SCOPING SPECIFICATIONS

PRICING ASSIST FOR A

DISTRIBUTION CENTER

PROJECT RODEO

TBD, TEXAS

DEVELOPER:
TBD

**NOT FOR REGULATORY APPROVAL,
PERMITTING OR CONSTRUCTION**

ARCHITECT:
MACGREGOR ASSOCIATES ARCHITECTS, INC.
2727 PACES FERRY ROAD, NW
BUILDING 2, SUITE 1400
ATLANTA, GEORGIA 30339

MAA PROJ NO 2018-159

ISSUED 10/29/2018

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END OF SECTION

SECTION 01 1000
SUMMARY

PART 1 GENERAL

1.01 PROJECT

A. Scoping documents for pricing assistance only. These are not full permit or construction documents. They are based on a previous project not sited in Texas. Final design and documentation will be required for a particular site.

B. Project Name: PROJECT RODEO, final location to be determined, Texas.

C. Contract Documents: Requirements of the work are contained in the contract documents, and include cross-references herein to published information, which is not necessarily bound therewith.

D. Verbal Summary: Without force and effect on the requirements of the Contract Documents, the description of the work of the contract can be summarized as follows:

1. Site Work including all clearing and grading, concrete pavement, curb and sidewalks, backfill against curb and sidewalks, pavement markings, handicap signage, site lighting, maintenance and removal of sediment controls and construction entrance, wire fabric fence, lime stabilization, tie in to site utilities and conduits for telephone services to the building. The site work is unclassified.
2. Building: Construction consists of one shell building: a single story structure of approximately 715,0003 square feet. Tenant imrpovement project to follow.
3. The Work includes but is not limited to: concrete foundations, concrete floor slab, reinforced concrete tilt-up walls, structural steel columns, steel girders, and joist framing for roof, miscellaneous metals, metal deck, single-ply roof membrane on rigid insulation, metal flashings, 1” insulated glass in aluminum storefronts at entrances, overhead doors, track guards, hollow metal frames, and painting.
4. The Work includes heating for freeze protection, roof drains, sanitary sewer lines with clean outs, natural gas services to heaters, and electrical systems.
5. The Work includes a complete ESFR fire suppression (sprinkler) system.

1.02 WORK FURNISHED BY THE OWNER UNDER SEPARATE CONTRACTS

A. Landscape improvements and landscape irrigation.

B. Material testing.

C. Builders Risk Insurance.

1.03 CONTRACTOR USE OF PREMISES

A. General: During the entire construction period, the Contractor shall coordinate use of the site with all work being performed under separate contracts

1. Use of the Site: Confine operations at the site to the areas required for performance of the contract.
2. Do not encumber the site with materials or equipment. Confine stockpiling of materials and location of storage sheds to areas designated by the Owner.
3. Smoking or open fires will not be permitted within the building enclosures.

1.04 CONNECTION, USE FEES, ETC.

A. Including water, sanitary sewer and power company fees for underground service from utility to transformer and to the building are to be paid by Owner. The contractor shall be responsible for costs of physically tapping into various utilities as well as all building permits and trade permits.

PART 2 PRODUCTS - NOT USED

PART 3 EXECUTION - NOT USED

END OF SECTION

SECTION 01 3000
ADMINISTRATIVE REQUIREMENTS

PART 1 GENERAL

1.01 SECTION INCLUDES

A. Electronic Submittals.
B. Preconstruction meeting.
C. Progress meetings.
D. Pre-Slab Meeting.
E. Structural Construction Observation Milestones.
F. Pre-Roof Meeting.
G. Progress photographs.
H. Webcam service.
I. Submittals for review, information, and project closeout.
J. Number of copies of submittals.
K. Submittal procedures.

1.02 RELATED REQUIREMENTS

A. Section 01 7000 - Execution and Closeout Requirements: Additional coordination requirements.
B. Section 01 7800 - Closeout Submittals: Project record documents.

PART 2 PRODUCTS - NOT USED

PART 3 EXECUTION

3.01 ELECTRONIC SUBMITTALS

A. All documents transmitted for purposes of administration of the contract are to be in electronic (PDF) format.
   1. This procedure applies to requests for information (RFIs), progress documentation, field reports and meeting minutes, and any other document any participant wishes to make part of the project record.
   2. It is Contractor's responsibility to submit documents in PDF format.
   3. Users of this procedure need an email address, Internet access, and PDF review software that includes ability to mark up and apply electronic stamps (such as Adobe Acrobat, www.adobe.com, or Bluebeam PDF Revu, www.bluebeam.com).
   4. All other specified submittal and document transmission procedures apply, except that electronic document requirements do not apply to samples or color selection charts.

3.02 PRECONSTRUCTION MEETING

A. Contractor will schedule a meeting within 15 days of date established in Notice to Proceed.
B. Attendance Required:
   1. Owner.
   2. Architect.
   3. Contractors Project Manager and Superintendent.
   4. Major Subcontractors.
   5. Testing Agency.
   6. Others as appropriate.
C. Agenda:
   1. Project Coordination: Designation of responsible personnel.
   2. Distribution of Contract Documents.
   3. Submission of list of Subcontractors, schedule of values, and progress schedule.

4. Designation of personnel representing the parties to Contract and Architect.
5. Major equipment deliveries and priorities.
6. Procedures and processing of field decisions, submittals, substitutions, applications for payments, proposal request, Change Orders, and Contract closeout procedures.
7. Procedures for testing and inspection.
8. Use of premises:
   a. Jobsite trailers, work and storage areas.
   b. Owner's requirements.
9. Temporary utilities.
10. Safety and first-aid procedures.
11. Security procedures.
12. Housekeeping procedures.
13. Scheduling activities of Testing Agency.

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

3.03 PROGRESS MEETINGS

A. Schedule and administer meetings throughout progress of the Work at maximum bi-monthly intervals.

B. Make arrangements for meetings, prepare agenda with copies for participants, preside at meetings.

C. Attendance Required: Job superintendent, major Subcontractors and suppliers, Owner, Architect, as appropriate to agenda topics for each meeting.

D. Agenda:
1. Review minutes of previous meetings.
2. Review of Work progress.
3. Field observations, problems, and decisions.
4. Identification of problems that impede, or will impede, planned progress.
5. Review of submittals schedule and status of submittals.
6. Review of off-site fabrication and delivery schedules.
7. Maintenance of progress schedule.
8. Corrective measures to regain projected schedules.
9. Planned progress during succeeding work period.
10. Maintenance of quality and work standards.
11. Effect of proposed changes on progress schedule and coordination.
12. Other business relating to Work.

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

3.04 PRE-SLAB MEETING:

A. Schedule and administer pre-slab meeting 14 days prior to placing floor slabs.

B. Attendance Required:
1. Owner's Representative.
2. Architect.
3. Structural Engineer
4. Material Testing Agency's Field Representative.
5. Concrete Consultant.
6. Contractor's Project Manager and Superintendent.
7. Concrete Finishing Subcontractor.
8. Concrete Supplier.
9. Others as appropriate.

C. Suggested Agenda:

1. Subgrade preparation.
2. Formwork.
3. Sequencing of slab pours.
4. Concrete mix designs.
5. Admixtures (if any).
6. Slump - Adding water at site.
7. Reinforcement (if any).
8. Doweling of construction joints.
9. Placing and finishing procedures.
10. Sawing of control joints.
11. Curing procedure.
12. Testing procedures - concrete.
13. Testing procedures - flatness and levelness.
14. Weather conditions and precautions.
15. Protection of floor slabs:
    a. Edge breakage at temporary ramps.
    b. Anchorage of tilt panel forms and reveals.
    c. Scratching/ marring of slab during tilt panel construction and erection.
    d. Repair of tilt panel bracing bolt holes.
    e. Oil staining by follow-on trades.
    f. Spalling of floor joints.
16. Slab joint fill procedures.
17. Procedure to follow if problems are encountered.

3.05 PRE-ROOFING MEETING:

A. Schedule and administer pre-roof meeting 14 days prior to commencing installation of roofing.

B. Attendance Required:
1. Owner's Representative.
2. Architect.
3. Contractor's Project Manager and Superintendent.
4. Roofing sub-contractor.
5. Roofing membrane manufacturer.
6. Others as appropriate.

C. Suggested Agenda
1. Discuss representative areas of roofing substrates; inspect and discuss condition of substrate, scupper preparations, curbs, penetrations, and other preparatory work performed by other trades.
2. Review structural loading limitations of deck and inspect deck for flatness and for required mechanical fastening.
3. Review roofing system requirements: Drawings, Specifications, and other Contract Documents.
4. Review required submittals, both complete and incomplete.
5. Review preliminary roof inspection reports verifying locations and heights of roof drains, overflow scuppers, sloping of roof deck, and other roof components.
6. Review and finalize construction schedule related to roofing work and verify availability of materials, Installer's personnel, equipment, and facilities needed to make progress and avoid delays.
7. Review required inspection, testing, certifying, and material use accounting procedures.
8. Review weather and forecasted weather conditions and procedures for coping with unfavorable conditions, including possibility of temporary roofing, and provision of watertight cut-offs.

3.06 CONSTRUCTION OBSERVATION MILESTONES:

A. Contractor to notify Architect 7 days prior to the following construction activities:

1. Beginning installation of reinforcing steel in the first tilt wall panels.
2. Beginning installation of the metal roof deck including perimeter decking.
3. 100% completion of all structural elements.
4. Office area rough-in of mechanical, plumbing and electrical work prior to closing up walls and ceilings.

3.07 PROGRESS PHOTOGRAPHS

A. Photography Type: Digital; electronic files.

B. Take photographs that apply to work under construction and submit promptly to Owner.
   1. Completion of site clearing.
   2. Excavations in progress.
   3. Foundations in progress and upon completion.
   4. Site utilities, particularly underground fireline and thrust blocks.
   5. Slab placements in progress.
   6. Structural framing in progress and upon completion.
   7. Enclosure of building, upon completion.

C. Aerial Views:
   1. Provide aerial photographs from four cardinal views monthly.

D. Digital Photographs: 24 bit color, minimum resolution of 1024 by 768, in JPG format; provide files unaltered by photo editing software.
   1. Delivery Medium: Via email.
   2. File Naming: Include project identification, date and time of view, and view identification.
   3. PDF File: Assemble all photos into printable pages in PDF format, with 2 to 4 photos per page, each photo labeled with file name; one PDF file per submittal.

3.08 WEBCAM SERVICE

A. Provide a webcam service - Set up and install a project camera (supplied by Owner) on a telephone pole, no power required since it is solar powered. Contact Marsha Rain, (404) 554-1462, with OxBlue Corp. Webcam to be on a fixed pole in a location approved by the Owner. Remove pole once service is terminated at project completion. Contractor to pay all monthly service charges from Oxblue for duration of the project.

3.09 SUBMITTALS FOR REVIEW

A. When the following are specified in individual sections, submit them for review:
   1. Product data.
   2. Shop drawings.
   3. Samples for selection.
   4. Samples for verification.

B. Submit to Architect for review for the limited purpose of checking for conformance with information given and the design concept expressed in the contract documents.

C. Samples will be reviewed only for aesthetic, color, or finish selection.

D. After review, provide copies and distribute in accordance with SUBMITTAL PROCEDURES article below and for record documents purposes described in Section 01 7800 - Closeout Submittals.

E. Job delays occasioned by requirement of resubmission of samples, shop drawings and product data not in accord with Contract Documents are Contractor's responsibility and will not be considered valid justification for extension of contract time.

F. Commence no portion of work requiring submittals until submittal has been reviewed by Architect.

3.10 SUBMITTALS FOR PROJECT CLOSEOUT

A. Submit Correction Punch List for Substantial Completion.

B. Submit Final Correction Punch List for Substantial Completion.

C. When the following are specified in individual sections, submit them at project closeout:
   1. Operation and maintenance data.
   2. Warranties.
   3. Other types as indicated.

D. Submit for Owner's benefit during and after project completion.

3.11 NUMBER OF COPIES OF SUBMITTALS

A. Electronic Documents: Submit one electronic copy in PDF format; an electronically-marked up file will be returned. Create PDFs at native size and right-side up; illegible files will be rejected.

B. Documents for Project Closeout: Make one reproduction of submittal originally reviewed. Submit one extra of submittals for information.

C. Samples: Submit the number specified in individual specification sections; one of which will be retained by Architect.
   1. After review, produce duplicates.
   2. Retained samples will not be returned to Contractor unless specifically so stated.

3.12 SUBMITTAL PROCEDURES

A. Shop Drawing Procedures:
   1. Prepare accurate, drawn-to-scale, original shop drawing documentation by interpreting the Contract Documents and coordinating related Work.
   2. Generic, non-project specific information submitted as shop drawings do not meet the requirements for shop drawings.

B. Transmit each submittal with a copy of approved submittal form.

C. Sequentially number the transmittal form. Revise submittals with original number and a sequential alphabetic suffix.

D. Identify Project, Contractor, Subcontractor or supplier; pertinent drawing and detail number, and specification section number, as appropriate on each copy.

E. Apply Contractor's stamp, signed or initialed certifying that review, approval, verification of Products required, field dimensions, adjacent construction Work, and coordination of information is in accordance with the requirements of the Work and Contract Documents.

F. Schedule submittals to expedite the Project, and coordinate submission of related items.

G. For each submittal for review, allow 15 days excluding delivery time to and from the Contractor.

H. Identify variations from Contract Documents and Product or system limitations that may be detrimental to successful performance of the completed Work.

I. Provide space for Contractor and Architect review stamps.

J. When revised for resubmission, identify all changes made since previous submission.

K. Distribute reviewed submittals as appropriate. Instruct parties to promptly report any inability to comply with requirements.

L. Submittals not requested will not be recognized or processed.

END OF SECTION

SECTION 01 4000
QUALITY REQUIREMENTS

PART 1 GENERAL

1.01 SECTION INCLUDES

A. References and standards.

B. Control of installation.

C. Testing and inspection services.

D. Manufacturers' field services.

1.02 RELATED REQUIREMENTS

A. Section 01 3000 - Administrative Requirements: Submittal procedures.

B. Section 01 6000 - Product Requirements: Requirements for material and product quality.

1.03 REFERENCE STANDARDS

A. ASTM C1077 - Standard Practice for Laboratories Testing Concrete and Concrete Aggregates for Use in Construction and Criteria for Laboratory Evaluation; 2014.

B. ASTM C1093 - Standard Practice for Accreditation of Testing Agencies for Masonry; 2013.

C. ASTM D3740 - Standard Practice for Minimum Requirements for Agencies Engaged in the Testing and/or Inspection of Soil and Rock as Used in Engineering Design and Construction; 2012a.

D. ASTM E329 - Standard Specification for Agencies Engaged in Construction Inspection and/or Testing; 2014a.

E. ASTM E543 - Standard Specification for Agencies Performing Nondestructive Testing; 2013.

1.04 TESTING AND INSPECTION AGENCIES

A. Owner will employ and pay for services of an independent testing agency to perform specified testing and inspection.
   1. Soils compaction.
   2. Paving (Concrete/Asphalt)
   3. Concrete Testing and Placement, (including Tilt-Up Wall Panels).
   4. Foundations
   5. Reinforcing steel.
   6. Floor flatness and levelness.
   7. Masonry
   8. Structural steel welds.
   9. Structural bolts.
   10. Metal deck attachments.

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

C. Testing Agency Requirements:
   1. Testing agency: Comply with requirements of ASTM E329, ASTM E543, ASTM C1077, and ASTM C1093.
   2. Inspection agency: Comply with requirements of ASTM D3740 and ASTM E329.
   3. Testing Equipment: Calibrated at reasonable intervals either by NIST or using an NIST established Measurement Assurance Program, under a laboratory measurement quality assurance program.
   4. Reports of all tests shall be signed by a qualified individual, having professional registration in the state in which the project is being constructed.

PART 2 PRODUCTS - NOT USED

PART 3 EXECUTION

3.01 CONTROL OF INSTALLATION

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

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

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

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

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

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

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

3.02 TESTING AND INSPECTION

A. Testing Agency Duties:
   1. Provide qualified personnel at site. Cooperate with Architect and Contractor in performance of services.
   2. Perform specified sampling and testing of products in accordance with specified standards.
   3. Ascertain compliance of materials and mixes with requirements of Contract Documents.
   4. Promptly notify Architect and Contractor of observed irregularities or non-conformance of Work or products.
   5. Perform additional tests and inspections required by Architect.
   6. Attend preconstruction meetings and progress meetings as required.
   7. Testing Agency shall promptly process and distribute all copies of test reports and related instructions to insure that all necessary retesting and/or replacement of materials can be accomplished without possible delay to progress of the work. The Testing Agency shall provide a written report within three (3) days related to every project test and inspection. Distribute copies to each of the following:
      a. Owner
      b. Architect
      c. Structural Engineer
      d. Contractor
      e. Building Official (if required)

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

C. Contractor Responsibilities:
   1. Deliver to agency at designated location, adequate samples of materials proposed to be used that require testing, along with proposed mix designs.
   2. Provide Testing Agency with copies of the following shop drawings prior to start of work:
      a. Asphalt mix designs.
      b. Concrete mix designs.
      c. Masonry grout/mortar mix designs.

d. Structural including steel, reinforcing, masonry.
e. Roofing shop drawings.

3. Cooperate with laboratory personnel, and provide access to the Work .
4. Provide incidental labor and facilities:
   a. To provide access to Work to be tested/inspected.
   b. To obtain and handle samples at the site or at source of Products to be tested/inspected.
   c. To facilitate tests/inspections.
   d. To provide storage and curing of test samples.
5. Notify the Testing Agency a minimum of 48 hours in advance of operations to allow for Testing Agency assignment of personnel and scheduling of tests.
6. Arrange with Owner's agency and pay for additional samples, tests, and inspections required by Contractor beyond specified requirements.

D. Re-testing required because of non-conformance to specified requirements shall be performed by the same agency on instructions by Architect.

E. Re-testing required because of non-conformance to specified requirements shall be paid for by Contractor.

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

3.03 MANUFACTURERS' FIELD SERVICES

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

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

3.04 DEFECT ASSESSMENT

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

B. If, in the opinion of Architect, it is not practical to remove and replace the Work, Architect will direct an appropriate remedy or adjust payment.

END OF SECTION

SECTION 01 5000
TEMPORARY FACILITIES AND CONTROLS

PART 1 GENERAL

1.01 SECTION INCLUDES

A. Temporary telecommunications services.

B. Temporary sanitary facilities.

C. Security requirements.

D. Waste removal facilities and services.

E. Project identification sign.

1.02 TEMPORARY UTILITIES

A. Provide and pay for all electrical power, lighting, water, heating and cooling, and ventilation required for construction purposes.

B. Provide temporary electrical service, including extensions and connections necessary for construction work. Pay costs of installing and maintaining service for duration of project. Pay costs associated with use of permanent electrical system until Date of Substantial Completion.

C. Temporary Heat and Ventilation:
   1. Provide adequate heat and ventilation required to properly complete and install all work.
   2. Provide humidity control in work and finished areas to permit proper installation and maintenance of finished work.
   3. Provide ventilation to prevent accumulation of dust, fumes or gases; to properly cure materials and disperse humidity.

D. Provide temporary water for construction purposes, including extensions and connections necessary for work. Pay costs of installing and maintaining service for duration of project. Pay costs associated with use of permanent water system until Date of Substantial Completion.

1.03 TELECOMMUNICATIONS SERVICES

A. Provide, maintain, and pay for local telephone service to field office at time of project mobilization.

B. Telecommunications services shall include:
   1. Telephone Land Lines: One line, minimum; one handset per line.
   2. Internet Connections: Minimum of one; DSL modem or faster.

1.04 TEMPORARY SANITARY FACILITIES

A. Provide and maintain required facilities and enclosures. Provide at time of project mobilization.

B. New permanent facilities may not be used during construction operations.

C. Maintain daily in clean and sanitary condition.

1.05 SAFEGUARDS DURING CONSTRUCTION:

A. Construct and maintain in accord with local building codes and OSHA regulations.

B. Temporary Controls: determine methods and procedures to be used and assume responsibility for proper protection and safety of all personnel, site, adjoining areas and structures, and public during all phases of the work. Provide all necessary boarding and fencing around all open excavation as required by applicable codes, by-laws, or governing authorities.

C. Barriers: Contractor shall be responsible for complete and proper protection from damage of existing buildings, improvements and existing parts of work to remain. Provide and maintain at all times suitable temporary barriers, partitions, and signs as necessary.

1.06 VEHICULAR ACCESS AND PARKING

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

B. Provide and maintain access to fire hydrants, free of obstructions.

C. Provide means of removing mud from vehicle wheels before entering streets.

D. Provide and maintain temporary roadways as required to construct the Work.

1.07 WASTE REMOVAL

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

1.08 PROJECT IDENTIFICATION

A. Construct a project sign of 3/4" thick AC plywood, approximately 4'-0" x 8'-0" painted in not more than four (4) colors, supported by 4" x 4" wood posts buried in ground 3'-0" minimum. Coordinate sign design with Architect.

B. Erect on site at location established by Architect.

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

1.09 FIELD OFFICES

A. Office: Weathertight, with lighting, electrical outlets, heating, cooling equipment, and equipped with sturdy furniture .

B. Provide space for Project meetings, with table and chairs to accommodate attendees.

1.10 REMOVAL OF UTILITIES, FACILITIES, AND CONTROLS

A. Relocate temporary facilities during soncstruction as required by progress of the Work at no additional cost to the Owner.

B. Remove temporary utilities, equipment, facilities, materials, prior to Final Application for Payment inspection.

PART 2 PRODUCTS - NOT USED

PART 3 EXECUTION - NOT USED

END OF SECTION

SECTION 01 6000
PRODUCT REQUIREMENTS

PART 1 GENERAL

1.01 SECTION INCLUDES

A. General product requirements.

B. Transportation, handling, storage and protection.

C. Product option requirements.

D. Substitution limitations and procedures.

E. Maintenance materials, including extra materials, spare parts, tools, and software.

1.02 RELATED REQUIREMENTS

A. Section 01 4000 - Quality Requirements: Product quality monitoring.

B. Section 01 6116 - Volatile Organic Compound (VOC) Content Restrictions: Requirements for VOC-restricted product categories.

PART 2 PRODUCTS

2.01 NEW PRODUCTS

A. Provide new products unless specifically required or permitted by the Contract Documents.

B. Where all other criteria are met, Contractor shall give preference to products that:
   1. If used on interior, have lower emissions, as defined in Section 01 6116.
   2. If wet-applied, have lower VOC content, as defined in Section 01 6116.
   3. Have a published GreenScreen Chemical Hazard Analysis.

2.02 PRODUCT OPTIONS

A. Products Specified by Reference Standards or by Description Only: Use any product meeting those standards or description.

B. Products Specified by Naming One or More Manufacturers: Use a product of one of the manufacturers named and meeting specifications, no options or substitutions allowed.

C. Products Specified by Naming One or More Manufacturers with a Provision for Substitutions: Submit a request for substitution for any manufacturer not named.
   1. The burden of proving equality of a proposed substitute to an item designated by trade name or by manufacturer's name in the contract documents rests on the party submitting the request for approval.

2.03 MAINTENANCE MATERIALS

A. Furnish extra materials, spare parts, tools, and software of types and in quantities specified in individual specification sections.

B. Deliver and place in location as directed; obtain receipt prior to final payment.

PART 3 EXECUTION

3.01 SUBSTITUTION PROCEDURES

A. Instructions to Bidders specify time restrictions for submitting requests for substitutions during the bidding period. Comply with requirements specified in this section.
   1. If the submittal is approved by the Architect, an Addendum will be issued to all prospective bidders at least three days prior to the bid date.
   2. Unless requests for changes are received and approvals are published by Addendum in accordance with the above procedure, the successful bidder shall be held responsible for furnishing items and materials of the trade names or manufacturer's names called for in the specifications.

B. Substitutions may be considered when a product becomes unavailable through no fault of the Contractor.

C. A request for substitution constitutes a representation that the submitter:
   1. Has investigated proposed product and determined that it meets or exceeds the quality level of the specified product.
   2. Will provide the same warranty for the substitution as for the specified product.
   3. Will coordinate installation and make changes to other Work that may be required for the Work to be complete with no additional cost to Owner.
   4. Waives claims for additional costs or time extension that may subsequently become apparent.

D. Requests for substitutions shall include the following data:
   1. Date of request.
   2. Project name.
   3. Specification reference.
   4. Specified item.
   5. Proposed substitution.
   6. Manufacturer.
   7. Deviations from the specified item.
   8. Manufacturer's recommendations for use and installation. Submit drawings if required for clarity.
   9. A complete schedule of changes in the drawings and specifications, if any, which must be made in other work in order to permit the use and installation of the proposed substitute in accordance with the recommendations of the manufacturer of the product.
   10. Technical data to support request for approval. List reference standards met, submit testing laboratory reports and experience records.
   11. Other supporting data such as brochures, samples and drawings.
   12. Samples or product literature of specified product for comparison, if requested by Architect.

E. Determination as to acceptability of proposed substitution shall be made based only on data submitted.

3.02 TRANSPORTATION AND HANDLING

A. Package products for shipment in manner to prevent damage; for equipment, package to avoid loss of factory calibration.

B. If special precautions are required, attach instructions prominently and legibly on outside of packaging.

C. Coordinate schedule of product delivery to designated prepared areas in order to minimize site storage time and potential damage to stored materials.

D. Transport and handle products in accordance with manufacturer's instructions.

E. Transport materials in covered trucks to prevent contamination of product and littering of surrounding areas.

F. Promptly inspect shipments to ensure that products comply with requirements, quantities are correct, and products are undamaged.

3.03 STORAGE AND PROTECTION

A. Designate receiving/storage areas for incoming products so that they are delivered according to installation schedule and placed convenient to work area in order to minimize waste due to excessive materials handling and misapplication.

B. Store and protect products in accordance with manufacturers' instructions.

C. Store with seals and labels intact and legible.

D. Store sensitive products in weather tight, climate controlled, enclosures in an environment favorable to product.

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

F. Protect products from damage or deterioration due to construction operations, weather, precipitation, humidity, temperature, sunlight and ultraviolet light, dirt, dust, and other contaminants.

G. Comply with manufacturer's warranty conditions, if any.

H. Cover products subject to deterioration with impervious sheet covering. Provide ventilation to prevent condensation and degradation of products.

I. Prevent contact with material that may cause corrosion, discoloration, or staining.

J. Provide equipment and personnel to store products by methods to prevent soiling, disfigurement, or damage.

K. Arrange storage of products to permit access for inspection. Periodically inspect to verify products are undamaged and are maintained in acceptable condition.

END OF SECTION

SECTION 01 7000
EXECUTION AND CLOSEOUT REQUIREMENTS

PART 1 GENERAL

1.01 SECTION INCLUDES

A. Surveying for laying out the work.

B. Cleaning and protection.

C. Starting of systems and equipment.

D. Demonstration and instruction of Owner personnel.

E. Closeout procedures, including Contractor's Correction Punch List, except payment procedures.

1.02 RELATED REQUIREMENTS

A. Section 01 3000 - Administrative Requirements: Submittals procedures.

B. Section 01 4000 - Quality Requirements: Testing and inspection procedures.

C. Section 01 7800 - Closeout Submittals: Project record documents, operation and maintenance data, warranties and bonds.

1.03 PROJECT CONDITIONS

A. Grade site to drain. Maintain excavations free of water.

B. Contractor shall endeavor to keep the site free from unnecessary damage from rain, surface or subsurface water. Water shall not be allowed to accumulate in excavations or under or about the structures. The Contractor at the end of each day should seal the site so that it drains and ensure that areas do not exist which would hold water. Should such conditions develop or be encountered, the water shall be kept constantly controlled and legally disposed of by temporary pumps, piping, ditches, dams or other methods.

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

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

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

1.04 COORDINATION

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

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

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

D. Coordinate space requirements, supports, and installation of mechanical and electrical work that are indicated diagrammatically on Drawings. Follow routing shown for pipes, ducts, and

conduit, as closely as practicable; place runs parallel with lines of building. Utilize spaces efficiently to maximize accessibility for other installations, for maintenance, and for repairs.

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

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

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

PART 2 PRODUCTS

PART 3 EXECUTION

3.01 LAYING OUT THE WORK

A. Verify locations of survey control points prior to starting work.

B. Promptly notify Architect of any discrepancies discovered.

C. Protect survey control points prior to starting site work; preserve permanent reference points during construction.

D. Utilize recognized engineering survey practices.

E. Establish elevations, lines and levels. Locate and lay out by instrumentation and similar appropriate means:

F. Periodically verify layouts by same means.

G. Maintain a complete and accurate log of control and survey work as it progresses.

3.02 GENERAL INSTALLATION REQUIREMENTS

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

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

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

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

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

3.03 PROGRESS CLEANING

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

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

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

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

3.04 PROTECTION OF INSTALLED WORK

A. Protect installed work from damage by construction operations.

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

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

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

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

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

G. Prohibit traffic from landscaped areas.

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

3.05 SYSTEM STARTUP

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

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

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

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

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

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

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

3.06 DEMONSTRATION AND INSTRUCTION

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

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

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

3.07 ADJUSTING

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

3.08 FINAL CLEANING

A. Execute final cleaning prior to Substantial Completion.

B. Use cleaning materials that are nonhazardous.

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

D. Remove all labels that are not permanent. Do not paint or otherwise cover fire test labels or nameplates on mechanical and electrical equipment.

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

F. Clean filters of operating equipment.

G. Clean debris from roofs, gutters, downspouts, scuppers, overflow drains, area drains, and drainage systems.

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

I. All concrete curb and gutter and concrete pavement and walks shall be pressure cleaned during final clean-up.

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

3.09 CLOSEOUT PROCEDURES

A. Make submittals that are required by governing or other authorities.
   1. Provide copies to Architect and Owner.

B. Notify Architect when work is considered ready for Architect's Substantial Completion inspection.

C. Conduct Substantial Completion inspection and create Final Correction Punch List containing Architect's and Contractor's comprehensive list of items identified to be completed or corrected and submit to Architect.

D. Correct items of work listed in Final Correction Punch List and comply with requirements for access to Owner-occupied areas.

E. Notify Architect when work is considered finally complete and ready for Architect's Substantial Completion final inspection.

F. Complete items of work determined by Architect listed in executed Certificate of Substantial Completion.

END OF SECTION

SECTION 01 7040
WARRANTIES

PART 1 - GENERAL

1.01 SUMMARY

A. This Section includes administrative and procedural requirements for warranties required by the Contract Documents, including manufacturers' standard warranties on products and special warranties.
   1. Refer to the General Conditions for terms of the Contractor's period for correction of the Work.

B. Related Sections:
   1. Section 01 3000 - Submittals.
   2. Section 01 7000 - Closeout Procedures.
   3. Divisions 1 through 35 Sections for specific requirements and agreements for continuing services to Owner are specified elsewhere in the Contract Documents.

C. Disclaimers and Limitations: Manufacturer's disclaimers and limitations on product warranties do not relieve the Contractor of the warranty on the Work that incorporates the products. Manufacturer's disclaimers and limitations on product warranties do not relieve suppliers, manufacturers, and subcontractors required to countersign special warranties with the Contractor.

1.02 DEFINITIONS

A. Standard Product Warranties are preprinted written warranties published by individual manufacturers for particular products and are specifically endorsed by the manufacturer to the Owner.

B. Special Warranties are written warranties required by or incorporated in the Contract Documents, either to extend time limits provided by standard warranties or to provide greater rights for the Owner.

1.03 WARRANTY REQUIREMENTS

A. General: Warranty all materials, equipment, and workmanship for a period of one year for general construction. Provide a two year warranty against water / moisture intrusion from the date established on the executed AIA Document G704 "Certificate of Substantial Completion."

B. Related Damages and Losses: When correcting failed or damaged warranted construction, remove and replace construction to its original condition that has been damaged as a result of such failure or must be removed and replaced to provide access for correction of warranted construction.

C. Reinstatement of Warranty: When Work covered by a warranty has failed and has been corrected by replacement or rebuilding, reinstate the warranty by written endorsement. The reinstated warranty shall be equal to the original warranty with an equitable adjustment for depreciation.

D. Replacement Cost: On determination that Work covered by a warranty has failed, replace or rebuild the Work to an acceptable condition complying with requirements of the Contract Documents. The Contractor is responsible for the cost of replacing or rebuilding defective Work regardless of whether the Owner has benefited from use of the Work through part of its anticipated useful service life.

E. Owner's Recourse: Expressed warranties made to the Owner are in addition to implied warranties, and shall not limit duties, obligations, rights, and remedies otherwise available under the law,. Expressed warranty periods shall not be interpreted as limitations on time in which the Owner can enforce such other duties, obligations, rights, or remedies.
   1. Rejection of Warranties: The Owner reserves the right to reject warranties and limit selections to products with warranties not in conflict with requirements of the Contract Documents.

F. Where the Contract Documents require a special warranty, or similar commitment on the Work or part of the Work, the Owner reserves the right to refuse to accept the Work, until the Contractor presents evidence that entities required to countersign such commitments are willing to do so.

G. The start-up of building systems shall be accomplished prior to the date of Substantial Completion to allow for finishing of building and debugging and checking of systems. The use of the building systems for temporary utilities and service shall in no way penalize the Owner by reducing benefits from warranties. Make good the coverage of warranties from the date of Substantial Completion. List the expiration date of all building systems and equipment at time of Substantial Completion.

1.04 WARRANTY MANAGEMENT PLAN

A. The Owner shall be the administrator of the Warranty Management Plan and will monitor all warranties during specified warranty terms.

B. The Contractor shall develop a warranty implementation plan which shall include, but not be limited to:
   1. Roles and responsibilities of all personnel associated with the warranty process, including points of contact and telephone numbers within the Contractor's organization, Subcontractors, manufacturers or suppliers.
   2. Listing of all Certificates of Warranty for extended warranty items, to include roof, HVAC test and balance, pumps, motors, transformers, fire protection, alarm system, electrical panels, lightning protection system, surge suppression, etc.
   3. A list for each warranted item, equipment, and feature of construction or system indicating:
      a. Name of item.
      b. Model and serial number.
      c. Installation location.
      d. Name and phone number of manufacturers or suppliers.
      e. Spare parts source.
      f. Terms of warranty.
      g. Cross reference to warranty certificate.
      h. Starting date and duration of warranty period.
      i. Summary of maintenance procedures required to continue warranty in force.
      j. Cross reference to respective Operations & Maintenance Manual section.
      k. Organization, names and phone numbers of continuously available warranty. service personnel, size of local service area.
      l. Expected response time and repair time expected for various equipment.
   4. The Contractor's plan for attendance at warranty inspections.
   5. Procedure and status of tagging all equipment covered by extended warranties.
   6. Copies of instructions to be posted near selected pieces of equipment where operation is critical for warranty and/or safety reasons.

1.05 SUBMITTALS

A. Submit written warranty form to the Architect and Owner prior to the date certified for Substantial Completion. If the Architect's Certificate of Substantial Completion designates a commencement date for warranties other than the date of Substantial Completion for the Work, or a designated portion of the Work, submit written warranties upon request of the Architect.

B. When the Contract Documents require the Contractor, or the Contractor and a subcontractor, supplier or manufacturer, prepare a written document that contains appropriate terms and identification, ready for execution by the required parties. Submit a draft to the Owner through the Architect for approval prior to final execution.

C. Forms of Submittal: At Final Completion, compile 2 copies of each standard warranty-guarantee (Exhibit A) and additional warranty required per specifications properly executed by the Contractor, or by the Contractor, subcontractor, supplier, or manufacturer.

Organize the warranty documents into an orderly sequence based on the table of contents of the Project Manuals.

PART 2 - PRODUCTS - NOT USED

PART 3 - EXECUTION

3.01 WARRANTY ADMINISTRATION

A. Owner's Service Group shall set up with Contractor/CM, Sub-Contractors, a warranty inspection walk-through at eleven (11) months after date of Substantial Completion of the Work. (Applicable to the one (1) year warranty period.) Inspections shall be conducted for other special warranties with extended warranty periods, as specified in each specification section. (Note: A similar 23-month warranty inspection (walk-through) shall be conducted for the roofing.)

1. Contractor's warranty excludes remedy for damage or defect caused by Owner's abuse, modifications not performed by Contractor, improper or insufficient maintenance by Owner (unless such maintenance was performed in accordance with the directions from Contractor), improper operation by Owner (unless such operations were performed in accordance with the directions from Contractor), or normal wear and tear under normal usage.
2. Contractor shall only execute warranty work authorized by Owner. All Work executed and/or completed without authorization from Owner's representative will not be recognized by Owner.
3. Contractor shall be required to obtain verification signature from Owner's Authorized Representative upon completion of warranty work.

END OF SECTION

SECTION 01 7800
CLOSEOUT SUBMITTALS

PART 1 GENERAL

1.01 SECTION INCLUDES

A. Project Record Documents.

B. Operation and Maintenance Data.

C. Warranties and bonds.

1.02 RELATED REQUIREMENTS

A. Section 01 3000 - Administrative Requirements: Submittals procedures, shop drawings, product data, and samples.

B. Section 01 7000 - Execution and Closeout Requirements: Contract closeout procedures.

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

1.03 SUBMITTALS

A. Upon receiving the Certificate of Substantial Completion, Contractor shall prepare, assemble and transmit the items listed herein within ten days.
   1. Project Record Documents:
      a. Submit one complete set of shop drawings to Owner.
      b. Submit one copy of the record drawings to Architect for review.
   2. Operation and Maintenance Data: Submit three copies of the O&M manuals to Architect for review.
   3. Warranties and Bonds: Submit three copies of the warranties and bonds to Architect for review.

PART 2 PRODUCTS - NOT USED

PART 3 EXECUTION

3.01 PROJECT RECORD DOCUMENTS

A. Maintain on site one set of the following record documents; record actual revisions to the Work:
   1. Drawings.
   2. Specifications.
   3. Addenda.
   4. Change Orders and other modifications to the Contract.
   5. Reviewed shop drawings, product data, and samples.
   6. Manufacturer's instruction for assembly, installation, and adjusting.

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

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

D. Record information concurrent with construction progress.

E. Record Drawings and Shop Drawings: On a complete set of prints, legibly mark each item to record actual construction including:
   1. Measured depths of foundations in relation to finish first floor datum.
   2. Measured horizontal and vertical locations of underground utilities and appurtenances, referenced to permanent surface improvements.
   3. Measured locations of internal utilities and appurtenances concealed in construction, referenced to visible and accessible features of the Work.
   4. Field changes of dimension and detail.
   5. Details not on original Contract drawings.

3.02 ASSEMBLY OF OPERATION AND MAINTENANCE MANUALS

A. Assemble operation and maintenance data into durable manuals for Owner's personnel use, with data arranged in the same sequence as, and identified by, the specification sections.

B. Where systems involve more than one specification section, provide separate tabbed divider for each system.

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

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

E. Binders: Commercial quality, 8-1/2 by 11 inch three D side ring binders with durable plastic covers; 3 inch maximum ring size. When multiple binders are used, correlate data into related consistent groupings.

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

G. Project Directory: Title and address of Project; names, addresses, and telephone numbers of Architect, Consultants,Contractorand subcontractors, with names of responsible parties.

H. Tables of Contents: List every item separated by a divider, using the same identification as on the divider tab; where multiple volumes are required, include all volumes Tables of Contents in each volume, with the current volume clearly identified.

I. Dividers: Provide tabbed dividers for each separate product and system; identify the contents on the divider tab; immediately following the divider tab include a description of product and major component parts of equipment.

