and to restore cracks, dents, and imperfections.

B. Repair or replace work to eliminate blisters, buckles, crazing, check cracking, dry-outs, efflorescence, sweat-outs, and similar defects.

C. Finish cutting and patching to match undamaged plaster; patching shall not be visible in finished installation.

3.4 CLEANING

A. Promptly remove plaster from surfaces not indicated to be plastered.

B. Repair surfaces stained, marred or otherwise damaged during plastering.

END OF SECTION

SECTION 09260

GYPSUM BOARD ASSEMBLIES

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes: Provide gypsum board systems including gypsum board, light gage metal framing, suspension system for gypsum board systems, joint treatment, acoustical accessories, and general accessories for complete installation.

B. LEED General: Refer to Section 01350 LEED Special Environmental Requirements and to LEED “Checklist” indicating points Design Team has anticipated relating to specific LEED credits and LEED requirements.

C. Related Sections:

1. Section 07840: Firestopping.
2. Section 09217: Lime wash finish (Tenant Improvement specs).

1.2 REFERENCES

A. ASTM C754: Installation of Steel Framing Members to Receive Screw-Attached Gypsum Wallboard, Backing Board, or Water-Resistant Backing Board.

B. ASTM C840: Application and Finishing of Gypsum Board.

1.3 SYSTEM DESCRIPTION

A. Performance Requirements: Perform gypsum board systems work in accordance with recommendations of ASTM C754 and ASTM C840 unless otherwise specified.

1. Loads: Comply with California Building Code requirements for design of metal framing for gypsum board systems.

a. Deflection: Maximum L/240 typical, L/360 where lime wash finish is indicated and where tile is indicated.

2. Seismic Requirements: Comply with code requirements for seismic bracing.

B. Fire-Rated Assemblies: Listed by Underwriter's Laboratory, Gypsum Association (GA) File No's in GA-600 Fire Resistance Design Manual or other listing approved by applicable authorities.

C. Systems Responsibility: Provide products manufactured by or recommended by manufacturer of gypsum board to maintain single-source responsibility for system.

D. Openings: Obtain dimensions and locations from other trades and provide openings and enclosures for accessories, specialties, equipment, and ductwork.

1.4 SUBMITTALS

A. Product Data: Furnish manufacturer's literature for framing, insulation, gypsum board, and acoustical accessories.

B. Manufacturer’s Certification: Furnish manufacturer's certification indicating products comply with Contract Documents and applicable codes.

C. LEED Certification Points: Submit information and certifications necessary to achieve maximum points for LEED certification; coordinate and cooperate with Owner and Architect in providing information necessary for required LEED rating.

1.5 PROJECT CONDITIONS

A. Do not begin installation of interior gypsum board until space is enclosed, space is not exposed to other sources of water, and space is free of standing water.

B. Maintain areas to receive gypsum board at minimum 50 degree F for 48 hours prior to application and continuously after application until drying of joint compound is complete; comply with ASTM C840.

C. Immediately remove from site gypsum board for interior use exposed to water, including gypsum board with water stains, with signs of mold, and gypsum board with mildew.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

A. National Gypsum Co.

B. Georgia-Pacific Corp.

C. United States Gypsum Co., USG Corp.

D. Substitutions: Refer to Section 01630.

2.2 MATERIALS

A. Framing Materials: Comply with ASTM C754, 20 gage and lighter, coordinate with Section 05400; where not otherwise indicated, provide gages as recommended by manufacturer for spans and loads indicated and as required by applicable codes.

1. Studs: ASTM C645, screw-type Cee-shaped.

a. Shaft Walls: Cee-T or Cee-H shaped studs.

2. Runners: Match studs.

3. Furring Members: ASTM C645, screw-type, hat-shaped.

a. Sound Rated Assemblies: Provide resilient channels where indicated and where required to provide required sound transmission classifications.

4. Channels: ASTM C754.

5. Hangers: ASTM A641, Class 1 wire not less than sizes in Table No. 5 of ASTM C754 and as required by applicable codes; hanger rods, flat hangers, and angle-type hangers as required.

6. Suspension System: ASTM C635, suspension system composed of main beams and cross furring members interlocking to form supporting network; recommended by gypsum board system manufacturer.

7. Fasteners and Anchorages: As recommended by gypsum board system manufacturer.

B. Gypsum Board: Comply with ASTM C840; maximum permissible lengths; ends square cut, tapered edges on boards to be finished.

1. Typical: ASTM C1396, Type X, fire rated gypsum board, unless otherwise indicated.

2. First Layer at Double Layer Applications: ASTM C1396 or ASTM C442, Type X, fire rated gypsum backing board.

3. Gypsum Core Board/Gypsum Liner Board: ASTM C442, Type X, 1" thick; mildew and mold resistant.

4. Extended Exposure Gypsum Board: Fire rated Type X gypsum board designed specifically for extended exposure to moisture during construction; ASTM C1177; provide with score of 10 when tested using ASTM D3273 for mold resistance.

a. National Gypsum/eXP Extended Exposure Sheathing.
b. Georgia Pacific/DensArmor Plus or DensGlass.
c. USG/Sheetrock Fiberock Aqua Tough Sheathing.
d. Substitutions: Refer to Section 01630.

C. Gypsum Board Accessories: Comply with ASTM C840.

1. Provide protective coated steel corner beads and edge trim; type designed to be concealed in finished construction by tape and joint compound.