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

K. Contents: Prepare a Table of Contents for each volume, with each product or system description identified, in three parts as follows:
   1. Part 1: Directory, listing names, addresses, and telephone numbers of Architect, Contractor, Subcontractors, and major equipment suppliers.
   2. Part 2: Operation and maintenance instructions, arranged by system and subdivided by specification section. For each category, identify names, addresses, and telephone numbers of Subcontractors and suppliers. Identify the following:
      a. List of equipment.
      b. Parts list for each component.
      c. Operating instructions.
      d. Maintenance instructions for equipment and systems.
   3. Part 3: Project documents and certificates, including the following:
      a. Shop drawings and product data.
      b. Photocopies of warranties and bonds.

3.03 WARRANTIES AND BONDS

A. Obtain warranties and bonds, executed in duplicate by responsible Subcontractors, suppliers, and manufacturers, within 10 days after completion of the applicable item of work. Except for items put into use with Owner's permission, leave date of beginning of time of warranty until the Date of Substantial completion is determined.

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

C. Include photocopies of each in operation and maintenance manuals, indexed separately on Table of Contents.

D. Manual: Bind in commercial quality 8-1/2 by 11 inch binders with durable plastic covers.

END OF SECTION

SECTION 02 3200
SUBSURFACE CONDITIONS

PART 1 - GENERAL

1.01 EXISTING CONDITIONS:

A. The Contractor shall visit the site and acquaint himself with all existing conditions. Prior to bidding, bidders may make their own subsurface investigations to satisfy themselves as to site and subsurface conditions, but such subsurface investigations shall be performed only under time schedule and arrangements approved in advance by the Owner.

1.02 SUBSURFACE CONDITIONS:

A. A subsurface investigation report obtained for use in the design of pavement and foundations is available for reference: Geotechnical Investigation, (name), (location), prepared for (client), prepared by (eng), project number (eng proj #), dated ().
   1. Contractor shall assume responsibility for any conclusions drawn from the data.
   2. Data on indicated subsurface conditions are not intended as representations or warrants of continuity of such conditions between soil borings. It is expressly understood that the Owner and his consultants will not be responsible for interpretations or conclusions drawn therefrom by the Contractor.
   3. Data are made available only for the convenience of Contractor. The Contractor shall perform any additional subsurface investigation necessary to completely familiarize and satisfy himself as to the existing conditions at no cost to the Owner.
   4. The Contractor should visit the site and acquaint himself with the site conditions.

END OF SECTION

SECTION 03 1000
CONCRETE FORMING AND ACCESSORIES

PART 1 GENERAL

1.01 SECTION INCLUDES

A. Formwork for cast-in place concrete, with shoring, bracing and anchorage.

B. Openings for other work.

C. Form accessories.

D. Form stripping.

1.02 RELATED REQUIREMENTS

A. Section 031500 - Slab on Ground Accessories: Dowel plates and plate baskets.

B. Section 03 2000 - Concrete Reinforcing.

C. Section 03 3000 - Cast-in-Place Concrete.

D. Section 03 3121 - Ductilcrete Interior Floor Slab on Ground: Coordination of work provided as portion of slab system.

E. Section 05 1200 - Structural Steel Framing: Placement of embedded steel anchors and plates in cast-in-place concrete.

1.03 REFERENCE STANDARDS

A. ACI 117 - Standard Specifications for Tolerances for Concrete Construction and Materials; 2010.

B. ACI 301 - Specifications for Structural Concrete; 2010 (Errata 2012).

C. PS 1 - Structural Plywood; 2009.

1.04 DESIGN REQUIREMENTS

A. Design, engineer and construct formwork, shoring and bracing to conform to code requirements; resultant concrete to conform to required shape, line and dimension.

1.05 QUALITY ASSURANCE

A. Perform work of this section in accordance with ACI 347, ACI 301, and ACI 318.

PART 2 PRODUCTS

2.01 FORMWORK - GENERAL

A. Provide concrete forms, accessories, shoring, and bracing as required to accomplish cast-in-place concrete work.

B. Design and construct to provide resultant concrete that conforms to design with respect to shape, lines, and dimensions.

C. Comply with applicable State and local codes with respect to design, fabrication, erection, and removal of formwork.

2.02 WOOD FORM MATERIALS

A. Softwood Plywood: PS 1, C Grade, Group 2.

B. Lumber: Southern yellow pine species; No 2 grade; with grade stamp clearly visible.

2.03 REMOVABLE PREFABRICATED FORMS

A. Preformed Steel Forms: Minimum 16 gage, 0.0598 inch thick, matched, tight fitting, stiffened to support weight of concrete without deflection detrimental to tolerances and appearance of finished surfaces.

2.04 FORMWORK ACCESSORIES

A. Form Ties: Removable type, galvanized metal, fixed length, cone type, with waterproofing washer, free of defects that could leave holes larger than 1 inch in concrete surface.

B. Form Release Agent: Capable of releasing forms from hardened concrete without staining or discoloring concrete or forming bugholes and other surface defects, compatible with concrete and form materials, and not requiring removal for satisfactory bonding of coatings to be applied.

C. Form Release Agent: Colorless mineral oil that will not stain concrete.

D. Nails, Spikes, Lag Bolts, Through Bolts, Anchorages: Sized as required, of sufficient strength and character to maintain formwork in place while placing concrete.

E. Embedded Anchor Shapes, Plates, Angles and Bars: As specified in Section 05 1200.

F. Waterstops: Preformed mineral colloid strips, 3/8 inch thick, moisture expanding.

PART 3 EXECUTION

3.01 EXAMINATION

A. Verify lines, levels and centers before proceeding with formwork. Ensure that dimensions agree with drawings.

3.02 ERECTION - FORMWORK

A. Erect formwork, shoring and bracing to achieve design requirements, in accordance with requirements of ACI 301.

B. Provide bracing to ensure stability of formwork. Shore or strengthen formwork subject to overstressing by construction loads.

C. Arrange and assemble formwork to permit dismantling and stripping. Do not damage concrete during stripping. Permit removal of remaining principal shores.

D. Align joints and make watertight. Keep form joints to a minimum.

E. Except for floor slabs, construct bulkheads with keys at separation of pours except as otherwise noted on drawings. Locations of bulkheads shall be as indicated on approved shop drawings.

F. Slab on Grade Edge Forms: Wood bulkheads for slab forms shall be cut true and straight with an angled top surface tapering down and away from slab at a 15 degree angle. Use of stryofoam blocks as a slab edge form shall not be permitted.

G. Coordinate this section with other sections of work that require attachment of components to formwork.

3.03 APPLICATION - FORM RELEASE AGENT

A. Apply form release agent on formwork in accordance with manufacturer's recommendations.

3.04 INSERTS, EMBEDDED PARTS, AND OPENINGS

A. Locate and set in place items that will be cast directly into concrete.

B. Coordinate with work of other sections in forming and placing openings, slots, reglets, recesses, sleeves, bolts, anchors, other inserts, and components of other work.

C. Install waterstops in accordance with manufacturer's instructions, so they are continuous without displacing reinforcement.

3.05 FORMWORK TOLERANCES

A. Construct formwork to maintain tolerances required by ACI 117, unless otherwise indicated.

3.06 FORM REMOVAL

A. Do not remove forms or bracing until concrete has gained sufficient strength to carry its own weight and imposed loads.

B. Loosen forms carefully. Do not wedge pry bars, hammers, or tools against finish concrete surfaces scheduled for exposure to view.

END OF SECTION

SECTION 03 1500
SLAB ON GROUND ACCESSORIES

PART 1 - GENERAL

1.01 SECTION INCLUDES

A. This section includes slab on ground dowel system.

1.02 RELATED REQUIREMENTS

A. Section 03 3000 - Cast-in-Place Concrete

B. Section 03 3121 - Ductilcrete Interior Floor Slab on Ground: Coordination of work provided as portion of slab system.

1.03 REFERENCE STANDARDS

A. ACI 360 - Design of Slabs-on-Ground; American Concrete Institute International; 2006

1.04 SUBMITTALS

A. Product Data: Provide product data on all products including manufacturers installation requirements.

B. Reports: Independent pull-out testing of the debonding agent must demonstrate a required pull-out force of less than 1,000 lbs per load plate.

PART 2 - PRODUCTS

2.01 GENERAL:

A. Acceptable manufacturers:
   1. PNA Construction Technologies
   2. No Substitutions.

2.02 MATERIALS:

A. Smooth plate bars, manufactured from steel meeting ASTM A 36.

B. Load plates must have smooth and true edges. Acceptable methods of manufacture are saw or plasma cut and deburred. If sheared, manufacture must demonstrate that all edges will be deburred, and smooth and true without any deformity that may induce restraint of the slab.

2.03 CONSTRUCTION JOINT DOWELS:

A. All formed construction joints at the slab-on-grade shall be doweled.

B. Acceptable Products:
   1. PNA Construction Technologies (800-542-0214): Diamond Dowel Plates.
      a. Diamond Dowel Plate: 3/8 x 4-1/2 x 4-1/2 inch steel plate.
      b. Spacing: 18 inch on center.
      c. Accessory: High density plastic pocket former.

2.04 SAWN CONTROL JOINT DOWEL BASKETS:

A. All sawn control joints at the slab-on-grade shall incorporate dowel baskets.

B. Acceptable Products:
   1. PNA Construction Technologies (800-542-0214):
      a. PD3 Tapered Plate Dowels: 1/2 x 2-1/2 x 12 inch steel plate.
      b. Spacing: 18 inch on center.

C. Basket: Fully welded wire basket assembly, fabricated from 1/4 inch diameter cold drawn wire. Eight gauge wires shall be welded across the side frames at approximately 3 feet on center to keep the assembly stable during shipping and installation.. Dimensions as required to locate dowel at mid-point of slab.

D. The load plates shall be delivered to the jobsite with a thin and consistently applied debonding agent of a maximum thickness of 0.002 inch. Greasing plates in the field is not acceptable.

PART 3 - EXECUTION

3.01 INSTALLATION

A. Slab on Ground Dowels:
   1. Place all joint reinforcement products in accordance with the manufacturer's installation details, utilizing all alignment tools available.
   2. Install dowels perpendicular to joint and parallel to finished concrete surface.
   3. Dowel alignment shall be within ACI 117 tolerance allowance.
   4. Do not grease plate dowels.

3.02 CONSTRUCTION JOINTS

A. Mark center point for spacing of each load plate on top of wood form along entire length. Set forms along construction joints. Place pocket former up to within 6 inches of joint intersection and a maximum of 12 inches to ensure positive load transfer at all joint intersections.

B. Install plastic pocket former sleeve insert to slab edge form at mid slab depth using the installation template included in each box of Diamond Dowel® pocket formers or the Diamond Dowel® bulkhead that can be purchased independently from PNA. After the form is removed, insert steel plate prior to adjacent slab pour.

C. Insert load plate into slot created by pocket former. Center corner of plate in middle of label and push straight through label into pocket former. Do not hammer or use excessive force to insert load plate. Insert load plate within three days of concrete placement.

3.03 SAWN CONTROL JOINTS:

A. Locate control lines on sub-base prior to slab pour for accurate placement of plate basket assembly, centered on joint. Basket shall be fabricated to place load plate at mid slab depth. Do not cut temporary cross wires.

B. Baskets shall be fully welded assemblies fabricated to best suit the joint layout. Assemblies that require more than 5 percent of the assemblies to be cut onsite will not be allowed. No basket with less than 3 plates should be used.

C. The number of load plates in the welded assembly at the specified spacing must place the end load plates as close as possible to 6 inches from the joint intersection and in no instance more than 18 inches from the joint intersection.

D. Stake baskets securely in place to prevent shifting during concrete placement. Basket assemblies placed on vapor retarders must be staked to ensure positive alignment during construction. The stakes shall be installed through mastic to maintain the integrity of the vapor retarder.

3.04 FIELD QUALITY CONTROL

A. An independent testing agency, as specified in Section 01400, will inspect installed accessories for conformance to contract documents before concrete placement.

END OF SECTION

SECTION 03 2000
CONCRETE REINFORCING

PART 1 GENERAL

1.01 SECTION INCLUDES

A. Reinforcing steel for cast-in-place concrete.

B. Supports and accessories for steel reinforcement.

1.02 RELATED REQUIREMENTS

A. Section 03 1000 - Concrete Forming and Accessories.

B. Section 03 1500 - Slab On Ground Accessories.

C. Section 03 3000 - Cast-in-Place Concrete.

D. Section 03 3121 - Ductilcrete Interior Floor Slab on Ground: Coordination of work provided as portion of slab system.

1.03 REFERENCE STANDARDS

A. ACI 301 - Specifications for Structural Concrete; 2010 (Errata 2012).

B. ACI 318 - Building Code Requirements for Structural Concrete and Commentary; 2011.

C. ACI 360 - Design of Slabs-on-Ground; American Concrete Institute International; 2006

D. ASTM A82/A82M - Standard Specification for Steel Wire, Plain, for Concrete Reinforcement; 2007.

E. ASTM A615/A615M - Standard Specification for Deformed and Plain Carbon Steel Bars for Concrete Reinforcement; 2015.

F. ASTM A1064/A1064M - Standard Specification for Carbon-Steel Wire and Welded Wire Reinforcement, Plain and Deformed, for Concrete; 2015.

G. CRSI (DA4) - Manual of Standard Practice; 2009.

1.04 SUBMITTALS

A. Shop Drawings: Include bar schedules, shapes of bent bars, spacing of bars, and location of splices.

B. Product Data: Manufacturer's data sheets on each product to be used.

C. Reports: Submit certified copies of mill test report of reinforcement materials analysis.

1.05 QUALITY ASSURANCE

A. Perform work of this section in accordance with ACI 301.

PART 2 PRODUCTS

2.01 REINFORCEMENT

A. Reinforcing Steel: ASTM A615/A615M, Grade 60 (60,000 psi).
   1. Deformed billet-steel bars.

B. Stirrup Steel: ASTM A1064/A1064M steel wire, unfinished.

C. Steel Welded Wire Reinforcement (WWR): Galvanized, deformed type; ASTM A1064/A1064M.
   1. Mesh Size and Wire Gage: As indicated on drawings.

D. Reinforcement Accessories:
   1. Tie Wire: Annealed, minimum 16 gage, 0.0508 inch.
   2. Chairs, Bolsters, Bar Supports, Spacers: Sized and shaped for adequate support of reinforcement during concrete placement.
   3. Provide stainless steel or plastic coated steel components for placement within 1-1/2 inches of weathering surfaces.

2.02 FABRICATION

A. Fabricate concrete reinforcing in accordance with CRSI (DA4) - Manual of Standard Practice and ACI 318.

B. Welding of reinforcement is not permitted.

PART 3 EXECUTION

3.01 PLACEMENT

A. Reinforcement, at the time concrete is placed, shall be free from rust scale, oil and other coatings reducing bond. Use no bars with kinks or bends not shown on placement drawings.

B. Place, support and secure reinforcement against displacement. Do not deviate from required position.

C. Accommodate placement of formed openings.

D. Protective concrete cover over reinforcement shall be as indicated on the drawings.

E. Install wire mesh reinforcement in sizes and locations indicated. Lap joints one wire spacing plus 2".

F. Conduit and Pipes: Concrete cover shall be equal to cover for reinforcing bars. Embedded conduit diameter shall not exceed 1/3 slab or wall thickness. Tie down low conduit on top of bottom reinforcing bars. Space no conduit less than three diameters apart and minimum 1" separation from parallel reinforcing bars. Use no aluminum conduits or couplings in concrete

3.02 FIELD QUALITY CONTROL

A. An independent testing agency, as specified in Section 01 4000, will inspect installed reinforcement for conformance to contract documents before concrete placement.

END OF SECTION

SECTION 03 3000
CAST-IN-PLACE CONCRETE

PART 1 GENERAL

1.01 SECTION INCLUDES

A. Concrete foundations.
B. Elevated concrete slabs.
C. Concrete floor slabs on grade.
D. Concrete tilt-up wall panels.
E. Joint devices associated with concrete work.
F. Miscellaneous concrete elements, including equipment pads and light pole bases.
G. Concrete curing.
H. Crack repair of concrete floor slabs.

1.02 RELATED REQUIREMENTS

A. Section 01 3000 - Administrative Requirements: Pre-Slab Meeting.
B. Section 01 4000 - Quality Requirements: Testing and inspection.
C. Section 03 1000 - Concrete Forming and Accessories: Forms and accessories for formwork.
D. Section 03 1500 - Slab-On-Ground Accessories.
E. Section 03 2000 - Concrete Reinforcing.
F. Section 03 3121 - Ductilcrete Interior Floor Slab on Ground: Coordination of work provided as portion of slab system.
G. Section 03 3511 - Concrete Floor Finishes.
H. Section 07 9200 - Joint Sealants: Products and installation for sealants for saw cut joints and isolation joints in slabs.
I. Section 03 4713 - Tilt-Up Concrete
J. Section 07 2600 - Vapor Retarder.

1.03 REFERENCE STANDARDS

A. ACI 117 - Standard Specifications for Tolerances for Concrete Construction and Materials; 2010.
B. ACI 211.1 - Standard Practice for Selecting Proportions for Normal, Heavyweight, and Mass Concrete; 1991 (Reapproved 2009).
C. ACI 211.2 - Standard Practice for Selecting Proportions for Structural Lightweight Concrete; 1998 (Reapproved 2004).
D. ACI 301 - Specifications for Structural Concrete; 2010 (Errata 2012).
E. ACI 302.1R - Guide for Concrete Floor and Slab Construction; 2004 (Errata 2007).
F. ACI 304R - Guide for Measuring, Mixing, Transporting, and Placing Concrete; 2000.
G. ACI 305R - Hot Weather Concreting; 2010.
H. ACI 306R - Cold Weather Concreting; 2010.
I. ACI 308R - Guide to Curing Concrete; 2001 (Reapproved 2008).
J. ACI 318 - Building Code Requirements for Structural Concrete and Commentary; 2011.
K. ASTM C33/C33M - Standard Specification for Concrete Aggregates; 2013.
L. ASTM C39/C39M - Standard Test Method for Compressive Strength of Cylindrical Concrete Specimens; 2015a.
M. ASTM C94/C94M - Standard Specification for Ready-Mixed Concrete; 2015.

N. ASTM C143/C143M - Standard Test Method for Slump of Hydraulic-Cement Concrete; 2012.

O. ASTM C150/C150M - Standard Specification for Portland Cement; 2015.

P. ASTM C260/C260M - Standard Specification for Air-Entraining Admixtures for Concrete; 2010a.

Q. ASTM C494/C494M - Standard Specification for Chemical Admixtures for Concrete; 2013.

R. ASTM D1751 - Standard Specification for Preformed Expansion Joint Filler for Concrete Paving and Structural Construction (Nonextruding and Resilient Bituminous Types); 2004 (Reapproved 2013).

1.04 SUBMITTALS

A. See Section 01 3000 - Administrative Requirements, for submittal procedures.

B. Mix Designs: Submit mix designs for each type and class of concrete to Testing Agency for their approval. Approved mix designs shall then be submitted to the Architect.
   1. Designation, type, quality, and source (natural or manufactured) of coarse and fine aggregate materials.
   2. Sieve Analysis Reports: Provide separate sieve analysis of percentages passing for coarse and fine aggregate. Show values for each sieve size shown on the mix design form. Do not leave any line blank. Sieve analysis sampling and testing for each aggregate source shall be conducted within 60 days of concrete submittal date.
   3. Aggregate Supplier Statement;
      a. Stating if aggregate is possibly alkali-reactive, based on tests or past service.
      b. Stating if aggregate can possibly cause pop-outs, "D" cracking, or other disruptions due to moisture gain, freezing, or other mechanisms, based on tests or past service.

C. Placing Drawings: Provide placing plan depicting layout and sequencing of slab pours for Owner approval. Include horizontal and vertical construction joint locations, control joint spacing, temporary block-outs and openings for equipment access.

D. Pre-qualify ready-mixed concrete suppliers according to the requirements of ASTM C94.

E. Test Reports: Submit report for each test or series of tests specified.

1.05 QUALITY ASSURANCE

A. Perform work of this section in accordance with ACI 301 and ACI 318.

B. Acquire cement from same source and aggregate from same source for entire project.

C. It shall be the responsibility of the Contractor to produce concrete slabs of the strength, durability, workability and specified finish.

D. Allowable Tolerances:
   1. Formwork: Conform to most stringent requirements of ACI 117 and ACI 301, except as specified herein.
   2. Slab on ground shall conform to ACI 117, unless noted otherwise.
   3. Slab on Ground Base Fine Grade: +0 inch, -3/4 inch, with transition no greater than 3/4 inch vertically to 8 inches horizontally for level slab.
   4. Average slab on ground thickness tolerance: -0 inch
   5. Minimum slab on ground thickness tolerance: -3/4 inch
   6. Ensure at least 85% of the slab on ground area will have a thickness that exceeds the thickness shown on the drawings minus 1/2 inch. Thickness samples are to be randomly located from each slab placement and not exceed 20,000 square feet of slab surface area.
   7. Floor Finished Surface Flatness and Levelness (Random Traffic):
      a. All slabs shall conform to the following tolerances as measured in accordance with ASTM E 1155.
      b. Overall: FF 50, FL 35
      c. Local: FF 35, FL 24

1) Bound individual floor sections for testing purposes by the following that provide the smallest sections: construction joints, column and half-column lines.

d. Start testing sections as soon as possible as they become available after slab finishing operations, so as not to impede the slab curing process.

e. Additional Requirements:
   1) Conform to F-numbers specified for floor areas within 2 feet of construction and isolation joints, in lieu of ASTM E 1155 requirements excluding these areas.
   2) Limit to 1/4-inch maximum elevation change that may occur within 2 feet of vertical elements (such as columns or walls) that pass through slab surface.
   3) If test data indicates areas within 10% of Minimum Local Value, additional testing shall be performed to identify possible out of tolerance areas.

f. Remedies for Out-of-Tolerance Work:
   1) Remove and replace slabs-on-ground measuring below the specified minimum local F-numbers, unless approved by Owner. If allowed to stay in place, remedy out-of-tolerance work as required by Owner.
   2) If entire project floor, when completed, fails to meet or exceed the specified overall F-numbers, then remedy entire floor as required by Owner.

g. Elevation Envelope: Provide top of entire slab-on-ground within ± 3/4 of an inch of finished floor elevation shown on Drawings.

h. Cost Responsibility: Costs for corrective work and extra testing required by defective work borne by Contractor.

8. Anchor Bolt and Other Embedment Placements:
   a. 1/8 inch center to center of any 2 anchor bolts or other embedments within group.
   b. 1/4 inch center to center of adjacent groups.
   c. 1/4 inch within specified elevation.
9. Slab on Ground Dowels:
   a. 0.075 inch maximum in dowel straightness.
   b. Plus or minus 1/8 inch in dowel alignment in vertical and horizontal planes.

1.06 ENVIRONMENTAL CONDITIONS

A. Concreting in Hot, Dry and/or Windy Weather:
   1. Employ methods to avoid cracking when the concrete rate of evaporation exceeds 0.2 pounds per square foot per hour or when any combination of concrete materials and weather conditions are favorable for the formation of plastic shrinkage cracks.
   2. Maintain an accurate thermometer at the job site to check temperature of concrete
   3. Unless otherwise allowed, reject concrete if its temperature before placement is over 90°F.
   4. Unless otherwise allowed, during hot weather mixing and delivery (discharge) time to be shorter than specified in ASTM C 94 as follows:
      a. When air temperature is between 85°F and 90°F, reduce allowable mixing and delivery time from 90 minutes to 75 minutes.
      b. When air temperature is over 90°F, reduce allowable mixing and delivery time to 60 minutes.
   5. Do not place concrete when forms, subgrade, base, or reinforcing bars are more than 120°F or more than 10°F hotter than ambient air temperature.
   6. Cool with water or water-soaked burlap as necessary, but allow no standing water on surface on which concrete is placed.

B. Concreting in Cold Weather:
   1. Conform to ACI 306.1 when temperature and other environmental conditions are as noted therein and following additional requirements:
      a. Frost susceptible soil shall be replaced with non-frost susceptible soil below the slabs to the depth determined by the Geotechnical Engineer.
      b. Frozen base and subgrade soils shall be thawed immediately before placing concrete.

2. Do not place slabs on subgrade, or base that are more than 20°F cooler than concrete. Warm subgrade, or base to decrease temperature differential to 20°F or less.

C. Precipitation Protection: Protect surfaces of exposed concrete from precipitation until adequate strength is gained to prevent damage.

1.07 PROJECT CONDITIONS

A. No satisfactory chemical or cleaning procedure is available to remove petroleum stains from the concrete surface. Prevention is therefore essential.
1. No motorized vehicles will be allowed on slabs without proper protection for wheels and oil or hydraulic reservoirs to eliminate oil drips and avoid staining of the concrete.
2. No trade will park vehicles on the inside slab. If necessary to complete their scope of work, drop cloths will be placed under vehicles at all times.
3. No pipe cutting machine will be used on the inside floor slab.
4. Steel will not be placed on interior slabs to avoid rust staining.

PART 2 PRODUCTS

2.01 FORMWORK

A. Comply with requirements of Section 03 1000.

2.02 REINFORCEMENT

A. Comply with requirements of Section 03 2000.

2.03 CONCRETE MATERIALS

A. Cement: ASTM C150, Type I, II Portland type.

B. Normal Weight Aggregate: Fine and coarse aggregate meeting ASTM C33 except as modified herein.
1. For exposed exterior surfaces, do not use fine or coarse aggregates that contain substances that cause spalling.
2. Do not use manufactured sand for slabs unless blended with natural sand or otherwise allowed.
3. For slab-on-grade design mix, conform to the following:
   a. Gradation requirement of ASTM C33 shall be waived in order to meet ranges specified. The conformance with the combined aggregate gradation requirements is of higher priority than meeting ASTM C33 aggregate gradation tolerances alone.
   b. Nominal maximum size coarse aggregate required in mix design shall be 1-1/2 inch (#467 stone).
   c. Adjust proportions of combined coarse, intermediate, and fine aggregates to provide the following particle size distribution characteristics, unless otherwise approved:
      1) Coarseness Factor of 60 to 75%.
         (a) The Coarseness Factor (CF) is the percent of combined aggregate retained on the #8 sieve that is also retained on the 3/8" sieve.
         (b) The Coarseness Factor is calculated as follows: CF = Aggregate retained on 3/8" sieve / Aggregate retained on #8 sieve.
      2) Adjusted Workability Factor:
         (a) The Workability Factor (WF) is the percent of combined aggregate that passes the #8 sieve.
         (b) The Adjusted Workability Factor (Adj-WF) is calculated as follows: Adj-WF = WF + [(Cementitious Material - 564 lbs) / 37.6].
         (c) The range of accepted Adj-WF for a given CF is as follows: Adj-WF = [(11.25 - .15 CF) + 35] +/- 2.5.
   d. Of total combined coarse and fine aggregates per mix design, do not allow material retained on any one sieve to be less than 6% nor more than 24% of total by weight, except for largest sieve and No. 100 sieves.
   e. Maintain percent of total combined aggregates retained on largest sieve at 1% to 4%.

f. Maintain percent of total combined aggregates retained on No. 100 sieve at 1.5% to 5%.
g. For actual field samples ensure total combined aggregates conform to limits specified herein.
h. Accepted deviations from the above combined gradation are as follows:
1) Never shall three (3) adjacent sieve sizes fall below 6% retained.
2) Never shall two (2) adjacent sieve sized fall below 5% retained.

C. Aggregate used for slab-on-grade mix shall have proven shrinkage characteristics of less than 0.04% in accordance with ASTM C 157 as modified herein.
1. Document slump, air, and temperature of the mixture at the time of mixing - attempt to simulate field conditions.
2. The test mix should include any/all admixtures anticipated at the dosage anticipated. If multiple dosages are possible, test mixes including each potential dosage or test mixtures including the high and low range of the potential dosage. Three beams are required for each mixture.
3. The test beams should be 4 in. x 4 in. x 11¼ in. as 1½ in. aggregate is included in the mix - Section 7.2 of ASTM C-157. Record consolidation procedure.
4. In lieu of the specified 28-day soak in lime-saturated water bath, moist-cure beams in moist room maintained at 100% RH for a period of 7 days. Other than this modification, follow the procedure in Section 10.2 to record the initial comparator reading.
5. After curing, store beams dry (50% RH and 73 °F as specified in Section 11.1.2 of ASTM C-157) and record length measurements using the same comparator used for the initial reading at 3, 7, 14, 21, and 28 days. Document each sample length measurement as well as its initial measurement.
6. Continue storage of samples and record additional verification length measurements at 8, 16, 32, and 64 weeks in accordance with Section 11.1.2 of ASTM C-157.
7. At each test age, report results in accordance with Section 13 of ASTM C-157. Report should include mixture proportions, data for each sample, and ambient conditions of storage room during drying period.

D. Do not use manufactured sand for slabs unless blended with natural sand or otherwise allowed.

E. Fly Ash: Not permitted.

F. Slag: Not permitted.

G. Water: Clean and not detrimental to concrete.

2.04 ADMIXTURES

A. Do not use chemicals that will result in soluble chloride ions in excess of 0.1 percent by weight of cement.

B. Air Entrainment Admixture: ASTM C260/C260M.

C. Water Reducing and Accelerating Admixture: ASTM C494/C494M Type E.

D. Water Reducing and Retarding Admixture: ASTM C494/C494M Type D.

E. Accelerating Admixture: ASTM C494/C494M Type C.

F. Retarding Admixture: ASTM C494/C494M Type B.

G. Water Reducing Admixture: ASTM C494/C494M Type A.

2.05 CRACK REPAIR MATERIAL:

A. Cracks Greater Than 1/8 Inch and less than 3/4 inch: Semi-rigid epoxy joint filler.

B. Cracks Less Than 1/8 Inch: Structural polymer adhesive.
1. Acceptable Product:
a. Metzger McGuire: Rapid Refloor.
b. Roadware, INc.: Roadware 10 Minute Concrete Mender.

2. Select product color from manufacturers full range to closely match concrete color.

2.06 SPALL REPAIR MATERIAL:

A. Spalls Greater Than 4 inch (in any one direction): Epoxy mortar.
   1. Acceptable Product:
      a. Metzger McGuire: Armor Hard
      b. SpecChem: SpecPoxy Mortar (3-component epoxy mortar; aggregate included)
   2. Physical properties before mixing with aggregate:
      a. Shore D Hardness: 75 (+/- 5)
      b. Compressive Strength: 10,500 PSI
      c. Tensile Strength: 1,400 PSI

B. Spalls Less Than 4 inches (in both directions): Structural polymer adhesive.
   1. Acceptable Product:
      a. Metzger McGuire: Rapid Refloor
   2. Physical Properties:
      a. Shore D Hardness: 70 (+/- 5)2
      b. Compressive Strength: 4,000 PSI
      c. Tensile Strength: 5,500 PSI
      d. Color: select color from manufacturers full range to closely match concrete color.

C. Sand Aggregate for Crack, Spall, and Joint Repair: Use fine, oven-dried, washed silica sand ranging from 20 to 40. Color of sand when added to repair material shall closely match concrete floor color.

2.07 BONDING AND JOINTING PRODUCTS

A. Bonding Admixture:
   1. Type: latex, non-rewettable type
   2. Acceptable Admixture.
      a. Dayton Superior: Acrylic Bonding Agent J40.
      b. Euclid Chemical Co.: SBR Latex or Flex-con
      c. Thoro (Degussa Building Products): Thorobond

B. Bonding Compound
   1. Type: polyvinyl acetate, re-wettable. For interior use only in areas not subject to moisture.
   2. Acceptable Compounds.
      a. Dayton Superior: PVA Bonding Agent J41
      b. Euclid Chemical Co.: Euco Weld

C. Epoxy Adhesive
   1. Type: two (2) component, 100% solids, and 100% reactive compound suitable for use on dry or damp surfaces.
   2. Acceptable Adhesive.
      a. Dayton Superior: Sure Bond J58
      b. Euclid Chemical Co.: Euco Epoxy #452 or #620
      c. Sika Chemical Corp.: Sikadur 32 Hi-Mod

D. Polymer Repair Mortar:
   1. Type: Polymer and microsilica modified cementitious-based compounds.
   2. Acceptable Mortar (horizontal).
      a. Dayton Superior: Thin Resurfacer
      b. Euclid Chemical Co.: Thin Top Supreme or Concrete Top Supreme
      c. Sika Chemical Corp.: Sikatop 121 Plus or 122 Plus
   3. Acceptable Mortars: (vertical)
      a. Dayton Superior: Civil/ Structural VO.
      b. Euclid Chemical Co.: Verticoat/Verticoat Supreme
      c. Sika Chemical Corp.: Sikatop Plus 123

E. Slab Isolation Joint Filler: 1/2 inch thick, height equal to slab thickness, with removable top section that will form 1/2 inch deep sealant pocket after removal.
   1. Material: ASTM D1751, cellulose fiber.
   2. Products:
      a. W.R. Meadows, Inc; Fiber Expansion Joint Filler with Snap-Cap: www.wrmeadows.com/#sle.
      b. Substitutions: See Section 01 6000 - Product Requirements.

2.08 EVAPORATION RETARDER

A. Evaporation Retarder: Liquid thin-film-forming compound that reduces rapid moisture loss caused by high temperature, low humidity, and high winds; intended for application immediately after concrete placement.
   1. Products:
      a. Dayton Superior: AquaFilm.
      b. Euclid: Eucobar.
      c. L & M: E-Con
      d. Nox-Crete: Monofilm
      e. Sonneborn: Confilm
      f. SpecChem: Spec Film

2.09 CURING MATERIALS

A. Curing Compound, Naturally Dissipating: Clear, water-based, liquid membrane-forming compound, that dissipates within 3 to 5 weeks; complying with ASTM C309 Type 1 - Clear or translucent, Class B. Moisture loss not more than 0.55 kg/sq. meter when applied at 200 sq. ft./gal. VOC compliant..
   1. Product shall be compatible with tilt-up bond breaker, floor hardeners, sealers, and floor coverings.
   2. Product shall be easily removeable from slab surface if film forming, and if used under building cover and not exposed to UV light.

2.10 MIXING DESIGNS:

A. Design mixes to provide normal weight concrete with the following properties:
   1. Footings:
      a. 28-Day Strength: 3,000 psi minimum.
      b. Slump Range: 4 inch +/- 1 inch.
      c. Admixtures: None required.
   2. Interior Slab-on-Grade:
      a. 28-Day Strength: 4,000 psi minimum.
      b. Top Size Aggregate Included: 1 1/2 inches.
      c. Max. W/C Ratio: 0.52.
      d. Slump Range: 4.5 inch +/- 1 inch. Concrete with a slump as measured per ASTM C143 exceeding 5.5 inches at the point of deposit on the sub-base shall be rejected.
      e. Admixtures:
         1) Water-reducing, 6 oz./100 lbs. cement max.
         2) Accelerating permissible when ambient air temperature less than 40 degrees F, quantity as approved by Engineer.
      f. Time of Setting: Initial setting time shall not exceed 400 minutes as determined by ASTM C 403 for a laboratory sample representing the submitted mix design, admixture dosages, and concrete temperature of 60 degrees F +/- 5 degrees F. Only one specimen or time of setting test is required per sample. If more than one test is performed per sample, report average times of initial setting. Test shall be performed by an independent testing agency selected by, and as a responsibility of, the Concrete Supplier.
   3. Elevated Slabs:
      a. 28-Day Strength: 3,000 psi minimum.

b. Max. Required Aggregate Size: 3/4 inch (pump mix).
c. Max. W/C Ratio: 0.52.
d. Slump Range: 4.5 inch +/- 1 inch.
e. Admixtures:
1) Water-reducing, 6 oz./100 lbs. cement max.
2) Accelerating permissible when ambient air temperature less than 40 degrees F, quantity as approved by Engineer.

4. Tilt-up Wall Panels:
a. 28-Day Strength: 4,000 psi minimum.
b. Max. Aggregate Size: 1 inch for tilt-up panels.
c. Max. W/C Ratio: 0.52.
d. Slump Range: 5 inch +/- 1 inch.
e. Admixtures:
1) Water-reducing, 6 oz./100 lbs. cement max.
2) Accelerating permissible when ambient air temperature less than 40 degrees F, quantity as approved by Engineer.

5. Non-structural and Miscellaneous Constructions (sidewalks):
a. 28-Day Strength: 3,000 psi.
b. Slump Range: 4 inch +/- 1 inch.
c. Admixtures:
1) Air entraining, 6% maximum, for exterior concrete.

B. Adjustment to Concrete Mixes: Mix design adjustments may be requested by Contractor when characteristics of materials, job conditions, weather, test results, or other circumstances warrant, as accepted by Engineer. Laboratory test data for revised mix design and strength results must be submitted to, and accepted by, Engineer before using in Work.

PART 3 EXECUTION

3.01 INSPECTION:

A. Pre-slab Meeting: A minimum of 14 days prior to beginning concrete placement, Contractor shall schedule meeting, as described in Section 01 3000 - Administrative Requirements, with Architect, Testing Agency, Concrete supplier, admixture manufacturer, Concrete placing and finishing foreman and other affected subcontractors. Discuss mix designs, placing procedures, acceptability of formwork and reinforcement, acceptable tolerances and finishes, testing, curing and protection. Contractor shall be responsible for keeping minutes of meeting and distributing to attending parties.

3.02 BATCHING AND MIXING:

A. Batch, mix and transport in accord with ASTM C94, except where more stringent requirements are specified.

B. Delivery Tickets: Concrete producer shall furnish with each load of concrete a numbered delivery ticket showing Contractor, name and location of project, date and time batched, truck number, number of cubic yards in load, specified strength, slump and mix design number.
1. Slab-on-Grade Mix: All delivery tickets shall be clearly marked to also show in gallons per cubic yard:
a. The “maximum permitted water content”.
b. The “actual batch water content” (including the water estimated to have been introduced by the aggregate).
c. The “maximum permitted additional water for slump adjustment” (ie. the difference between the “maximum” and “actual” water contents).

C. Clean truck mixer drums prior to each batching of concrete. Load truck mixers at capacity that will ensure uniform batch at slump specified. Reject non-uniform mixing.

D. Start mixing time after all ingredients are in mixer. Minimum mixing shall be 70 revolutions at mixing speed, if charged to maximum capacity; 50 revolutions at mixing speed, if charged to less than maximum capacity.

E. When concrete is delivered in a truck mixer or agitator, no additional water shall be added after the initial introduction of mixing water for the batch, except when on arrival at project site the slump of the concrete is less than that specified or as allowed herein for hot weather concreting. Such additional water (not to exceed the required water/cement ratio) may be added to bring slump within required limits, and shall be injected into the mixer. The drum or blades shall be turned an additional 30 revolutions or more at mixing speed until the concrete is within the proper slump limits.

F. Discharge of the concrete shall be completed within 1-1/2 hours or before the drum has revolved 300 revolutions, whichever comes first, after the introduction of the mixing water to the cement and aggregates or the introduction of the cement to the aggregates.

G. Concrete shall be delivered at such a rate as will assure prompt discharge upon truck arrival. Place no concrete that has been discharged from mixer truck for longer than 30 minutes.

H. Reject truck mixers with unacceptable batches of concrete. Dispose of concrete legally and clean mixer prior to refill. Rejected mixers shall be tested by Testing Agency on new delivery for slump and mix tests.

I. Cause for rejection of concrete:
   1. Concrete exceeds allowable slump.
   2. Excessive air (over 3%) in concrete for floor slabs, and in other instances where air exceeds project specifications.
   3. Concrete temperature at placement exceeds 90 degrees F.
   4. Concrete discharge exceeds 90 minute time limit and in other instances where concrete does not meet project specifications.