2. Corner Beads: Manufacturer's standard metal beads.

3. Edge Trim: “J”, "L", "LK", or "LC" casing beads.

4. Reinforcing Tape, Joint Compound, Adhesive, Water, Fasteners: Types recommended by system manufacturer and conforming to ASTM C475.

a. Typical Joint Compound: Chemical hardening type for bedding and filling, ready-mixed or powder vinyl type for topping.

5. Control Joints: Back to back casing beads.

a. Back control joints with 4 mil thick polyethylene air seal.

D. Acoustical Accessories:

1. Acoustical Insulation: Preformed mineral fiber, ASTM C665, Type I; friction fit type without integral vapor barrier; as required to meet STC ratings indicated, or of thickness indicated.

2. Acoustical Sealant: ASTM C919, type recommended for use in conjunction with gypsum board.

a. Type: Paintable, non-shrinking and non-cracking where exposed, nondrying, nonskinning, nonstaining, and nonbleeding where concealed.

3. Electrical Box Pads: Provide at outlet, switch and telephone boxes in walls with acoustical insulation.

a. Manufacturers for Non-Fire Rated Partitions:

1) Harry A. Lowry & Associates (800.772.2521)/Lowry's Electrical Box Pads.
2) Tremco Sheet Caulking (650.572.1656).
3) Fire rated partition material manufacturers.
4) Substitutions: Refer to Section 01630.

b. Manufacturers for Fire Rated Partitions:

1) Hevi-Duty Nelson (800.331.7325)/Fire Rated FSP Firestop Putty Pads.
2) Specified Technologies, Inc. (800.992.1180)/Fire Putty Pads.
3) Hilti, Corp./Hilti Box Pads.
4) Substitutions: Refer to Section 01630.

E. LEED Recycled Content: Where available provide materials with post-consumer and pre-consumer recycled content to achieve maximum LEED credits.

F. LEED Regionally Manufactured, Extracted, Harvested, or Recovered Materials: Where possible obtain materials that qualify for LEED credits for regional materials obtained within 500 miles of Project.

G. LEED Total Volatile Organic Compounds (TVOC) and Toxic Substances: Provide materials with volatile organic compound emissions and toxic substances such as urea-formaldehyde complying with LEED requirements to reduce indoor air contaminants.

PART 3 - EXECUTION

3.1 INSTALLATION

A. Metal Framing Erection: Erect metal framing in accordance with ASTM C754 and manufacturer's recommendations.

1. Install members true to lines and levels to provide surface flatness with maximum variation of 1/8" in 10'-0" in any direction.

2. Door Opening Framing: Install double studs at door frame jambs; install runners on each side of opening at frame head height between jamb studs and adjacent studs.

3. Install metal framing backing where required for support of fixtures, cabinets, accessories and hardware.

4. Coordinate installation of bucks, anchors, blocking, electrical and mechanical work which is to be placed in or behind partition framing; allow items to be installed after framing is complete.

B. Ceiling Framing Installation: Erect in accordance with ASTM C754 and manufacturer's recommendations.

1. Coordinate location of hangers with other work; provide trapeze supports and steel bracing as required to support ceiling.

2. Install ceiling furring independent of walls, columns, and above-ceiling work.

3. Space main carrying channels at maximum 48" on center, not more than 6" from perimeter walls.

   a. Lap splices minimum 12" and secure together 2" from each end of splice.

4. Place furring channels perpendicular to carrying channels at maximum 24" on center and not more than 2" from perimeter walls.

5. Lap splices minimum 8" and secure together 2" from each end of splice.

6. Reinforce openings in ceiling suspension system which interrupt main carrying channels or furring channels, with lateral channel bracing; extend bracing minimum 24" past each end of openings.

7. Laterally brace entire suspension system.

C. Gypsum Board Installation: Install in accordance with ASTM C840 and manufacturer's recommendations.

1. Use screws when fastening gypsum board to furring and to framing.

2. Erect gypsum board with ends and edges occurring over firm bearing.

3. For fire rated systems comply with requirements for fire ratings.

4. Place control joints to be consistent with lines of building spaces and as directed by Architect.

   a. Provide where system abuts structural elements.
   b. Provide at dissimilar materials.
   c. Lengths exceeding 30'-0" in partitions.
   d. Ceiling areas exceeding 50'-0" or 2500 square feet.
   e. Wings of "L", "U" and "T" shaped ceilings.

5. Place corner beads at external corners; use longest practical lengths.

6. Place edge trim where gypsum board abuts dissimilar materials.

7. Tape, fill, and sand exposed joints, edges, corners and openings to produce surface ready to receive finishes; feather coats onto adjoining surfaces.

8. Finishing: Comply with Gypsum Association (GA) “Levels of Gypsum Board Finish”.

    a. GA Level 4 (Typical): Provide three coat finishing and sanding is required for surfaces indicated to be painted; provide flush, smooth joints and surfaces ready for applied paint finishes.

9. Remove and replace defective work.

D. Acoustical Accessories Installation:

1. Place acoustical insulation tight within spaces, around cut openings, behind and around electrical and mechanical items within partitions, and tight to items passing through partitions.

2. Place acoustical sealant within partitions in accordance with manufacturer's recommendations; install acoustical sealant at gypsum board perimeter at:

    a. Metal Framing: One or two beads.
    b. Base layer and face layer.
    c. Penetrations of partitions.

3. Tolerance: Maximum 1/4" space between gypsum board at floor, ceiling, and penetrations.

4. Install electrical box pads with pads molded and pressed on back side of box, closing openings, in accordance with manufacturer's instructions, for complete acoustical barrier.

5. Pressurized Chambers: Install drywall assemblies airtight at air shafts, stairs, air plenums and where indicated on Drawings.

    a. Comply with requirements for HVAC system for air pressure requirements.

END OF SECTION

SECTION 09900

PAINTS AND COATINGS

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes:

1. Provide painting and finishing of exposed items and surfaces.

a. Specified surface preparation, priming and coats of paint are in addition to shop-priming and surface treatment specified under other sections of work.

b. Painting and finishing includes field finishing of exterior and interior items not listed as "Surfaces not to be Painted" unless clearly indicated otherwise.

c. Painting and finishing includes field finishing of select shop finished items where indicated as required to match adjacent surfaces, such as mechanical grilles and registers.

d. Field paint exposed bare and covered pipes, ducts, and hangers, exposed steel and iron work, and primed metal surfaces of equipment installed under mechanical and electrical work in occupied spaces.

B. LEED General: Refer to Section 01350 LEED Special Environmental Requirements and to LEED “Checklist” indicating points Design Team has anticipated relating to specific LEED credits and LEED requirements.

C. Related Sections: Shop priming of ferrous metal items is included under various Specification sections.

D. Surfaces Not To Be Painted:

1. Finished items including finished metal surfaces.

2. Walls and ceilings in concealed areas and generally inaccessible areas.

3. Moving parts of operating mechanical and electrical units.

4. Labels: Keep equipment identification and fire rating labels free of paint.

5. Plastic smoke stops and weather-stripping at doors.

1.2 SUBMITTALS

A. Product Data: Submit manufacturer's technical information, including paint label analysis and application instructions for each material.

B. Samples: Submit samples for review of color and texture; provide list of material and application for each coat of each finish sample.

1. Brush-Outs: Submit samples of each color and material with texture to simulate actual conditions, on hardboard.

2. Field Samples: Duplicate painted finishes of approved samples on actual wall surfaces and components for approval prior to commencing work.

a. Size: Minimum 100 sf located where approved.
b. Components: One full component as directed.
c. Simulate finished lighting conditions for review.

C. Certificates: Furnish certificates from each manufacturer stating materials are top quality lines and suitable for intended use on this Project.

D. LEED Certification Points: Submit information and certifications necessary to achieve maximum points for LEED certification; coordinate and cooperate with Owner and Architect in providing information necessary for required LEED rating.

1.3 QUALITY ASSURANCE

A. Regulatory Requirements: Furnish materials approved for use by applicable air quality management district for limitations of volatile organic compounds for architectural or special coatings as applicable.

1.4 DELIVERY, STORAGE, AND HANDLING

A. Deliver materials to job site in original, new and unopened packages and containers bearing manufacturer's name and label, with:

1. Name of material, color and sheen.
2. Manufacturer's name, stock number and date of manufacture.
3. Contents by volume, for major pigment and vehicle constituents.
4. Thinning and application instructions.

1.5 SITE CONDITIONS

A. Apply water-base paints when temperature of surfaces and surrounding air are between 50 and 90 degrees F.

B. Do not apply paint in rain, fog or mist; or when relative humidity exceeds 85 percent; or to damp or wet surfaces.

C. Painting may be continued during inclement weather if areas to be painted are enclosed and heated within temperature limits specified.

D. Provide additional temporary ventilation during interior application of paints to eliminate volatile organic compound (VOC) emissions from interior spaces as quickly as possible.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

A. Benjamin Moore & Co.

B. ICI Paints.

C. Frazee Paint Co.

D. Ralph Lauren Paints.

E. Manufacturers listed on Finish Schedule.

F. Substitutions: Refer to Section 01630.

2.2 MATERIALS

A. Definition: "Paint" as used herein means coating systems including primers, emulsions, enamels, stains, sealers and fillers, whether used as prime, intermediate or finish coats.

B. Material Quality: Provide top line quality commercial grade (professional painter) paints; materials not bearing manufacturer's identification as a best-grade product shall not be acceptable.

1. Primers: Provide premium grade primers recommended by paint manufacturer for substrates indicated and for finish systems specified.

2. Undercoats and Barrier Coats: Provide undercoat paints produced by same manufacturer as finish coats; use only thinners approved by paint manufacturer, and use only within recommended limits.

3. Finish Coats: Provide finish coats capable of being washed with mild detergent without loss of color, sheen, or pigments.

    a. Color pigments: Pure, non-fading, applicable types to suit substrates and service indicated; no lead content permitted.

4. Finish Coat Coordination: Provide finish coats which are compatible with prime paints, undercoats, and barrier coats used.

    a. Review other Specification sections in which prime paints are provided; ensure compatibility of total coatings systems.

    b. Upon request from other trades furnish information on characteristics of finish materials proposed for use.

    c. Provide barrier coats over incompatible primers or remove and prime as required.

    d. Notify Architect in writing of any anticipated problems in use of specified coating systems with substrates primed by others.

C. Colors and Finishes: Prior to commencement of painting work, Architect will furnish color chips for surfaces to be painted.

1. Use of proprietary names in color selection is not intended to imply exclusion of equivalent products of other manufacturers.