3.03 EXAMINATION

A. Verify lines, levels, and dimensions before proceeding with work of this section.

3.04 PREPARATION

A. Coordinate placement of embedded items with erection of concrete formwork and placement of form accessories.

B. Install premolded expansion-contraction joint filler in accordance with manufacturer's instructions.
   1. Position joint filler against forms, at interrupting objects or columns, and against abutting structures before concrete placement.
   2. Extend joint filler from bottom of slab to within 1/2 inch of finished slab surface. Place expansion joint cap to flush with finished slab surface.
   3. Prior to installation of joint sealant, slide expansion joint cap off the expansion joint.
   4. Conform to Section 07 9005 for joint sealer requirements.

3.05 PLACING CONCRETE

A. Place concrete in accordance with ACI 304R.

B. Place concrete for floor slabs in accordance with ACI 302.1R.

C. Maintain records of concrete placement. Record date, location, quantity, air temperature, and test samples taken.

D. Ensure reinforcement, inserts, waterstops, embedded parts, and formed construction joint devices will not be disturbed during concrete placement.

E. All footing excavations should be examined by the Geotechnical Engineer to verify that the design bearing pressure is available. All footings should be clean, level and free of ponding water. Since the soils tend to soften upon exposure, concrete should be placed as soon as is

practical after the footing is excavated. Any open footing shall be protected from weather conditions until reinforcing steel and concrete can be placed.

F. Slab on grade shall be placed on compacted subbase. Fine grade subbase using a laser controlled grading box and then roller compact to within ± 3/8" of final grade. A final examination of the subbase shall be performed by the Geotechnical Engineer immediately prior to placing floor slabs. If the exposed subgrade becomes wet or frozen, the surface shall be recompacted at the direction of the Geotechnical Engineer. The minimum compaction required unless noted otherwise is 98% of ASTM Specification D-698 (Standard Proctor Density). Proof roll each slab placement area on the day prior to slab installation using a loaded 40 GWT tandem axle truck. Slabs shall not be placed over any base that visibly "pumps" or ruts more than ½ inch under such proof rolling. If pumping is encountered, Contractor shall make repairs as recommended by the Geotechnical Engineer at no additional cost to the Owner or extension of Contract Time.

G. Before placing concrete, inspect and approve formwork, reinforcement, sleeves and embedded items.

H. Maintain reinforcing in proper position on dobies during concrete placement. Use sufficient dobies to withstand construction loads. Hold reinforcing in place not less than one support per 15 sf of slab area.

I. Place concrete continuously without construction (cold) joints wherever possible; where construction joints are necessary, before next placement prepare joint surface by removing laitance and exposing the sand and sound surface mortar, by sandblasting or high-pressure water jetting.

J. Handle concrete from mixer to place of final deposit as rapidly as practical by methods that shall prevent segregation or loss of ingredients. Distribute concrete by means of equal to a steep sided bottom drop concrete bucket. Allow no concrete to free-fall over 4'-0". Utilize buckets with a capacity of not less than 1/2 cu. yd. Clean transporting and handling equipment at frequent intervals and flush with water before and after each day's run. Discharge no water into concrete forms.

K. Place no concrete in forms after initial set has taken. Re-tempering of concrete that has partially set is prohibited. Place no concrete while temperature or other environmental conditions or limitations of facilities prevent proper finishing and curing.

L. Deposit concrete as near final position as possible to avoid rehandling. Place concrete in forms with uniform horizontal layers 1'-6" to 2'-0" in depth; avoid vertical joints or inclined planes. Do not permit piling up of concrete in forms in a manner to permit escape of mortar or flow of the concrete. Deposit concrete continuously with thorough consolidation by vibrating to insure a dense, homogeneous mass without voids or pockets.

M. Transport and place pumped concrete in accord with ACI 304 requirements. Brace formwork to handle effects of pump hammer. Employ aggregates of controlled water contents for pumped concrete. Use no aluminum pipes for transporting concrete. Equipment used to transport concrete shall be compatible with concrete reinforcement and desired finishes.

N. Finish floors level and flat, unless otherwise indicated, within the tolerances specified below.

3.06 CONSOLIDATION:

A. Use vibrators for concrete consolidation. Place vibrators in concrete rapidly to penetrate into previous lift blending two layers and minimizing or eliminating entrapped air between concrete and form.

B. Use vibrators along slab-on-grade edge forms to properly consolidate concrete around construction joint reinforcement dowels. Vibrator head shall not be allowed to come within 3" of form face.

C. Use vibrators with steady, continuous motion in concrete mass and for long enough duration at each position in a pattern to permit maximum escape of air from concrete.

D. Vibrators shall be 2-1/2" to 2-5/8" in diameter with minimum frequency of 10,000 impulses per minute. Furnish number of vibrators as required to vibrate all concrete immediately upon placing. Maintain spare vibrators at project site in case of breakdown. Use and type of vibrators shall conform to ACI 309 "Recommended Practice for Consolidation of Concrete".

3.07 COLD WEATHER CONCRETING:

A. Take cold weather precautions when temperature on job site is below 40 degrees F., in accord with ACI 306R. Accelerators, if used, shall be added at the concrete producer's plant in accord with approved mix design.

B. Heat water, aggregates or both to maintain the temperature of the concrete at the time of delivery at not less than 55 degrees F. Provide tarps, heaters, insulated forms or other means to maintain the temperature of deposited concrete at not less than 40 degrees F. for seven days after placement.

3.08 HOT WEATHER CONCRETING:

A. Concreting in Hot, Dry and/or Windy Weather:
   1. Conform to ACI 305R when any combination of high air or concrete temperature, low relative humidity, and wind velocity tend to impair quality of concrete.
   2. Employ special precautions when evaporation rate as obtained from ACI 305R is expected to reach 0.2 pound per square foot per hour or more.
   3. Unless otherwise allowed, reject concrete if its temperature before placement is over 90F.
   4. Unless otherwise allowed, during hot weather mixing and delivery (discharge) time shall be shorter than specified in ASTM C94 as follows:
      a. When air temperature is between 85F and 90F, reduce allowable mixing and delivery time from 90 minutes to 75 minutes.
      b. When air temperature is greater than 90F, reduce allowable mixing and delivery time to 60 minutes.
   5. Do not place concrete when forms, subgrade, base, or reinforcing bars are more than 120F or more than 10F hotter than ambient air temperature.
   6. Cool with water or water-soaked burlap as necessary, but allow no standing water on surface on which concrete is placed.

B. Retarders, if used, shall be added at concrete producer's plant in accord with approved mix designs. Where necessary, cool aggregates or use chilled water or both to maintain concrete temperature as delivered to the job site below 90 degrees F.

C. In hot weather, up to 10% of design mix water (not to exceed the required water/cement ratio) may be added to truck mixers at job site to replace water lost by evaporation. Mix for minimum of 30 additional revolutions after water is added. Make slump test and cylinders for compression test specimens from each truck to which water has been added. The additional cylinders shall not be counted in determining "frequency of testing" as defined in Concrete Testing section. Cost for additional testing shall be borne by Contractor.

3.09 SLAB FINISHES:

A. Deposit and consolidate concrete slabs in a continuous operation, within limits of construction joints, until the placing of a panel or section is completed.

B. Using Laser Screed, consolidate concrete during placement operations so that concrete is thoroughly worked around reinforcement, other embedded items and into corners. Do not over-vibrate surface.

C. Bring slab surfaces to correct level with straightedge and strike-off. Use highway straightedge, bull float or darbies to smooth surface, free of humps or hollows. Do not disturb slab surfaces prior to beginning finishing operations.

D. Begin floating when surface water has disappeared or when concrete has stiffened sufficiently to permit operation of power-driven floats, or both. Float surfaces on concrete in manner that will compact concrete and produce surface free of depressions or ridges. Test for grade or

level and correct as necessary by removing excess or adding and compacting additional concrete. Surfaces to receive float finish include slabs to receive setting beds.

E. Check and level surface plane to tolerance of 1/4" maximum deviation in 10 feet. Cut down high spots and fill low spots.

F. Trowel finish: Apply a 3 trowel finish to designated monolithic slab surfaces. After floating, begin first trowel finish operation using power-driven trowel. Begin final toweling when surface produces ringing sound as trowel is moved over surface. Consolidate concrete surface by final hand and power troweling operation, free of trowel marks, uniform in texture and appearance. Do not overwork the final troweling operation. Do NOT burnish the slab surface.

G. Non-slip broom finish: Immediately after trowel finishing, roughen concrete surface by brooming in direction perpendicular to main traffic routes. Coordinate required final finish with Architect before application. Apply non-slip broom finish to all exterior concrete platforms, steps, pavement and ramps.

3.10 SLAB JOINTING

A. Locate joints as indicated on drawings.

B. Construction Joints:
   1. Locate construction joints as indicated on the drawings or as approved.
   2. Provide 1/8 inch edger to edge of second slab placement so that joint can be easily located and recut for joint filling operation. Do not edge first placement.

C. Sawcut Contraction Joints:
   1. All sawn contraction joints shall be made using the "Soff-Cut" method. Minimum depth of joint with new blade shall be 1-1/2 inch.
   2. Saw joints immediately following the final finishing operation in accordance with recommendations of Soff-Cut International, and as soon as concrete has hardened sufficiently to prevent raveling or dislodging of aggregates. For "Soff-Cut" saw, this will typically be from 1 hour in hot weather to 4 hours in cold weather after completing finishing of slab in that joint location.
   3. Install Velcro or other non-scratch material to base of skid plate to reduce surface scratching.
   4. Replace saw blades at first sign of raveling at the joint. Guide plate shall be replaced each time a saw blade is replaced.
   5. Use "joint saver" inserts, provided by the saw manufacturer, at all intersecting joints and at location where front wheel crosses perpendicular to the previously cut joint.
   6. Use offset grinder with abrasive wheel or small diameter diamond blade to extend saw cut into column or perimeter isolation joint material.

D. Saw-Cut Control Joint Dust Collection
   1. Connect a dust collection system directly to each Soff-Cut saw being used.
   2. Remove all saw debris, either loose or compacted, from slab surface and joints prior to curing cover installation.

3.11 CONCRETE FORM FINISHING

A. Repair surface defects, including tie holes, immediately after removing formwork.

B. Unexposed Form Finish: Rub down or chip off fins or other raised areas 1/4 inch or more in height.

C. Exposed Form Finish: Rub down or chip off and smooth fins or other raised areas 1/4 inch or more in height. Provide finish as follows:
   1. Smooth Rubbed Finish: Wet concrete and rub with carborundum brick or other abrasive, not more than 24 hours after form removal.

3.12 CURING AND PROTECTION

A. Comply with requirements of ACI 308R. Immediately after placement, protect concrete from premature drying, excessively hot or cold temperatures, and mechanical injury.

B. Maintain concrete with minimal moisture loss at relatively constant temperature for period necessary for hydration of cement and hardening of concrete.
   1. Normal concrete: Not less than 7 days.
   2. High early strength concrete: Not less than 4 days.

C. Membrane Curing Compound:
   1. The compound shall be applied uniformly over the entire surface in accordance with manufacturer's instruction.
   2. Moisture loss from absorption of forms shall be minimized by keeping forms wet until they can be safely removed.
   3. During 7 day curing period, the surfaces shall be protected from damage by equipment, temperature change, stored materials, curing procedures, rain and running water.

3.13 GRINDING OF CONSTRUCTION JOINTS

A. All construction joints shall be ground and polished to an even, smooth, slick finish using gasoline powered diamond-disk and/or stone grinders. The final polishing pass shall be performed using not less than 100 grit stone.

3.14 PROTECTION:

A. Where other concrete structures are to be poured on top of or adjacent to finished surfaces, take all necessary precautions to prevent damage from erection of formwork or staining from concrete laitance.

B. Alert other trades to the need for special protection against rolling or sliding heavy loads across the surface, oil drippings from pipe threaders, spillage of paint, plaster and mortar. Insure that the covering is not damaged or removed during the progress of the work.

C. Review proposed tilt panel construction and erection procedures to ensure that scratching, marring, gouging, and cracking of the floor slabs will be avoided.

3.15 DEFECTIVE FLOOR SLAB:

A. Defective Slab: If it is determined that any type of crack or defect in the slab-on-ground has occurred due to the result of Contractor's failure to comply with these specifications and construction documents, Contractor shall repair and/or replace cracked and defective slabs to the satisfaction of the Owner, and as directed by the Architect.

3.16 CRACK AND SPALL REPAIR OF FLOOR SLABS:

A. Coordination: Repairs made after the Owner moves in shall be made at times that do not interfere with regular business activities.

B. Repair those cracks that meet any of the following conditions:
   1. The crack is within the "shipping/receiving" bays.
   2. The crack is wider than 1/ 32 inch (i.e. “credit card width”).
   3. The crack edges have begun to spall.
   4. Adjacent slab elements (on either side of the crack) exhibit vertical movement when crossed by a loaded forklift.

C. Method of Crack Repair: Follow these steps (or use other method acceptable to the Architect):
   1. Multiple cracks clustered in a spider web appearance, or cracks within the "shipping/receiving" bays:
      a. Remove concrete slab forming a rectangular area normal to column grid. Extend rectangular area to the nearest control or construction joint.
      b. Place and finish new concrete with same specifications as original slab. All edges shall be doweled into existing slab using 3/4 x 12 inch long square steel dowels at 18 inches on-center. Dowels shall be placed centered in slab. Drill oversized 1-1/4" holes approximately 5-1/4" deep in to the existing slab to receive square dowels, set in epoxy grout. Install PNA square dowel clips over dowel length to be placed in new slab.

2. Isolated random cracks less than 1/8 inch wide, without "islands" or chipping, and not subject to movement:
    a. Clean crack out using right angle grinder with soft wire wheel or wire brush, then blow out with air.
    b. Following manufacturer's mixing and installation instructions fill the crack with structural polymer adhesive material slightly overfilling. Monitor top and refill if necessary to assure fill remains crowned above floor surface.
    c. After cure, use medium grit grinding pad to remove excess material flush with floor surface.
3. Isolated random cracks greater than 1/8 inch and less than 3/4 inch, and not subject to movement:
    a. Utilizing crack chasing saws and dust-free cleanout, cut along the crack to a depth of approximately 3/4 inch creating a straight, clean vertical edge. Ensure that all concrete “islands”, and any loose or weak concrete from the crack edge is removed. Blow out with air to clear all loose elements or debris.
    b. Following manufacturer's mixing and installation instructions fill the joint with semi-rigid epoxy joint filler. Monitor top and refill if necessary to assure fill remains crowned above floor surface
    c. After cure, trim the overfill using a stiff sharp razor so top of filler material is flush with concrete floor on both sides.

D. Method of Spall Repair: Follow these steps (or use other method acceptable to the Architect):
1. Bolt holes, small gouges, chips, and spall areas less than 4 inches:
    a. For anchor bolt holes, cut bolt off and drive anchor minimum 1/2" below floor surface.
    b. Roughen surface of concrete with grinder. Sweep and vacuum roughened surface to remove debris.
    c. Clean surfaces free of oil, grease, coatings, sealers, paint, rust, etc. Verify surfaces are dry, and structurally sound.
    d. Following manufacturer's mixing and installation instructions fill area with structural polymer adhesive, slightly overfilling, and trowel smooth.
    e. After material has cured, grind off overfill to ensure flush, smooth floor surfaces.
2. Spalled areas 4 inches and greater:
    a. Prevent feather edging by making vertical cuts at the spall outer edges, minimum 3/4 inch deep.
    b. Remove delaminated material and deteriorated concrete surface material a minimum depth of 1/2 inch. Sweep and vacuum roughened surface to remove debris.
    c. Clean surfaces free of oil, grease, coatings, sealers, paint, rust, etc. Verify surfaces are dry, and structurally sound.
    d. Following manufacturer's mixing and installation instructions fill area with epoxy mortar repair material, slightly overfilling, and trowel smooth.
    e. After material has cured, grind off overfill to ensure flush, smooth floor surfaces.

3.17 FIELD QUALITY CONTROL

A. An independent testing agency will perform field quality control tests, as specified in Section 01 4000.

B. Provide free access to concrete operations at project site and cooperate with appointed firm.

C. Submit proposed mix design of each class of concrete to inspection and testing firm for review prior to commencement of concrete operations.

D. Testing Agency Duties:
1. Review proposed mix designs for concrete classes specified.
2. Review concrete materials for compliance with specifications. Obtain samples as required.
3. Concrete Plant Certification: Certify plants proposed for furnishing concrete as being approved at highest level by NRMCA or by Department of Transportation in state where project is located.

4. Sample concrete at project site and prepare compressive strength test specimens, tests for slump, air content and unit weight.
5. Maintain field test data sheet for each set of concrete specimens. The completed data sheet shall include laboratory number, date, plant, truck number, time batched, time sampled, air temperature, concrete temperature, inspector, mix design number, required compressive strength, unit weight, air content, slump, location of placement, seven day and 28 day strengths.
6. Transport test specimens to Testing Agency's laboratory.
7. Perform specified laboratory tests.
8. Notify Architect immediately of any test specimens that do not meet design compressive strength at 28 days or 2/3 of design strength at seven days.
9. Perform floor tolerance measurements.

E. Contractor Duties Regarding Testing Agency:
1. Provide a space suitable for Testing Agency to store 1-6 day old cylinders that will not require continual movement during construction.
2. If weather dictates, provide for Testing Agency an on site curing space in accordance with ACI standards for storage of cylinders during cold weather concreting.

F. Compressive Strength Tests: ASTM C39/C39M. For each test, mold and cure three concrete test cylinders. Obtain test samples for every 100 cu yd or less of each class of concrete placed.
1. Specimens may be 4x8 inch cylinders or 6x12 inch cylinders.
2. When the frequency of testing will provide less than five acceptance tests for a given mix design, tests shall be made from at least five batches selected at random or from each batch.
3. Perform acceptance testing using cylinders at 28 days.
4. Compressive strength of concrete will be considered satisfactory if averages of all sets of three consecutive strength test results equal or exceed the required 28 day design compressive strength and no individual strength test result falls below design compressive strength by more than 500 psi.

G. Perform one slump test for each set of test cylinders taken, following procedures of ASTM C143/C143M.

H. For trowel finished slabs, perform air test for every 150 cu yd or less of concrete placed. Reject concrete if air content is over 3%.

I. During first day of concrete placement and later as directed by Owner's Representative, take concrete sample at point of final placement to verify mix design submittals. Washout sample to remove material finer than No. 200 sieve and perform combined sieve analysis, using sieve sizes specified, furnishing percent retained on each sieve. Ensure concrete sample size is large enough to be representative but is not less than 70 pounds. Conform to ASTM C136. As compared to approved concrete mix design, of total combined coarse and fine aggregates, ensure within tolerance for material retained on any 1 sieve of 3% and +4%, except No. 100 sieve. Ensure within tolerance for material retained on No. 100 sieve is +2% or 2%.

3.18 DEFECTIVE CONCRETE

A. Test Results: The testing agency shall report test results in writing to Architect and Contractor within 24 hours of test.

B. Defective Concrete: Concrete not conforming to required lines, details, dimensions, tolerances or specified requirements.

C. Repair or replacement of defective concrete will be determined by the Architect. The cost of additional testing shall be borne by Contractor when defective concrete is identified.

END OF SECTION

SECTION 03 3121
DUCTILCRETE INTERIOR FLOOR SLAB ON GROUND

PART 1 GENERAL

1.01 SECTION INCLUDES

A. This Section specifies the proprietary interior floor slab installation(s) to be designed and performed by DuctilCrete Slab Systems and/or its Licensees.

1.02 RELATED REQUIREMENTS

A. Section 01 3000 - Administrative Requirements: Submittal procedures, project meetings, progress schedules and documentation, reports, coordination.

B. Section 01 4000 - Quality Requirements: Procedures for testing, inspection, mock-ups, reports, certificates; use of reference standards.

C. Section 01 7800 - Closeout Submittals: Project record documents, operation and maintenance (O&M) data, warranties and bonds.

D. Section 03 3000 - Cast-in-Place Concrete: Additional requirements and information.

1.03 SUBMITTALS

A. See Section 01 3000 - Administrative Requirements, for submittal procedures.

B. Slab System Specification: Data describing the design, materials, installation and finishing of the slab system.

C. Construction Drawings: Detailed drawings of slab system coordianted with overall building design documents.

D. Warranty Documentation: Submit manufacturer warranty and ensure that forms have been completed in Owner's name and registered with manufacturer.

PART 2 PRODUCTS

2.01 PROPRIETARY SLAB ON GROUND SYSTEM

A. Description:
   1. DuctilCrete's construction drawings and specification information under separate cover.

PART 3 EXECUTION

3.01 EXAMINATION AND INSTALLATION

A. Refer to DuctilCrete's specification information included under separate cover.

3.02 CLOSEOUT ACTIVITIES

A. See Section 01 7800 - Closeout Submittals, for closeout submittals.

END OF SECTION

SECTION 03 3511
CONCRETE FLOOR FINISHES

PART 1 GENERAL

1.01 SECTION INCLUDES

A. Surface treatments for concrete floors and slabs.

1.02 RELATED REQUIREMENTS

A. Section 03 3000 - Cast-in-Place Concrete: Finishing of concrete surface to tolerance; floating, troweling, and similar operations; curing.

B. Section 03 3121 - Ductilcrete Interior Floor Slab on Ground: Coordination of work provided as portion of slab system.

1.03 SUBMITTALS

A. See Section 01 3000 - Administrative Requirements, for submittal procedures.

B. Product Data: Manufacturer's published data on each finishing product, including information on compatibility of different products and limitations.

1.04 DELIVERY, STORAGE, AND HANDLING

A. Deliver materials in manufacturer's sealed packaging, including application instructions.

PART 2 PRODUCTS

2.01 DENSIFIERS AND HARDENERS

A. Liquid Densifier/Hardener: Penetrating chemical compound that reacts with concrete, filling the pores and dustproofing; for application to concrete after set.
   1. Composition: Lithium silicate.
   2. Penetrating, chemically reactive, concrete hardener containing a minimum 7% lithium silicate solids, (no potassium or sodium silicate blends allowed) equal to:
      a. Dayton Superior: Pentra-Hard Densifier
      b. Nox-Crete: Duro-Nox LSC
      c. Prosoco: Consolideck LS-CS
      d. SpecChem: LithSeal Lite

PART 3 EXECUTION

3.01 EXAMINATION

A. Verify that floor surfaces are acceptable to receive the work of this section.

B. Verify that flaws in concrete have been patched and joints filled with methods and materials suitable for further finishes.

C. Examine slab surface prior to starting work, with liquid surface treatment Applicator present, for conditions affecting the Applicator's ability to properly apply the liquid surface treatment. Correct conditions detrimental to timely and proper work. Do not proceed until unsatisfactory conditions are corrected.

D. Verify via water test or other non-destructive test that no bond breakers, curing compounds or similar materials are present. If such materials are present; do not proceed until they are removed.

3.02 GENERAL

A. Apply materials in accordance with manufacturer's instructions.

3.03 PENETRATING CONCRETE HARDENER:

A. The hardener shall be applied after final finishing and soft cutting control joints. Concrete surface shall be hardened sufficiently so that it will not be marred by the application process, and prior to the curing compound application.

B. Application: Follow the manufacturer's written instructions for the application of the hardener.

1. The manufacturer's technical representative shall be present at the initial application to observe the work and provide technical assistance.
2. It is critical that the dust or slurry from saw cutting of floor joints be thoroughly removed from the slab prior to application.

C. Immediately apply the specified curing compound or initiate the specified curing procedure.

END OF SECTION

SECTION 03 3533
STAMPED CONCRETE

PART 1 GENERAL

1.01 SECTION INCLUDES

A. Stamping of new full-depth concrete.

B. Coloring of stamped concrete.

C. Surface coatings on stamped concrete.

1.02 RELATED REQUIREMENTS

A. Section 03 3000 - Cast-in-Place Concrete: Concrete mix design; bonding and chemical admixtures; mixing; placement; finishing of concrete surface to tolerance: floating, troweling, and similar operations; frequency and treatment of control joints.

1.03 REFERENCE STANDARDS

A. ASTM C33/C33M - Standard Specification for Concrete Aggregates; 2013.

B. ASTM C1315 - Standard Specification for Liquid Membrane-Forming Compounds Having Special Properties for Curing and Sealing Concrete; 2011.

1.04 ADMINISTRATIVE REQUIREMENTS

A. Preinstallation Meeting: Conduct a preinstallation meeting one week prior to start of work of this section.
   1. Require attendance of parties directly affecting work of this section, including:
      a. Installer.
      b. Contractor's representative.
      c. Owner.
   2. Review mock-ups, material sequence, preparation and application, cleaning, protection and coordination with other work.

1.05 SUBMITTALS

A. See Section 01 3000 - Administrative Requirements, for submittal procedures.

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

1.06 QUALITY ASSURANCE

A. Installer Qualifications: Company specializing in performing the work of this section with minimum five years documented experience and approved by owner.

1.07 MOCK-UPS

A. Construct mock-up(s) of stamped concrete to serve as basis for evaluation of workmanship.
   1. Number of Mock-Ups to be Prepared: One.
   2. Use same materials and methods for use in the work.
   3. Record technique, timed procedures and material used.
   4. Locate where directed.
   5. Minimum Size: 4 by 4 feet.

B. Obtain approval of mock-up by Architect before proceeding with work.

C. Retain mock-up(s) until completion of work for use as quality standard.

1.08 FIELD CONDITIONS

A. Do not install materials when air and surface temperatures are below 55 degrees F or above 80 degrees F.

B. Do not install materials when rain, snow, or excessive moisture is expected during application or within 24 hours after application.

PART 2 PRODUCTS

2.01 STAMPED CONCRETE APPLICATIONS

A. Full Depth Stamped Concrete Slab: Patterned new concrete.
   1. Application(s): All indicated exterior locations.
   2. As last step, apply combination curing compound / clear sealer.

2.02 FULL-DEPTH CONCRETE SLAB MATERIALS

A. See other section(s) for concrete design mix, mixing, forming, and reinforcement.

B. Slump: 4.0 inches maximum.

C. Do not use calcium chloride or admixtures containing calcium chloride.

D. Aggregates: Use non-reactive fine and coarse aggregates free from deleterious material and complying with ASTM C33/C33M.

2.03 STAMPING MATERIALS

A. Stamping Mats: Mat type imprinting tools for texturing freshly placed concrete, in pattern and texture to achieve required surface profile and design.
   1. Mat Composition: Polyurethane.

B. Release Agent: Bond breaker compound capable of releasing stamping forms from concrete without creating surface defects or leaving any residue; type as recommended by stamping mat manufacturer; compatible with concrete, form materials and specified coloring agents.

2.04 ACCESSORY MATERIALS

A. Curing and Sealing Compound: Clear, non-yellowing, non-staining, breathable, UV stable curing agent and sealer, complying with ASTM C1315 and compatible with all components of stamped concrete systems.

B. Concrete Cleaner: Biodegradable cleaning and neutralizing agent for removal of curing compounds.

END OF SECTION

SECTION 03 4713
TILT-UP CONCRETE

PART 1 GENERAL

1.01 SECTION INCLUDES

A. Tilt-up, site cast concrete wall panels, load bearing, erected from mold to final position .

B. Supports, devices, load bearing supports, and attachments.

C. Grouting under panels.

D. The Architect/Engineer has not been retained to design the wall panels or the floor slab to resist the stresses caused by erection of the wall panels, nor to determine the means and methods to be used for erection and bracing until permanent bracing is in place.

1. It shall be the Contractor's responsibility to erect the panel in a manner that will be both safe for personnel and property, and to brace and otherwise protect the panels against wind and other forces that may occur during construction and until connections to the permanent structural system are completed.
2. It shall be the Contractor's responsibility to ensure that a suitable slab has been prepared to provide for the level of finish that has been established within this specification.
3. It shall be the Contractor's responsibility to coordinate the slab finishing including saw cutting of all joints with the panel forming to minimize the impact to the architectural finish of the panels.

1.02 RELATED REQUIREMENTS

A. Section 03 3000 - Cast-in-Place Concrete: Requirements for concrete for tilt-up panels.

B. Section 03 3511 - Concrete Floor Finishes.

C. Section 05 5000 - Metal Fabrications: Miscellaneous metal for embedment.

D. Section 07 9005 - Joint Sealers: Calking of perimeter joint with sealant and backing.

E. Section 09 9035 - Textured Coatings: Field applied painting of tilt-up panels.

1.03 REFERENCE STANDARDS

A. ACI 301 - Specifications for Structural Concrete; 2010 (Errata 2012).

B. ACI 304R - Guide for Measuring, Mixing, Transporting, and Placing Concrete; 2000.

C. ACI 305R - Hot Weather Concreting; 2010.

D. ACI 306R - Cold Weather Concreting; 2010.

E. ACI 308 - Standard Practice for Curing Concrete.

F. ACI 318 - Building Code Requirements for Structural Concrete and Commentary; 2011.

G. ASTM A615/A615M - Standard Specification for Deformed and Plain Carbon Steel Bars for Concrete Reinforcement; 2015.

H. ASTM C94/C94M - Standard Specification for Ready-Mixed Concrete; 2015.

I. ASTM C309 - Standard Specification for Liquid Membrane-Forming Compounds for Curing Concrete; 2011.

J. AWS D1.1/D1.1M - Structural Welding Code - Steel; 2015.

K. AWS D1.4/D1.4M - Structural Welding Code - Reinforcing Steel; 2011.

1.04 SUBMITTALS

A. See Section 01 3000 - Administrative Requirements, for submittal procedures.

B. Product Data: Submit manufacturers' current data on manufactured items used, including recommended methods of installation, relevant installation limitations, and safety precautions. Submit current product data for bondbreakers, grouts and patching materials.

C. Shop Drawings: Indicate layout, tilt-up unit locations, configuration, unit identification marks, reinforcement, connection details, support items, location of lifting devices, dimensions, openings, reveals and relationship to adjacent components.

1.05 QUALITY ASSURANCE

A. Perform work in accordance with ACI 318.

B. Fabricator Qualifications: Company specializing in performing the work of this section with minimum 5 years of documented experience.

C. Design units under direct supervision of a Professional Structural Engineer experienced in design of this Work and licensed in the State in which the Project is located.
   1. Construction Loads: Design and fabricate tilt-up wall panels to withstand construction loads which may occur during lifting, bracing, and impact by adjoining panels.
   2. Comply with the recommendations of the Tilt-Up Concrete Association's Guideline for Temporary Wind Bracing of Tilt-Up Concrete Panels During Construction. The minimum construction period wind force shall be 15 psf and adjusted higher based upon the appropriate factors for the project.

D. Welding Qualifications: Welding processes and welding operators qualified within previous 12 months in accordance with AWS D1.1/D1.1M and AWS D1.4/D1.4M.

1.06 FIELD CONDITIONS

A. Cold Weather: Comply with provisions of ACI 306R for freezing or near-freezing conditions.
   1. Provide adequate equipment for heating and protecting concrete materials.
   2. Do not use concrete materials, reinforcing steel, forms, fillers, ground surface, or other materials that are frozen, frost-covered or that contain ice.
   3. If shelters are used, do not use fuel that will weaken concrete surfaces.

B. Hot Weather: Comply with provisions of ACI 305R for high temperature conditions.
   1. During periods of dry winds, low humidity, and other conditions that cause rapid drying, protect fresh concrete with an evaporation retardant or fine fog spray of water applied immediately after screeding and bull floating.
   2. Maintain protection until final finishing and curing compounds are applied.

PART 2 PRODUCTS

2.01 TILT-UP PANEL UNITS

A. Tilt-Up Panel Units:
   1. Concrete: Minimum 4,000 psi, 28 day strength; comply with ACI 301. See Section 03 3000 - Cast-in-Place Concrete.
   2. Design Loads: Static loads, anticipated dynamic loading, including positive and negative wind loads, thermal movement loads, and erection forces as defined by applicable code.
   3. Calculate structural properties of units in accordance with ACI 318.
   4. Accommodate construction tolerances, deflection of building structural members, and clearances of intended openings.
   5. Provide connections that accommodate building movement and thermal movement and adjust to misalignment of structure without unit distortion or damage.
   6. Provide lifting hardware and lifting system appropriate to panel size and configuration.

2.02 PANEL MATERIALS

A. Provide basic concrete materials in accordance with Section 03 3000.

B. Curing Compound: Liquid membrane-forming compound complying with ASTM C309, Type I and ID, Class B.

C. Bond Breaker: Product shall be a non-staining, bond breaker compatible with the curing compound and sealer/hardeners specified in Section 03 3511. Contractor shall assume all responsibility for properly preparing floor slab to receive sealer or sealer/hardeners.
   1. Dayton Superior: J-6 WB

2. Richmond: Maxi Tilt with Dye
3. Nox-Crete: Silcoseal 2000CF
4. SpecChem: SpecTilt WB

D. Grout: Beneath panels, provide standard type, sand and cement compound capable of developing over 3,000 psi compressive strength in 28 days.

E. Sacking Materials: Portland cement, polymer modifiers, ultra-fine aggregates and water, mixed to a uniform creamy paste.
1. Dayton Superior: Architectural Finish
2. Nox-Crete: Panel Patch
3. CTS Cements: Rapid Set WunderFixx
4. SpecChem: Spec Smooth

F. Reinforcement:
1. Face: Rebar to be provided each face of tilt-panel.
2. General: Meet ACI 533.1R Chapter 7.
3. Bars: Meet ASTM A615 with Supplement S1, grade 60, except that ties may be grade 40. #3 and larger bars shall be deformed type.
4. Welded wire fabric: Meet ASTM A185, cold-drawn, resistance welded.
5. Tie Wire: 16 gauge annealed steel wire.
6. Bar Supports: Prefabricated accessories shall comply with CRSI Manual of Standard Practice MSP-I-80 as follows:
   a. For exposed, exterior formed work designated to receive smooth formed or rubbed finish: Class 2, stainless steel, type B.
   b. For exposed, exterior formed work designated to receive special architectural finishes: Class 1, plastic protected.
7. Bar mats for concrete reinforcement shall conform to ASTM A184.

G. Forms: Wood material to maintain forms in good alignment and produce required finish.
1. External form bracing shall be equal to Aztec “Tilt Bracket” system with self-adhering plastic shoe and reusable plastic bracket, to prevent form displacement during casting operations.

H. Reveals:
1. Acceptable materials for forming reveals:
   a. Medium density fiberboard.
   b. High density extruded polystyrene foam with minimum 40 psi compressive strength.
2. Spray Adhesive: equal to Demand Products (800-325-7540) "Foam Lock Adhesive", or approved equal.

I. Floor Protection Inserts: PVC inserts equal to "Slab Saver" by Victory Bear Construction Products.

2.03 LIFTING DEVICES, INSERTS AND BRACES:

A. Acceptable Manufacturer:
1. Burke.
2. Dayton Superior.
3. Richmond Screw Anchor.

B. Wall panel lifting devices, inserts and additional reinforcement required for lifting of the panels shall be designed by the approved manufacturer and certified by a Structural Engineer registered in the state where the project is located.

C. Panel braces shall be designed by the approved manufacturer.
1. Comply with the recommendations of the Tilt-Up Concrete Association’s Guideline for Temporary Wind Bracing of Tilt-Up Concrete Panels During Construction.

PART 3 EXECUTION

3.01 EXAMINATION

A. Verify that building structure, anchors, devices, and openings are ready to receive work of this section.

B. Verify that casting slab specified in Section 03 3000 is cured and ready for work of this section. Fill cracks, saw cuts, joints, or defects that would adversely affect appearance of tilt-up panels.

3.02 PREPARATION

A. Coordinate site cast tilt-up operations with work of other sections to expedite the Work and avoid omissions and delays.

B. Apply bondbreaker to casting slab in accordance with manufacturer's recommendations.

C. Provide for erection procedures and induced loads during erection, and provide for temporary bracing that will remain in place until roof diaphragm has been completely installed and connected.

D. Forms: Place forms to minimize damage to casting slab surface.
   1. Use rigid forms, constructed to maintain tilt-up unit uniform in shape, size and finish.
   2. Formwork bracing brackets with double sided tape shall be adhered to floor slabs. No anchors shall be used to penetrate the slab.

E. Reveals: Extruded polystyrene foam or medium density fiberboard shall be accurately cut, laid out and adhered to the floor slab.

F. Floor Protection Inserts: In order to protect the floor during panel erection, install intermittent PVC floor protection inserts at all bottom outside panel edges in accordance with manufacturer’s recommendations.

3.03 FORMING PANELS

A. Lay out panels in manner that will minimize joints in panel faces. Coordinate installation of inserts and anchorages.

B. Maintain consistent quality during construction of forms.

C. Fabricate connecting devices, plates, angles, items fit to steel framing members, inserts, bolts, and accessories. Fabricate to permit initial placement and final attachment.

D. Embed reinforcing steel, anchors, inserts plates, angles, and other cast-in items as indicated.

E. Locate hoisting devices to permit removal after erection.

F. Work concrete thoroughly around reinforcement, around embedded items, and into corners of the forms. Consolidate concrete in accordance with ACI recommendations.

G. Cold joints are not permitted in any individual panel.

3.04 PLACING AND CURING CONCRETE

A. Mix and deliver concrete in accordance with ASTM C94/C94M, Option A, and in compliance with recommendations of ACI 304R.

B. Protect freshly placed concrete from premature drying and excessively hot or cold temperatures.

C. Cure units to develop concrete quality, and to minimize appearance blemishes such as non-uniformity, staining, or surface cracking.

3.05 FINISHING CONCRETE

A. Exterior Surfaces: Shall have a smooth finish with all fins removed. Surfaces shall be left ready to receive coatings.

B. Interior Surfaces: Exposed surfaces shall have a smooth steel trowel finish.

C. All defects, which are exposed to view, shall be corrected before final finish. All visible returns, edges, etc. shall be patched, rubbed, and otherwise finished to match adjacent surfaces.

D. Patch panels with grout where lifting hooks or other devices have been removed. Plastic insert covers are not acceptable.

3.06 SITE FABRICATION TOLERANCES

A. Unless otherwise approved by Architect, provide panels conforming to casting tolerances as specified below.

B. Panel Height and Width:
   1. Up to 20 feet: 1/4 inch maximum.
   2. 20 to 30 feet: 3/8 inch maximum.
   3. Each additional 10 ft increment: 1/8 inch maximum.

C. Panel Thickness: 3/16 inch maximum average variation through any vertical or horizontal cross section.

D. Skew of Panel or Opening: Measured as difference in length of the two diagonals:
   1. Per 6 feet of diagonal dimension: 1/8 inch maximum.
   2. Maximum total difference: 1/2 inch.

E. Panel Openings:
   1. Size: 1/4 inch maximum.
   2. Location of Centerline: 1/4 inch maximum.
   3. Size: 1/4 inch maximum.
   4. Location of Centerline: 1/4 inch maximum.

F. Location and Placement of Embedded Items:
   1. Inserts, Bolts, and Pipe Sleeves: 3/8 inch.
   2. Lifting and Bracing Inserts: As specified by manufacturer.
   3. Weld Plate Embedments: 1 inch for location; 1/4 inch for tipping and flushness.

G. Maximum Out of Square: 1/8 inch in 10 feet, non-cumulative.

H. Variation From Dimensions Indicated on Shop Drawings: Plus or minus 1/8 inch.

I. Maximum Misalignment of Anchors, Inserts, Openings: 1/8 inch.

J. Maximum Bowing of Units: Length of bow/ 360.

3.07 DEFECTIVE CONCRETE

A. Defective Concrete: If test results indicate concrete not conforming to specified requirements, Contractor with the agreement of Architect must adjust mix to provide acceptable concrete on subsequent work. For concrete not meeting specified requirements, Owner may require core specimens to be taken and tested, at Contractor's expense. Concrete cores that test below specified requirements will be deemed to be defective.