2. Final acceptance of colors will be from samples applied on site.

D. LEED Recycled Content: Where available provide materials with post-consumer and pre-consumer recycled content to achieve maximum LEED credits.

E. LEED Regionally Manufactured, Extracted, Harvested, or Recovered Materials: Where possible obtain materials that qualify for LEED credits for regional materials obtained within 500 miles of Project.

F. LEED Total Volatile Organic Compounds (TVOC) and Toxic Substances: Provide materials with volatile organic compound emissions and toxic substances such as urea-formaldehyde complying with LEED requirements to reduce indoor air contaminants.

PART 3 - EXECUTION

3.1 PREPARATION

A. Inspection: Examine areas and conditions under which painting work is to be applied.

1. Start of painting work indicates acceptance of surfaces and conditions of surfaces and conditions within any particular area.

2. Where exposed items or surfaces are not specifically mentioned in Schedules, paint same as adjacent similar materials or areas.

3. Do not paint over dirt, rust, scale, grease, moisture, scuffed surfaces, or conditions detrimental to a durable paint film.

B. Perform preparation and cleaning procedures in accordance with paint manufacturer's instructions and as specified for substrate condition.

C. Remove hardware, accessories, and items in place and not to be painted, or provide protection prior to surface preparation and painting; after painting reinstall removed items.

D. Clean surfaces before applying paint; remove oil and grease prior to mechanical cleaning; program cleaning so contaminants from cleaning process do not fall onto wet, newly painted surfaces.

E. Cementitious Materials: Prepare by removing efflorescence, chalk, dirt, grease, oils, and by roughening as required to remove glaze.

1. Determine alkalinity and moisture content of surfaces to be painted.

2. If surfaces are found to be sufficiently alkaline to cause blistering and burning of finish paint, neutralize before application of paint.

3. Do not paint over surfaces where moisture content exceeds manufacturer's printed directions.

F. Ferrous Metals: Touch up shop-applied prime coats wherever damaged using same type of primer as applied in shop or barrier coat compatible with finish paint.

1. Bare Surfaces: Clean surfaces that are not galvanized or shop-coated, of oil, dirt, loose mill scale and other foreign substances by solvent or mechanical cleaning.

2. Galvanized Surfaces: Clean free of oil and surface contaminants, using non-petroleum based solvent; primer and touch-up primer to be zinc-rich primer.

G. Mix painting materials in accordance with manufacturer's directions.

H. Store materials in tightly covered containers; maintain containers used in storage, mixing and application of paint in a clean condition, free of foreign materials and residue.

I. Stir materials before application to produce mixture of uniform density, and stir as required during application; do not stir surface film into material, if necessary, strain material before using.

3.2 APPLICATION

A. Apply paint in accordance with manufacturer's directions; use applicators and techniques best suited for substrate and type of material being applied.

1. Apply additional coats when stains or blemishes show through final coat, until paint is a uniform finish, color and appearance.

2. Provide extra attention to assure dry film thickness at corners and crevices is equivalent to that of flat surfaces.

3. Finish doors on tops, bottoms and side edges same as faces.

4. Sand lightly between each succeeding enamel coat and each varnish coat.

B. Scheduling Painting: Apply first coat to surfaces that have been cleaned, pretreated or prepared for painting as soon as practicable after preparation.

1. Allow time between successive coatings to permit proper drying.

2. Do not recoat until paint feels firm and does not deform or feel sticky under moderate thumb pressure.

C. Minimum Coating Thickness: Apply materials at not less than manufacturer's recommended spreading rate, to establish a total dry film thickness as recommended by coating manufacturer.

D. Prime Coats: Apply to items not previously primed; recoat primed and sealed surfaces where there is evidence of suction spots or unsealed areas in first coat.

E. Finish Coats: Provide even texture; leave no laps, irregularity in texture, skid marks, or other surface imperfections.

1. Opaque Finishes: Provide opaque, uniform finish, color and coverage; cloudiness, spotting, holidays, brush marks, runs, sags, ropiness, and other surface imperfections are not acceptable.

F. Completed Work: Match approved samples for color, texture and coverage; remove, refinish or repaint work not accepted.

3.3 PAINTING SCHEDULE

A. Exterior Work: Provide following paint systems.

1. Metal: Semigloss sheen.

a. 1st Coat: Touch-up primer, prime if none.
b. 2nd and 3rd Coat: Exterior 100% acrylic enamel.

2. Plaster: Flat sheen.

a. 1st and 2nd Coat: Heavy body waterproof elastomeric acrylic coating.

3. Mineral Fiber Cement Siding: Flat sheen.

a. 1st Coat: Alkali resistant primer.
b. 2nd and 3rd Coat: Exterior 100% acrylic enamel.

B. Interior Work: Provide following paint systems.

1. Gypsum Board Systems:

a. 1st Coat: Universal primer.
b. 2nd and 3rd Coat: Interior latex or acrylic latex emulsion.

2. Metal:

a. 1st Coat: Touch-up primer, prime if none.
b. 2nd and 3rd Coat: 100% acrylic enamel.

C. Sheens: Comply with ASTM D523, reflectance of paint.

1. Flat: 1-10.
2. Satin: 15-30.
3. Eggshell: 30-45.
4. Semigloss: 45-75.
5. Gloss: 75-100.

3.4 CLEAN-UP, PROTECTION, AND REPAIR

A. Clean-Up: During progress of work, remove discarded paint materials, rubbish, cans and rags from site at end of each work day.

1. Clean glass and paint-spattered surfaces immediately by proper methods of washing and scraping, using care not to scratch or damage finished surfaces.

B. Protection: Protect work of other trades, whether to be painted or not; correct damage by cleaning, repairing or replacing, and repainting, as acceptable to Architect.

1. Provide "Wet Paint" signs to protect newly-painted finishes.

2. Remove temporary protective wrappings provided by others for protection of their work, after completion of painting operations.

C. Repair: At completion of work of other trades, touch-up and restore damaged surfaces or defaced painted surfaces.

END OF SECTION

SECTION 10210

WALL LOUVERS

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes: Provide metal louvers and frames, with screens, attachment hardware, and accessories as required for complete finished installation.

B. LEED General: Refer to Section 01350 LEED Special Environmental Requirements and to LEED “Checklist” indicating points Design Team has anticipated relating to specific LEED credits and LEED requirements.

1.2 SYSTEM DESCRIPTION

A. Performance Requirements: Where indicated, comply with specific performance requirements; unit performance ratings determined in compliance with Air Movement and Control Association (AMCA) Standard 500.

1. Free Area: Minimum 45% based on 48" by 48" louver.

2. Static Pressure Loss: Maximum 0.15" of water gage at airflow of 1000 fpm free air velocity.

3. Water Penetration: Maximum 0.05 oz/ft^2 of free area at intake airflow of 1000 fpm free area velocity.

1.3 SUBMITTALS

A. Product Data: Furnish manufacturer's literature for each type of louver.

B. Shop Drawings: Indicate profile of frame, details, relation to adjacent construction, flashing, blade configuration, duct work connection, screens, and percentage of free air opening.

C. Samples: Furnish samples of metal finish.

D. Certificates: Where performance requirements are included, provide AMCA Certified Rating Seal indicating louvers comply with requirements.

E. LEED Certification Points: Submit information and certifications necessary to achieve maximum points for LEED certification; coordinate and cooperate with Owner and Architect in providing information necessary for required LEED rating.

1.4 PROJECT CONDITIONS

A. Take site dimensions affecting louvers prior to fabrication.

B. Ensure openings are properly prepared and flashings are correctly located to divert moisture to exterior.

C. Protect adjacent surfaces, finishes and materials from damage during installation of louvers.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

A. The Airolite Corporation.

B. Construction Specialties, Inc. (CSI).

C. Ruskin Manufacturing Division, Philips Industries, Inc.

D. Substitutions: Refer to Section 01630.

2.2 MATERIALS

A. Aluminum Extrusions: ASTM B221, 6061 or 6063 alloy, T5 or T6 temper; minimum 0.08" thick.

B. Aluminum Sheet: ASTM B209, manufacturer's standard alloy; minimum 0.08" thick.

C. LEED Recycled Content: Where available provide materials with post-consumer and pre-consumer recycled content to achieve maximum LEED credits.

D. LEED Regionally Manufactured, Extracted, Harvested, or Recovered Materials: Where possible obtain materials that qualify for LEED credits for regional materials obtained within 500 miles of Project.

E. LEED Total Volatile Organic Compounds (TVOC) and Toxic Substances: Provide materials with volatile organic compound emissions and toxic substances such as urea-formaldehyde complying with LEED requirements to reduce indoor air contaminants.

2.3 FABRICATION

A. Louvers: Manufacturer's standard fabrication for types specified and configurations indicated on Drawings.

1. Type: Extruded aluminum wall louvers, continuous blade (mullionless) type.

B. Bird Screen for Exterior Louvers: Minimum 0.063" diameter wire, 1/2" interwoven square mesh.

1. Wire: Stainless steel.

2. Frame: Match louver.

C. Fabricate louvers to maximum extent possible and disassemble as necessary for shipping and handling limitations; clearly mark units for reassembly and installation.

1. Fabricate frames, including integral sills, to suit adjacent construction with tolerances for installation.

2. Fabricate sill extension, flashings, wall anchors, structural supplementary sub-framing, and accessories as required for complete system; use same materials as provided for louvers.

D. Join frame members and louver blades by welding; maintain equal blade spacing, including separation between blades and frame head and sill; maintain uniform appearance.

1. Shop miter and weld blades into shop fabricated corner units to align with straight sections; include concealed bracing.

E. Finish:

1. Shop Finished Louvers: Factory finish with fluoropolymer coating based on Kynar 500 or Hylar 5000 and conforming with AAMA 605.2; not less than two coat system.

a. Color: As selected by Architect.

1) Custom color may be required to match other exposed aluminum components.

PART 3 - EXECUTION

3.1 INSTALLATION

A. Install louvers in accordance with manufacturer recommendations and installation instruction, properly aligned and level.

B. Secure louver rigid with concealed fasteners of non-corrosive metals to suit materials being encountered and to resist anticipated loads.

C. Coordinate installation method with application of adjacent backing and structural elements, and mechanical work.

D. Set and tie into flashings to ensure diversion of moisture to exterior.

E. Hinge screens for access.

END OF SECTION

SECTION 11165

DOCK BUMPERS

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes: Provide molded rubber dock bumpers with attachment hardware as required for complete installation.

B. LEED General: Refer to Section 01350 LEED Special Environmental Requirements and to LEED “Checklist” indicating points Design Team has anticipated relating to specific LEED credits and LEED requirements.