B. Repair or replacement of defective concrete will be determined by the Architect and will be paid for by Contractor. The cost of additional testing shall be borne by Contractor when defective concrete is identified.

C. Any demolition or repair of other materials or systems as a result of repair or replacement of defective concrete shall be at the Contractor's expense.

D. Do not patch, fill, touch-up, repair, or replace damaged or defective concrete except upon express direction of Architect for each individual area.

3.08 ERECTION

A. Before beginning erection operations, verify that site conditions are appropriate for the work. Mark elements to conform to designations indicated on approved shop drawings.

B. Employ erection equipment that will prevent damage to existing construction, permanent floor slabs, and tilt-up panels. Protect panels to prevent staining, warping, or cracking.

C. Erect cast components in accordance with approved Shop Drawings. Do not erect tilt-up panels until a minimum strength has been reached of 2,500 psi or as required by the lifting insert manufacturer. Take all precautions necessary to prevent damage to panels.

D. Apply bond breaker adequately to ensure minimum resistance when lifting the panels off the casting surface.

E. Erection: Use erection equipment sized to handle the heaviest panel load. Operate equipment and adequately shore outriggers.
   1. Erection crane may run on top of panels on the floor slab. Provide tarps or protective barrier to prevent tire marks on interior surface of wall panels. Operate equipment and adequately shore outriggers, taking care to prevent damage to floor slabs. Repair floor slab cracks and damage as directed in Section 03 3513 - High-Tolerance Concrete Floor Finishing.

F. Raise and lift panels and erect plumb in accurate location and alignment. Do not drag or bounce panels across floor slab. Use wedges and shims where required to correctly position panels. Provide grout between panels and foundation system.

G. After placing, provide temporary braces and supports to securely hold panels in position. Maintain braces and supports in place, undisturbed, until closures, columns, or other supporting structures have been installed and are capable of receiving panels. Use of manufacturer specified or approved brace anchors at all bracing points shall be required. Wedge anchors or expansion bolts by others is not acceptable.
   1. All slab anchors shall be torqued to the required specification and certified by the installing contractor. All slab anchors must be re-torqued and re-certified following exposure to winds in excess of 35 mph.

H. Holes caused by installation of temporary braces anchored to floor slabs shall be patched with structural polymer adhesive, flush and smooth with floor surface. Color shall closely match concrete color. Provide mockup of patch for Architect approval prior to beginning work.

I. Good floor slab cosmetics are a primary concern. It is the Contractor's responsibility to employ sufficient means during the pouring, lifting, and setting of the tilt panels to avoid any damage including, but not limited to, scratching, marring, gouging, delaminating, and cracking to the permanent slab on grade. Damaged slab-on-grade sections shall be replaced solely at the Contractor's expense.

3.09 ERECTION TOLERANCES

A. Unless otherwise approved by Architect, install site-cast tilt-up panels within erection tolerances as specified below.

B. Replace panels that cannot be installed within specified tolerances.

C. Joint Width Variation:
   1. Up to 20 feet tall panels: 1/4 inch maximum.
   2. Each additional 10 ft increment: 1/8 inch maximum.
   3. Do not increase or decrease joint width more than 50 percent from specified joint width in any case, as measured between panels at exterior face.

D. Joint Taper:
   1. Up to 20 feet tall panels: 1/4 inch maximum.
   2. Each additional 10 ft increment: 1/8 inch maximum.
   3. Maximum for entire length of panel: 3/8 inch width difference for non-parallel panel edges.

E. Panel Alignment:
   1. Horizontal and Vertical Joints: 1/4 inch maximum.
   2. Offset in Adjacent Exterior Panel Faces: 1/4 inch.

F. Panels shall be set plumb, level, true to line and grade, and in alignment with adjacent panels. Maximum allowable tolerance from panel face to panel face shall be 1/4". Allowable joints between panels shall be 3/4" nominal with no joint greater than 1-1/4" or less than 3/8".

3.10 CLEANING AND ADJUSTING

A. Concrete improperly formed, not true, plumb or level, not to required elevations or containing cracks detrimental to structural integrity or appearance shall be repaired to the Engineer's satisfaction.

B. Immediately after removing forms, concrete surfaces shall be inspected. Any pour joints, voids, stone pockets, or other defective areas shall be patched as required by the Architect. The patching mortar shall consist of concrete materials with the coarse aggregate omitted. Thoroughly compact the mortar into place and screed off slightly higher than the surrounding area. After one to two hours patch shall be rubbed and finished to match the surrounding surface.

C. Chip or grind off all defective materials and foreign matter.

D. The joints between all panels shall be sealed with materials as specified in Section 07920.

END OF SECTION

SECTION 05 1200
STRUCTURAL STEEL FRAMING

PART 1 GENERAL

1.01 SECTION INCLUDES

A. Structural steel framing members, support members.

B. Base plates, shear stud connectors.

1.02 RELATED REQUIREMENTS

A. Section 01 4000 - Quality Requirements: Testing and inspection.

B. Section 05 2100 - Steel Joist Framing.

C. Section 05 3100 - Steel Decking: Support framing for small openings in deck.

D. Section 05 5000 - Metal Fabrications: Steel fabrications affecting structural steel work.

1.03 REFERENCE STANDARDS

A. AISC (MAN) - Steel Construction Manual; 2011.

B. AISC S303 - Code of Standard Practice for Steel Buildings and Bridges; 2010.

C. AISC S348 - Specification for Structural Joints Using ASTM A325 or A490 Bolts; 2004.

D. ASTM A36/A36M - Standard Specification for Carbon Structural Steel; 2014.

E. ASTM A53/A53M - Standard Specification for Pipe, Steel, Black and Hot-Dipped, Zinc-Coated, Welded and Seamless; 2012.

F. ASTM A108 - Standard Specification for Steel Bar, Carbon and Alloy, Cold Finished; 2013.

G. ASTM A325 - Standard Specification for Structural Bolts, Steel, Heat Treated, 120/105 ksi Minimum Tensile Strength; 2014.

H. ASTM A325M - Standard Specification for Structural Bolts, Steel, Heat Treated 830 MPa Minimum Tensile Strength (Metric); 2014.

I. ASTM A490 - Standard Specification for Structural Bolts, Alloy Steel, Heat Treated, 150 ksi Minimum Tensile Strength; 2014a.

J. ASTM A490M - Standard Specification for High-Strength Steel Bolts, Classes 10.9 and 10.9.3, for Structural Steel Joints (Metric); 2014a.

K. ASTM A500/A500M - Standard Specification for Cold-Formed Welded and Seamless Carbon Steel Structural Tubing in Rounds and Shapes; 2013.

L. ASTM A563 - Standard Specification for Carbon and Alloy Steel Nuts; 2007a (Reapproved 2014).

M. ASTM A563M - Standard Specification for Carbon and Alloy Steel Nuts [Metric]; 2007.

N. ASTM A992/A992M - Standard Specification for Structural Steel Shapes; 2011 (Reapproved 2015).

O. ASTM F436 - Standard Specification for Hardened Steel Washers; 2011.

P. AWS A2.4 - Standard Symbols for Welding, Brazing, and Nondestructive Examination; 2012.

Q. AWS D1.1/D1.1M - Structural Welding Code - Steel; 2015.

R. SSPC-Paint 15 - Steel Joist Shop Primer/Metal Building Primer; 1999 (Ed. 2004).

1.04 SUBMITTALS

A. See Section 01 3000 - Administrative Requirements, for submittal procedures.

B. Shop Drawings:
   1. Indicate profiles, sizes, spacing, locations of structural members, openings, attachments, and fasteners.
   2. Indicate cambers and loads.

3. Indicate welded connections with AWS A2.4 welding symbols. Indicate net weld lengths.

C. Manufacturer's Mill Certificate: Certify that products meet or exceed specified requirements.

D. Welders Certificates: Certify welders employed on the Work, verifying AWS qualification within the previous 12 months.

1.05 QUALITY ASSURANCE

A. Fabricate structural steel members in accordance with AISC "Steel Construction Manual."

B. Design connections not detailed on drawings under direct supervision of a Professional Structural Engineer experienced in design of this work and licensed in the State in which the Project is located.

1.06 DELIVERY, STORAGE AND HANDLING

A. Store structural steel members at project site above ground on platforms or skids. Do not place in contact with earth or concrete slabs. Store bolts and welding rods in original containers with labels intact.

B. Protect items from corrosion affecting structural strength and use.

PART 2 PRODUCTS

2.01 MATERIALS

A. Steel Angles, Plates, and Channels: ASTM A36/A36M.

B. Steel W Shapes and Tees: ASTM A992/A992M.

C. Cold-Formed Structural Tubing: ASTM A500/A500M, Grade B.

D. Pipe: ASTM A53/A53M, Grade B, Finish black.

E. Shear Stud Connectors: Made from ASTM A 108 Grade 1015 bars, cold finished carbon steel, with dimensions complying with AISC Specifications.

F. High-Strength Structural Bolts, Nuts, and Washers: ASTM A325 or A325M, Type 1, medium carbon, galvanized, with matching compatible ASTM A563 or A563M nuts and ASTM F436 washers.

G. Unfinished Bolts and Nuts: ASTM A 307, Grade A, regular low-carbon steel bolts and nuts.

H. High-Strength Structural Bolts: ASTM A490 or A490M; Type 1 alloy steel, with matching compatible ASTM A563 or A563M nuts and ASTM F436 washers.

I. Anchor Bolts: ASTM A 307, Grade C, non-headed type unless otherwise indicated.

J. Welding Materials: AWS D1.1/D1.1M; type required for materials being welded.

K. Shop and Touch-Up Primer: SSPC-Paint 15, Type 1, gray oxide, complying with VOC limitations of authorities having jurisdiction.

2.02 FABRICATION

A. Shop fabricate to greatest extent possible. Fabricate items of structural steel in accordance with AISC Specifications and as indicated on final shop drawings.
   1. Properly mark and match-mark materials for field assembly. Fabricate for delivery sequence which will expedite and minimize field handling of materials.
   2. Where finishing is required, complete assembly, including welding of units, before start of finishing operations. Provide finish surfaces of members exposed in final structure free of markings, burrs, and other defects.

B. Develop required camber for members.

C. Connections: Weld or bolt shop connections as indicated.
   1. Bolt field connections, except where welded connections or other connections are indicated.
   2. Provide high-strength threaded fasteners for principal bolted connections, except where unfinished bolts are indicated.

3. Provide unfinished threaded fasteners for only bolted connections of secondary framing members to primary members (including purlins, girts, and other framing members taking only nominal stresses) and for temporary bracing to facilitate erection.

D. High-Strength Bolted Construction: Install high-strength threaded fasteners in accordance with AISC "Specifications for Structural Joints using ASTM A325 or A490 Bolts". Bolts shall be installed with hardened washers under the element turned in tightening bolts to facilitate verification inspection

E. Welded Construction: Comply with AWS Code for procedures, appearance and quality of welds, and methods used in correcting welding work.

F. Assemble and weld built-up sections by methods which will produce true alignment of axis without warp.

G. Shear Connectors: Prepare steel surfaces as recommended by manufacturer of shear connectors. Shop weld shear connectors, spaced as shown, to beams and girders in composite construction. Use automatic end welding of headed stud shear connectors in accordance with manufacturer's printed instructions.

H. Holes for Other Work: Provide holes required for securing other work to structural steel framing, and for passage of other work through steel framing members, as shown on final shop drawings.
   1. Cut, drill, or punch holes perpendicular to metal surfaces. Do not flame cut holes or enlarge holes by burning. Drill holes in bearing plates. Remove burrs resulting from drilling operations.

I. Header Units: Provide header units to support tail joists at openings in floor or roof system unless otherwise indicated.

2.03 FINISH

A. Surface Preparation:
   1. Clean all surfaces after fabrication and immediately prior to shop painting in accord with SSPC-SP2, Hand Tool Cleaning, SSPC- SP3, Power Tool Cleaning, or SSPC-SP6, Commercial Blast Cleaning at manufacturer's option.
   2. Blast clean only when relative humidity is below 85% and when surface temperature of steel is a minimum of 5 degrees F. above the dew point. Remove all traces of blast residue and dust. Do not contaminate the surfaces. Require workmen to wear clean gloves when handling blast cleaned steel.

B. Shop Painting:
   1. Apply specified shop coat in accord with manufacturer's product data to provide a minimum dry film thickness of 2.0 mils. Apply shop coat of paint within four hours after cleaning and before rust-bloom occurs. Paint only in relative humidity below 85% and surface temperatures of 5 degrees F. above dew point.
   2. Apply lacquer to milled surfaces to dry film thickness of 0.5 mils.

C. Shop Painting Schedule: Paint all structural steel with a shop coat of paint, except:
   1. Members encased in concrete.
   2. Contact surfaces of welded connections and areas within 2" of field welds except as noted.
   3. Contact surfaces of high-strength bolted connections.
   4. Surfaces receiving sprayed-on fireproofing.
   5. Surfaces receiving field welded steel studs.

PART 3 EXECUTION

3.01 ERECTION

A. Erect structural steel in compliance with AISC "Code of Standard Practice for Steel Buildings and Bridges".

B. Allow for erection loads, and provide sufficient temporary bracing to maintain structure in safe condition, plumb, and in true alignment until completion of erection and installation of permanent bracing.

C. Set structural frames accurately to lines and elevations indicated. Align and adjust various members forming part of complete frame or structure before permanently fastening. Clean bearing surfaces and other surfaces which will be in permanent contact before assembly. Perform necessary adjustments to compensate for discrepancies in elevations and alignment.
   1. Level and plumb individual members of structure within specified AISC tolerances.
   2. Splice members only where indicated and accepted on shop drawings.
   3. Do not enlarge unfair holes in members by burning or by use of drift pins. Ream holes that must be enlarged to admit bolts.
   4. Gas Cutting: Do not use gas cutting torches in field for correcting fabrication errors in structural framing unless acceptable to Architect/ Engineer. Finish gas-cut sections equal to a sheared appearance when permitted.

D. Do not field cut or alter structural members without approval of Architect.

3.02 TOUCH-UP PAINTING

A. After erection, clean and remove rust, dirt and other foreign matter from exposed surfaces of field connections, unpainted areas adjacent to field connections, and damaged areas in shop primer. Touch-up paint with primer to the same standards as required for the shop coat and paint using identical primer.

3.03 TOLERANCES

A. Level and plumb individual members of structure within specified AISC tolerances.

3.04 FIELD QUALITY CONTROL

A. An independent testing agency will perform field quality control tests, as specified in Section 01 4000.

B. High-Strength Bolts: Provide testing and verification of field-bolted connections in accordance with AISC "Specification for Structural Joints Using ASTM A325 or A490 Bolts", testing 100 percent of bolts at each connection.
   1. Load indicating washers or snap off bolts shall be 100 percent visually inspected.

C. Welded Connections: Visually inspect all field-welded connections.

D. Re-inspection shall be required for all failed tests.

END OF SECTION

SECTION 05 2100
STEEL JOIST FRAMING

PART 1 GENERAL

1.01 SECTION INCLUDES

A. Open web steel joists and joist girders , with bridging, attached seats and anchors.

1.02 RELATED REQUIREMENTS

A. Section 01 4000 - Quality Requirements: Testing and inspection.

B. Section 05 1200 - Structural Steel Framing: Superstructure framing.

C. Section 05 3100 - Steel Decking: Support framing for openings less than 18 inches in decking.

D. Section 05 5000 - Metal Fabrications: Non-framing steel fabrications attached to joists.

1.03 REFERENCE STANDARDS

A. ASTM A153/A153M - Standard Specification for Zinc Coating (Hot-Dip) on Iron and Steel Hardware; 2009.

B. ASTM A307 - Standard Specification for Carbon Steel Bolts, Studs, and Threaded Rod 60 000 PSI Tensile Strength; 2014.

C. AWS B2.1/B2.1M - Specification for Welding Procedure and Performance Qualification; 2014.

D. AWS D1.1/D1.1M - Structural Welding Code - Steel; 2015.

E. SJI (SPEC) - Catalog of Standard Specifications Load Tables and Weight Tables for Steel Joists and Joist Girders; 2011.

F. SJI Technical Digest No. 9 - Handling and Erection of Steel Joists and Joist Girders; 2008.

G. SSPC-Paint 15 - Steel Joist Shop Primer/Metal Building Primer; 1999 (Ed. 2004).

H. SSPC-SP 2 - Hand Tool Cleaning; 1982 (Ed. 2004).

1.04 SUBMITTALS

A. See Section 01 3000 - Administrative Requirements, for submittal procedures.

B. Shop Drawings: Indicate standard designations, joist coding, configurations, sizes, spacings, cambers, locations of joists, joist leg extensions, bridging, connections, and attachments.

C. Welders' Certificates: Submit manufacturer's certificates, certifying welders employed on the Work, verifying AWS qualification within the previous 12 months.

1.05 QUALITY ASSURANCE

A. Design connections not detailed on drawings under direct supervision of a Professional Structural Engineer experienced in design of this work and licensed in the State in which the Project is located.

B. Provide joists fabricated in compliance with the following, and as herein specified.
   1. Steel Joist Institute (SJI) "Standard Specifications for Open Web Steel Joists, K Series"
   2. Steel Joist Institute (SJI) "Standard Specifications for Open Web Steel Joists, LH Series"
   3. Steel Joist Institute (SJI) "Standard Specifications for Open Web Steel Joists, DLH Series"
   4. Steel Joist Institute (SJI) "Standard Specifications for Joist Girders"

C. Inspect joists and joist girders in accordance with applicable SJI specifications.

D. Perform Work, including that for headers and other supplementary framing, in accordance with SJI Standard Specifications Load Tables and SJI Technical Digest No.9.

1.06 DELIVERY, STORAGE, AND HANDLING

A. Transport, handle, store, and protect products to SJI requirements. Handle and store joists in a manner to avoid deforming members and to avoid excessive stresses.

B. Store steel joists at project site above ground on platforms or skids. Do not place in contact with earth or concrete slabs.

PART 2 PRODUCTS

2.01 MATERIALS

A. Steel: Comply with applicable SJI Specifications.

B. Unfinished Threaded Fasteners: ASTM A307, Grade A, regular hexagon type, low carbon steel.

C. High-Strength Threaded Fasteners: ASTM A325 or A490 heavy hexagon structural bolts with nuts and hardened washers.

D. Steel Prime Paint: Paint shall be manufacturers standard grey primer conforming to SJI "Standard Specifications", for the shop painting of steel joists

E. Anchor Bolts, Nuts and Washers: ASTM A 307, hot-dip galvanized per ASTM A 153/A 153M, Class C.

F. Welding Materials: AWS D1.1/D1.1M; type required for materials being welded.

G. Shop and Touch-Up Primer: SSPC-Paint 15, Type 1, gray oxide, complying with VOC limitations of authorities having jurisdiction.

2.02 FABRICATION

A. General: Fabricate steel joists and joist girders in accordance with applicable SJI Specifications.

B. Extended Ends: Provide extended ends on joists where shown, complying with manufacturer's standards and requirements of applicable SJI Specifications.

C. Bridging: Provide horizontal or diagonal type bridging for joists, complying with applicable SJI Specifications.
   1. Provide bridging anchors for ends of bridging lines terminating at walls or beams.
   2. Coordinate location of bridging with ESFR sprinkler heads to avoid obstruction conflicts.

D. Header Units: Header units to support tail joists at openings in floor and roof systems shall be provided in Section 05 1200 unless otherwise indicated.

2.03 FINISH

A. Shop prime joists as specified.

B. Prepare surfaces to be finished in accordance with SSPC-SP 2.

C. Apply one shop coat of steel prime paint to joists, joist girders, and accessories by spray, dipping, or other methods to provide a continuous dry paint film thickness of not less than 1.0 mil.

PART 3 EXECUTION

3.01 EXAMINATION

A. Verify existing conditions prior to beginning work.

3.02 ERECTION

A. Erect joists with correct bearing on supports.

B. Allow for erection loads. Provide sufficient temporary bracing to maintain framing safe, plumb, and in true alignment.

C. After joist alignment and installation of framing, field weld joist seats to steel bearing surfaces.

D. Coordinate placement of anchors in concrete construction for securing bearing plates and angles.

E. Position and field weld joist chord extensions and wall attachments.

F. Do not permit erection of decking until joists are braced, bridged, and secured or until completion of erection and installation of permanent bridging and bracing.

G. Do not field cut or alter structural members without approval of joist manufacturer.

H. After erection, clean and remove rust, dirt an dother foreign matter from exposed surfaces including field connections. Prime welds, damaged shop primer, and surfaces not shop primed . Use same type of paints as used for shop painting.

3.03 TOLERANCES

A. Maximum Variation From Plumb: 1/4 inch.

B. Maximum Offset From True Alignment: 1/4 inch.

3.04 FIELD QUALITY CONTROL

A. An independent testing agency will perform field quality control tests, as specified in Section 01 4000 - Quality Requirements.

B. High-Strength Bolts: Provide testing and verification of field-bolted connections in accordance with AISC "Specification for Structural Joints Using ASTM A325 or A490 Bolts", testing 100 percent of all bolts.

C. Welded Connections: Visually inspect all field-welded connections.

D. Re-inspection shall be required for all failed tests.

END OF SECTION

SECTION 05 3100
STEEL DECKING

PART 1 GENERAL

1.01 SECTION INCLUDES

A. Roof deck.

B. Metal form deck.

C. Supplementary framing for openings up to and including 18 inches.

D. Bearing plates and angles.

1.02 RELATED REQUIREMENTS

A. Section 05 5000 - Metal Fabrications:

1.03 REFERENCE STANDARDS

A. ASTM A36/A36M - Standard Specification for Carbon Structural Steel; 2014.

B. ASTM A123/A123M - Standard Specification for Zinc (Hot-Dip Galvanized) Coatings on Iron and Steel Products; 2015.

C. ASTM A653/A653M - Standard Specification for Steel Sheet, Zinc-Coated (Galvanized) or Zinc-Iron Alloy-Coated (Galvannealed) by the Hot-Dip Process; 2015.

D. ASTM A1008/A1008M - Standard Specification for Steel, Sheet, Cold-Rolled, Carbon, Structural, High-Strength Low-Alloy, High-Strength Low-Alloy with Improved Formability, Solution Hardened, and Bake Hardenable; 2015.

E. AWS D1.1/D1.1M - Structural Welding Code - Steel; 2015.

F. FM P7825 - Approval Guide; Factory Mutual Research Corporation; current edition.

G. SDI (DM) - Publication No.30, Design Manual for Composite Decks, Form Decks, and Roof Decks; 2007.

1.04 SUBMITTALS

A. See Section 01 3000 - Administrative Requirements, for submittals procedures.

B. Shop Drawings: Indicate deck plan, support locations, projections, openings, reinforcement, pertinent details, and accessories.

C. Product Data: Provide deck profile characteristics, dimensions, structural properties, and finishes.

D. Provide metal roof deck units which have been evaluated by Factory Mutual System and are listed in "Factory Mutual Approval Guide" for Class 1 fire rating.

E. Welders Certificates: Certify welders employed on the Work, verifying AWS qualification within the previous 12 months.

1.05 DELIVERY, STORAGE, AND HANDLING

A. Store deck on dry wood sleepers; slope for positive drainage.

B. Protect steel deck from corrosion, deformation, and other damage during delivery, storage, and handling. Protect with a waterproof covering and ventilate to avoid condensation.

PART 2 PRODUCTS

2.01 STEEL DECK

A. Roof Deck: Non-composite type, fluted steel sheet:
   1. Ungalvanized Steel Sheet: ASTM A1008/A1008M, Designation SS, Grade 80/550.
   2. Primer: SSPC-Paint 15, Type I, white primer paint over cleaned and phosphatized substrate. Comply with VOC limitations of authorities having jurisdiction.
   3. Minimum Metal Thickness, Excluding Finish: 22 gage or as indicated on the drawings.
   4. Nominal Height: 1-1/2 inch.

5. Profile: Fluted, Type B wide rib.

B. Metal Form Deck: Corrugated sheet steel:
   1. Galvanized Steel Sheet: ASTM A653/A653M, Structural Steel (SS) Grade 33/230, with G90/Z275 galvanized coating.
   2. Minimum Metal Thickness, Excluding Finish: 26 gage or as indicated on the drawings.

2.02 ACCESSORY MATERIALS

A. Bearing Plates and Angles: ASTM A36/A36M steel.

B. Welding Materials: AWS D1.1/D1.1M.

C. Weld Washers: Mild steel, uncoated, 3/4 inch outside diameter, 1/8 inch thick.

2.03 FABRICATED DECK ACCESSORIES

A. Sheet Metal Deck Accessories: Metal closure strips, wet concrete stops, and cover plates, 22 gage, 0.0299 inch thick sheet steel; of profile and size as indicated; finished same as deck.

B. Roof Sump Pans: Formed sheet steel, 14 gage, 0.0747 inch minimum thickness, flat bottom, sloped sides, recessed 1-1/2 inches below roof deck surface, bearing flange 3 inches wide, sealed watertight.

PART 3 EXECUTION

3.01 INSTALLATION

A. Erect metal deck in accordance with SDI Design Manual and approved shop drawings. Align and level.

B. Placing of Decking:
   1. Position decking on supporting steel framework and adjust to final position with ends bearing on supporting members and aligned end-to-end before being permanently fastened. Roof decking shall be continuous over a minimum of three spans.
   2. Lap ends not less than 4 inches.
   3. Do not stretch or contract side lap interlocks.
   4. Place decking flat and square and secure to adjacent framing without warp or deflection.
   5. Install deck with corrugations running perpendicular to supports. Lay only as much deck as can be welded during same work period.

C. Fastening Decking - Welding:
   1. Secure decking to supporting members with 5/8 inch minimum diameter fusion welds at ends and at intermediate supports. See structural drawings for spacing requirements. Welds shall be free of sharp points or edges. Welding washers are required for deck thickness less than 0.028 inches thick.
   2. Welding shall conform to AWS D1.3.
   3. Lock side laps between deck supports. Side laps shall be made with self-tapping #10 sheet metal screws.

D. Cutting and Fitting:
   1. Cut and fit decking and accessories around projections through decking.
   2. Make cuts neat, square and trim.
   3. Cut openings in deck true to dimensions using metal saws, drills or cutting torches.
   4. Reinforce cuts in decking as indicated on structural drawings.

E. Allow no decking to be used for storage or working platforms until permanently secured in position. Limit loading after securing in place to 20 psf.

F. No decking showing signs of rust shall be installed.

G. At deck openings from 6 inches to 18 inches in size, provide 2 by 2 by 1/4 inch steel angle reinforcement. Place angles perpendicular to flutes; extend minimum two flutes beyond each side of opening and fusion weld to deck at each flute.

H. Where deck (other than cellular deck electrical raceway) changes direction, install 6 inch minimum wide sheet steel cover plates, of same thickness as deck. Fusion weld 12 inches on center maximum.

I. At openings between deck and walls, columns, and openings, provide sheet steel closures and angle flashings to close openings.

J. Position roof drain pans with flange bearing on top surface of deck. Fusion weld at each deck flute.

K. Immediately after welding deck and other metal components in position, coat welds, burned areas, and damaged surface coating, with touch-up primer.

L. After erection, clean and remove rust, dirt and other foreign matter from exposed surfaces including field connections. Touch-up paint with primer to the same standards as required for the shop coat and paint using identical primer.

3.02 FIELD QUALITY CONTROL

A. An independent testing agency will perform field quality control tests, as specified in Section 01 4000.

B. Welded Connections: Visually inspect all field-welded connections.

END OF SECTION

SECTION 05 4000
COLD-FORMED METAL FRAMING

PART 1 GENERAL

1.01 SECTION INCLUDES

A. Formed steel stud exterior wall, interior wall, and miscellaneous framing.

B. Formed steel joist framing and bridging.

1.02 RELATED REQUIREMENTS

A. Section 09 2216 - Non-Structural Metal Framing.

1.03 REFERENCE STANDARDS

A. AISI S100-12 - North American Specification for the Design of Cold-Formed Steel Structural Members; American Iron and Steel Institute; 2012.

B. AISI SG02-1 - North American Specification for the Design of Cold-Formed Steel Structural Members; American Iron and Steel Institute; 2001 with 2004 supplement. (replaced SG-971)

C. ASTM A153/A153M - Standard Specification for Zinc Coating (Hot-Dip) on Iron and Steel Hardware; 2009.

D. ASTM A653/A653M - Standard Specification for Steel Sheet, Zinc-Coated (Galvanized) or Zinc-Iron Alloy-Coated (Galvannealed) by the Hot-Dip Process; 2015.

E. ASTM 1003 - Standard Specification for Steel Sheet, Carbon, Metallic and Nonmetallic-Coated for Cold-Formed Framing Members.

F. ASTM C955 - Standard Specification for Load-Bearing (Transverse and Axial) Steel Studs, Runners (Tracks), and Bracing or Bridging for Screw Application of Gypsum Panel Products and Metal Plaster Bases; 2011c.

G. ASTM C1007 - Standard Specification for Installation of Load Bearing (Transverse and Axial) Steel Studs and Related Accessories; 2011a.

H. AWS D1.3/D1.3M - Structural Welding Code - Sheet Steel; 2008.

I. SSPC-Paint 20 - Zinc-Rich Primers (Type I, "Inorganic," and Type II, "Organic"); 2002 (Ed. 2004).

1.04 ADMINISTRATIVE REQUIREMENTS

A. Coordinate with work of other sections that is to be installed in or adjacent to the metal framing system, including but not limited to structural anchors, cladding anchors, utilities, insulation, and firestopping.

1.05 SUBMITTALS

A. See Section 01 3000 - Administrative Requirements, for submittal procedures.

B. Product Data: Provide data on standard framing members; describe materials and finish, product criteria, limitations and technical data sheets.

C. Shop Drawings: Indicate information on shop drawings as follows:
   1. Submit shop drawings prepared by the manufacturer showing plans, sections, elevations, layouts, profiles and product component locations, including anchorage, bracing, fasteners, accessories and finishes.
      a. Show connection details with screw types and locations, weld lengths and locations, and other fastener requirements.
      b. Where prefabricated or prefinished panels are to be provided, depict panel configurations, dimensions and locations.

D. Delegated Design Submittals: Submit structural calculations as follows:
   1. Structural calculations prepared by manufacturer for approval. Submittal shall be sealed by a professional engineer registered in the State in which the Project is located.
   2. Description of design criteria.

3. Engineering analysis depicting stress and deflection (stiffness) requirements for each framing application.
4. Selection of framing components, accessories and welded connection requirements.
5. Verification of attachments to structure and adjacent framing components.

E. Manufacturer's Installation Instructions: Indicate special procedures, conditions requiring special attention.

PART 2 PRODUCTS

2.01 MANUFACTURERS

A. Metal Framing:
1. Marino|WARE: www.marinoware.com.
2. Substitutions: See Section 01 6000 - Product Requirements.

B. Framing Connectors and Accessories:

2.02 FRAMING SYSTEM

A. Provide primary and secondary framing members, bridging, bracing, plates, gussets, clips, fittings, reinforcement, and fastenings as required to provide a complete framing system.

B. Design Criteria: Provide completed framing system having the following characteristics:
1. Design: Calculate structural characteristics of cold-formed steel framing members according to AISI S100-12.
2. Structural Performance: Design, engineer, fabricate, and erect to withstand specified design loads for project conditions within required limits.
3. Design Loads: In accordance with applicable codes.
4. Live load deflection meeting the following, unless otherwise indicated:
5. Able to tolerate movement of components without damage, failure of joint seals, undue stress on fasteners, or other detrimental effects when subject to seasonal or cyclic day/night temperature ranges.
6. Able to accommodate construction tolerances, deflection of building structural members, and clearances of intended openings.

2.03 FRAMING MATERIALS

A. Studs and Track: ASTM C955; studs formed to channel, "C" shape with punched web; U-shaped track in matching nominal width and compatible height.
1. Gage and Depth: As required to meet specified performance levels.
2. Galvanized in accordance with ASTM A653/A653M, G60/Z180 coating.

B. Joists and Purlins: Fabricated from ASTM A653/A653M steel sheet, with G60/Z180 hot dipped galvanized coating.
1. Gage and Depth: As required to meet specified performance levels.

C. Framing Connectors: Factory-made, formed steel sheet.
1. Material: ASTM A653/A653M SS Grade 33 (minimum),, for 33 and 43 mill members, Grade 50 for 54 mill or heavier with G60/Z180 hot dipped galvanized coating for base metal thickness less than 10 gage, 0.1345 inch, and factory punched holes and slots.
2. Structural Performance: Maintain load and movement capacity required by applicable code, when evaluated in accordance with AISI S100-12.
3. Movement Connections: Provide mechanical anchorage devices that accommodate movement using slotted holes, shouldered screws or screws and anti-friction or stepped bushings, while maintaining structural performance of framing. Provide movement connections where indicated on drawings.
a. Where continuous studs bypass elevated floor slab, connect stud to slab in manner allowing vertical and horizontal movement of slab without affecting studs; allow for minimum movement of 1/2 inch.
b. Where top of stud wall terminates below structural floor or roof, connect studs to structure in manner allowing vertical and horizontal movement of slab without affecting studs; allow for minimum movement of 1/2 inch.

c. Provide top track with long leg track and head of wall movement connectors; minimum track length of 10 feet.

4. Fixed Connections: Provide non-movement connections for tie-down to foundation, floor-to-floor tie-down, roof-to-wall tie-down, joist hangers, gusset plates, and stiffeners.

2.04 ACCESSORIES

A. Bracing, Furring, Bridging: Formed sheet steel, thickness determined for conditions encountered; finish to match framing components.

B. Plates, Gussets, Clips: Formed Sheet Steel, thickness determined for conditions encountered; finish to match framing components.

C. Touch-Up Primer for Galvanized Surfaces: SSPC-Paint 20, Type I - Inorganic, complying with VOC limitations of authorities having jurisdiction.

2.05 FASTENERS

A. Self-Drilling, Self-Tapping Screws, Bolts, Nuts and Washers: Hot dip galvanized per ASTM A153/A153M.

B. Anchorage Devices: Powder actuated, Drilled expansion bolts, and Screws with sleeves.

PART 3 EXECUTION

3.01 INSTALLATION OF STUDS

A. Install components in accordance with manufacturers' instructions and ASTM C1007 requirements.

B. Place studs at 16 inches on center, or as indicated on shop drawings; not more than 2 inches from abutting walls and at each side of openings. Connect studs to tracks using clip and tie method.

C. Construct corners using minimum of three studs. Install double studs at wall openings, door and window jambs.

D. Install load bearing studs full length in one piece. Splicing of studs is not permitted.

E. Install load bearing studs, brace, and reinforce to develop full strength and achieve design requirements.

F. Coordinate placement of insulation in multiple stud spaces made inaccessible after erection.

G. Install intermediate studs above and below openings to align with wall stud spacing.

H. Provide deflection allowance in stud track, directly below horizontal building framing at non-load bearing framing.

I. Attach cross studs to studs for attachment of fixtures anchored to walls.

J. Install framing between studs for attachment of mechanical and electrical items, and to prevent stud rotation.

3.02 INSTALLATION OF JOISTS AND PURLINS

A. Install framing components in accordance with manufacturer's instructions.

B. Make provisions for erection stresses. Provide temporary alignment and bracing.

C. Place joists at 16 inches on center; not more than 2 inches from abutting walls. Connect joists to supports using fastener method.

D. Set floor and ceiling joists parallel and level, with lateral bracing and bridging.

E. Locate joist end bearing directly over load bearing studs or provide load distributing member to top of stud track.

END OF SECTION

SECTION 05 5000
METAL FABRICATIONS

PART 1 GENERAL

1.01 SECTION INCLUDES

A. Shop fabricated steel items, including:
   1. Steel ladder and safety cage.
   2. Barrier rails.
   3. Bollards.
   4. Miscellaneous steel framing and supports.
   5. Roof opening framing.
   6. Concrete edge confinement angles.
   7. Downspout guards.
   8. Cantilevered structural steel support for dock canopies.
   9. Concrete stair tread nosings.

1.02 RELATED REQUIREMENTS

A. Section 03 3000 - Cast-in-Place Concrete: Placement of metal fabrications in concrete.

B. Section 05 1200 - Structural Steel Framing: Structural steel column anchor bolts.

C. Section 05 2100 - Steel Joist Framing: Structural joist bearing plates, including anchorage.

D. Section 05 3100 - Steel Decking: Bearing plates for metal deck bearing, including anchorage.

E. Section 05 5100 - Metal Stairs.

F. Section 09 9000 - Painting and Coating.

1.03 REFERENCE STANDARDS

A. ANSI A14.3 - American National Standard for Ladders -- Fixed -- Safety Requirements; 2008.

B. ASTM A36/A36M - Standard Specification for Carbon Structural Steel; 2014.

C. ASTM A53/A53M - Standard Specification for Pipe, Steel, Black and Hot-Dipped, Zinc-Coated, Welded and Seamless; 2012.

D. ASTM A123/A123M - Standard Specification for Zinc (Hot-Dip Galvanized) Coatings on Iron and Steel Products; 2015.

E. ASTM A153/A153M - Standard Specification for Zinc Coating (Hot-Dip) on Iron and Steel Hardware; 2009.

F. ASTM A283/A283M - Standard Specification for Low and Intermediate Tensile Strength Carbon Steel Plates; 2013.

G. ASTM A325 - Standard Specification for Structural Bolts, Steel, Heat Treated, 120/105 ksi Minimum Tensile Strength; 2014.

H. ASTM A325M - Standard Specification for Structural Bolts, Steel, Heat Treated 830 MPa Minimum Tensile Strength (Metric); 2014.

I. ASTM A501/A501M - Standard Specification for Hot-Formed Welded and Seamless Carbon Steel Structural Tubing; 2014.

J. AWS A2.4 - Standard Symbols for Welding, Brazing, and Nondestructive Examination; 2012.

K. AWS D1.1/D1.1M - Structural Welding Code - Steel; 2015.

L. SSPC-Paint 15 - Steel Joist Shop Primer/Metal Building Primer; 1999 (Ed. 2004).

M. SSPC-Paint 20 - Zinc-Rich Primers (Type I, "Inorganic," and Type II, "Organic"); 2002 (Ed. 2004).

1.04 SUBMITTALS

A. Shop Drawings: Indicate profiles, sizes, connection attachments, reinforcing, anchorage, size and type of fasteners, and accessories. Include erection drawings, elevations, and details where applicable.
   1. Indicate welded connections using standard AWS A2.4 welding symbols. Indicate net weld lengths.

B. Welders' Certificates: Submit certification for welders employed on the project, verifying AWS qualification within the previous 12 months.

1.05 QUALITY ASSURANCE

A. Fabricator Qualifications: Firm experienced in successfully producing metal fabrications similar to that indicated for this Project, with sufficient production capacity to produce required units without causing delay in the Work.

B. Qualify welding processes and welding operators in accordance with AWS D1.1 "Structural Welding Code - Steel," D1.3 "Structural Welding Code - Sheet Steel".

1.06 SEQUENCING AND SCHEDULING

A. Shop Assembly: Preassemble metal fabrications in shop to greatest extent possible to minimize field splicing and assembly. Disassemble units only as necessary for shipping and handling limitations. Clearly mark fabricated units for reassembly and coordinated installation.

B. Schedule production and site delivery of metal fabrications so as to avoid delay to other work in which such fabrication are incorporated, and to avoid encumbering site with stored materials.

PART 2 PRODUCTS

2.01 MATERIALS - STEEL

A. Steel Sections: ASTM A36/A36M.

B. Steel Tubing: ASTM A501/A501M hot-formed structural tubing.

C. Plates: ASTM A283.

D. Pipe: ASTM A53/A53M, Grade B Schedule 40, black finish.

E. Fasteners: Provide zinc coated fasteners for exterior use or where built into exterior walls. Select fasteners for the type, grade, and class required..