1.2 SUBMITTALS

A. Product Data: Submit manufacturer's literature.

B. Shop Drawings: Clearly indicate unit dimensions, method of anchorage/mounting and details of construction.

C. LEED Certification Points: Submit information and certifications necessary to achieve maximum points for LEED certification; coordinate and cooperate with Owner and Architect in providing information necessary for required LEED rating.

PART 2 - PRODUCTS

2.1 MATERIALS

A. Molded Bumpers: Provide nylon, rayon or polyester reinforced rubber dock bumpers; minimum 75 durometer, 950 psi tensile strength, 95% impact resistance; sizes and shapes as indicated on Drawings.

1. Rectangular Type: Minimum 4" thick.

a. Durable Mat Co./Type B.
b. Pawling Corp./Type B-4.
c. Kelley Co./Type E Impactor.
d. Substitutions: Refer to Section 01630.

B. Attachment Devices and Accessories: Manufacturer's standard recessed anchor system and accessories for dock configuration and substrate.

C. LEED Recycled Content: Where available provide materials with post-consumer and pre-consumer recycled content to achieve maximum LEED credits.

D. LEED Regionally Manufactured, Extracted, Harvested, or Recovered Materials: Where possible obtain materials that qualify for LEED credits for regional materials obtained within 500 miles of Project.

E. LEED Total Volatile Organic Compounds (TVOC) and Toxic Substances: Provide materials with volatile organic compound emissions and toxic substances such as urea-formaldehyde complying with LEED requirements to reduce indoor air contaminants.

PART 3 - EXECUTION

3.1 INSTALLATION

A. Install dock bumpers to dock edge in accordance with manufacturer's recommendations and installation instructions.

B. Bolt dock bumpers to dock level, straight, true to line, and in correct relationship to adjacent materials.

END OF SECTION

SECTION 14240

HYDRAULIC ELEVATORS

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes: Provide holeless type hydraulic elevator system including guide rails, brackets, cylinder, plunger, hydraulic fluid reservoir, pit buffers, hardware, and accessories as required for complete operational system.

1. Provide motors, pumps, piping, controls and wiring to main switch.

2. Provide hoistway doors, frames, and sills.

3. Provide passenger cars and car doors.

4. Review construction documents to assure necessary spaces and materials for legal elevator service are being provided under other sections.

a. Ensure proper fused disconnect switches, hoistway, pits, and machinery room with access, lighting, communications, ventilation and services are being provided under other sections.

b. Inform Architect of any discrepancies and omissions during bid period.

c. Work of this Section includes furnishing items necessary for a complete operational elevator system and not provided elsewhere.

B. LEED General: Refer to Section 01350 LEED Special Environmental Requirements and to LEED “Checklist” indicating points Design Team has anticipated relating to specific LEED credits and LEED requirements.

C. Related Work:

1. Section 05500: Metal fabrications such as elevator pit ladders, pit gratings, sill angle supports, and metal fabrications sized on Architectural Drawings.

2. Section 09300: Tile for elevator cabs floors (Tenant Improvement Specs).

3. Division 15: Pit drainage.

4. Division 16: Electrical power to Machine Room, including main switch, breaker and lighting.

1.2 REFERENCES

A. American National Standards Institute, ANSI A17.1: Safety Code for Elevators, Dumbwaiters and Escalators, and Moving Walks.

B. ANSI C1/NFPA 70: National Electrical Code.

C. ANSI A17.2: Practice for the Inspection of Elevators, Escalators and Moving Walks.

D. AWS D1.1: Structural Welding Code.

E. California Code of Regulations Title 24, Part 7, Elevator Safety Regulations, and Part 2 regulations for elevators accessible to persons with disabilities and ambulance gurney access.

F. Americans with Disabilities Act Accessibility Guidelines.

1.3 SYSTEM DESCRIPTION

A. Design Requirements:

1. Elevator #1 Characteristics:

a. Net Capacity: 2500 lbs.
b. Speed: 100 fpm.
c. Door: 48" wide by 8’-0” high side opening, single speed.
d. Cab Clear Height: 9’-0”.

2. Operation: Selective collective operation.

a. Home Landing: Ground floor.

3. Signal Equipment:

a. Car control station and in-car position indicator.
b. Hall push-button stations.
c. Lanterns and gongs.
d. Hall position indicators.

4. Special Features:

a. Access for persons with disabilities.
b. Medical emergency service.
c. Earthquake requirements.
d. Emergency exit service.
e. Elevator keyed security operation (Elevator No. 2).

B. Design Requirements:

1. Elevator #2 Characteristics:

a. Net Capacity: 5000 lbs.
b. Speed: 100 fpm.
c. Door: 48" wide by 8’-0” high side opening, single speed.
d. Cab Clear Height: 9’-0”.

2. Operation: Selective collective operation.

    a. Home Landing: Ground floor.

3. Signal Equipment:

    a. Car control station and in-car position indicator.
    b. Hall push-button stations.
    c. Lanterns and gongs.
    d. Hall position indicators.

4. Special Features:

    a. Access for persons with disabilities.
    b. Medical emergency service.
    c. Earthquake requirements.
    d. Emergency exit service.

1.4 SUBMITTALS

A. Product Data: Submit descriptive brochures or detail drawings of landing buttons, hall fixtures, car position indicators, car operating panels, car interior and hoistway doors and frames for review.

    1. Wiring Diagrams: Furnish complete diagrams for elevator system.

B. Shop Drawings: Indicate space requirements, general arrangement of elevator equipment, and material being supplied.

    1. Show connections, attachments, reinforcing, anchorage and location of exposed fastenings, and location and amount of loads and reactions to be carried on the building structure.

C. Samples: Submit samples of finishes, operating and signal system fixtures, samples of each type of sign or graphics provided, and finish of hoistway entrances and doors.

D. LEED Certification Points: Submit information and certifications necessary to achieve maximum points for LEED certification; coordinate and cooperate with Owner and Architect in providing information necessary for required LEED rating.

    1. Wood Product Certification: Furnish certification indicating wood products are from FSC “well-managed” forests.

1.5 QUALITY ASSURANCE

A. Installer Qualifications: Elevator manufacturer or firm approved by elevator manufacturer in writing and with minimum five years successful experience installing elevators similar to those required for Project.

B. Regulatory Requirements: Comply with applicable codes and regulations for elevator work and including to ANSI A17.1 Safety Code for Elevators, Dumbwaiters and Escalators, and Moving Walks.

C. Certified Wood Products: Wood products to be from forests certified “well-managed” by an agency accredited by Forest Stewardship Council (FSC).

1.6 DELIVERY, STORAGE, AND HANDLING

A. Deliver items and materials to site only after area in which they are to be installed is ready to receive them in their place of final installation.

B. Store materials in storage area allotted.

C. Fully protect movable and operating equipment from weather.

1.7 WARRANTY

A. Component Warranties: Provide coincidental product warranties, where available, for major components of elevator work.

1.8 MAINTENANCE

A. Elevator Maintenance Period: Maintain entire elevator installation 12 months after date of Substantial Completion of Work.

1. Include systematic examination, adjustment and lubrication of elevator equipment.

a. Repair or replace worn electrical and mechanical parts of elevator equipment, using parts produced by manufacturer of equipment.

2. Perform work without removing cars during peak traffic periods.

3. Provide 24 hour emergency call-back service during maintenance period.

4. Ensure competent personnel handle maintenance service; maintain locally an adequate stock of parts for replacement or emergency purposes.

a. Have qualified personnel available at such places to ensure fulfillment of this service without unreasonable loss of time.

B. Extended Maintenance Proposal: Submit proposal for maintenance of installed elevator work for a period of three years after termination of regular maintenance required at end of this section.

1. Proposal shall include stipulated sum for time period stated, with premiums due annually.

2. Extended maintenance proposal shall include requirements specified at end of section for first year maintenance agreement.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

A. ThyssenKrupp Elevators, Marquis and Continental Series

B. Substitutions: Refer to Section 01630.

2.2 MATERIALS

A. Rolled Steel Sections, Shapes, and Rods: ANSI A17.1; ASTM A924 and A653 G90 galvanized coating.

B. Sheet Steel: ASTM A653, G90 coating designation, stretcher leveled, commercial grade.

C. Stainless Steel: ASTM A666, Type 304.

D. Aluminum: ASTM B221; enameling or anodizing quality as applicable.

E. Plywood: PS 1, fire retardant treated.

F. Sills: Extruded aluminum.

G. LEED Recycled Content: Where available provide materials with post-consumer and pre-consumer recycled content to achieve maximum LEED credits.

H. LEED Regionally Manufactured, Extracted, Harvested, or Recovered Materials: Where possible obtain materials that qualify for LEED credits for regional materials obtained within 500 miles of Project.

I. LEED Total Volatile Organic Compounds (TVOC) and Toxic Substances: Provide materials with volatile organic compound emissions and toxic substances such as urea-formaldehyde complying with LEED requirements to reduce indoor air contaminants.

2.3 FABRICATION

A. Machine: A.C. type specifically designed for hydraulic elevator service, having motor, pump, tank valves and muffler mounted and aligned on steel bedplate.

1. Provide solid state motor starter for car.

B. Viscosity Control: Provide complete hydraulic electronic control maintaining hydraulic fluid in reservoir, pump, and control valve at minimum 100 degrees F (plus or minus 5 degrees) at all times.

C. Cylinder/Plunger: Holeless type, machine polished steel tube welded stop on bottom, sliding in high strength steel pipe cylinder having closed bottom and stuffing box with packing gland at top and necessary piping connections.

D. Elevator Car: Sheet steel enclosure with structural steel frame and bracing; 3/4" fire retardant treated plywood floor and wall cladding fastened with hidden mechanical fasteners.

E. Doors: Power operated hollow metal doors with track, rollers and frame; two-point suspension, nonmetallic sheaves; minimum 3" diameter for car doors, 2-1/2" diameter for hoistway doors.

1. Finish: Stainless steel.

F. Hoistway Entrances: Provide formed metal entrances with struts, hanger headers, fascia plates, toe guards, and Underwriters' Laboratory labels.

1. Finish: Match doors.

2. Floor Graphics: Provide minimum 2" high embossed Arabic numerals, with Braille immediately left of numeral, on each side of each door frame; center at 60" above floor.

a. Provide medical emergency symbol at medical emergency elevator.
b. Provide star symbol complying with applicable codes at grade level.

3. Entrance Protection: Provide infrared door detectors complying with applicable codes and regulations, including requirements for access for persons with disabilities.