F. Bolts, Nuts, and Washers: ASTM A325 (ASTM A325M), Type 1, galvanized to ASTM A153/A153M where connecting galvanized components.

G. Welding Materials: AWS D1.1/D1.1M; type required for materials being welded.

H. Shop and Touch-Up Primer: SSPC-Paint 15, complying with VOC limitations of authorities having jurisdiction.

I. Touch-Up Primer for Galvanized Surfaces: SSPC-Paint 20, Type I - Inorganic, complying with VOC limitations of authorities having jurisdiction.

2.02 FABRICATION

A. Form metal fabrications from materials of size, thickness, and shapes indicated but not less than that needed to comply with performance requirements indicated. Work to dimensions indicated or accepted on shop drawings, using proven details of fabrication and support. Use type of materials indicated or specified for various components of each metal fabrication.

B. Form exposed work true to line and level with accurate angles and surfaces and straight sharp edges.

C. Shear and punch metals cleanly and accurately. Remove burrs.

D. Ease exposed edges to a radius of approximately 1/32 inch, unless otherwise indicated. Form bent-metal corners to smallest radius possible without causing grain separation or otherwise impairing work.

E. Remove sharp or rough areas on exposed traffic surfaces.

F. Weld corners and seams continuously to comply with AWS recommendations.

G. Form exposed connections with hairline joints, flush and smooth, using concealed fasteners wherever possible. Use exposed fasteners of type indicated or, if not indicated, Phillips flat-head (countersunk) screws or bolts. Locate joints where least conspicuous.

H. Provide for anchorage of type indicated; coordinate with supporting structure. Fabricate and space anchoring devices to provide adequate support for intended use.

I. Clearly mark shop assembled and disassembled units for reassembly and coordinated installation.

J. Cut, reinforce, drill and tap miscellaneous metal work as indicated to receive finish hardware, screws, and similar items.

K. Fabricate joints that will be exposed to weather in a manner to exclude water, or provide weep holes where water may accumulate.

L. Supply components required for anchorage of fabrications. Fabricate anchors and related components of same material and finish as fabrication, except where specifically noted otherwise.

2.03 FABRICATED ITEMS

A. Ladders: Steel; in compliance with ANSI A14.3; with mounting brackets and attachments; galvanized finish. Unless otherwise shown, provide the following:
   1. Side Rails: 3/8 x 2-1/2 inches, flat bar members with eased edges, spaced at 18 inches.
   2. Rungs: 3/4 inch diameter deformed solid round bar spaced 12 inches on center.
   3. Fit rungs in centerline of side rails, plug weld and grind smooth on outer rail faces.
   4. Support each ladder at top and bottom and at intermediate points spaced not more than 5 feet o.c. Use welded or bolted steel brackets, designed for adequate support and anchorage and to hold the ladder clear of the wall surface with a minimum of 7 inch clearance from wall to centerline of rungs.
   5. Except at roof hatch, extend rails 42 inches above top rung and return rails to wall or structure unless other secure handholds are provided. If the adjacent structure does not extend above the top rung, goose-neck the extended rails back to the structure to provide secure ladder access.
   6. Provide OSHA approved safety cage where shown.

B. Barrier Rails: Schedule 40 steel pipe and steel channel sections, as detailed; prime paint finish.

C. Bollards: Schedule 40 steel pipe, concrete filled, crowned cap, as detailed; galvanized finish at exterior, prime paint finish for interior.

D. Ledge Angles, Shelf Angles, Channels, and Plates Not Attached to Structural Framing: For support of metal decking; prime paint finish.

E. Roof Opening Framing: As detailed; prime paint finish.
   1. Unless otherwise indicated, provide frame for roof openings 12 x 12 inches or larger in size. Infill frame with 1/2 inch diameter steel bars spaced not over 12 inches on center both ways, unless otherwise indicated.

F. Concrete Edge Confinement Angles: Steel angles; prime painted finish.
   1. Provide loose structural steel angles with integral anchor bolts for confinement and protection of exposed concrete edges as shown. Weld anchor bolts to angles with equivalent of 3/16 inch full perimeter fillet welds and space as shown, but not closer than 4 inches from ends and corners.
   2. Drill and tap angle legs for 1/4 inch by 20 machine screw connection to concrete forms. Provide anchorages at not greater than 48 inches o.c.
   3. Miter cut angle legs to form corners and multiple edge intersections as shown.

G. Downspout Guards: As detailed; galvanized finish.

H. Cantilevered Dock Canopy Support: As detailed; prime painted finish.

I. Stair Tread Nosing: Stair nosings shall be equal to type No.BF311D as manufactured by American Safety Tread Company, Helena, Alabama 35080.Telephone 1-800-245-4881. The base shall consist of heat treated extruded aluminum alloy 6063-T6. The abrasive filler shall consist of a mixture of aluminum oxide and silicon carbide granules in an epoxy matrix. Nosings shall terminate not more than 3" from ends of steps for poured concrete stairs; for concrete filled steel pan stairs, nosings shall be full length of steps less 1/8" clearance. Color shall be as selected by the Architect.

J. Decorative Steel Pipe Entry Feature: As detailed, prime painted finish. Provide end closures to all pipes.
   1. Primer paint shall be Sherwin Williams B58 Series, Steel Spec Epoxy Primer.

2.04 FINISHES - STEEL

A. Prime paint all steel items except where indicated otherwise.
   1. Exceptions: Galvanize items to be embedded in concrete or masonry.
   2. Exceptions: Do not prime surfaces in direct contact with concrete, where field welding is required, and items to be covered with sprayed fireproofing.

B. Clean surfaces of rust, scale, grease, and foreign matter prior to finishing.

C. Prime Painting: One coat, gray metal primer, or approved equal, applied to a minimum dry film thickness of 2.0 mils.

D. Galvanizing of Structural Steel Members: Galvanize after fabrication to ASTM A123/A123M requirements.

2.05 FABRICATION TOLERANCES

A. Squareness: 1/8 inch maximum difference in diagonal measurements.

B. Maximum Offset Between Faces: 1/16 inch.

C. Maximum Misalignment of Adjacent Members: 1/16 inch.

D. Maximum Bow: 1/8 inch in 48 inches.

E. Maximum Deviation From Plane: 1/16 inch in 48 inches.

PART 3 EXECUTION

3.01 PREPARATION

A. Clean and strip primed steel items to bare metal where site welding is required.

B. Supply setting templates to the appropriate entities for steel items required to be cast into concrete or embedded in masonry.

3.02 INSTALLATION

A. Install items plumb and level, accurately fitted, free from distortion or defects.

B. Provide for erection loads, and for sufficient temporary bracing to maintain true alignment until completion of erection and installation of permanent attachments.

C. Field weld components as indicated on drawings.

D. Perform field welding in accordance with AWS D1.1/D1.1M.

E. Obtain approval prior to site cutting or making adjustments not scheduled.

F. After erection, prime welds, abrasions, and surfaces not shop primed or galvanized, except surfaces to be in contact with concrete.

3.03 INSTALLATION OF BOLLARDS AND BARRIER RAILS

A. Temporarily support bollards and barrier posts plumb in each direction and cast integrally with monolithic footings.

B. Fill bollards and barrier posts with 3,000 psi min. 28 day compressive strength concrete as specified under Section 03 3000, "Cast-in-Place Concrete". Form top with compacted smooth and convex surface to shed water.

END OF SECTION

SECTION 05 5100
METAL STAIRS

PART 1 GENERAL

1.01 SECTION INCLUDES

A. Stairs with grating treads.

B. Structural steel stair framing and supports.

C. Handrails and guards.

1.02 RELATED REQUIREMENTS

A. Section 05 5000 - Metal Fabrications.

1.03 REFERENCE STANDARDS

A. ASTM A36/A36M - Standard Specification for Carbon Structural Steel; 2014.

B. ASTM A53/A53M - Standard Specification for Pipe, Steel, Black and Hot-Dipped, Zinc-Coated, Welded and Seamless; 2012.

C. ASTM A500/A500M - Standard Specification for Cold-Formed Welded and Seamless Carbon Steel Structural Tubing in Rounds and Shapes; 2013.

D. ASTM A501/A501M - Standard Specification for Hot-Formed Welded and Seamless Carbon Steel Structural Tubing; 2014.

E. AWS D1.1/D1.1M - Structural Welding Code - Steel; 2015.

F. NAAMM AMP 510 - Metal Stairs Manual; 1992, Fifth Edition.

G. SSPC-SP 2 - Hand Tool Cleaning; 1982 (Ed. 2004).

1.04 DESIGN REQUIREMENTS

A. Design and fabricate stair assembly to support a uniform live load of 100 lb/sq ft and a concentrated load of 300 lb on an area of 4 square inches, with deflection of stringer or landing framing not to exceed 1/180 of span.

B. Engineer, fabricate, and install handrails and railing systems to withstand the following structural loads:

1. Top Rail of Guardrail: Uniform load of 50 pounds per linear foot applied in any direction at the top, and a concentrated load of 200 pounds applied in any direction at any point along the top. The concentrated and uniform loads need not be assumed to act concurrently.
2. Infill Area of Guardrail: Horizontal load of 50 pounds on an area not to exceed 1 square foot, including openings and space between rails. This load need not be assumed to act concurrently with loads on top rails of railing system in determining stress on guard.

1.05 SUBMITTALS

A. See Section 01 3000 - Administrative Requirements, for submittal procedures.

B. Shop Drawings: Indicate profiles, sizes, connection attachments, reinforcing, anchorage, size and type of fasteners, and accessories.

1. Include the design engineer's stamp or seal on each sheet of shop drawings.

C. Welders' Certificates.

1.06 QUALITY ASSURANCE

A. Fabricator Qualifications: Firm experienced in producing steel stairs similar to those indicated for this Project with a record of successful in service performance.

B. Structural Designer Qualifications: Professional Structural Engineer experienced in design of this work and licensed in the State in which the Project is located, or personnel under direct supervision of such an engineer.

C. Welder Qualifications: Show certification of welders employed on the Work, verifying AWS qualification within the previous 12 months.

PART 2 PRODUCTS

2.01 METAL STAIRS - GENERAL

A. Metal Stairs: Provide stairs of the design specified, complete with landing platforms, vertical and horizontal supports, railings, and guards, fabricated accurately for anchorage to each other and to building structure.
   1. Regulatory Requirements: Provide stairs and railings complying with the most stringent requirements of local, state, and federal regulations; where requirements of the contract documents exceed those of regulations, comply with the contract documents.
   2. Structural Design: Provide complete stair and railing assemblies complying with the applicable local code.

B. Metal Jointing and Finish Quality Levels:
   1. Commercial: Exposed joints as inconspicuous as possible, whether welded or mechanical; underside of stair not covered by soffit IS considered exposed to view.
      a. Welded Joints: Intermittently welded on back side, filled with body putty, and sanded smooth and flush.
      b. Welds Exposed to View: Ground smooth and flush.
      c. Mechanical Joints: Butted tight, flush, and hairline.
      d. Bolts Exposed to View: Countersunk flat or oval head bolts; no exposed nuts.
      e. Exposed Edges and Corners: Eased to small uniform radius.
      f. Metal Surfaces to be Painted: Sanded or ground smooth, suitable for satin or matte finish.

2.02 METAL STAIRS WITH GRATING TREADS

A. Jointing and Finish Quality Level: Commercial, as defined above.

B. Risers: Closed.

C. Treads: Grip Strut Safety Grating, regular duty, with slip resistant serrated surface.
   1. Galvanized Steel - hot-dip galvanized before fabrication, ASTM A525 (G-90) standard.
   2. Height: 1-1/2 inches.
   3. Gage: Minimum 12 gage or as required for span.

D. Stringers: Rolled steel channels.
   1. Stringer Depth: 12 inches.
   2. End Closure: Sheet steel of same thickness as risers welded across ends.

E. Landings: Same construction as treads, supported and reinforced as required to achieve design load capacity.

F. Railings: Steel pipe railings.

G. Finish: Galvanized after fabrication.

2.03 HANDRAILS AND GUARDS

A. Wall-Mounted Handrails: Round pipe rails unless otherwise indicated.
   1. Nominal Diameter: 1-1/4 inch.

B. Guards:
   1. Top Rails: Round pipe or tube rails unless otherwise indicated.
      a. Nominal Diameter: 2 inch.
   2. Infill at Pipe Railings: Pipe or tube rails sloped parallel to stair.
      a. Pipe Nominal Diameter: 2 inch.
      b. Material: Steel pipe or tube, round.
      c. Jointing: Welded and ground smooth and flush.
   3. End and Intermediate Posts: Same material and size as top rails.
      a. Horizontal Spacing: As indicated on drawings.
      b. Mounting: Welded to top surface of stringer.

C. Fabrication:

1. Fabricate pipe handrails and railing systems to comply with requirements indicated for design, dimensions, details, finish, and member sizes, including wall thickness of pipe, post spacings, and anchorage, but not less than that required to support structural loads.
2. Interconnect railing and handrail members by butt welding or welding with internal connectors, at fabricator's option, unless otherwise indicated.
   a. At tee and cross intersections, cope ends of intersecting members to fit contour of pipe to which end is joined, and weld all around.
3. Form changes in direction of handrails and rails as follows:
   a. By welding in prefabricated flush elbow fittings.
   b. By radius bends of radius indicated.
   c. By flush radius bends.
   d. By bending.
   e. By any method indicated above, applicable to change of direction involved.
4. Form simple and compound curves by bending pipe in jigs to produce uniform curvature for each repetitive configuration required; maintain cylindrical cross section of pipe throughout entire bend without buckling, twisting, cracking, or otherwise deforming exposed surfaces of pipe.
5. Provide wall returns at ends of wall-mounted handrails, unless otherwise indicated.
6. Close exposed ends of pipe by welding 3/16-inch- (4.8-mm-) thick steel plate in place or with prefabricated fittings.
7. Locate drain or vent holes in pipe in inconspicuous locations. Plug all holes before delivery to site.
8. Brackets, Flanges, Fittings, and Anchors: Provide wall brackets, end closures, flanges, miscellaneous fittings, and anchors for interconnections of pipe and attachment of handrails and railing systems to other work. Furnish inserts and other anchorage devices for connecting handrails and railing systems to concrete or masonry work.

D. Finish:
   1. Exterior location to be galvanized.
   2. Interior location to be prime painted.

2.04 MATERIALS

A. Steel Sections: ASTM A 36/A 36M.

B. Steel Tubing: ASTM A500/A500M or ASTM A501/A501M structural tubing, round and shapes as indicated.

C. Pipe: ASTM A 53/A 53M, Grade B Schedule 40, black finish.

D. Safety Grating: Grip Strut Safety Grating, regular duty, with slip resistant serrated surface.

2.05 SHOP FINISHING

A. Clean surfaces of rust, scale, grease, and foreign matter prior to finishing.

B. Do not prime surfaces in direct contact with concrete or where field welding is required.

C. Prime Painting: Use specified shop- and touch-up primer.
   1. Preparation of Steel: In accordance with SSPC-SP 2, Hand Tool Cleaning.
   2. Number of Coats: One, gray metal primer, or approved equal, applied to a minimum dry film thickness of 2.0 mils.

PART 3 EXECUTION

3.01 EXAMINATION

A. Verify that field conditions are acceptable and are ready to receive work.

3.02 INSTALLATION

A. Install components plumb and level, accurately fitted, free from distortion or defects.

B. Allow for erection loads, and for sufficient temporary bracing to maintain true alignment until completion of erection and installation of permanent attachments.

C. Provide welded field joints where specifically indicated on drawings. Perform field welding in accordance with AWS D1.1/D1.1M.

D. Other field joints may be either welded or bolted provided the result complies with the limitations specified for jointing quality levels.

E. Mechanically fasten joints butted tight, flush, and hairline. Grind welds smooth and flush.

F. Obtain approval prior to site cutting or creating adjustments not scheduled.

G. After erection, prime welds, abrasions, and surfaces not shop primed or galvanized, except surfaces to be in contact with concrete.

3.03 INSTALLING STEEL PIPE RAILINGS AND HANDRAILS

A. Adjust handrails and railing systems prior to anchoring to ensure matching alignment at abutting joints. Space posts at spacing indicated or, if not indicated, as required by design loadings. Plumb posts in each direction. Secure posts and railing ends to building construction as follows:
   1. Anchor posts to steel by welding directly to steel supporting members.
   2. Anchor handrail ends into concrete and masonry with steel round flanges welded to rail ends and anchored into wall construction with drilled-in expansion anchors.

B. Secure handrails to wall with wall brackets and end fittings. Provide bracket with minimum 1-1/2 inch clearance from inside face of handrail and finished wall surface. Locate brackets as indicated or, if not indicated, at spacing required to support structural loads. Secure wall brackets and wall return fittings to building construction as follows:
   1. Use type of bracket with flange tapped for concealed anchorage to threaded hanger bolt.
   2. For concrete and solid masonry anchorage, use drilled in expansion anchor.

3.04 TOLERANCES

A. Maximum Variation From Plumb: 1/4 inch per story, non-cumulative.

B. Maximum Offset From True Alignment: 1/4 inch.

END OF SECTION

SECTION 06 1000
ROUGH CARPENTRY

PART 1 GENERAL

1.01 SECTION INCLUDES

A. Sheathing.

B. Roof-mounted curbs.

C. Roofing nailers.

D. Preservative treated wood materials.

E. Fire retardant treated wood materials.

F. Communications and electrical room mounting boards.

1.02 RELATED REQUIREMENTS

1.03 REFERENCE STANDARDS

A. ASTM A153/A153M - Standard Specification for Zinc Coating (Hot-Dip) on Iron and Steel Hardware; 2009.

B. ASTM E84 - Standard Test Method for Surface Burning Characteristics of Building Materials; 2015a.

C. AWPA U1 - Use Category System: User Specification for Treated Wood; 2012.

D. PS 1 - Structural Plywood; 2009.

E. PS 20 - American Softwood Lumber Standard; 2010.

1.04 SUBMITTALS

A. See Section 01 3000 - Administrative Requirements, for submittal procedures.

1.05 DELIVERY, STORAGE, AND HANDLING

A. General: Cover wood products to protect against moisture. Support stacked products to prevent deformation and to allow air circulation.

B. Fire Retardant Treated Wood: Prevent exposure to precipitation during shipping, storage, or installation.

PART 2 PRODUCTS

2.01 GENERAL REQUIREMENTS

A. Dimension Lumber: Comply with PS 20 and requirements of specified grading agencies.
   1. If no species is specified, provide any species graded by the agency specified; if no grading agency is specified, provide lumber graded by any grading agency meeting the specified requirements.
   2. Grading Agency: Any grading agency whose rules are approved by the Board of Review, American Lumber Standard Committee (www.alsc.org) and who provides grading service for the species and grade specified; provide lumber stamped with grade mark unless otherwise indicated.

B. Lumber fabricated from old growth timber is not permitted.

2.02 CONSTRUCTION PANELS

A. Wall Sheathing: Plywood, PS 1, Grade C-C, Exterior Exposure.

B. Communications and Electrical Room Mounting Boards: APA rated sheathing, A-D or better, fire retardant treated; 3/4 inch thick; flame spread index of 25 or less, smoke developed index of 450 or less, when tested in accordance with ASTM E 84.

2.03 ACCESSORIES

A. Fasteners and Anchors:

1. Metal and Finish: Hot-dipped galvanized steel per ASTM A 153/A 153M for high humidity and preservative-treated wood locations, unfinished steel elsewhere.
2. Anchors: Expansion shield and lag bolt type for anchorage to solid masonry or concrete.

2.04 FACTORY WOOD TREATMENT

A. Treated Lumber and Plywood: Comply with requirements of AWPA U1 - Use Category System for wood treatments determined by use categories, expected service conditions, and specific applications.

B. Fire Retardant Treatment:
   1. Interior Type A: AWPA U1, Use Category UCFA, Commodity Specification H, low temperature (low hygroscopic) type, chemically treated and pressure impregnated; capable of providing a maximum flame spread rating of 25 when tested in accordance with ASTM E84, with no evidence of significant combustion when test is extended for an additional 20 minutes.
      a. Kiln dry wood after treatment to a maximum moisture content of 19 percent for lumber and 15 percent for plywood.
      b. Treat rough carpentry items as indicated .
      c. Do not use treated wood in applications exposed to weather or where the wood may become wet.

C. Preservative Pressure Treatment of Lumber Above Grade: AWPA U1, Use Category UC3B, Commodity Specification A using waterborne preservative to 0.25 lb/cu ft retention.
   1. Kiln dry lumber after treatment to maximum moisture content of 19 percent.
   2. Treat lumber in contact with roofing, flashing, or waterproofing.
   3. Treat lumber in contact with masonry or concrete.

PART 3 EXECUTION

3.01 INSTALLATION - GENERAL

A. Select material sizes to minimize waste.

B. Reuse scrap to the greatest extent possible; clearly separate scrap for use on site as accessory components, including: shims, bracing, and blocking.

C. Where treated wood is used on interior, provide temporary ventilation during and immediately after installation sufficient to remove indoor air contaminants.

3.02 INSPECTION:

A. Verify that surfaces to receive rough carpentry materials are prepared to required grades and dimensions.

3.03 INSTALLATION:

A. General:
   1. Accurately cut and fit items with close joints to proper plane and alignment.
   2. Rigidly secure members, free of warp or bend to maintain proper alignment and to adequately resist design loads.
   3. Linear runs of material shall be formed using lengths as great as practicable.
   4. Where multiple members are used to form linear runs, offset joints in member not less than 3 feet.
   5. Roof nailer height shall match the total thickness of insulation being used and shall be installed with a 1/8 inch gap between each length or change of direction.
   6. Roof nailers shall be anchored with fasteners suitable for the application having a minimum withdrawal resistance of 100 lb, staggered 6 inches on center within 8 feet of an outside corners and 12 inches on center along other perimeter areas.

B. Pressure-Treated Wood Products:
   1. Provide pressure-treated wood for all framing, blocking, furring, nailing strips built into masonry walls and wood in contact with concrete.

2. Install pressure treated wood nailers in locations required by roofing manufacturer including but not limited to:
   a. Perimeter of the roof with gutter.
   b. Base of roof projections.
   c. All roof penetrations.
   d. Expansion joints.
3. Re-dry and clean lumber, after treatment, to maximum moisture content of 19%, stamped "DRY".
4. Apply two brush coats of same preservative used in original treatment to all sawed or cut surfaces of treated lumber.

3.04 ROOF-RELATED CARPENTRY

A. Coordinate installation of roofing carpentry with deck construction, framing of roof openings, and roofing assembly installation.

3.05 INSTALLATION OF CONSTRUCTION PANELS

A. Wall Sheathing: Secure with long dimension perpendicular to wall studs, with ends over firm bearing and staggered, using nails, screws, or staples.

B. Communications and Electrical Room Mounting Boards: Secure with screws to studs with edges over firm bearing; space fasteners at maximum 24 inches on center on all edges and into studs in field of board.
   1. At fire-rated walls, install board over wall board indicated as part of the fire-rated assembly.
   2. Where boards are indicated as full floor-to-ceiling height, install with long edge of board parallel to studs.
   3. Install adjacent boards without gaps.
   4. Size and Location: As indicated on drawings.

END OF SECTION

SECTION 07 2100
THERMAL INSULATION

PART 1 GENERAL

1.01 SECTION INCLUDES

A. Rigid Wall Insulation.

B. Batt Insulation.

1.02 RELATED REQUIREMENTS

A. Section 07 5400: Board insulation specified as part of roof system.

1.03 REFERENCE STANDARDS

A. ASTM C552 - Standard Specification for Cellular Glass Thermal Insulation; 2015.

B. ASTM C1289 - Standard Specification for Faced Rigid Cellular Polyisocyanurate Thermal Insulation Board; 2014.

C. ASTM E84 - Standard Test Method for Surface Burning Characteristics of Building Materials; 2015a.

D. ASTM E96/E96M - Standard Test Methods for Water Vapor Transmission of Materials; 2014.

E. FM 4880 - Wall-Ceiling Construction Metal-Faced –Class 1 Fire Rated.

1.04 SUBMITTALS

A. See Section 01 3000 - Administrative Requirements, for submittal procedures.

B. Product Data: Provide data on product characteristics, performance criteria, and product limitations.

PART 2 PRODUCTS

2.01 RIGID WALL INSULATION

A. Polyisocyanurate Board Insulation with Facers Both Sides: Rigid cellular foam, complying with ASTM C1289; Type I, aluminum foil both faces; Class 1, non-reinforced foam core.
   1. Flame Spread Index (FSI): Class A - 0 to 25, when tested in accordance with ASTM E84.
   2. Smoke Developed Index (SDI): 450 or less, when tested in accordance with ASTM E84.
   3. Facing: 1.25 mil white embossed aluminum on one face and 1.25 mil embossed aluminum on the other face.
   4. Board Size: 4 feet wide by longest length practical, to minimize joints.
   5. Board Thickness: 1-1/2 inch.
   6. Thermal Resistance: R-value of R-9.8.
   7. Board Edges: Square.
   8. Large Scale Testing: Class 1 wall panel when tested in accordance with Factory Mutual Standard 4880, UL 1040 or UL 1715.
   9. Manufacturers:
      a. Dow Chemical Co: Thermax Light Duty.
      b. Substitutions: See Section 01 6000 - Product Requirements.

B. Accessories:
   1. Insulation Washer/Fasteners: 2 3/8 inch white plastic mechanical fastening washer, equal to Pneutek XIW, masonry anchors of length to suit insulation thickness and substrate, capable of securely and rigidly fastening insulation in place. Seat washers flush with or maximum 1/16 inch below insulation surface.
   2. Insulation Retainer - Perimeter: Equal to Quick Clip, ("J"- Trim) by Victory Bear Construction Products: www.victorybear.com.
   3. Insulation Retainer - Field: Equal to Flex-Tite, ("T-Bar"- Trim) by Victory Bear Construction Products: www.victorybear.com.
   4. Aluminum Foil Tape: Equal to Venture Tape 1558HT by GTA Adhesives, 3M: www.venturetape.com.

5. Sealants:
    a. Silicone; Dow Corning, 790
    b. Polyurethane; Sika, Sikaflex-201
    c. Polyurethane; Schnee-Morehead, Permathane SM7108
    d. Butyl; Tremco, Vulkem 116

2.02 BATT INSULATION MATERIALS

A. Batt Insulation concealed in walls and soffit:
    1. Type: Fiberglass insulation equal to Owens Corning Insulation "EcoTouch Insulation".
    2. Thickness: 3-1/2 or 6-1/4 inch based on framing depth.
    3. Minimum R Value: 13 or 19 respectively.

B. Batt Insulation exposed in plenum or occupied space:
    1. Type: Fiberglass insulation equal to Owens Corning Insulation "Flamespread 25".
    2. Thickness: 3-1/2 or 6-1/4 inch based on framing depth.
    3. Minimum R Value: 13 or 19 respectively.
    4. Vapor Barrier: Foil scrim faced with flame spread rating not to exceed 25 and maximum smoke developed of 50.

C. Exposed Batt Insulation attached to inside face of wall:
    1. Type: Unfaced fiberglass insulation equal to Owens Corning Insulation "EcoTouch Insulation"
    2. Thickness: 6-1/4 inch.
    3. Width: 4 foot.
    4. Minimum R Value: 19.
    5. Vapor Retarder/Facing: Applied over exposed surface.

D. Acoustic Batt Insulation:
    1. Type: Unfaced sound attenuation fiberglass batt insulation equal to Owens Corning Insulation "EcoTouch Sound Attenuation Batts (SAB'S)".
    2. Thickness: 3-1/2 inch.

E. Acoustic Batt Ceiling Insulation, not in reurn air plenum:
    1. Type: Unfaced sound attenuation fiberglass batt insulation equal to Owens Corning Insulation "EcoTouch Sonobatts Insulation".
    2. Thickness: 3-1/2 inch.
    3. Size: To fit above standard ceiling tiles.
    4. Minimum R Value: 13.

F. Metal Building Faced Batt Insulation:
    1. Type: Fiberglass insulation equal to Owens Corning Insulation "EcoTouch Certified R".
    2. Thickness: 6.3 inches
    3. Size: Standard roll width approprite to function.
    4. Minimum R Value: 19 with facing laminated.
    5. Vapor Retarder: Laminated facing, white polypropylene metalized polyester film, with flame spread rating not to exceed 25 and maximum smoke developed of 450, NIA 404 certified.

G. Accessories:
    1. Stick Pin:
        a. Insulation Fasteners: Impaling clip of galvanized steel , to be adhered to surface to receive insulation, length to suit insulation thickness and substrate, with washer retainer capable of securely and rigidly fastening insulation in place. Equal to Midwest Fasteners - Spindle - IHSP.
        b. Washer Retainer - Exposed to View: Equal to Midwest Fasteners - Capped Speed Washer - PCW, decorative domed cap, aluminum with white finish.
        c. Washer Retainer - Concealed from View: Equal to Midwest Fasteners - Self-Locking Square Washer - WA/WS, aluminum with with stainless steel.

d. Adhesive: High strength specifically intended for this purpose, and approved by manufacturer.

2. Sheet Vapor Retarder: NAIMA approved, composite vapor retarder composed of 0.0015 inch white polypropylene film, a reinforcing layer, and 0.0005 inch metallized polyester film. complying with applicable provisions of ASTM C991, Type 1, and as follows:
   a. Product: Lamtec WMP-VR-R Plus, or as approved.
      1) Perm rating: 0.02
      2) Width: 54 inch rolls.
      3) Color: White.
      4) Surface Burning Characteristics: Maximum flame spread and smoke developed values of 25 and 450, respectively.
   b. Tape for Vapor Retarder: Pressure sensitive tape of type recommended by vapor retarder manufacturer for sealing joints and penetrations in vapor retarder.
3. Acoustic Selant: Nonhardening, permanently resilient equal to Ownes Corning QuietZone Acoustic Sealant.

PART 3 EXECUTION

3.01 BOARD INSTALLATION AT EXTERIOR WALLS

A. Cut and fit insulation board tightly to protrusions or interruptions to the insulation plane.

B. Install insulation board vertically, longest practical lengths.

C. FM Installation:
   1. Install per FM 4880 with tape sealed joints and 1 inch minimum diameter plate fastener per each 1 square foot.

D. Install "J" trim at all exposed edges of insulation.

E. Apply continuous bead of sealant at flange of "J" trim installation.

F. Apply a 3/8 inch bead of polyurethane or butyl caulk to the top of each board and around each cut penetration (joist pockets, conduits, cutouts, etc.).

G. Apply 3/8” bead of adhesive full height on the back of the boards in zig zag pattern, off the edges by 6 inches.

H. Install insulation washer/fasteners through front face of insulation board at 4 foot o.c. vertically along centerline of board.

I. Tape Joint Installation:
   1. Tape insulation board joints.

J. "T-Bar" Trim:
   1. Install base section of PVC "T-Bar" trim vertically with self-impaling nails/fasteners and washers.
   2. Adjust base strip to insulation board to allow for correct width. Align each PVC section 1/8 inch from the insulation board, mark and attach.
   3. Apply a continuous bead of sealant along the face of the boards next to the joint.
   4. Guide the top PVC section along the insulation board until it snaps into the interlocking system base.

3.02 BATT INSTALLATION

A. Install insulation and vapor retarder in accordance with manufacturer's instructions.

B. Install in exterior wall spaces without gaps or voids. Do not compress insulation.

C. Trim insulation neatly to fit spaces. Insulate miscellaneous gaps and voids.

D. Fit insulation tightly in cavities and tightly to exterior side of mechanical and electrical services within the plane of the insulation.

E. Walls and Soffits with Metal Stud Framing:
   1. Install insulation with vapor barrier towards building interior.
   2. Use friction fit between framing members.

F. Exposed Insulation Attached to Concrete Walls:
   1. Install insulation with vapor barrier towards building interior.
   2. Install batt insulation to wall with insulation hangers and plastic washers. Hangers shall be equally spaced at a rate of approximately 1 fastener per 8 square feet of wall area, 3 foot x 3 foot grid per 4 foot wide roll.
   3. Provide J-trim at all exposed edges in warehouse.
   4. Install vapor retarder without sags or wrinkles, and with 6 inch minimum side and end laps. Install in longest, continuous sheets as practicable, with sheet edges properly aligned, plumbed horizontally and vertically.

G. Tape seal butt ends, lapped flanges, and tears or cuts in membrane.

H. Provide uniform, neat appearing vapor retarder installation upon completion, with clean-cut, square edges.

I. At partitions calling for acoustic insulation, provide acosutic sealant at gaps between wall stud plates and floor, around electrical boxes, around air ducts and boots, around doors and windows, and any other miscellaneous wall, ceiling and floor penetrations or gaps.

J. Install insulation above acosutic ceiling tile fit tightly together. Cooridinate with lighting fixtures for required clearances.

3.03 PROTECTION

A. Do not permit installed insulation to be damaged prior to its concealment.

END OF SECTION

SECTION 07 2616
VAPOR RETARDER

PART 1 - GENERAL

1.01 DESCRIPTION OF WORK:

A. Vapor retarder to be placed under interior concrete slabs on grade where indicated.

1.02 RELATED REQUIREMENTS

A. Section 03 3121 - Ductilcrete Interior Floor Slab on Ground: Coordinate placement of vapor retarder/barrier with slab system design.

1.03 REFERENCES:

A. ASTM E 96 - Standard Test Methods for Water Vapor Transmission of Materials, 2005.

B. ASTM E 1745 - Standard Specification for Plastic Water Vapor Retarders Used in Contact with Soil or Granular Fill under Concrete Slabs; 2009.

1.04 SUBMITTALS:

A. Product Data: Submit manufacturer's product literature and instructions for vapor barrier material and mastic.

1.05 DELIVERY, STORAGE AND HANDLING:

A. Deliver materials to project site in manufacturer's original packaging or containers.

B. Store to prevent damage, deterioration or contamination.

PART 2 - PRODUCTS

2.01 VAPOR RETARDER:

A. Acceptable Manufacturer:
   1. Stego Industries: Stego Wrap Class A Vapor Retarder.
   2. Fortifiber Industries: Moistop Ultra 10.
   3. Viper: Vaporcheck II.
   4. Substitutions: 01 6000 - Product Requirements.

B. Requirements:
   1. Permeance of 0.03 or less perms as tested in accordance with ASTM E 96.
   2. Strength: Class A requirements of ASTM E 1745.
   3. Minimum Thickness: 10 mil.

C. Adhesive or Tape: Acceptable to manufacturer of vapor barrier material.

PART 3 - EXECUTION

3.01 INSTALLATION:

A. Install vapor barrier over compacted, clean subgrade material, free of debris and protrusions.

B. Lay vapor barrier over interior building area to receive concrete slab; lap edges 6" minimum and seal with manufactuer's tape. Lay membrane with seams perpendicular to and lapped in direction of pour. Turn edges of membrane up to within 1/2" of top of slab at intersection with vertical surfaces.

C. Where expansion or control joints are indicated in slab, lay vapor barrier continuous under joint filler.

D. Seal openings in vapor barrier around pipes and other protrusions per manufacturer's instructions. Fold at corners to form envelopes.

E. Protect vapor barrier installation from damage until concrete slab is in place.

END OF SECTION

SECTION 07 4264
METAL COMPOSITE MATERIAL WALL PANELS

PART 1 GENERAL

1.01 SECTION INCLUDES

A. Exterior cladding consisting of formed metal composite material (MCM) sheet, secondary supports, and anchors to structure, attached to solid backup.

1.02 RELATED REQUIREMENTS

1.03 REFERENCE STANDARDS

A. ASTM A36/A36M - Standard Specification for Carbon Structural Steel; 2014.

B. ASTM A123/A123M - Standard Specification for Zinc (Hot-Dip Galvanized) Coatings on Iron and Steel Products; 2015.

C. ASTM A153/A153M - Standard Specification for Zinc Coating (Hot-Dip) on Iron and Steel Hardware; 2009.

D. ASTM A276/A276M - Standard Specification for Stainless Steel Bars and Shapes; 2016.

E. ASTM A480/A480M - Standard Specification for General Requirements for Flat-Rolled Stainless and Heat-Resisting Steel Plate, Sheet, and Strip; 2015.

F. ASTM A653/A653M - Standard Specification for Steel Sheet, Zinc-Coated (Galvanized) or Zinc-Iron Alloy-Coated (Galvannealed) by the Hot-Dip Process; 2015.

G. ASTM A666 - Standard Specification for Annealed or Cold-Worked Austenitic Stainless Steel Sheet, Strip, Plate, and Flat Bar; 2015.

H. ASTM A792/A792M - Standard Specification for Steel Sheet, 55% Aluminum-Zinc Alloy-Coated by the Hot-Dip Process; 2010 (Reapproved 2015).

I. ASTM D523 - Standard Test Method for Specular Gloss; 2014.

J. ASTM D1781 - Standard Test Method for Climbing Drum Peel for Adhesives; 1998 (Reapproved 2012).

K. ASTM D1929 - Standard Test Method for Determining Ignition Temperature of Plastics; 2014.

L. ASTM D2244 - Standard Practice for Calculation of Color Differences from Instrumentally Measured Color Coordinates; 2011.

M. ASTM D4145 - Standard Test Method for Coating Flexibility of Prepainted Sheet; 2010.

N. ASTM D4214 - Standard Test Methods for Evaluating the Degree of Chalking of Exterior Paint Films; 2007.

O. ASTM E84 - Standard Test Method for Surface Burning Characteristics of Building Materials; 2015a.

P. ASTM E330/E330M - Standard Test Method for Structural Performance of Exterior Windows, Doors, Skylights and Curtain Walls by Uniform Static Air Pressure Difference; 2014.

1.04 ADMINISTRATIVE REQUIREMENTS

A. Pre-Installation Meeting: Convene one week before starting work of this section to verify project requirements, co-ordinate with installers of other work, establish condition and completeness of building substrate, and review manufacturers' installation instructions and warranty requirements.
   1. Require attendance by the installer and relevant sub-contractors.
   2. Include MCM sheet manufacturer’s representative and wall system manufacturer’s representative to review storage and handling procedures.
   3. Review in detail truck transportation, parking, vertical transportation, schedule, personnel, installation of adjacent materials and substrate.
   4. Review procedures for protection of work and other construction.

1.05 SUBMITTALS

A. See Section 01 3000 - Administrative Requirements, for submittal procedures.

B. Product Data - MCM Sheets: Manufacturer's data sheets on each product to be used, including thickness, physical characteristics, and finish, and:
   1. Finish manufacturer's data sheet showing physical and performance characteristics.
   2. Storage and handling requirements and recommendations.
   3. Fabrication instructions and recommendations.
   4. Specimen warranty for finish, as specified herein.

C. Shop Drawings: Show layout and elevations, dimensions and thickness of panels, connections, details and location of joints, sealants and gaskets, method of anchorage, number of anchors, supports, reinforcement, trim, flashings, and accessories.
   1. Indicate panel numbering system.
   2. Differentiate between shop and field fabrication.
   3. Indicate substrates and adjacent work with which the wall system must be coordinated.
   4. Include large-scale details of anchorages and connecting elements.
   5. Include large-scale details or schematic, exploded or isometric diagrams to fully explain flashing at a scale of not less than 1-1/2 inches per 12 inches.
   6. Include design engineer's stamp or seal on shop drawings for attachments and anchors.

D. Test Report: Submit report of full-size mock-up tests for air infiltration, water penetration, and wind performance.

E. Installer’s Qualifications.

F. Installer's Qualification Statement.

G. Testing Agency's Qualification Statement.

H. Maintenance Data: Care of finishes and warranty requirements.

I. Executed Warranty: Submit warranty and ensure that forms have been completed in Owner's name and registered with manufacturer.