G. Car Finishes: Finishes as indicated.

1. Front Wall Panels: Stainless steel with inset buttons, swing return panels.

2. Side and Back Wall Panels: Removable stainless steel panels and stainless steel trim.

3. Flooring: Tile provided in Section 09300 (Tenant Improvement Specs).

4. Ceiling: Removable stainless steel downlight type.

5. Railings: Stainless steel tube rails at both sides.

6. Pads: Provide wall attachment buttons and protective pads.

H. Operating Fixtures and Signals: Comply with requirements for providing access for persons with disabilities; comply with applicable codes and regulations; stainless steel face panels unless otherwise indicated.

1. Car Control Station: Provide one car station, with hands free communications and service cabinet.

a. Provide door hold open button.

2. Hall Call Buttons: Provide one hall station riser with illuminated mechanical hall buttons.

3. Jamb Lanterns: Provide jamb-mounted lanterns with audible signal, one for up travel, two for down travel.

4. Signs in lobbies, 1/2" letters, to read, "IN CASE OF FIRE USE STAIRWAY FOR EXIT - DO NOT USE ELEVATOR;" sign to be approved by Architect and applicable authorities; stainless steel.

    a. Provide elevator lobby graphics conforming to applicable code requirements.

I. Miscellaneous Items: Provide as required by applicable codes and as follows.

1. Provide battery operated emergency lighting in each car.
2. Provide two-speed fan in each car.

J. Special Features:

1. Access for Persons with Disabilities: Comply with requirements of California Code of Regulations, Title 24, and ADAAG for providing access for persons with disabilities.

2. Medical Emergency Operation: Comply with California Code of Regulations, Title 24, for providing medical emergency operation.

3. Earthquake Requirements: Comply with applicable regulations.

4. Emergency Exit Service: Provide system designed to lower elevators to next lower floor level or to Ground floor in power outage and doors to open without requiring assistance of elevator service company.

5. Elevator Keyed Security Operation (Elevator No. 2): Provide keyed buttons in car control stations allowing each floor to be individually locked out to prevent passenger from access to floor.

2.4 FINISHES

A. Nonexposed-to-View Surfaces:

1. Structural and Nonexposed Ferrous Metal Surfaces: Clean surfaces of rust, oil or grease and prime with structural steel primer.

2. Field Welds: Remove oxidation, flux or residue, wire brush clean and apply two coats of primer.

3. Wood: Provide one coat primer and two coats semi-gloss acrylic enamel.

B. Exposed-to-View Surfaces in Car, Machine Room and Hoistway Entrances:

1. Stainless Steel: Number 4 finish (satin directional polish).

2. Baked Enamel: Clean, degrease zinc-coated metal surface; one coat zinc oxide primer sprayed and baked; two coats semi-gloss enamel sprayed and baked; color as approved.

PART 3 - EXECUTION

3.1 PREPARATION

A. Examine work of other trades on which elevator work depends. Report defects to Architect in writing which may affect elevator work or equipment operation.

B. Ensure shafts and openings for moving equipment are plumb, level and in line. Verify pits are to proper depth, waterproofed and drained, with necessary access doors, ladder and guards.

C. Ensure machine room is properly illuminated, heated and ventilated, complete with floor and access door, and with equipment foundations or supporting beams correctly located.

D. Before fabrication, take necessary job site measurements and verify where work is governed by other trades; check measurement of space for equipment and means of access for installation and operation.

1. Obtain dimensions from site for preparation of shop drawings.

E. Ensure preparatory work has been properly completed to receive elevator work, including such work as:

1. Electrical feeder wires are provided to fused disconnect switches.

2. Provisions of hoistway outlets and power are provided for car light and for light in pit and outlets in machine room for light.

3. Furnishing of electric power is available for testing and adjusting equipment.

4. Provision of hoistway outlet is provided for telephone.

5. Machine room is enclosed and protected from moisture, with lockable door.

F. Supply in ample time for installation by other trades, inserts, anchors, bearing plates, brackets, supports and bracing, including setting templates and diagrams for placement.

3.2 INSTALLATION

A. Install in accordance with manufacturer's instructions, applicable codes, and standards to provide a quiet, smoothly operating installation, free from sidesway, oscillation or vibration.

1. Work shall be by mechanics skilled in this work and under direct control and supervision of elevator manufacturer's experienced supervisor.

B. Set hoistway entrances in alignment with car openings and true with plumb sill lines.

C. Mount machine in accordance with approved shop drawings; isolate and dampen machine vibration with properly sized sound-reducing anti-vibration pads.

D. Excavate for plunger and cylinder, set in place plumb and accurate, and enclose with 3000 psi concrete.

E. Erect hoistway sills, headers and frames prior to erection of rough walls and doors; erect fascias and toe guards after rough walls are finished.

F. Grout sills and hoistway entrance frames.

G. Make necessary adjustments of equipment to ensure elevator operates smoothly and accurately.

H. Locate and protect or lock movable equipment and controls in such a way that they can be operated only by authorized persons.

3.3 FIELD QUALITY CONTROL

A. Inspections and Permits: Obtain and pay for necessary inspections and permits and make such tests as are required by regulations and authorities.

1. Final inspection shall be after elevator installation, hoisting enclosure and machine room are complete.

2. Inspect installation in accordance with ANSI A17.2.

3. Deliver test certificates and permits to Architect.

END OF SECTION