1.06 QUALITY ASSURANCE

A. Design Engineer's Qualifications: Design structural supports and anchorages under direct supervision of a Structural Engineer experienced in design of this type of Work and licensed in the State in which the Project is located.

B. Installer Qualifications: Company specializing in performing work of the type specified in this section.
   1. With minimum 3 years of documented experience.

C. Testing Agency Qualifications: Independent agency experienced in testing assemblies of the type required for this project and having the necessary facilities for full-size mock-up testing of the type specified.

1.07 DELIVERY, STORAGE, AND HANDLING

A. Deliver products in manufacturer's original, unopened, undamaged containers with identification labels intact.
   1. Protect finishes by applying heavy duty removable plastic film during production.
   2. Package for protection against transportation damage.
   3. Provide markings to identify components consistently with drawings.
   4. Exercise care in unloading, storing and installing panels to prevent bending, warping, twisting and surface damage.

B. Store products protected from exposure to harmful weather conditions and at temperature conditions recommended by manufacturer.
   1. Store in well ventilated space out of direct sunlight.
   2. Protect from moisture and condensation with tarpaulins or other suitable weather tight covering installed to provide ventilation.

3. Store at a slope to ensure positive drainage of any accumulated water.
4. Do not store in any enclosed space where ambient temperature can exceed 120 degrees F.
5. Avoid contact with any other materials that might cause staining, denting, or other surface damage.

1.08 WARRANTY

A. See Section 01 7800 - Closeout Submittals, for additional warranty requirements.

B. MCM Sheet Manufacturer’s Finish Warranty: Provide manufacturer's written warranty stating that the finish will perform as follows for minimum of 10 years:
   1. Chalking: No more than that represented by a No.8 rating based on ASTM D4214.
   2. Color Retention: No fading or color change in excess of 5 Hunter color difference units, calculated in accordance with ASTM D2244.
   3. Gloss Retention: Minimum of 30 percent gloss retention, when tested in accordance with ASTM D523.

PART 2 PRODUCTS

2.01 MANUFACTURERS

A. Metal Composite Material Sheet Manufacturers:
   1. Alcan Composites USA, Inc; : www.alucobondusa.com.
   2. Alcoa, Inc; : www.alcoa.com/#sle.
   3. ALPOLIC Materials; : www.alpolic-usa.com/#sle.

2.02 WALL PANEL SYSTEM

A. Wall Panel System: Metal panels, fasteners, and anchors designed to be supported by framing or other substrate provided by others; provide installed panel system capable of maintaining specified performance without defects, damage or failure.
   1. Provide structural design by or under direct supervision of a Structural Engineer licensed in the State in which the Project is located.
   2. Provide panel jointing and weatherseal using a "wet," sealant sealed system.
   3. Anchor panels to supporting framing without exposed fasteners.

B. Performance Requirements:
   1. Thermal Movement: Provide for free and noiseless vertical and horizontal thermal movement due to expansion and contraction under material temperature range of minus 20 degrees F to 180 degrees F without buckling, opening of joints, undue stress on fasteners, or other detrimental effects; allow for ambient temperature at time of fabrication, assembly, and erection procedures.
   2. Wind Performance: Provide system tested in accordance with ASTM E330/E330M without permanent deformation or failures of structural members under the following conditions:
      a. Design Wind Load: See General Notes on Structural Drawings.
      b. Maximum deflection of perimeter framing member of L/175 normal to plane of the wall; maximum deflection of individual panels of L/60.
      c. Maximum anchor deflection in any direction of 1/16 inch at connection points of framing members to anchors.

2.03 MATERIALS

A. Metal Composite Material (MCM) Sheet: Two sheets of aluminum sandwiching a solid core of extruded thermoplastic material formed in a continuous process with no glues or adhesives between dissimilar materials; core material free of voids and spaces; no foamed insulation material content.
   1. Overall Sheet Thickness: 3 mm, minimum.
   2. Face Sheet Thickness: 0.019 inches, minimum.
   3. Alloy: Manufacturer's standard, selected for best appearance and finish durability.

4. Bond and Peel Strength: No adhesive failure of the bond between the core and the skin nor cohesive failure of the core itself below 22.4 inch-pound/inch with no degradation in bond performance, when tested in accordance with ASTM D1781, simulating resistance to panel delamination, after 8 hours of submersion in boiling water and after 21 days of immersion in water at 70 degrees F.
5. Surface Burning Characteristics: Flame spread index of 25, maximum; smoke developed index of 450, maximum; when tested in accordance with ASTM E84.
6. Flammability: Self-ignition temperature of 650 degrees F or greater, when tested in accordance with ASTM D1929.
7. Factory Finish: One coat fluoropolymer resin coating, approved by the coating manufacturer for the length of warranty specified for the project, and applied by coil manufacturing facility that specializes in coil applied finishes.
    a. Coating Flexibility: Pass ASTM D4145 minimum 1T-bend, at time of manufacturing.
    b. Long-Term Performance: Not less than that specified under WARRANTY in PART 1.

B. Metal Framing Members: Include all sub-girts, zee-clips, base and sill angles and channels, hat-shaped and rigid channels, and furring channels required for complete installation.
1. Provide material strength, dimensions, configuration as required to meet the applied loads applied and in compliance with applicable building code.
2. Sheet Steel Components: ASTM A653/A653M galvanized to G90/Z275 or zinc-iron alloy-coated to A60/ZF180; or ASTM A792/A792M aluminum-zinc coated to AZ60/AZM180.
3. Stainless Steel Sheet Components: ASTM A480/A480M.

C. Anchors, Clips and Accessories: Use one of the following:
1. Stainless steel complying with ASTM A480/A480M, ASTM A276 or ASTM A666.
2. Steel complying with ASTM A36/A36M and hot-dipped galvanized to ASTM A153/A153M.
3. Steel complying with ASTM A36/A36M and hot-dipped galvanized to ASTM A123/A123M Coating Grade 10.

D. Fasteners:
1. Exposed fasteners: Stainless steel; permitted only where absolutely unavoidable and subject to prior approval of the Architect.
2. Screws: Self-drilling or self-tapping Type 410 stainless steel or zinc-alloy steel hex washer head, with EPDM or PVC washer under heads of fasteners bearing on weather side of metal wall panels.
3. Bolts: Stainless steel.

E. Provide panel system manufacturer's and installer’s standard corrosion resistant accessories, including fasteners, clips, anchorage devices and attachments.

PART 3 EXECUTION

3.01 EXAMINATION

A. Verify dimensions, tolerances, and interfaces with other work.

B. Verify substrate on-site to determine that conditions are acceptable for product installation in accordance with manufacturers written instructions.

C. If substrate preparation is the responsibility of another installer, notify Architect of unsatisfactory preparation before proceeding.

D. Notify Architect in writing of conditions detrimental to proper and timely completion of work. Do not proceed with erection until unsatisfactory conditions have been corrected.

3.02 PREPARATION

A. Protect adjacent work areas and finish surfaces from damage during installation.

3.03 INSTALLATION

A. Do not install products that are defective, including warped, bowed, dented, and broken members, and members with damaged finishes.

B. Comply with instructions and recommendations of MCM sheet manufacturer and wall system manufacturer, as well as with approved shop drawings.

C. Install wall system securely allowing for necessary thermal and structural movement; comply with wall system manufacturer's instructions for installation of concealed fasteners.

D. Do not handle or tool products during erection in manner that damages finish, decreases strength, or results in visual imperfection or failure in performance. Return component parts that require alteration to shop for refabrication, if possible, or for replacement with new parts.

E. Do not form panels in field unless required by wall system manufacturer and approved by the Architect; comply with MCM sheet manufacturer's instructions and recommendations for field forming.

F. Separate dissimilar metals; use gasket fasteners, isolation shims, or isolation tape where needed to eliminate possibility of electrolytic action between metals.

G. Where joints are designed for field applied sealant, seal joints completely with specified sealant.

H. Install square, plumb, straight, and true, accurately fitted, with tight joints and intersections maintaining the following installation tolerances:
   1. Variation From Plane or Location: 1/2 inch in 30 feet of length and up to 3/4 inch in 300 feet, maximum.
   2. Deviation of Vertical Member From True Line: 0.1 inch in 25 feet run, maximum.
   3. Deviation of Horizontal Member From True Line: 0.1 inch in 25 feet run, maximum.
   4. Offset From True Alignment Between Two Adjacent Members Abutting End To End, In Line: 0.03 inch, maximum.

I. Replace damaged products.

3.04 CLEANING

A. Ensure weep holes and drainage channels are unobstructed and free of dirt and sealants.

B. Remove protective film after installation of joint sealers, after cleaning of adjacent materials, and immediately prior to completion of work.

C. Remove temporary coverings and protection of adjacent work areas.

D. Clean installed products in accordance with manufacturer's instructions.

END OF SECTION

SECTION 07 5400
THERMOPLASTIC MEMBRANE ROOFING

PART 1 GENERAL

1.01 SECTION INCLUDES

A. Mechanically attached system with thermoplastic roofing membrane.

B. Insulation, flat and tapered.

C. Flashings.

D. Roofing stack boots, roofing expansion joints, and walkway pads.

1.02 RELATED REQUIREMENTS

A. Section 01 3000 - Administrative Requirements: Pre-Installation Meeting.

B. Section 06 1000 - Rough Carpentry: Wood nailers and curbs.

C. Section 07 6200 - Sheet Metal Flashing and Trim: Counterflashings, reglets,.

1.03 REFERENCE STANDARDS

A. ASTM C1289 - Standard Specification for Faced Rigid Cellular Polyisocyanurate Thermal Insulation Board; 2014.

B. ASTM E1980 - Standard Practice for Calculating Solar Reflectance Index of Horizontal and Low-Sloped Opaque Surfaces; 2011.

C. FM DS 1-28 - Wind Design; 2007.

D. NRCA ML104 - The NRCA Roofing and Waterproofing Manual; Fifth Edition, with interim updates.

E. UL (DIR) - Online Certifications Directory; current listings at database.ul.com.

1.04 ADMINISTRATIVE REQUIREMENTS

A. Preinstallation Meeting: Convene two weeks before starting work of this section.
   1. Review preparation and installation procedures and coordinating and scheduling required with related work.

1.05 SUBMITTALS

A. See Section 01 3000 - Administrative Requirements, for submittal procedures.

B. Product Data: Provide data indicating membrane materials, flashing materials, insulation, and fasteners.

C. Specimen Warranty: For approval.

D. Shop Drawings: Indicate joint or termination detail conditions, conditions of interface with other materials, and mechanical fastener layout.

E. Manufacturer's Installation Instructions: Indicate membrane seaming precautions and perimeter conditions requiring special attention.

F. Manufacturer's Certificate: Certify that products meet or exceed specified requirements.

1.06 QUALITY ASSURANCE

A. Perform work in accordance with NRCA Roofing and Waterproofing Manual.

B. Installer Qualifications: Company specializing in performing the work of this section:
   1. Approved by membrane manufacturer.

1.07 DELIVERY, STORAGE, AND HANDLING

A. Deliver products in manufacturer's original containers, dry, undamaged, with seals and labels intact.

B. Store products in weather protected environment, clear of ground, roof deck and moisture.

C. Ensure storage and staging of materials does not exceed static and dynamic load-bearing capacities of roof decking.

D. Additional coverage of insulation to be considered utilizing plastic or canvas tarps.

E. Protect foam insulation from direct exposure to sunlight.

1.08 WARRANTY

A. See Section 01 7800 - Closeout Submittals, for additional warranty requirements.

B. System Warranty: Provide manufacturer's total system warranty agreeing to repair or replace roofing that leaks or is damaged due to wind or other natural causes.
   1. Warranty Term: 20 years.
   2. For repair and replacement include costs of both material and labor in warranty.
   3. The maximum wind speed coverage shall be peak gusts of 72 mph measured at 30 feet above ground level.
   4. Pro-rated membrane system warranties shall not be accepted.
   5. The roofing system manufacturer’s warranty shall include roof edge metal and the installation of that edge metal in the warranty. See Section 07 6200 - Sheet Metal Flashing and Trim.
   6. No exclusion may be maintained for temperature exposure of the membrane except at a “hot stack.” Field membrane cannot be restricted to temperature exposure limitation.
   7. Roof system must be inspected at completion of installation. Manufacturer cannot deny coverage for any items not installed in compliance with manufacturer’s application requirements and standards after warranty is issued or as a part of terms and conditions of the warranty. The manufacturer’s technical field representative/inspector will conduct final inspections.
   8. Warranty shall be transferable and transfer cannot be at manufacturer’s discretion nor require an inspection, but shall be transferable upon notification in writing to manufacturer and payment of the standard transfer fee.

PART 2 PRODUCTS

2.01 MANUFACTURERS

A. Thermoplastic Polyolefin Membrane Materials:
   1. Carlisle SynTec; : www.carlisle-syntec.com.
   2. Firestone Building Products, LLC; : www.firestonebpco.com/#sle.
   3. GAF; EverGuard TPO: www.gaf.com/sle.
   4. Johns Manville: www.jm.com
   5. Substitutions: See Section 01 6000 - Product Requirements.

2.02 ROOFING

A. Thermoplastic Membrane Roofing: One ply membrane, mechanically fastened, over insulation.

B. Roofing Assembly Requirements:
   1. Solar Reflectance Index (SRI): 78, minimum, calculated in accordance with ASTM E1980.
      a. Field applied coating may not be used to achieve specified SRI.
   2. Roof Covering External Fire Resistance Classification: UL Class A.
   3. Factory Mutual Classification: Class I and windstorm resistance of I-60, in accordance with FM DS 1-28.
   4. Design Wind Speed: See Structural Drawings.

C. Acceptable Insulation Types - Constant Thickness Application:
   1. Minimum 2 layers of polyisocyanurate board.

2.03 ROOFING MEMBRANE AND ASSOCIATED MATERIALS

A. Membrane:
   1. Reinforcing: Internal fabric.
   2. Thickness: 0.060 inch, minimum.

3. Sheet Width: Maximum 10 feet, factory fabricated.
4. Color: White.

B. Seaming Materials: As recommended by membrane manufacturer.

C. Membrane Fasteners: As recommended and approved by membrane manufacturer.

D. Flexible Flashing Material: Same material as membrane.

2.04 INSULATION

A. Polyisocyanurate Board Insulation: Rigid cellular foam, complying with ASTM C 1289, Type II, Class 1, glass fiber mat both sides.
1. Provide tapered boards where indicated or as required for sloping to drain. Fabricate with taper of 1/2 inch per foot, unless indicated otherwise.
2. Compressive Strength: 20 psi
3. Board Size: 48 x 96 inch.
4. Thermal Resistance: Minimum aged R-Value 20 LTTR.

2.05 ACCESSORIES

A. Stack Boots: Prefabricated flexible boot and collar for pipe stacks through membrane; same material as membrane.

B. Insulation Fasteners: Appropriate for purpose intended and approved by roofing manufacturer.
1. Length as required for thickness of insulation material and penetration of deck substrate, with metal washers.

C. Membrane Adhesive: As recommended by membrane manufacturer.

D. Roofing Nails: Galvanized, hot dipped type, size and configuration as required to suit application.

E. Termination Bars: As recommended by membrane manufacturer.

F. Sealants: As recommended by membrane manufacturer.

G. Walkway Pads: Suitable for maintenance traffic, contrasting color or otherwise visually distinctive from roof membrane.
1. Composition: Roofing membrane manufacturer's standard.
2. Size: 18 x 18 inch.
3. Surface Color: White or yellow.

PART 3 EXECUTION

3.01 INSTALLATION - GENERAL

A. Perform work in accordance with NRCA Roofing and Waterproofing Manual and manufacturer's instructions.

B. Do not apply roofing membrane during unsuitable weather.

C. Do not apply roofing membrane when ambient temperature is outside the temperature range recommended by manufacturer.

D. Do not apply roofing membrane to damp or frozen deck surface or when precipitation is expected or occurring.

E. Do not expose materials vulnerable to water or sun damage in quantities greater than can be weatherproofed the same day.

3.02 EXAMINATION

A. Verify that surfaces and site conditions are ready to receive work.

B. Verify deck is supported and secure.

C. Verify deck is clean and smooth, flat, free of depressions, waves, or projections, properly sloped and suitable for installation of roof system.

D. Verify deck surfaces are dry and free of snow or ice.

E. Verify that roof openings, curbs, and penetrations through roof are solidly set, and nailing strips are in place.

F. Verify that positive roof slope exists in all areas.

G. Verify location, dimensions and elevations of primary and secondary roof drainage components including roof drains and overflow scuppers.

H. Correct unsuitable conditions before proceeding with installation. Commencing installation signifies acceptance by the installer of the substrate.

3.03 SUBSTRATE PREPARATION

A. Prior to the start of work, make the substrate smooth and free of debris, sharp edges, and other surface irregularities that will be detrimental to the installation.

B. Correct unevenness and joint gaps greater than 1/4 inch in the membrane substrate as they can cause inconsistent membrane welds. When such conditions occur fill with appropriate and properly secured insulation or material approved by manufacturer's technical review department.

C. Nailers: Verify that:
   1. Nailers are installed at gravel stops and drip edges.
   2. Nailers are pressure-preservative treated (fire-retardant-treated where required; creosote and asphaltic preservatives are not acceptable).
   3. Nailers are anchored with fasteners suitable for the application having a minimum withdrawal resistance of 100 lb, staggered 6 inches on center within 8 feet of an outside corners and 12 inches on center along other perimeter areas.
   4. Top surfaces of nailers match the top surface of adjacent construction plus/minus 1/4 inch, without contributing to ponding.

D. Flashing Substrates: Verify that the substrate is smooth and free of sharp edges and other surface irregularities that will be detrimental to 100-percent adhesion of the flashing membrane.

3.04 FASTENERS - GENERAL

A. Install fasteners with a depth-sensing screw gun to prevent overdriving or underdriving, unless otherwise approved or required by project conditions.

3.05 VAPOR RETARDER AND INSULATION - UNDER MEMBRANE

A. Attachment of Insulation:
   1. Mechanically fasten insulation to deck in accordance with roofing manufacturer's instructions .

B. Lay subsequent layers of insulation with joints staggered minimum 6 inch from joints of preceding layer.

C. Handle and secure insulation boards so as to not damage or rupture the facer and surface. Cut out damaged areas and replace with structurally sound insulation, properly secured in place.

D. Install boards with the longest dimension perpendicular to the direction of the membrane seams and with end joints staggered. Butt boards as closely as possible with no gaps over 1/4 inch.

E. Lay boards with edges in moderate contact without forcing. Cut insulation to fit neatly to perimeter blocking and around penetrations through roof.

F. At roof drains, use factory-tapered boards to slope down to roof drains over a distance of 24 inches from the clamp ring. Custom trim the lower edges immediately surrounding the drain bowl, and any hard edge between the flat panel and the tapered panel surface to provide a smooth, sloping transition. Miter corners of the tapered insulation panels with a 45 degree angle cut..

G. Do not apply more insulation than can be covered with membrane in same day.

3.06 MEMBRANE APPLICATION

A. Roll out membrane, free from wrinkles or tears. Place sheet into place without stretching.

B. Shingle joints on sloped substrate in direction of drainage.

C. Overlap edges and ends and seal seams by heat welding, overlapping minimum 5.5 inches. Seal permanently waterproof.
   1. Use hand-held welders for small work and repairs.
   2. Use automatic hot-air welders for field seaming. All seams are to be welded a minimum of 1 inch from edge of lap joint.
   3. The equipment settings and alignment adjustments must be checked continuously during each day to insure complete fusion within the welded area and a smooth, wrinkle-free seam.
   4. The seams shall be checked for continuity and integrity. All imperfections shall be corrected.
   5. T-joints/ laps shall heaved welded patch per manufacturer recommendations.
   6. Membrane seams shall be aligned with adjoining membrane seams as possible to reduce T-joints/ laps.

D. Mechanical Attachment: Apply membrane and mechanical attachment devices in accordance with manufacturer's instructions. Fastener spacing depend on building location, parapet height, building height, deck type and deck thickness. Fastener spacing for field sheets, perimeter sheets and added rows of fasteners as required by manufacturer. Fasteners must penetrate top flanges of metal decking as applicable.

E. At intersections with vertical surfaces:
   1. Extend membrane up a minimum of 8 inches onto vertical surfaces.
   2. Fully adhere flexible flashing over membrane and up to nailing strips.
   3. On all curbs the flashing shall be bonded to the roofing membrane and turned up the curb and terminate beneath the curbs or mechanical equipment curb cap flashing.

F. Around roof penetrations, seal flanges and flashings with flexible flashing.

G. Roof Drains: Install in accordance with membrane manufacturer's details.
   1. Properly secure all bolts to provide 100-percent continuous compression of the clamping ring.
   2. Do not run field seams through drains.
   3. Insulation shall be tapered around the drain to provide positive drainage, prevent the membrane from bridging, and provide a smooth transition from the roof surface to the drain clamping ring.
   4. The seal between the membrane and the drain base shall be provided by polysulfide or polyurethane sealant under constant, even compression from the drain clamping ring.
   5. Where detailing drains, install a new target patch of PVC membrane, within the entire sumped profile. Cut a circular sheet opening of a diameter slightly greater than drain pipe diameter. Bolt holes within the new membrane shall be cut round only, no straight or cross cuts allowed.
   6. Cut membrane neatly to provide full access to drain outlet pipe.

H. Metal Work:
   1. Install and anchor in a manner that prevents damage from buckling or wind, in accordance with SMACNA and ES-1 guidelines or in manner approved by membrane manufacturer.
   2. Seal and waterproof in an acceptable manner to prevent leakage.
   3. Make and install edge metal assemblies at perimeter in accordance with membrane manufacturer's details.

I. Roof Walkway Pads: Install pads in accordance with roofing manufacturer's instructions.
   1. Install walkway pads extending 4 feet from the service panels of all roof mounted equipment and at the roof access landing.
   2. Prepare dirty or weathered membrane, removing visible dirt and debris.

3. Position walkway pad and cut to desired length.
4. Whenever possible, do not cover membrane seams with walkway pad. When installed adjacent to a seam, keep the pad a minimum of 2 inches from the edge of the seam on the bottom sheet of the completed lap and a minimum of 6 inches from the edge of the seam when located on the top sheet of a completed lap.
5. When covering seams is unavoidable, the lap seam should be completed per manufacturers recommendations, and thoroughly probed with any deficiencies repaired prior to pad installation.
6. In circumstances where drainage around the walkway pad is a concern, shorter walkway pad lengths spaced with a 2 inch gap may be desired.
7. Weld perimeter of walkway pad to the membrane following standard welding procedures. Periodic breaks in the weld of 1 to 2 inches are required on the low slope edge of the pad to prevent the accumulation of water under the pad.

J. Coordinate installation of roof drains and sumps and related flashings.

3.07 PERIMETER AND CORNER FASTENING

A. Fastener row spacing shall be decreased along all roof edges with the exception of the following:
   1. Roof edges along the bases of interior building walls or at the bases of roof elevation changes.
   2. Roof transitions, expansion joints, control joints, or fire walls, where the difference between the finished adjacent roof elevations is less than or equal to 36 inches. If the elevation difference is greater than 36 inches, the edge of the higher roof shall be treated as a perimeter.

B. Perimeter Zone Fastening:
   1. Where the perimeter roof edge runs perpendicular to the deck rib direction, decreased fastener row spacing shall be provided by using perimeter sheets fastened within the lap seams. Extend perimeter sheets to the intersecting perimeter roof edges. Perimeter sheet width shall be less than or equal to 60% of the field sheet width.
   2. Where the perimeter roof edge runs parallel to the deck rib direction, the field sheets shall be installed through the perimeter zone to the intersecting perimeter roof edge. Decreased fasener row spacing shall then be provided in the perimeter zones, by installing an additional row of membrane plates and fasteners, parallel to and midway between the field sheet seams.

C. Corner Zone Fastening: Decreased fastener row spacing shall be provided in the corner zones by installing an additional row of membrane plates and fasteners, parallel to and midway between the perimeter sheet seams.

D. Perimeter and Corner Zone Fastening:
   1. The length of the added fastener rows within the perimeter and corner zones shall equal the total width of the areas that receive perimeter sheets.
   2. The added rows of plates and fasteners shall be installed over and through the membrane, and fastened to the top flange of the deck at the specified fastening rate. Strip-in each fastener row using 8 inch wide strips of heat welded field membrane material, with each extending a minimum of 4 inch beyond the fastener on each end.

3.08 FLASHINGS

A. Flashings shall be constructed and terminated as per the detail drawings. The specified water cut-off sealant or sealant tape shall be applied behind the top edges of the flashings. The top edges of flashings shall be fastened per the Manufacturer's requirements at a minimum, unless superseded by the detail drawings.

B. Apply manufacturer approved contact adhesive over the clean, dry, compatible substrate using an approved solvent-resistant roller. Apply in a uniform coat at the rate of 3/4 to 2 gallons per 100 square feet depending upon substrate finish. Allow adhesive to dry completely before installing flashing membrane.

C. All flashings shall be totally bonded to the previously coated substrate at a rate of approximately 50 square feet per gallon of adhesive. Do not allow adhesive to dry completely on the underside of the membrane. The bonded sheet shall be pressed firmly into place using a hand roller.

D. Flashings shall extend a minimum of 6 inch onto the roof membrane and 8 inch up the vertical.

3.09 FIELD QUALITY CONTROL

A. See Section 01 4000 - Quality Requirements, for general requirements for field quality control and inspection.

B. Ensure that metal work shall be secured in a manner approved by roof manufacturer, or in accordance with SMACNA guidelines, to prevent damage from buckling, or wind exposure. All metal work that is part of the waterproofing envelope shall be sealed, structurally sound, and appropriately anchored to prevent leakage.

C. Tests:
   1. Seam Tests: Probe the entire lap edge of each seam with an approved seam probing tool after seam has cooled completely to verify seam consistency. Probing before the seam area has cooled will damage the membrane.
   2. Seam test cuts required daily (min 2 per day), to verify integrity of weld.

D. Manufacturer's Field Service: Upon completion of the installation, have the manufacturer's representative make an inspection to ascertain that the roofing membrane system has been installed according to manufacturer's approved specifications and details.

E. Warranty Inspection: Provide copy of manufacturer's inspection for acceptance for warranty.

F. Rejection of Defective Work: Areas having excessive patching as a result of damage to the membrane or faulty installation may be rejected by membrane manufacturer or the Architect; replace the membrane completely in these areas.

3.10 CLEANING

A. Remove bituminous markings from finished surfaces.

B. In areas where finished surfaces are soiled by work of this section, consult manufacturer of surfaces for cleaning advice and conform to their documented instructions.

C. Repair or replace defaced or damaged finishes caused by work of this section.

3.11 PROTECTION

A. Protect installed roofing and flashings from construction operations.

B. Where traffic must continue over finished roof membrane, protect surfaces using durable materials.

END OF SECTION

SECTION 07 6200
SHEET METAL FLASHING AND TRIM

PART 1 GENERAL

1.01 SECTION INCLUDES

A. Fabricated sheet metal items, including flashings, counterflashings, gutters, downspouts, and copings.

B. Sealants for joints within sheet metal fabrications.

1.02 RELATED REQUIREMENTS

A. Section 06 1000 - Rough Carpentry: Wood nailers for sheet metal work.

B. Section 07 5400 - Thermoplastic Membrane Roofing: Roofing system.

C. Section 07 9005 - Joint Sealers.

1.03 REFERENCE STANDARDS

A. ANSI/SPRI ES-1 - Wind Design Standard for Edge Systems Used with Low Slope Roofing Systems.

B. ASTM A653/A653M - Standard Specification for Steel Sheet, Zinc-Coated (Galvanized) or Zinc-Iron Alloy-Coated (Galvannealed) by the Hot-Dip Process; 2015.

1.04 SUBMITTALS

A. Shop Drawings: Indicate material profile, jointing pattern, jointing details, fastening methods, flashings, terminations, and installation details.

B. Submit manufacturer's full range of color options for Architect selection.

C. Warranty Specimen: For approval.

1.05 QUALITY ASSURANCE

A. Perform work in accordance with SMACNA 1793 and CDA A4050 requirements and standard details, except as otherwise indicated.

B. Roof edge metal assemblies including copings, fascias and gravel stops shall be designed in accordance with ANSI/SPRI ES-1.

1.06 DELIVERY, STORAGE, AND HANDLING

A. Stack material to prevent twisting, bending, and abrasion, and to provide ventilation. Slope metal sheets to ensure drainage.

B. Prevent contact with materials that could cause discoloration or staining.

1.07 WARRANTY

A. See Section 01 7800 - Closeout Submittals, for additional warranty requirements.

B. Warrant flashing and sheet metal work to be free of defects in materials and workmanship for a period of two years from Date of Substantial Completion.

C. Roof edge metal assemblies shall be included in the roof system warranty. See Section 07 5400 - Thermoplastic Membrane Roofing.

D. Prefinished Metal: Warrant against fading and peeling for a period of 10 years.

PART 2 PRODUCTS

2.01 SHEET MATERIALS

A. Pre-Finished Galvanized Steel: ASTM A 653/A 653M, with G90/Z275 zinc coating; minimum.0239 inch (24 gage) thick base metal, shop pre-coated with PVDF coating.
   1. Underside shall be coated with manufacturer's standard wash coat.

2.02 FASTENERS:

A. Generally composed of same materials as flashings being fastened. Exposed fasteners shall have 5/8 inch steel/neoprene washers under the head. Fasteners shall be treated for resistance to rust and corrosion.
   1. Sheet Metal to Wood:
      a. Concealed Application: Annular threaded nail with minimum 3/16 inch diameter head, not less than 12 gauge and of sufficient length to penetrate substrate 1-1/4 inch minimum.
      b. Exposed Application: No. 10 screws minimum. Penetrate wood blocking minimum 1-1/2 inches. Installed withdrawal resistance shall be a minimum of 150 pounds per screw.
   2. Sheet Metal to Sheet Metal: Self-tapping sheet metal screws of 1/2 inch length and a minimum No. 8 diameter.
   3. Concrete and Masonry Anchors: Specially threaded anchors, 3/16 inch minimum diameter, length to penetrate minimum 1-1/2 inches into concrete or masonry. Installed withdrawal resistance shall be a minimum of 150 pounds per anchor.

2.03 FABRICATION

A. Shop fabricate work to greatest extent possible. Comply with details shown and with applicable requirements of SMACNA "Architectural Sheet Metal Manual" and other recognized industry practices. Fabricate for waterproof and weather resistant performance; with expansion provisions for running work, sufficient to permanently prevent leakage, damage or deterioration of the work. Form work to fit substrates.

B. Provide gage suitable for purpose as recommended by SMACNA Manual.

C. Form sections true to shape, accurate in size, square, and free from distortion or defects.

D. Form pieces in longest possible lengths.

E. Hem exposed edges on underside 1/2 inch; miter and seam corners.

F. Fabricate corners from one piece with minimum 4 inch nor more than 12 inch long legs; seam for rigidity, seal with sealant.

G. Fabricate vertical faces with bottom edge formed outward 1/4 inch (6 mm) and hemmed to form drip.

H. Blind clips and cleats shall be at least the same gauge as sheet metal flashing.

2.04 SCHEDULE

A. Gutters:
   1. Material: Galvanized steel, minimum 24 gage.
   2. Design: SMACNA Figure 1-2, style A.
   3. Expansion Joint: SMACNA Figure 1-6, lap type expansion joint at 50 feet on center maximum.
   4. Supports: Support gutter on 1/4 inch x 1-1/2 inch galvanized steel brackets at 30 inches o.c. and outer edge of gutter with metal straps staggered at 30 inches o.c. with brackets in accordance with SMACNA Figure 1-13A.

B. Downspouts:
   1. Material: Galvanized steel, minimum 24 gage.
   2. Design: SMACNA Figure 1-32B.

C. Downspout Hangers:
   1. Material: Galvanized steel, 20 gage.
   2. Design: SMACNA Figure 1-35A.

D. Gravel-Stop Fascia:
   1. Material: Galvanized steel, minimum 24 gage.
   2. Design: SMACNA Figure 2-1B.

E. Coping:
   1. Material: Galvanized steel, minimum 24 gage.
   2. Design: SMACNA Figure 3-4A; slope top 1/2 inch.
   3. Joint Design: SMACNA Figure 3-3, style 19; butt seam with 12 inch wide backup plate. Fabricate in 10 foot lengths with 1/2 inch minimum joint for expansion and contraction.

F. Conductor Heads:
   1. Material: Galvanized steel, 22 gage, soldered construction.
   2. Design: SMACNA Figure 1-25F.

G. Overflow Scupper:
   1. Material: Galvanized steel, 24 gage, soldered construction.
   2. Design: SMACNA Figure 1-30, modified in accordance with details indicated on Drawings.
   3. Fabricate scuppers with minimum 4" wide roof side flange. Cross section of scupper shall be ½" less in width and height than the parapet opening.

PART 3 EXECUTION

3.01 EXAMINATION

A. Verify roof openings, curbs, pipes, sleeves, ducts, and vents through roof are solidly set, reglets in place, and nailing strips located.

B. Verify roofing termination and base flashings are in place, sealed, and secure.

3.02 INSTALLATION

A. Except as otherwise indicated, comply with the installation recommendations of SMACNA and Factory Mutual Data Sheet 1-49 Perimeter Flashing.

B. Coordinate flashing at roof surfaces with roofing work to provide weather-tight condition at roof terminations.

C. Sheet metal items shall be installed true to line, without buckling, creasing, or warp.

D. Anchor units of work securely in place, providing for thermal expansion of metal units. Conceal fasteners where possible. Exposed fasteners shall be covered with sealant.

E. Fastening:
   1. Nails: Confine to one edge only of flashing 12" or less in width. Space nails at 4" o.c. maximum.
   2. Cleats: Continuous, formed to profile of item being secured.
   3. Clips: Minimum 2" wide by 3" long formed to profile of item being secured. Space at 24" o.c. maximum except as otherwise indicated.

F. Gutters and Downspouts:
   1. Gutter joints must be lapped 1 inch, riveted on 2 inch centers, and soldered weathertight.
   2. Secure downspouts to exterior walls at 10 feet on center maximum. Lap downspout joints 1-1/2 inch and rivet.
   3. Provide downspout terminations at grade. Coordinate installation to ensure that water is directed onto concrete paving or concrete splashblock. Provide connection to underground storm drain system where indicated on Drawings. Extend 2 inches into pvc cap, and apply sealant all around.

G. Roof Penetration Flashing: Flash and install penetrations in accordance with sheet roofing manufacturer's product data.

END OF SECTION

SECTION 07 7200
ROOF ACCESSORIES

PART 1 GENERAL

1.01 SECTION INCLUDES

A. Roof hatches.

B. Prefabricatd hatch rail system.

C. Ladder up safety post

1.02 RELATED REQUIREMENTS

A. Section 07 6200 - Sheet Metal Flashing and Trim: Roof accessory items fabricated from sheet metal.

1.03 SUBMITTALS

A. See Section 01 3000 - Administrative Requirements, for submittal procedures.

B. Product Data: Manufacturer's data sheets on each product to be used.

1.04 DELIVERY, STORAGE, AND HANDLING

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

B. Store products under cover and elevated above grade.

PART 2 PRODUCTS

2.01 ROOF HATCHES

A. Manufacturers - Roof Hatches:
   1. Acudor Products Inc: www.acudor.com.
   2. Babcock-Davis: www.babcockdavis.com.
   3. Bilco Co.: www.bilco.com
   4. Dur-Red Products: www.dur-red.com.
   5. Substitutions: See Section 01 6000 - Product Requirements.

B. Roof Hatch Assembly Requirements:
   1. Design Wind Speed: Loading shown on Structural Drawings.

C. Roof Hatches and Smoke Vents, General: Factory-assembled steel frame and cover, complete with operating and release hardware.
   1. Style: Provide flat metal covers unless otherwise indicated.
   2. For Stair Access: Single leaf; opening 30 by 96 inches.

D. Frames/Curbs: One-piece curb and frame with integral cap flashing to receive roof flashings; extended bottom flange to suit mounting.
   1. Material: Galvanized steel, 14 gage, 0.0747 inch thick.
   2. Finish: Factory prime paint.
   3. Insulation: Manufacturer's standard; 1 inch rigid glass fiber, located on outside face of curb.
   4. Curb Height: 12 inches from surface of roof deck, minimum.

E. Metal Covers: Flush, insulated, hollow metal construction.
   1. Capable of supporting 40 psf live load.
   2. Material: Galvanized steel; outer cover 14 gage, 0.0747 inch thick, liner 22 gage, 0.03 inch thick.
   3. Finish: Factory prime paint.
   4. Insulation: Manufacturer's standard 1 inch rigid glass fiber.
   5. Gasket: Neoprene, continuous around cover perimeter.

F. Safety Railing System: Manufacturer's standard accessory safety rail system mounted directly to curb.
   1. Comply with 29 CFR 1910.23, with a safety factor of two.

2. Posts and Rails: Aluminum tube.
3. Gate: Same material as railing; automatic closing with latch.
4. Finish: Manufacturer's standard, factory applied finish.
5. Gate Hinges and Post Guides: ASTM B221 (ASTM B221M), 6063 alloy, T5 temper aluminum.
6. Mounting Brackets: Hot dipped galvanized steel, 1/4 inch thick, minimum.
7. Fasteners: Type 316 stainless steel.

G. Hardware: Steel, zinc coated and chromate sealed, unless otherwise indicated or required by manufacturer.
1. Lifting Mechanisms: Compression or torsion spring operator with shock absorbers that automatically opens upon release of latch; capable of lifting covers despite 10 psf load.
2. Hinges: Heavy duty pintle type.
3. Hold open arm with vinyl-coated handle for manual release.
4. Latch: Upon closing, engage latch automatically and reset manual release.
5. Locking: Padlock hasp on interior.

2.02 LADDER UP SAFETY POST

A. Safety post shall be equal to LadderUP® safety post Model LU-1 as manufactured by The Bilco Company. Device shall be steel with black enamel finish. It shall be designed with a telescoping tubular section that locks automatically when fully extended. Upward and downward movement shall be controlled by a stainless steel spring balancing mechanism.

B. Install on fixed ladder below hatch cover. Unit shall be completely assembled with fasteners for securing to the ladder rungs in accordance with the manufacturer’s instructions.

PART 3 EXECUTION

3.01 INSTALLATION

A. Install in accordance with manufacturer's instructions, in manner that maintains roofing weather integrity.

B. Apply bituminous paint on surfaces of units in contact with cementitious materials or dissimilar metals.

C. Adjust hinges for smooth operation.

D. Secure telescoping safety post to top two rungs of access ladder or as shown in drawings.

END OF SECTION

SECTION 07 9200
JOINT SEALANTS

PART 1 GENERAL

1.01 SECTION INCLUDES

A. Sealants.

B. Joint backings and accessories.

1.02 RELATED REQUIREMENTS

A. Section 07 8400 - Firestopping: Firestopping sealants.

B. 07 9216 - INTERIOR FLOOR JOINT FILLER AND SEALANT

C. Section 08 8000 - Glazing: Glazing sealants and accessories.

D. Section 09 2116 - GYPSUM BOARD ASSEMBLIES: Sealing acoustical and sound-rated walls and ceilings.

1.03 REFERENCE STANDARDS

A. ASTM C834 - Standard Specification for Latex Sealants; 2014.

B. ASTM C920 - Standard Specification for Elastomeric Joint Sealants; 2014.

C. ASTM C1193 - Standard Guide for Use of Joint Sealants; 2013.

D. ASTM C1330 - Standard Specification for Cylindrical Sealant Backing for Use with Cold Liquid-Applied Sealants; 2002 (Reapproved 2013).

E. SCAQMD 1168 - South Coast Air Quality Management District Rule No.1168; current edition.

1.04 SUBMITTALS

A. See Section 01 3000 - Administrative Requirements, for submittal procedures.

B. Product Data for Sealants: Submit manufacturer's technical data sheets for each product to be used, that includes the following.
   1. Physical characteristics, including movement capability, VOC content, hardness, cure time, and color availability.
   2. List of backing materials approved for use with the specific product.
   3. Substrates that product is known to satisfactorily adhere to and with which it is compatible.
   4. Substrates the product should not be used on.
   5. Substrates for which use of primer is required.
   6. Installation instructions, including precautions, limitations, and recommended backing materials and tools.

C. Color Cards for Selection: Where sealant color is not specified, submit manufacturer's color cards showing standard colors available for selection.

D. Sustainable Design Documentation: For sealants and primers, submit VOC content and emissions documentation as specified in Section 01 6116.

1.05 QUALITY ASSURANCE

A. Installer Qualifications: Company specializing in performing the work of this section and with at least three years of documented experience.

1.06 WARRANTY

A. See Section 01 7800 - Closeout Submittals, for additional warranty requirements.

B. Correct defective work within a 2 year period after Date of Substantial Completion.

C. Warranty: Include coverage for installed sealants and accessories that fail to achieve watertight seal , exhibit loss of adhesion or cohesion, or do not cure.

PART 2 PRODUCTS

2.01 MANUFACTURERS

A. BASF Construction Chemicals-Building Systems: www.buildingsystems.basf.com.

B. Dow Corning Corporation: www.dowcorning.com/construction/sle.

C. Pecora Corporation: www.pecora.com.

D. Tremco Global Sealants: www.tremcosealants.com.

E. Sika Corporation: www.usa-sika.com.

F. Tremco Commercial Sealants & Waterproofing: www.tremcosealants.com/#sle.

G. W.R. Meadows, Inc: www.wrmeadows.com/sle.

H. Substitutions: See Section 01 6000 - Product Requirements.

2.02 SEALANTS

A. Exterior Portland cement concrete pavement joint sealant, non-sag silicone, ASTM D5893 Type NS, single component, low modulus, weather and UV resistant.
   1. Color: Gray
   2. Product:
      a. Dow Corning #888
   3. Movement Capability: Plus 100 percent, minus 50 percent.
   4. Appplications: Use for sealing of cracks and joints in exterior concrete paving.

B. Exterior Metal Lap Joint Sealant: Butyl or polyisobutylene, nondrying, nonskinning, noncuring.
   1. Product:
      a. Pecora: BC-158.
      b. Tremco: TremPro JS-773.
   2. Applications: Use for:
      a. Concealed sealant bead in sheet metal work.

C. General Purpose Interior Sealant: Siliconized acrylic emulsion latex; ASTM C834, Type OP, Grade NF single component, paintable.
   1. Color: Standard colors matching finished surfaces.
   2. Product:
      a. Pecora: AC-20 + Silicone.
      b. BASF: Masterseal NP 520.
      c. Tremco: Tremflex 834
   3. Applications: Use for:
      a. Interior wall and ceiling control joints.
      b. Joints between door and window frames and wall surfaces.
      c. Other interior joints for which no other type of sealant is indicated.

D. Bathtub/Tile Sealant: Silicone; ASTM C 920, Uses I, M and A; single component, mildew resistant.
   1. Product:
      a. Pecora: #898.
      b. BASF: OmniPlus.
      c. Tremco: Tremsil 200
   2. Applications: Use for:
      a. Joints between plumbing fixtures and floor and wall surfaces.
      b. Joints between kitchen and bath countertops and wall surfaces.

E. Nonsag Polyurethane Sealant: ASTM C920, Grade NS, Class 25, Uses NT, I, M, A, G; multi component, chemical curing, non-staining, non bleeding, non-sagging type.
   1. Color: Colors as selected by Architect from manufacturer's standard stock color selection.
   2. Product:
      a. Pecora: Dynatrol II.

b. Tremco Dymeric: 240FC.
c. BASF Masterseal NP2.
d. Sikaflex-2c NS

3. Movement Capability: Plus and minus 25 percent.
4. Applications:
   a. interior joints between concrete wall panels and between concrete panels and other work.

F. Self-Leveling Polyurethane Sealant: ASTM C920, Grade P, Class 25 minimum; Uses T, I, M, A, O; single component, chemical curing, non staining, non bleeding, capable of continuous water immersion, self-leveling type.
1. Color: Gray.
2. Product:
   a. Pecora: Urexpan NR 201.
   b. BASF Masterseal SL1.
   c. Tremco: 45SSL.
   d. Sikaflex-1c SL.
3. Movement Capability: Plus and minus 50 percent.
4. Applications:
   a. Joints in sidewalks and exterior concrete paving
   b. Joint where concrete sidewalk or paving abuts vertical surfaces.

G. Silicone Sealant: ASTM C 920, Grade NS, Class 50, Uses NT, A, G, M, O; single component, moisture curing, non staining, non bleeding.
1. Color: Color as selected by Architect from manufacturer's standard stock color selection.
2. Product:
   a. Dow Corning: #790.
   b. Pecora: #890.
   c. Tremco: Spectrem 1.
   d. Sikasil-728NS
3. Movement Capability: Plus 100 percent, minus 50 percent.
4. Applications:
   a. Exterior and interior perimeter joints at storefronts.
   b. Bedding joints under exterior thresholds.
   c. Exterior joints between concrete wall panels and between concrete panels and other work.

2.03 ACCESSORIES

A. Backer Rod: Cylindrical cellular foam rod with surface that sealant will not adhere to, compatible with specific sealant used, and recommended by backing and sealant manufacturers for specific application.

B. Backing Tape: Self-adhesive polyethylene tape with surface that sealant will not adhere to and recommended by tape and sealant manufacturers for specific application.

C. Joint Cleaner: Non-corrosive and non-staining type, type recommended by sealant manufacturer; compatible with joint forming materials.

D. Primers: Type recommended by sealant manufacturer to suit application; non-staining.

PART 3 EXECUTION

3.01 EXAMINATION

A. Verify that joints are ready to receive work.

B. Verify that backing materials are compatible with sealants.

C. Verify that backer rods are of the correct size.

3.02 PREPARATION

A. Remove loose materials and foreign matter that could impair adhesion of sealant.

B. Clean joints, and prime as necessary, in accordance with manufacturer's instructions.

C. Perform preparation in accordance with manufacturer's instructions and ASTM C1193.

D. Mask elements and surfaces adjacent to joints from damage and disfigurement due to sealant work; be aware that sealant drips and smears may not be completely removable.

3.03 INSTALLATION

A. Perform work in accordance with sealant manufacturer's requirements for preparation of surfaces and material installation instructions.

B. Perform installation in accordance with ASTM C1193.

C. Measure joint dimensions and size joint backers to achieve width-to-depth ratio, neck dimension, and surface bond area as recommended by manufacturer, except where specific dimensions are indicated.

D. Install bond breaker backing tape where backer rod cannot be used.

E. Install sealant free of air pockets, foreign embedded matter, ridges, and sags, and without getting sealant on adjacent surfaces.

F. Employ installation techniques which will insure that caulking materials are deposited in uniform, continuous ribbons without gaps or air pockets, with complete wetting of joint bond surfaces. Where horizontal joints are between a horizontal surface and a vertical surface, fill joint to form slight cove so that joint will not trap moisture and debris.

G. Do not allow materials to overflow or spill onto adjacent surfaces. use masking tape or other precautionary devices to prevent staining of adjacent surfaces.

H. Remove excess and misplaced materials as work progresses. Clean the adjoining surfaces to eliminate evidence of misplaced materials, without damage to adjacent surfaces or finishes.

I. Tool joints concave.

J. Do not install sealant when ambient temperature is outside manufacturer's recommended temperature range, or will be outside that range during the entire curing period, unless manufacturer's approval is obtained and instructions are followed.

K. Nonsag Sealants: Tool surface concave, unless otherwise indicated; remove masking tape immediately after tooling sealant surface.

3.04 EXTERIOR CONCRETE WALL PANEL JOINTS

A. Coordinate installation of sealant and backer rod material with installation of textured coating. Backer rod may be placed in joint to prevent textured coating from adhering to joint surfaces.

B. Install backer rod half way into joint prior to coating panels; remove backer rod and rotate 180 degrees and reinsert prior to installing sealant.

C. Install panel joint sealant after textured coating has been applied.

3.05 CLEANING

A. Clean adjacent soiled surfaces.

3.06 PROTECTION

A. Protect sealants until cured.

END OF SECTION

SECTION 07 9216
INTERIOR FLOOR JOINT FILLER AND SEALANT

PART 1 GENERAL

1.01 SECTION INCLUDES

A. Furnishing and installing floor joint filler in construction joints and sawn contraction joints in interior concrete floor slabs within Warehouse Area.

1.02 RELATED SECTIONS

A. Section 03 3000 - Cast-In-Place Concrete.

B. Section 07 9005 - Joint Sealers.

1.03 REFERENCES

A. ASTM D 2240 - Rubber Property - Durometer Hardness.

B. ACI 302.1R - Guide for Concrete Floor and Slab Construction.

1.04 SUBMITTALS

A. Product Data: Provide data indicating sealant performance criteria, substrate preparation, limitations and color availability.

B. Color Samples: Submit samples of manufacturer's standard material colors and special colors as indicated at least 30 days prior to commencement of application. Samples shall be actual materials.

C. Submit manufacturer's approved applicator certificate.

1.05 QUALITY ASSURANCE

A. Applicator Qualifications: Company specializing in performing the work of this section with minimum three years experience.

1.06 DELIVERY, STORAGE AND HANDLING

A. Deliver and store materials in manufacturer's unopened packaging with seals and labels intact. Comply with manufacturer's instructions regarding environmental conditions under which materials may be stored.

1.07 ENVIRONMENTAL REQUIREMENTS

A. Maintain temperature and humidity recommended by the joint filler manufacturer during and after installation.

B. Comply with manufacturer's recommendation as to environmental conditions under which materials may be applied.

PART 2 PRODUCTS

2.01 SEMI-RIGID JOINT FILLER

A. Epoxy Products:
   1. Metzger/McGuire Co: MM-80.
   2. Euclid Chemical Co - Euco 700.

B. Description:
   1. Hardness Shore A: A85 minimum.
   2. Tensile Strength: 500 psi minimum.
   3. Adhesion to Concrete: 285 psi minimum.
   4. Solids Content: 100%.

C. Joint Filler Stain Preventing Film:
   1. SPF by Metzger/McGuire.
   2. Euco CleanCut by Euclid.

2.02 SELF-LEVELING FLEXIBLE POLYURETHANE ISOLATION JOINT SEALANT

A. Products: Subject to compliance with requirements, provide one of the following:
   1. Euclid Chemical Co: Eucolastic II.
   2. Pecora: Urexpan NR 200.
   3. Sonneborn Building Products - Sonolastic SL 2 Sealant.
   4. Tremco: THC 900.
   5. Vulkem - Vulkem 45.

B. Description:
   1. Hardness - Shore "A": A30 minimum.
   2. Movement Capability: Plus and minus 25 percent.
   3. USDA Approved.

2.03 STRUCTURAL REPAIR MORTAR

A. Products:
   1. Metzger McGuire: Armor-Hard for spalls greater than 4 inch.
   2. Metzger McGuire: Rapid Refloor for spalls less than 4 inch.

B. Description: High strength polymer resin material manufactured to repair and rebuild large openings and spalled concrete floor areas. Two-part, 100% solids, liquid system with high tensile strength, intended to be used alone or to be combined with aggregate to create a mortar.

2.04 ACCESSORIES

A. Do not use silica sand to choke-off shrinkage cracks beneath filler.

B. The use of compressible foam backer rod is strictly prohibited in ALL saw-cut contraction joints. Use of backer rod in any saw-cut joints will result in rejection of all saw-cut joint work.

C. Compressible foam backer rod may be used in through slab construction joints only but MUST be placed below saw-cut shelf and at a minimum depth of 2 inch. No other use of backer rod will be allowed.

PART 3 EXECUTION

3.01 INSTALLATION

A. Installation shall be by installer who is approved in writing by the manufacturer's corporate office for this project. It is the responsibility of the installer to inspect project and joint conditions and notify on-site management in writing of any deficiencies that might adversely affect the quality or durability of the work performed or his contract price. Start of work by the installer implies acceptance of conditions.

B. Installation shall not proceed until the slab has had a minimum cure time of 90 days.

C. Use joint filler stain preventing film at all joints where semi-rigid epoxy joint filler is applied.

3.02 JOINT SURFACE PREPARATION

A. Prior to installation of joint fillers, all saw-cut joints shall be thoroughly cleaned to their full original depth. Construction joints shall be cleaned to a minimum depth of 2 inch.

B. Construction joints shall be recut minimum 1/8 inch wide by 2 inch deep.

C. Where joints have minor raveling and edge chips (less than 1 inch wide), they shall be squared off and filled along with the joint itself.

D. Wide area surface spalled areas along the joint (1 inch wide and greater) shall be squared off and filled with epoxy repair mortar and joint recut and filled.

E. Apply stain preventing film prior to joint cleanout and filler placement.

3.03 CHOKING-OFF JOINT BOTTOM

A. Do NOT use silica sand placed at the bottom of the saw-cut joints to prevent filler run-thru into the shrinkage crack.

B. Compressible backer rod is prohibited in saw-cut joints.

C. Compressible backer rod may be used in through-slab (non-sawn) construction joints only, but must be placed BELOW saw-cut shelf and at a miniumum depth of 2”. No other use of backer rod will be allowed.

3.04 APPLICATION OF SEMI-RIGID JOINT FILLER

A. Material shall be mixed and installed in strict accordance with manufacturer's printed installation instructions, except where more stringent requirements are shown or specified.

B. Install using a two pass method per manufacturer instructions, with second pass overfilled (crowned).

C. Once the filler has fully cured, razor off excess to leave a flush filler profile. The overfill should be heated just prior to shaving to provide a smooth, flush filler profile (see manufacturer instructions on heating methods).

D. Remove stain preventing film. Film shall be removed by joint filler installer immediately after shaving joint filler.

3.05 JOINT FILLER DEFICIENCIES

A. Installer is advised that significant deficiencies in workmanship, including less than proper filler depth, inadequate joint cleaning, concave filler profile, etc., shall be removed and properly replaced.

B. Joint filler installed to depths less than specified in this Section shall be removed and replaced at no additional cost to the General Contractor or Owner. As each sector of work is completed the general contractor, using a 1/8” drill bit, shall drill through the filler to verify filler depth. GC shall test drill at an approximate rate of 1 core every 1,000 lineal feet. Location of core and filler depth found shall be recorded and provided to the owner prior to project completion.

3.06 JOINT FILLER SEPARATION:

A. Joint filler separation, both adhesive (leap-frog side to side) and cohesive, occurs as a result of concrete shrinkage and subsequent joint opening in excess of the fillers ability to laterally expand. In the event joint separation voids are 0.03. inch (credit card width) or greater, correction by refilling shall be required.

3.07 JOINT SEALANT INSTALLATION

A. Conform to manufacturer's printed installation instructions.

3.08 JOINT FILLER SCHEDULE

A. Interior Floor Slab Isolation Joints Subject to Movement: Flexible polyurethane joint sealant.
   1. Interior floor slab joints subject to movement include joints between floor slab and column isolation pour, and floor slab isolated from vertical wall surface.

B. Interior Warehouse Floor Slab Joints: Semi-rigid epoxy joint filler.
   1. Interior floor slab joints in non-office areas of Warehouse not subject to movement include sawn contraction joints and construction joints.

END OF SECTION

SECTION 08 1113
HOLLOW METAL DOORS AND FRAMES

PART 1 GENERAL

1.01 SECTION INCLUDES

A. Non-fire-rated steel doors and frames.

B. Fire-rated steel doors and frames.

C. Thermally insulated steel doors.

D. Steel glazing frames.

1.02 RELATED REQUIREMENTS

A. Section 08 7100 - Door Hardware.

B. Section 08 8000 - Glazing: Glass for doors and borrowed lites.

C. Section 09 9113 - Exterior Painting: Field painting.

D. Section 09 9123 - Interior Painting: Field painting.

1.03 REFERENCE STANDARDS

A. ADA Standards - Americans with Disabilities Act (ADA) Standards for Accessible Design; 2010.

B. ANSI/ICC A117.1 - American National Standard for Accessible and Usable Buildings and Facilities; International Code Council; 2009.

C. ANSI/SDI A250.8 - Specifications for Standard Steel Doors and Frames (SDI-100); 2014.

D. ANSI/SDI A250.10 - Test Procedure and Acceptance Criteria for Prime Painted Steel Surfaces for Steel Doors and Frames; 2011.

E. ASTM A653/A653M - Standard Specification for Steel Sheet, Zinc-Coated (Galvanized) or Zinc-Iron Alloy-Coated (Galvannealed) by the Hot-Dip Process; 2015.

F. BHMA A156.115 - American National Standard for Hardware Preparation in Steel Doors and Steel Frames; 2014.

G. ICC A117.1 - Accessible and Usable Buildings and Facilities; 2009.

H. DHI A115 Series - Specifications for Steel Doors and Frame Preparation for Hardware; Door and Hardware Institute; 2000 (ANSI/DHI A115 Series).

I. NAAMM HMMA 840 - Guide Specifications for Installation and Storage of Hollow Metal Doors and Frames; 2007.

J. NFPA 80 - Standard for Fire Doors and Other Opening Protectives; 2016.

K. SDI - 105 - Recommended Erection Instructions for Steel Frames.

L. UL 10C - Standard for Positive Pressure Fire Tests of Door Assemblies; Current Edition, Including All Revisions.

1.04 SUBMITTALS

A. See Section 01 3000 - Administrative Requirements, for submittal procedures.

B. Product Data: Materials and details of design and construction, hardware locations, reinforcement type and locations, anchorage and fastening methods, and finishes; and one copy of referenced grade standard.

C. Shop Drawings: Details of each opening, showing elevations, glazing, frame profiles, and any indicated finish requirements.

D. Manufacturer's Certificate: Certification that products meet or exceed specified requirements.

1.05 DELIVERY, STORAGE, AND HANDLING

A. Comply with NAAMM HMMA 840 or ANSI/SDI A250.8 (SDI-100) in accordance with specified requirements.

B. Protect with resilient packaging; avoid humidity build-up under coverings; prevent corrosion and adverse effects on factory applied painted finish.

PART 2 PRODUCTS

2.01 MANUFACTURERS

A. Steel Doors and Frames:
   1. Ceco Door Products.
   2. Curries Co.
   3. Mesker Co.
   4. Republic Builders Products.
   5. Steelcraft.
   6. Substitutions: See Section 01 6000 - Product Requirements.

2.02 DOORS AND FRAMES

A. Requirements for All Doors and Frames:
   1. Accessibility: Comply with ICC A117.1 and ADA Standards.
   2. Door Texture: Smooth faces.
   3. Glazed Lights: Non-removable stops on non-secure side; sizes and configurations as indicated on drawings.
   4. Hardware Preparation: In accordance with BHMA A156.115, with reinforcement welded in place, in addition to other requirements specified in door grade standard.
   5. Finish: Factory primed, for field finishing.

B. Combined Requirements: If a particular door and frame unit is indicated to comply with more than one type of requirement, comply with all the specified requirements for each type; for instance, an exterior door that is also indicated as being sound-rated must comply with the requirements specified for exterior doors and for sound-rated doors; where two requirements conflict, comply with the most stringent.

2.03 STEEL DOORS

A. Exterior Doors:
   1. Grade: ANSI A250.8 Level 2, physical performance Level B, Model 2, seamless (18 gage). No visible seams permitted.
   2. Core: Polystyrene foam.
   3. Top Caps : Flush with top of faces and edges.
   4. Galvanizing: Components hot-dipped zinc-iron alloy-coated (galvannealed) in accordance with ASTM A653/A653M, with manufacturer's standard coating thickness.
   5. Insulating Value: U-value of 0.50, when tested in accordance with ASTM C1363 .
   6. Weatherstripping: Separate, see Section 08 7100.

B. Interior Doors, Non-Fire-Rated:
   1. Grade: ANSI A250.8 Level 2, physical performance Level B, Model 2, seamless (18 gage). No visible seams permitted.
   2. Core: Kraftpaper honeycomb.
   3. Thickness: 1-3/4 inch.

C. Interior Doors, Fire-Rated:
   1. Grade: ANSI A250.8 Level 2, physical performance Level B, Model 2, seamless (18 gage). No visible seams permitted.
   2. Fire Rating: As indicated on Door and Frame Schedule, tested in accordance with UL 10C ("positive pressure").
      a. Attach fire rating label to each fire rated unit.
   3. Core: Mineral board.
   4. Thickness: 1-3/4 inches.

2.04 STEEL FRAMES

A. General:

1. Comply with the requirements of grade specified for corresponding door.
   a. ANSI A250.8 Level 2 Doors: 16 gage frames.
2. Finish: Factory primed, for field finishing.
3. Frames in Masonry Walls: Size to suit masonry coursing with head member 4 inches high to fill opening without cutting masonry units.

B. Exterior Door Frames: Face welded, seamless with joints filled.
   1. Galvanizing: Components hot-dipped zinc-iron alloy-coated (galvannealed) in accordance with ASTM A653/A653M, with manufacturer's standard coating thickness.
   2. Weatherstripping: Separate, see Section 08 7100.

C. Interior Door Frames, Non-Fire-Rated: Knockdown type.

D. Interior Door Frames, Fire-Rated: Knockdown type.
   1. Fire Rating: Same as door, labeled.

E. Frames for Interior Glazing or Borrowed Lights: Construction and face dimensions to match door frames, and as indicated on drawings.

2.05 ACCESSORY MATERIALS

A. Louvers: Roll formed steel with overlapping frame; finish same as door components; factory-installed.

B. Glazing: As specified in Section 08 8000, factory installed.

C. Removable Stops: Formed sheet steel, mitered corners; prepared for countersink style tamper proof screws.

D. Astragals for Double Doors:
   1. Exterior Doors: Steel, Z-shaped.
   2. Fire-Rated Doors: Steel, shape as required to accomplish fire rating.

E. Silencers: Resilient rubber, fitted into drilled hole; 3 on strike side of single door, 3 on center mullion of pairs, and 2 on head of pairs without center mullions.

F. Temporary Frame Spreaders: Provide for all factory- or shop-assembled frames.

2.06 FINISH MATERIALS

A. Primer: Rust-inhibiting, complying with ANSI/SDI A250.10, door manufacturer's standard.

B. Bituminous Coating: Asphalt emulsion or other high-build, water-resistant, resilient coating.

PART 3 EXECUTION

3.01 EXAMINATION

A. Verify existing conditions before starting work.

B. Verify that opening sizes and tolerances are acceptable.

C. Verify that finished walls are in plane to ensure proper door alignment.

3.02 PREPARATION

A. Coat inside of frames to be installed in masonry or to be grouted, with bituminous coating, prior to installation.

3.03 INSTALLATION

A. Install frames in accordance with SDI-105

B. In addition, install fire rated units in accordance with NFPA 80.

C. Coordinate frame anchor placement with wall construction.

D. Grout frames in masonry construction, using hand trowel methods; brace frames so that pressure of grout before setting will not deform frames.

E. Coordinate installation of hardware.

F. Comply with glazing installation requirements of Section 08 8000.

G. Coordinate installation of electrical connections to electrical hardware items.

3.04 TOLERANCES

A. Clearances Between Door and Frame: As indicated in ANSI/SDI A250.8 (SDI-100).

B. Maximum Diagonal Distortion: 1/16 in measured with straight edge, corner to corner.

3.05 ADJUSTING AND CLEANING

A. Adjust for smooth and balanced door movement.

B. Fill all dents, holes, etc. with metal filler and sand smooth and flush with adjacent surfaces - Paint to match finish.

C. Remove dirt and excess sealants, mortar, or glazing compounds from exposed surfaces.

END OF SECTION

SECTION 08 3613
SECTIONAL DOORS

PART 1 GENERAL

1.01 SECTION INCLUDES

A. Overhead sectional doors, manually operated.

B. Operating hardware and supports.

1.02 REFERENCE STANDARDS

A. ASTM A653/A653M - Standard Specification for Steel Sheet, Zinc-Coated (Galvanized) or Zinc-Iron Alloy-Coated (Galvannealed) by the Hot-Dip Process; 2015.

B. ASTM E330/E330M - Standard Test Method for Structural Performance of Exterior Windows, Doors, Skylights and Curtain Walls by Uniform Static Air Pressure Difference; 2014.

C. DASMA 102 - American National Standard Specifications for Sectional Overhead Type Doors; 2011.

1.03 SUBMITTALS

A. Shop Drawings: Indicate opening dimensions and required tolerances, connection details, anchorage spacing, hardware locations, and installation details.

B. Wind Load Certification: Submit documentation from manufacturer certifying that doors have been tested in accordance with the specified requirements.

1.04 QUALITY ASSURANCE

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

B. Doors shall include a manufacturer's label certifying compliance with specified windload.

1.05 WARRANTY

A. See Section 01 7800 - Closeout Submittals for warranty requirements.

B. Provide one (1) year warranty against defects in materials and workmanship, commencing with the Date of Substantial Completion.

PART 2 PRODUCTS

2.01 INSULATED STEEL SECTIONAL DOORS

A. Acceptable Manufacturers (Heavy Duty Door):
   1. Clopay: 3717 Series.
   2. Overhead Door Co: Thermacore 591 Series
   3. Wayne Dalton Door Co: Thermospan TS150 Series.
   4. Substitutions: See Section 01600 - Product Requirements.

B. Characteristics:
   1. Size: As indicated on the drawings.
   2. Type: Metal/foam/metal sandwich panel construction, with EPDM thermal break and ship-lap design with rounded water channels.
   3. Panels:
      a. Metal Facer: Nominal 26 gauge galvanized steel, stucco embossed.
      b. Panel Thickness: nominal 1 3/8 inch.
      c. Finish: Manufacturer’s standard baked-on polyester coat. Color as indicated on drawings.
      d. Insulation: CFC-free and HCFC-free polyurethane, fully encapsulated.
      e. Thermal Values: Minimum R-value of 12.75.
   4. Operation:
      a. Truck Doors: Manual pull rope operated.
      b. Drive-In Doors: Chain hoist operated.

5. Lift: Full vertical, unless otherwise indicated.
6. Hardware:
    a. Counterbalance: Heavy duty torsion springs mounted on cross header shaft. Minimum 50,000 cycle.
    b. Tracks: 3 inch.
    c. Provide lift handles on inside face.
    d. Lock: Provide inside only slide bar lock – mount at 5 feet AFF on left side of door.
    e. Hinges: heavy duty.
    f. Provide spring bumpers.
7. Weatherstripping: EPDM rubber tube seals fitted inside joints between sections. EPDM rubber bulb-type strip at bottom. Header seal and jamb weatherstripping.
8. Vision Panel: 1/4 inch acrylic. Nominal size 24 inch x 6 inch. Frame to match door finish.
9. Wind Load Design: Withstand positive and negative wind loads when tested in accordance with ASTM E 330. Total test duration for each test direction shall be one minute at design pressure. Include pressure equal to 1.5 times the design pressure for 10 seconds during each test.
    a. Design Wind Load Pressure: See Structural Drawings, Allowable Stress Design (ASD) for Components and Cladding.

2.02 SCREEN SECTIONAL DOORS

A. Acceptable Manufacturers:
    1. Rasco Industries, Inc.: Bug Blocker

B. Characteristics:
    1. Size: As indicated on the drawings.
    2. Type: Aluminum frame construction.
    3. Panels:
        a. Screen Panel: Stainless steel 0.011 inch 30 x 30 mesh.
        b. Finish: Manufacturer’s standard anodized aluminum frame.
    4. Operation:
        a. Truck Doors: Manual pull rope operated.
    5. Lift: Full vertical. Coordinate setting separate track behind dock doors
    6. Hardware:
        a. Counterbalance: Heavy duty torsion springs mounted on cross header shaft. Minimum 50,000 cycle.
        b. Tracks: 3 inch.
        c. Maufacturer's standrad hardware.
        d. Hinges: heavy duty.
        e. Provide spring bumpers.
    7. Seals: Maufacturer's standard bulb and/or brush seals to fully close gaps.
    8. Wind Load Design: Withstand positive and negative wind loads when tested in accordance with ASTM E 330. Total test duration for each test direction shall be one minute at design pressure. Include pressure equal to 1.5 times the design pressure for 10 seconds during each test.
        a. Design Wind Load Pressure: See Structural Drawings, Allowable Stress Design (ASD) for Components and Cladding.
    9. Screen door system to be fully coordinated to function with with dock door assembly

PART 3 EXECUTION

3.01 EXAMINATION

A. Verify that wall openings are ready to receive work and opening dimensions and tolerances are within specified limits.

3.02 INSTALLATION

A. Install door unit assembly in accordance with manufacturer's instructions.

B. Anchor assembly to wall construction and building framing without distortion or stress.

C. Securely brace door tracks suspended from structure. Secure tracks to structural members only.

D. Fit and align door assembly including hardware.

3.03 TOLERANCES

A. Maximum Variation from Plumb: 1/16 inch.

B. Maximum Variation from Level: 1/16 inch.

C. Longitudinal or Diagonal Warp: Plus or minus 1/8 inch from 10 ft straight edge.

D. Maintain dimensional tolerances and alignment with adjacent work.

3.04 ADJUSTING

A. Adjust door assembly for smooth operation and full contact with weatherstripping.

3.05 PROTECTION

A. Protect installed products from damage until Date of Substantial Completion.

B. Do not permit construction traffic through overhead door openings after adjustment and cleaning.

END OF SECTION

SECTION 08 4313
ALUMINUM-FRAMED STOREFRONTS

PART 1 GENERAL

1.01 SECTION INCLUDES

A. Aluminum-framed storefront, with vision glass.

B. Aluminum doors and frames.

C. Weatherstripping.

D. Door hardware.

1.02 RELATED REQUIREMENTS

A. Section 07 9005 - Joint Sealers: Perimeter sealant and back-up materials.

B. Section 08 7100 - Door Hardware: Hardware items other than specified in this section.

C. Section 08 8000 - Glazing: Glass and glazing accessories.

1.03 REFERENCE STANDARDS

A. AAMA CW-10 - Care and Handling of Architectural Aluminum From Shop to Site; 2015.

B. AAMA 611 - Voluntary Specification for Anodized Architectural Aluminum; 2012.

C. ASTM B209 - Standard Specification for Aluminum and Aluminum-Alloy Sheet and Plate; 2014.

D. ASTM B209M - Standard Specification for Aluminum and Aluminum-Alloy Sheet and Plate [Metric]; 2014.

E. ASTM B221 - Standard Specification for Aluminum and Aluminum-Alloy Extruded Bars, Rods, Wire, Profiles, and Tubes; 2014.

F. ASTM B221M - Standard Specification for Aluminum and Aluminum-Alloy Extruded Bars, Rods, Wire, Profiles, and Tubes [Metric]; 2013.

G. ASTM E283 - Standard Test Method for Determining the Rate of Air Leakage Through Exterior Windows, Curtain Walls, and Doors Under Specified Pressure Differences Across the Specimen; 2004 (Reapproved 2012).

1.04 PERFORMANCE REQUIREMENTS

A. Design and size components to withstand the following load requirements without damage or permanent set, when tested in accordance with ASTM E 330, using loads 1.5 times the design wind loads and 10 second duration of maximum load.
   1. Design Wind Load: See General Notes on Structural Drawings.
   2. Member Deflection: Limit member deflection to 1/175 in any direction, with full recovery of glazing materials.

B. Movement: Accommodate movement between storefront and perimeter framing and deflection of lintel, without damage to components or deterioration of seals.

C. Air Infiltration: Limit air infiltration through assembly to 0.06 cu ft/min/sq ft of wall area, measured at a reference differential pressure across assembly of 1.57 psf as measured in accordance with ASTM E 283.

D. Water Leakage: None, when measured in accordance with ASTM E 331 with a test pressure difference of 2.86 lbf/sq ft.

E. System Internal Drainage: Drain to the exterior by means of a weep drainage network any water entering joints, condensation occurring in glazing channel, and migrating moisture occurring within system.

F. Expansion/Contraction: Provide for expansion and contraction within system components caused by cycling temperature range of 170 degrees F over a 12 hour period without causing detrimental effect to system components, anchorages, and other building elements.

1.05 SUBMITTALS

A. See Section 01 3000 - Administrative Requirements, for submittal procedures.

B. Product Data: Provide component dimensions, describe components within assembly, anchorage and fasteners, glass and infill, internal drainage details .

C. Shop Drawings: Indicate system dimensions, framed opening requirements and tolerances, affected related Work, expansion and contraction joint location and details, and field welding required.

D. Hardware Schedule: Complete itemization of each item of hardware to be provided for each door, cross-referenced to door identification numbers in Contract Documents.

E. Warranty: Submit manufacturer warranty and ensure forms have been completed in Owner's name and registered with manufacturer.

1.06 QUALITY ASSURANCE

A. Designer Qualifications: Design structural support framing components under direct supervision of a Professional Structural Engineer experienced in design of this Work and licensed at the State in which the Project is located.

B. Manufacturer and Installer Qualifications: Company specializing in manufacturing aluminum glazing systems with minimum three years of documented experience.

1.07 DELIVERY, STORAGE, AND HANDLING

A. Handle products of this section in accordance with AAMA CW-10.

B. Protect finished aluminum surfaces with wrapping. Do not use adhesive papers or sprayed coatings that bond to aluminum when exposed to sunlight or weather.

1.08 PROJECT CONDITIONS

A. Coordinate the work with installation of firestopping components or materials.

1.09 FIELD CONDITIONS

A. Do not install sealants when ambient temperature is less than 40 degrees F. Maintain this minimum temperature during and 48 hours after installation.

1.10 WARRANTY

A. See Section 01 7800 - Closeout Submittals, for additional warranty requirements.

B. Provide five year manufacturer warranty against excessive degradation of exterior finish. Include provision for replacement of units with excessive fading, chalking, or flaking.

PART 2 PRODUCTS

2.01 ALUMINUM STOREFRONT FRAMING SYSTEM

A. Acceptable Manufacturers:
   1. EFCO Corporation.
   2. Kawneer Company.
   3. U.S. Aluminum.
   4. Vistawall.
   5. YKK Architectural Products.
   6. Substitutions: See Section 01600 - Product Requirements.

B. System: shall be equal to TRI FAB 451T as manufactured by Kawneer Company.

2.02 COMPONENTS

A. Aluminum Framing Members: Tubular aluminum sections, drainage holes and internal weep drainage system.
   1. Glazing stops: Flush.
   2. Cross-Section: 2 x 4-1/2 inch nominal dimension.

3. Structurally Reinforced Members: Extruded aluminum with internal reinforcement of structural steel member.

B. Swing Doors: Glazed aluminum.
1. Thickness: 1-3/4 inches.
2. Top Rail: 3-1/2 inches wide.
3. Vertical Stiles: 3-1/2 inches wide.
4. Bottom Rail: 10 inches wide.
5. Glazing Stops: Square.
6. Finish: Same as storefront.

C. Sill Pan: High Performance (HP) sill pan.

2.03 MATERIALS

A. Extruded Aluminum: ASTM B221 (ASTM B221M).

B. Sheet Aluminum: ASTM B209 (ASTM B209M).

C. Fasteners: Stainless steel.

D. Exposed Flashings: Aluminum sheet, 20 gage, 0.032 inch minimum thickness; finish to match framing members.

E. Concealed Flashings: 0.018 inch thick galvanized steel.

F. Perimeter Sealant: Type - Silicone, specified in Section 07 9005.

G. Glass: As specified in Section 08 8000.

H. Glazing Accessories: As specified in Section 08 8000.

2.04 FINISHES

A. Class I Color Anodized Finish: AAMA 611 AA-M12C22A42 Integrally colored anodic coating not less than 0.7 mils thick.

B. Color: As indicated on the drawings.

C. Touch-Up Materials: As recommended by coating manufacturer for field application.

2.05 HARDWARE

A. Finish to match framing members unless indicated otherwise.

B. Weatherstripping: Wool pile, continuous and replaceable; provide on all doors.

C. Sill Sweep Strips: Resilient seal type, of neoprene; concealed mounting; provide on all exterior doors.

D. Threshold: Extruded mill finished aluminum, one piece per door opening, ribbed surface; provide on all exterior doors.

E. Pivots: Offset type; top, intermediate, and bottom.

F. Push/Pull Set: Standard configuration push/pull handles.

G. Exit Devices: Panic type.

H. Door Closers: Concealed overhead.

I. Dead Latch: Adams Rite 4710 dead latch with 4568 lever handle. Provide on all exterior doors.

J. Cylinders: As specified in Section 08710 - Door Hardware.

2.06 FABRICATION

A. Fabricate components with minimum clearances and shim spacing around perimeter of assembly, yet enabling installation and dynamic movement of perimeter seal.

B. Accurately fit and secure joints and corners. Make joints flush, hairline, and weatherproof.

C. Prepare components to receive anchor devices. Fabricate anchors.

D. Coat concealed metal surfaces that will be in contact with cementitious materials or dissimilar metals with bituminous paint.

E. Arrange fasteners and attachments to conceal from view.

F. Reinforce components internally for door hardware .

G. Reinforce framing members for imposed loads.

H. Finishing: Apply factory finish to all surfaces that will be exposed in completed assemblies.
   1. Touch-up surfaces cut during fabrication so that no natural aluminum is visible in completed assemblies, including joint edges.

PART 3 EXECUTION

3.01 EXAMINATION

A. Verify dimensions, tolerances, and method of attachment with other work.

B. Verify that wall openings and adjoining air and vapor seal materials are ready to receive work of this section.

3.02 INSTALLATION

A. Install wall system in accordance with manufacturer's instructions.

B. Attach to structure to permit sufficient adjustment to accommodate construction tolerances and other irregularities.

C. Provide alignment attachments and shims to permanently fasten system to building structure.

D. Align assembly plumb and level, free of warp or twist. Maintain assembly dimensional tolerances, aligning with adjacent work.

E. Provide thermal isolation where components penetrate or disrupt building insulation.

F. Install sill flashings. Turn up ends and edges; seal to adjacent work to form water tight dam.

G. Where fasteners penetrate sill flashings, make watertight by seating and sealing fastener heads to sill flashing.

H. Coordinate attachment and seal of perimeter air and vapor barrier materials.

I. Pack fibrous insulation in shim spaces at perimeter of assembly to maintain continuity of thermal barrier.

J. Set thresholds in bed of sealant and secure.

K. Install hardware using templates provided.

L. Install glass and infill panels in accordance with Section 08 8000, using glazing method required to achieve performance criteria.

M. Install perimeter sealant in accordance with Section 07 9005.

N. Touch-up minor damage to factory applied finish; replace components that cannot be satisfactorily repaired.

3.03 TOLERANCES

A. Maximum Variation from Plumb: 0.06 inches every 3 ft non-cumulative or 1/16 inches per 10 ft, whichever is less.

B. Maximum Misalignment of Two Adjoining Members Abutting in Plane: 1/32 inch.

3.04 ADJUSTING

A. Adjust operating hardware and sash for smooth operation.

3.05 CLEANING

A. Remove protective material from pre-finished aluminum surfaces.

B. Wash down surfaces with a solution of mild detergent in warm water, applied with soft, clean wiping cloths. Take care to remove dirt from corners. Wipe surfaces clean.

C. Remove excess sealant by method acceptable to sealant manufacturer.

END OF SECTION

SECTION 08 7100
DOOR HARDWARE

PART 1 GENERAL

1.01 SECTION INCLUDES

A. Hardware for wood, aluminum, and hollow metal doors.

B. Thresholds.

C. Weatherstripping, seals and door gaskets.

1.02 RELATED REQUIREMENTS

A. Section 08 1113 - Hollow Metal Doors and Frames.

B. Section 08 4313 - Aluminum-Framed Storefronts: Hardware for same except cylinders; installation of cylinders.

1.03 REFERENCE STANDARDS

A. BHMA A156.1 - American National Standard for Butts and Hinges; 2013.

B. BHMA A156.4 - American National Standard for Door Controls - Closers; 2013.

C. BHMA A156.6 - American National Standard for Architectural Door Trim; 2010.

D. BHMA A156.7 - American National Standard for Template Hinge Dimensions; 2014.

E. BHMA A156.8 - American National Standard for Door Controls - Overhead Stops and Holders; 2010.

F. BHMA A156.18 - American National Standard for Materials and Finishes; 2012.

G. BHMA A156.21 - American National Standard for Thresholds; 2014.

H. BHMA A156.22 - American National Standard for Door Gasketing and Edge Seal Systems, Builders Hardware Manufacturers Association; 2012.

I. NFPA 80 - Standard for Fire Doors and Other Opening Protectives; 2016.

J. UL (DIR) - Online Certifications Directory; current listings at database.ul.com.

1.04 ADMINISTRATIVE REQUIREMENTS

A. Coordinate the manufacture, fabrication, and installation of products that door hardware will be installed upon.

1.05 SUBMITTALS

A. Hardware schedules: Schedule shall be in vertical format listing each door opening, including the handing of the opening, door sizes, materials of door and frames, any light or louver openings, degree of opening, all hardware scheduled for the opening and finish. Include cut/catalog sheets and any required special mounting instructions with the hardware schedule.

B. Certification of compliance: Submit any information necessary to indicate compliance to any or all of these specifications as requested.

C. Submit any samples necessary as required by architect.

D. Templates for finish hardware items shall be sent to related door and frame suppliers within 3 working days of approved schedule receipt.

1.06 QUALITY ASSURANCE

A. Hardware Supplier Qualifications: Company specializing in supplying commercial door hardware with five years of experience.

B. Hardware Supplier Personnel: Employ an Architectural Hardware Consultant (AHC) to assist in the work of this section.

1.07 DELIVERY, STORAGE, AND HANDLING

A. Package hardware items individually; label and identify each package with door opening code to match hardware schedule.

1.08 COORDINATION

A. Coordinate the work with other directly affected sections involving manufacture or fabrication of internal reinforcement for door hardware.

B. Furnish templates for door and frame preparation.

C. Coordinate Owner's keying requirements during the course of the Work.

1.09 WARRANTY

A. All finish hardware shall be supplied with a one (1) year warranty against defects in materials and workmanship, commencing with the Date of Substantial Completion.

PART 2 PRODUCTS

2.01 DOOR HARDWARE - GENERAL

A. Provide hardware specified or required to make doors fully functional, compliant with applicable codes, and secure to the extent indicated.

B. Provide items of a single type of the same model by the same manufacturer.

C. Provide products that comply with the following:
   1. Applicable provisions of federal, state, and local codes.
   2. Fire-Rated Doors: NFPA 80.
   3. Hardware on Fire-Rated Doors, Except Hinges: Listed and classified by UL as suitable for the purpose specified and indicated.

D. Finishes: Provide door hardware of the same finish unless otherwise indicated.
   1. Finish: Satin chrome plated over nickel on brass or bronze, 626 (approx US26D) unless indicated otherwise..
   2. Finish Definitions: BHMA A156.18.
   3. Exceptions:
      a. Where base metal is specified to be different, provide finish that is an appearance equivalent according to BHMA A156.18.
      b. Hinges for Fire-Rated Doors: Steel base metal with painted finish.
      c. Hinges for Exterior Doors: Satin stainless steel, 630 (US32D).

2.02 LOCKS AND LATCHES

A. Locks: Provide a lock for every door, unless specifically indicated as not requiring locking.
   1. If no hardware set is indicated for a swinging door provide an office lockset.
   2. Trim: Provide lever handle or pull trim on outside of all locks unless specifically stated to have no outside trim.
   3. Lock Cylinders: Provide key access on outside of all locks unless specifically stated to have no locking or no outside trim.
   4. All locksets, latchsets, and trim shall be of one manufacturer and compatible with the IC cores specified.
   5. Provide wrought box strike boxes and curved lip strikes with proper lip length to protect trim of the frame, but not to project more than 1/8 inch beyond frame trim or the inactive leaf of a pair of doors. All cylinder collars shall be cast.

B. Latches: Provide a latch for every door that is not required to lock, unless specifically indicated "push/pull" or "not required to latch".

2.03 HINGES

A. Hinges: Provide hinges on every swinging door.
   1. Provide five-knuckle full mortise butt hinges unless otherwise indicated.
   2. Provide ball-bearing hinges at all doors having closers.

3. Provide hinges in the quantities indicated.
4. Provide non-removable pins with security studs on exterior outswinging doors.

B. Butt Hinges: Comply with BHMA A156.1 and A156.7; standard weight, unless otherwise indicated.
1. Provide hinge width required to clear surrounding trim.

C. Quantity of Hinges Per Door:
1. Doors up to 60 inches High: Two hinges.
2. Doors From 60 inches High up to 90 inches High: Three hinges.
3. Doors 90 inches High up to 120 inches High: Four hinges.

D. Manufacturers - Hinges:
1. Hager Companies: www.hagerco.com.
2. Stanley Black & Decker: www.stanleyblackanddecker.com.
3. Substitutions: See Section 01 6000 - Product Requirements.

2.04 PUSH/PULLS:

A. Push/Pulls: Comply with BHMA A156.6.

B. Provide push and pull on doors not specified to have lockset, latchset, exit device, or auxiliary lock.

C. On solid doors, provide matching push plate and pull plate on opposite faces.

D. Acceptable Manufacturers:
1. H. B. Ives: 8103 Series Door Pull, and 8200 Series Push Plate.
2. Rockwood: #111 Door Pull, and #70 Push Plate.

E. Description:
1. Push Plate: Minimum .050 inch thick, 6 inch x 16 inch rectangular plate, with square corners.
2. Pull: Straight pull, 1 inch round, 10 inch center to center, with 2-1/2 inch projection.

2.05 CYLINDERS AND KEYING

A. All locks and cylinders shall be furnished with 7-pin, small format, interchangeable core and keyed into a new factory-registered Grand Masterkey System with restricted keyway. Provide construction cores and keys during the construction period. Construction control and operating keys and cores shall not be part of the Owner's permanent keying system. All keying shall be accomplished at the factory of the lock manufacturer. Coordinate with Owner's representative to obtain keying requirements.

B. Supply keys in the following quantities:
1. 5 master keys.
2. 5 grand master keys.
3. 3 change keys for each lock.

C. Keying: Grand master keyed.

2.06 CYLINDRICAL LOCKSETS

A. Manufacturers - Cylindrical Locksets:
1. Assa Abloy Corbin Russwin: CL3600 Series, with "Newport" lever handle design.
2. Best Access Systems, division of Stanley Security Solutions: 9K Series, with "15D" lever handle design.
3. Sargent: 10 Line, with "L" lever handle design.
4. Schlage: ND Series, with "Sparta" lever handle design:
5. Substitutions: See Section 01 6000 - Product Requirements.

2.07 FLUSHBOLTS AND COORDINATORS

A. Flushbolts: Lever extension bolts in leading edge of door, one bolt into floor, one bolt into top of frame.

1. Pairs of Swing Doors: At inactive leaves, provide flush bolts of type as required to comply with code.
2. Floor Bolts: Provide dustproof strike except at metal thresholds.

2.08 EXIT DEVICES

A. Acceptable Manufacturers:
   1. Corbin-Russwin: 39 Series.
   2. Dorma Group:
   3. Von Duprin: 99 Series.

B. Exit devices shall be "UL" listed for life safety. All exit devices for labeled doors shall have "UL" label for "Fire Exit Hardware". All devices mounted on labeled wood doors shall be thru-bolt mounted or per the door manufacturers listing requirements. All devices shall conform to N.F.P.A. #80 and #101 requirements.

C. All exit devices shall be of a heavy duty, chassis mounting design, with one piece removable covers, eliminating necessity of removing the device from the door for standard maintenance.

D. All trim shall be thru-bolted to the lock stile case.

E. All exit devices shall be of a brass, bronze, or stainless steel base material, plated to standard architectural finishes to match the balance of the door hardware. Painted or anodized aluminum finishes will not be considered acceptable for heavy duty usage on this project.

F. All exit devices shall be by the same manufacturer. No deviations will be considered.

2.09 CLOSERS

A. Closers: Complying with BHMA A156.4.
   1. Provide surface-mounted, door-mounted closers unless otherwise indicated.
   2. Provide a door closer on every exterior door.
   3. Provide a door closer on every fire- and smoke-rated door. Spring hinges are not an acceptable self-closing device unless specifically so indicated.
   4. On pairs of swinging doors, if an overlapping astragal is present, provide coordinator to ensure the leaves close in proper order.
   5. At outswinging exterior doors, mount closer in inside of door.

B. Manufacturers - Surface Mounted Closers:
   1. Assa Abloy Brands; Corbin Russwin, Norton, Rixson, Sargent, or Yale: www.assaabloydss.com.
   2. DORMA USA, Inc.; 7400 Series, 8600 Series, 8900 Series, and TS93: www.dorma.com.
   3. LCN, an Allegion brand: www.allegion.com/us.

C. All door closers shall be heavy duty, surface mounted, hydraulic type, with high strength cast case, full rack and pinion construction of heavy steel.

D. Size all closers in accordance with the manufacturers recommendations at the building site.

E. All closers shall be the products of a single manufacturer.

F. The closers shall have adjustable spring power, which allows for closer sizing. Closers shall have separate, tamper resistant, non critical regulating screw valves for closing speed, latching speed, and backcheck control as a standard feature.

2.10 STOPS AND HOLDERS

A. Stops: Complying with BHMA A156.8; provide a stop for every swinging door, unless otherwise indicated.

B. Acceptable Manufacturers:
   1. Glynn-Johnson:
      a. Interior Floor Mounted Door Stop: FB 13 (w/ riser as required)
      b. Exterior Floor Mounted Door Stop: FB 19X
      c. Overhead Door Holder/Stop: 70H
   2. H. B. Ives:

a. Interior Floor Mounted Door Stop: FS436 (w/ riser as required)
b. Exterior Floor Mounted Door Stop: FS442

3. Rockwood:
a. Interior Floor Mounted Door Stop: #441 (w/ riser as required)
b. Exterior Floor Mounted Door Stop: #483

C. Door stops shall be furnished for every door leaf. Every door shall have either a floor stop or overhead stop.

D. Place door stops in such a position that they permit maximum door swing, but do not present a hazard or obstruction. Furnish floor strikes on floor holders of proper height to engage holders or doors.

E. Where overhead stops and holders are specified, or otherwise required, they shall be heavy duty, and of solid brass or stainless steel with no plastic type or parts.

2.11 GASKETING AND THRESHOLDS

A. Gasketing:
1. Gaskets: Complying with BHMA A156.22.
a. On each door in smoke partition, provide smoke gaskets; top, sides, and meeting stile of pairs. If fire/smoke partitions are not indicated on drawings, provide smoke gaskets on each door identified as a "smoke door" and 20-minute rated fire doors.
b. On each exterior door, provide weatherstripping gaskets, unless otherwise indicated; top, sides, and meeting stiles of pairs.
1) Where exterior door is also required to have fire or smoke rating, provide gaskets functioning as both smoke and weather seals.
c. On each exterior door, provide door bottom sweep, unless otherwise indicated.
2. Acceptable Manufacturers:
a. National Guard Products:
1) Perimeter Seal: #160VA
2) Door Bottom Sweep: #C627A
b. Pemko Mfg
1) Perimeter Seal: #303AV
2) Door Bottom Sweep: #3452AV
c. Reese
1) Perimeter Seal: #128A
2) Door Bottom Sweep: #353A

B. Thresholds: Complying with BHMA A156.21.
1. At each exterior door, provide a threshold unless otherwise indicated.
2. Accessible panic threshold, maximum overall height 1/2 inch. Threshold shall be extruded aluminum with mill finish and vinyl bumper gasket to seal against door. Provide width to fit door.
3. Acceptable Manufacturers:
a. National Guard Products: #896
b. Pemko Mfg: #2005AT
c. Reese: #F-S483APR

2.12 DRIP CAPS

A. Acceptable Manufacturers:
1. National Guard Products: #16
2. Pemko Mfg: #346
3. Reese: #R201A

2.13 LATCH GUARD

A. Acceptable Manufacturers:
1. H. B. Ives: LG Series, coordinate with lockset type.
2. Rockwood: 320 Series, coordinate with lockset type.

B. shall be stainless steel, without exposed fasteners on face of the unit.

2.14 PROTECTION PLATES

A. Protection Plates:
   1. Kickplate: Provide on push side of every door with closer, except aluminum storefront and glass entry doors.

B. Acceptable Manufacturers:
   1. Acceptable Manufacturers:
      a. H. B. Ives: LG Series, coordinate with lockset type.
      b. Rockwood: 320 Series, coordinate with lockset type.

C. Kickplates shall be 8" high by 2" less than door width and mounted flush with the bottom of the door. They shall be 16 gauge (.050) thick stainless steel. For doors with louvers, or narrow bottom rails; kickplate height shall be 1" less than the dimension shown from the bottom of the door to the bottom of the louver or glass.

PART 3 EXECUTION

3.01 EXAMINATION

A. Verify that doors and frames are ready to receive work; labeled, fire-rated doors and frames are present and properly installed, and dimensions are as indicated on shop drawings.

3.02 INSTALLATION

A. Install hardware in accordance with manufacturer's instructions and applicable codes.

B. Use templates provided by hardware item manufacturer.

C. Install hardware on fire-rated doors and frames in accordance with code and NFPA 80.

D. Hardware shall be completely fitted before the final coat of paint or other finish is applied, and then removed for the final coat. Mortise and cutting shall be done neatly, and evidence of cutting shall be concealed in the finished work. Permanently install the hardware after finishing operations are complete and dry.

E. Set exterior door thresholds with full-width bead of elastomeric sealant on each point of contact with floor providing a continuous weather seal; anchor thresholds with stainless steel countersunk screws.

3.03 ADJUSTING

A.

3.04 PROTECTION

A. Do not permit adjacent work to damage hardware or finish.

B. Protect knobs/levers from scratching or other damage. Tag keys and turn over to the owner at the time of acceptance of the project.

END OF SECTION

SECTION 08 8000
GLAZING

PART 1 GENERAL

1.01 SECTION INCLUDES

A. Glass.

B. Glazing compounds and accessories.

1.02 RELATED REQUIREMENTS

A. Section 07 9005 - Joint Sealers: Sealant and back-up material.

B. Section 08 1113 - Hollow Metal Doors and Frames: Glazed doors and borrowed lites.

C. Section 08 4313 - Aluminum-Framed Storefronts: Glazing furnished by storefront manufacturer.

1.03 REFERENCE STANDARDS

A. 16 CFR 1201 - Safety Standard for Architectural Glazing Materials; current edition.

B. ASTM C864 - Standard Specification for Dense Elastomeric Compression Seal Gaskets, Setting Blocks, and Spacers; 2005 (Reapproved 2011).

C. ASTM C920 - Standard Specification for Elastomeric Joint Sealants; 2014.

D. ASTM C1036 - Standard Specification for Flat Glass; 2011.

E. ASTM C1048 - Standard Specification for Heat-Strengthened and Fully Tempered Flat Glass; 2012.

F. ASTM C1193 - Standard Guide for Use of Joint Sealants; 2013.

G. ASTM E1300 - Standard Practice for Determining Load Resistance of Glass in Buildings; 2012a.

H. ASTM E2190 - Standard Specification for Insulating Glass Unit Performance and Evaluation; 2010.

I. GANA (GM) - GANA Glazing Manual; 2009.

J. GANA (SM) - GANA Sealant Manual; 2008.

1.04 PERFORMANCE REQUIREMENTS

A. Select type and thickness of exterior glass to withstand dead loads and wind loads acting normal to plane of glass at design pressures in accordance with the International Building Code.
   1. Use the procedure specified in ASTM E 1300 to determine glass type and thickness.
   2. Limit glass deflection to 1/175 or 3/4 inch or flexure limit of glass, whichever is less, with full recovery of glazing materials.
   3. Thicknesses listed are minimum.

1.05 SUBMITTALS

A. Product Data on Glass and Plastic Types: Provide structural, physical and environmental characteristics, size limitations, special handling or installation requirements.

B. Samples: Submit two samples 12 x 12 inch in size of glass units, showing coloration and design.

C. Manufacturer's Certificate: Certify that wind-borne debris rated glass meets or exceeds specified requirements.

1.06 QUALITY ASSURANCE

A. Perform Work in accordance with GANA Glazing Manual and FGMA Sealant Manual for glazing installation methods.

B. Installer Qualifications: Company specializing in performing the work of this section with minimum three years documented experience.

1.07 WARRANTY

A. See Section 01 7800 - Closeout Submittals, for additional warranty requirements.

B. Sealed Insulating Glass Units: Provide a five (5) year warranty to include coverage for seal failure, interpane dusting or misting, including replacement of failed units.

PART 2 PRODUCTS

2.01 INSULATING GLASS UNITS

A. Type IG-1 - Sealed Insulating Glass Units: Vision glazing with Low-E coating.
   1. Application: All exterior glazing unless otherwise indicated.
   2. Outboard Lite: Annealed float glass, 1/4 inch thick, minimum.
      a. Vitro/PPG Solarban 60 on # 2 surface.
      b. Tint: Solargray
      c. Coating: Low-E (passive type), on #2 surface.
   3. Inboard Lite: Annealed float glass, 1/4 inch thick, minimum.
      a. Tint: Clear.
   4. Total Thickness: 1 inch.
   5. Total Visible Light Transmittance: 35 percent, nominal.
   6. Winter Nighttime: U = 0.29
   7. Total Solar Heat Gain Coefficient: 0.25, nominal.
   8. Glazing Method: Gasket glazing.

2.02 GLAZING UNITS

A. Type IG-2 - Sealed Insulating Glass Units: Spandrel glazing.
   1. Outboard Lite: Annealed float glass, 1/4 inch thick, minimum.
      a. Tint: Clear.
      b. Coating: Same as on vision units, on #2 surface.
   2. Inboard Lite: Heat-strengthened float glass, 1/4 inch thick.
      a. Tint: Clear.
      b. Opacifier: Ceramic frit, on #4 surface.
      c. Opacifier Color: to match Type IG-1.
   3. Total Thickness: 1 inch.

2.03 EXTERIOR GLAZING ASSEMBLIES

A. Performance Criteria: Select type and thickness of glass to withstand dead and live loads caused by positive and negative wind pressure acting normal to plane of glass.
   1. Use the procedure specified in ASTM E1300 to determine glass type and thickness.
   2. Limit glass deflection to 1/200 or flexure limit of glass, whichever is less, with full recovery of glazing materials.
   3. Glass thicknesses listed are minimum.

2.04 GLASS MATERIALS

A. Float Glass Manufacturers:
   1. AFG Industries, Inc.
   2. Pilkington Building Products North America.
   3. Vitro/PPG Industries, Inc.
   4. Visteon Glass Systems.
   5. Substitutions: Refer to Section 01 6000 - Product Requirements.

B. Float Glass: All glazing is to be float glass unless otherwise indicated.
   1. Annealed Type: ASTM C1036, Type I, transparent flat, Class 1 clear, Quality Q3 (glazing select).
   2. Heat-Strengthened and Fully Tempered Types: ASTM C1048.

3. Tinted Types: Color and performance characteristics as indicated.
4. Thicknesses: As indicated; for exterior glazing comply with specified requirements for wind load design regardless of specified thickness.

2.05 SEALED INSULATING LAMINATED GLASS MATERIALS

A. Manufacturers:
1. Any of the manufacturers specified for float glass.
2. Guardian Industries Corporation: www.guardian.com.
3. Old Castle Glass: www.oldcastleglass.com
4. Viracon, Apogee Enterprises, Inc: www.viracon.com.

B. Sealed Insulating Glass Units: Types as indicated.
1. Durability: Certified by an independent testing agency to comply with ASTM E2190.
2. Edge Spacers: Aluminum, bent and soldered corners.
3. Edge Seal: Glass to elastomer with supplementary silicone sealant.
4. Purge interpane space with dry hermetic air.

2.06 GLAZING COMPOUNDS

A. Acceptable Products:
1. Dow Corning Corp: #795 Silicone Sealant.
2. Tremco: Spectrem 1.

B. Silicone Sealant: Single component; neutral curing; capable of water immersion without loss of properties; non-bleeding, non-staining; ASTM C920, Type S, Grade NS, Class 25, Uses M, A, and G; with cured Shore A hardness range of 15 to 25; color as selected.

2.07 GLAZING ACCESSORIES

A. Setting Blocks: Neoprene, 80 to 90 Shore A durometer hardness; ASTM C864 Option II. Length of 0.1 inch for each square foot of glazing or minimum 4 inch x width of glazing rabbet space minus 1/16 inch x height to suit glazing method and pane weight and area.

B. Spacer Shims: Neoprene, 50 to 60 Shore A durometer hardness; ASTM C864 Option II. Minimum 3 inch long x one half the height of the glazing stop x thickness to suit application, self adhesive on one face.

C. Glazing Tape: Preformed butyl compound with integral resilient tube spacing device; 10 to 15 Shore A durometer hardness; black color.

D. Glazing Gaskets: Resilient silicone extruded shape to suit glazing channel retaining slot; ASTM C864 Option II; Black color.

E. Glazing Clips: Manufacturer's standard type.

PART 3 EXECUTION

3.01 EXAMINATION

A. Verify that openings for glazing are correctly sized and within tolerance.

B. Verify that surfaces of glazing channels or recesses are clean, free of obstructions that may impede moisture movement, weeps are clear, and ready to receive glazing.

3.02 PREPARATION

A. Clean contact surfaces with solvent and wipe dry.

B. Seal porous glazing channels or recesses with substrate compatible primer or sealer.

C. Prime surfaces scheduled to receive sealant.

D. Install sealants in accordance with ASTM C1193 and GANA Sealant Manual.

E. Install sealants in accordance with manufacturer's instructions.

3.03 INSTALLATION - EXTERIOR/INTERIOR DRY METHOD (GASKET GLAZING)

A. Place setting blocks at 1/4 points with edge block no more than 6 inch from corners.

B. Rest glazing on setting blocks and push against fixed stop with sufficient pressure on gasket to attain full contact.

C. Install removable stops without displacing glazing gasket; exert pressure for full continuous contact.

3.04 CLEANING

A. Remove glazing materials from finish surfaces.

B. Remove labels after Work is complete.

C. Wash all glass prior to Date of Substantial Completion using a mild detergent or glass cleaner, leaving glass clean and free of streaks.

3.05 PROTECTION

A. Remove and replace broken, cracked, chipped or otherwise damaged glazing materials prior to Date of Substantial Completion.

END OF SECTION

SECTION 09 2116
GYPSUM BOARD ASSEMBLIES

PART 1 GENERAL

1.01 SECTION INCLUDES

A. Gypsum sheathing.

B. Cementitious backing board.

C. Gypsum wallboard.

D. Decorative moldings and reveals.

E. Joint treatment and accessories.

1.02 RELATED REQUIREMENTS

A. Section 06 1000 - Rough Carpentry: Wood blocking product and execution requirements.

B. Section 07 2100 - Thermal Insulation: Acoustic and thermal fiberglass batt insulation.

C. Section 09 2216 - Non-Structural Metal Framing.

1.03 REFERENCE STANDARDS

A. ANSI A108.11> ANSI A108/A118/A136.1 - American National Standard for Interior of Cementitious Backer Units; 2010 (Revised).

B. ANSI A118.9>ANSI A108/A118/A136.1 - American National Standard Specifications for Test Methods and Specifications for Cementitious Backer Units; 1999 (Reaffirmed 2010).

C. ASTM B221 - Standard Specification for Aluminum and Aluminum-Alloy Extruded Bars, Rods, Wire, Profiles, and Tubes; 2014.

D. ASTM C475/C475M - Standard Specification for Joint Compound and Joint Tape for Finishing Gypsum Board; 2015.

E. ASTM C840 - Standard Specification for Application and Finishing of Gypsum Board; 2013.

F. ASTM C1047 - Standard Specification for Accessories For Gypsum Wallboard and Gypsum Veneer Base; 2014a.

G. ASTM C1177/C1177M - Standard Specification for Glass Mat Gypsum Substrate for Use as Sheathing; 2013.

H. ASTM C1280 - Standard Specification for Application of Gypsum Sheathing Board; 2013.

I. ASTM C1325 - Specification for Non-Asbestos Fiber-Mat Reinforced Cementitious Backer Units; 2014.

J. ASTM C1396/C1396M - Standard Specification for Gypsum Board; 2014.

K. GA-216 - Application and Finishing of Gypsum Board; 2013.

L. UL (FRD) - Fire Resistance Directory; current edition.

1.04 SUBMITTALS

A. Product Data: Provide data on gypsum board, accessories, and joint finishing system.

B. Installer proposed control joint locations.

1.05 QUALITY ASSURANCE

A. Perform in accordance with ASTM C 840. Comply with requirements of GA-600 for fire-rated assemblies.

B. Installer Qualifications: Company specializing in performing gypsum board installation and finishing, with minimum __ years of experience, with minimum three years of documented experience.

PART 2 PRODUCTS

2.01 GYPSUM BOARD ASSEMBLIES

A. Provide completed assemblies complying with ASTM C840 and GA-216.

2.02 BOARD MATERIALS

A. Gypsum Wallboard: Paper-faced gypsum panels as defined in ASTM C1396/C1396M; sizes to minimize joints in place; ends square cut.
   1. Application: Use for vertical surfaces and ceilings, unless otherwise indicated.
   2. At Assemblies Indicated with Fire-Rating: Use type required by indicated tested assembly; if no tested assembly is indicated, use Type X board, UL or WH listed.
   3. Thickness:
      a. Vertical Surfaces: 5/8 inch.
      b. Ceilings: 5/8 inch.
   4. Paper-Faced Products:
      a. USG Corporation; Sheetrock Brand Gypsum Panels.
      b. Substitutions: See Section 01 6000 - Product Requirements.

B. Mold Resistant Wallboard: Moisture and mold-resistant gypsum core encased in moisture resistant papers.
   1. Application: At all interior surfaces of exterior walls.
   2. At Assemblies Indicated with Fire-Rating: Use type required by indicated tested assembly; if no tested assembly is indicated, use Type X board, UL or WH listed.
   3. Thickness: 5/8 inch.
   4. Products:
      a. USG Corporation: Sheetrock Brand Gypsum Panels.
      b. Substitutions: See Section 01 6000 - Product Requirements.

C. Backing Board For Wet Areas:
   1. Application: Surfaces behind tile in wet areas including tub and shower surrounds and shower ceilings.
   2. ANSI Cement-Based Board: Non-gypsum-based; aggregated Portland cement panels with glass fiber mesh embedded in front and back surfaces complying with ANSI A118.9-SystemDeleted or ASTM C1325.
      a. Thickness: 1/4 inch.
      b. Products:
         1) USG Corporation; Durock: www.usg.com.
         2) Substitutions: See Section 01 6000 - Product Requirements.

D. Backing Board For Non-Wet Areas: Water-resistant gypsum backing board as defined in ASTM C1396/C1396M; sizes to minimum joints in place; ends square cut.
   1. Application: Vertical surfaces behind thinset tile, except in wet areas, restroom walls, and janitor room walls.
   2. Type: Regular and Type X, in locations indicated.
   3. Type X Thickness: 5/8 inch.
   4. Regular Board Thickness: 5/8 inch.
   5. Edges: Tapered.
   6. Products:
      a. USG Corporation; Fiberock Aqua-Tough Interior Panels.
      b. Substitutions: See Section 01 6000 - Product Requirements.

E. Ceiling Board: Special sag resistant gypsum ceiling board as defined in ASTM C1396/C1396M; sizes to minimize joints in place; ends square cut.
   1. Application: Ceilings, unless otherwise indicated.
   2. Thickness: 1/2 inch.
   3. Edges: Tapered.
   4. Products:

a. USG Corporation; Sheetrock Brand Sag-Resistant Interior Gypsum Ceiling Board.
b. Substitutions: See Section 01 6000 - Product Requirements.

F. Exterior Sheathing Board: Sizes to minimize joints in place; ends square cut.
1. Application: Exterior sheathing at ceilings, unless otherwise indicated.
2. Glass Mat Faced Sheathing: Glass mat faced gypsum substrate as defined in ASTM C1177/C1177M.
3. Regular Board Thickness: 1/2 inch.
4. Edges: Square.
5. Glass Mat Faced Products:
a. CertainTeed Corporation; GlasRoc Brand.
b. Georgia-Pacific Gypsum; DensGlass Sheathing.
c. National Gypsum Company; Gold Bond eXP Sheathing.

G. Shaftwall and Coreboard: Type X; 1 inch thick by 24 inches wide, beveled long edges, ends square cut.
1. Paper Faced Type: Gypsum shaftliner board or gypsum coreboard as defined ASTM C1396/C1396M; water-resistant faces.
2. Products:
a. USG Corporation; Sheetrock Gypsum Liner Panels.
b. Substitutions: See Section 01 6000 - Product Requirements.

2.03 ACCESSORIES

A. Moldings and Reveals: Extruded aluminum drywall trim. Size and shape as indicated on the drawings.

B. Finishing Accessories: ASTM C1047, galvanized steel or rolled zinc, unless noted otherwise.
1. Types: As detailed or required for finished appearance.
2. Special Shapes: In addition to conventional corner bead and control joints, provide U-bead at exposed panel edges.

C. Joint Materials: ASTM C475/C475M and as recommended by gypsum board manufacturer for project conditions.
1. Tape: 2 inch wide, coated glass fiber tape for joints and corners, except as otherwise indicated.
2. Ready-mixed vinyl-based joint compound.

D. Screws: ASTM C 1002; self-piercing tapping type; cadmium-plated for exterior locations.

E. Anchorage to Substrate: Tie wire, nails, screws, and other metal supports, of type and size to suit application; to rigidly secure materials in place.

F. Exterior Soffit Vents: One piece, perforated, ASTM B221 6063 T5 alloy aluminum, with edge suitable for direct application to gypsum board and manufactured especially for soffit application. Provide continuous vent.

PART 3 EXECUTION

3.01 EXAMINATION

A. Verify that project conditions are appropriate for work of this section to commence.

3.02 BOARD INSTALLATION

A. Comply with ASTM C840, GA-216, and manufacturer's instructions. Install to minimize butt end joints, especially in highly visible locations.

B. Single-Layer Non-Rated: Install gypsum board vertical (parallel to framing), with ends and edges occurring over firm bearing.
1. Stagger joints in drywall on opposite sides of metal studs.

C. Fire-Rated Construction: Install gypsum board in strict compliance with requirements of assembly listing.

D. Exterior Sheathing: Comply with ASTM C1280. Install sheathing vertically, with edges butted tight and ends occurring over firm bearing.

E. Cementitious Backing Board: Install over steel framing members where indicated, in accordance with ANSI A108.11-SystemDeleted and manufacturer's instructions.

F. Installation on Metal Framing: Use screws for attachment of gypsum board except face layer of non-rated double-layer assemblies, which may be installed by means of adhesive lamination.

G. Moisture Protection: Treat cut edges and holes in moisture resistant gypsum board with sealant.

3.03 INSTALLATION OF TRIM AND ACCESSORIES

A. Control Joints: Place control joints consistent with lines of building spaces and as follows:
   1. Based on reviewed contractor's submittal of proposed joint locations based on ASTM C840/GA-216.

B. Corner Beads: Install at external corners, using longest practical lengths.

C. Edge Trim: Install at locations where gypsum board abuts dissimilar materials.

D. Exterior Soffit Vents: Install according to manufacturer's written instructions and in locations indicated on the drawings. Provide vent area specified.

E. Moldings and Reveals: Install in accordance with manufacturer's instructions. All pieces shall be securely mounted to gypsum wallboard substrate and all joints shall be butted tight and finished smooth.

3.04 JOINT TREATMENT

A. Glass Mat Faced Gypsum Board: Use fiberglass joint tape, bedded and finished with chemical hardening type joint compound.

B. Paper Faced Gypsum Board: Use paper joint tape, bedded with ready-mixed vinyl-based joint compound and finished with ready-mixed vinyl-based joint compound.

C. Finish gypsum board in accordance with levels defined in ASTM C840, as follows:
   1. Level 4: Walls and ceilings to receive paint finish or wall coverings, unless otherwise indicated.
   2. Level 2: In utility areas, behind cabinetry, and on backing board to receive tile finish.
   3. Level 1: Fire rated wall areas above finished ceilings, whether or not accessible in the completed construction.

D. Tape, fill, and sand exposed joints, edges, and corners to produce smooth surface ready to receive finishes.
   1. Feather coats of joint compound so that camber is maximum 1/32 inch.
   2. Taping, filling, and sanding is not required at surfaces behind adhesive applied ceramic tile and fixed cabinetry.

E. Fill and finish joints and corners of cementitious backing board as recommended by manufacturer.

3.05 TOLERANCES

A. Maximum Variation of Finished Gypsum Board Surface from True Flatness: 1/8 inch in 10 feet in any direction.

END OF SECTION

SECTION 09 2216
NON-STRUCTURAL METAL FRAMING

PART 1 GENERAL

1.01 SECTION INCLUDES

A. Metal partition, ceiling, and soffit framing.

B. Framing accessories.

1.02 RELATED REQUIREMENTS

1.03 REFERENCE STANDARDS

A. ASTM C754 - Standard Specification for Installation of Steel Framing Members to Receive Screw-Attached Gypsum Panel Products; 2015.

B. ASTM C1002 - Standard Specification for Steel Self-Piercing Tapping Screws for Application of Gypsum Panel Products or Metal Plaster Bases to Wood Studs or Steel Studs; 2014.

1.04 SUBMITTALS

A. See Section 01 3000 - Administrative Requirements, for submittal procedures.

B. Product Data: Provide data describing framing member materials and finish, product criteria, load charts, and limitations.

PART 2 PRODUCTS

2.01 FRAMING MATERIALS

A. Non-Loadbearing Framing System Components: ASTM C 645; galvanized sheet steel, of size and properties necessary to comply with ASTM C 754 for the spacing indicated, with maximum deflection of wall framing of L/240 at 5 psf at interior and L/360 at 20 psf for exterior locations.
   1. Studs: C shaped with flat or formed webs .
   2. Runners: U shaped, sized to match studs.
   3. Ceiling Channels: C shaped.
   4. Furring: Hat-shaped sections, minimum depth of 7/8 inch.

B. Partition Head to Structure Connections: Provide extended leg track fastened to structure with legs of sufficient length to accommodate deflection, for friction fit of studs cut short .

C. Tracks and Runners: Same material and thickness as studs or heavier per design requirements, bent leg retainer notched to receive studs .

D. Furring and Bracing Members: Of same material as studs; thickness to suit purpose; complying with applicable requirements of ASTM C754.

E. Fasteners: ASTM C1002 self-piercing tapping screws.

F. Anchorage Devices: Power actuated.

PART 3 EXECUTION

3.01 EXAMINATION

A. Verify existing conditions before starting work.

3.02 INSTALLATION OF STUD FRAMING

A. Comply with requirements of ASTM C754.

B. Partitions Terminating at Ceiling: Attach ceiling runner securely to ceiling track in accordance with manufacturer's instructions.

C. Partitions Terminating at Structure: Attach extended leg top runner to structure, maintain clearance between top of studs and structure, and brace both flanges of studs as indicated.

D. Align and secure top and bottom runners at 24 inches on center.

E. Fit runners under and above openings; secure intermediate studs to same spacing as wall studs.

F. Install studs vertically at spacing indicated on drawings.

G. Align stud web openings horizontally.

H. Secure studs to tracks using fastener method. Do not weld.

I. Fabricate corners using a minimum of three studs.

J. Double stud at wall openings, door and window jambs, not more than 2 inches from each side of openings.

K. Brace stud framing system rigid.

L. Coordinate erection of studs with requirements of door frames; install supports and attachments.

M. Coordinate installation of bucks, anchors, and blocking with electrical, mechanical, and other work to be placed within or behind stud framing.

N. Furring: Install at spacing and locations shown on drawings. Lap splices a minimum of 6 inches.

3.03 CEILING AND SOFFIT FRAMING

A. Comply with requirements of ASTM C754.

B. Install furring after work above ceiling or soffit is complete. Coordinate the location of hangers with other work.

C. Install furring independent of walls, columns, and above-ceiling work.

D. Securely anchor hangers to structural members or embed in structural slab. Space hangers as required to limit deflection to criteria indicated. Use rigid hangers at exterior soffits.

E. Space main carrying channels at maximum 48 inch on center, and not more than 6 inches from wall surfaces. Lap splice securely.

F. Securely fix carrying channels to hangers to prevent turning or twisting and to transmit full load to hangers.

G. Place furring channels perpendicular to carrying channels, not more than 2 inches from perimeter walls, and rigidly secure. Lap splices securely.

H. Reinforce openings in suspension system that interrupt main carrying channels or furring channels with lateral channel bracing. Extend bracing minimum 24 inches past each opening.

END OF SECTION

SECTION 09 9035
TEXTURED COATINGS

PART 1 - GENERAL

1.01 WORK INCLUDED:

A. Textured coating on exterior concrete wall surfaces and light pole bases.

B. Preparation of of concrete wall panels.

1.02 RELATED WORK:

A. Section 03 3000 - Cast-in-Place Concrete.

B. Section 03 4100 - Precast Structural Concrete.

C. Section 03 4713 - Tilt-Up Concrete.

D. Section 09 9113 - Exterior Painting.

1.03 REFERENCE STANDARDS:

A. ASTM D522/D522M - Standard Test Methods for Mandrel Bend Test of Attached Organic Coatings; 2013.

B. ASTM D714 - Test Method for Evaluating Degree of Blistering in Paint; 2002 (Reapproved 2009).

C. ASTM D968 - Standard Test Methods for Abrasion Resistance of Organic Coatings by Falling Abrasive; 2005 (Reapproved 2010).

D. ASTM D2243 - Standard Test Method for Freeze-Thaw Resistance of Water-Borne Coatings; 1995 (Reapproved 2014).

E. ASTM D2247 - Standard Practice for Testing Water Resistance of Coatings in 100% Relative Humidity; 2011.

F. ASTM D6904 - Standard Practice for Resistance to Wind-Driven Rain for Exterior Coatings Applied on Masonry; 2003 (Reapproved 2013).

G. ASTM E-84 Standard Test Method for Surface Burning Characteristics of Building Materials; 2015a.

H. ASTM E96/E96M - Standard Test Methods for Water Vapor Transmission of Materials; 2014.

1.04 QUALITY ASSURANCE:

A. Product Manufacturer: Company specializing in the manufacturing of quality textured coating products with a minimum of 10 years experience.

B. Application: Company specializing in commercial application with 3 years experience on projects of similar scope.

1.05 REGULATORY REQUIREMENTS:

A. Comply with applicable city, county, state and federal requirements and ordinances regarding maximum V.O.C. (Volatile Organic Compound) content.

B. Conform to applicable building code for flame/fuel/smoke rating requirements for finishes.

C. Section 01 6116 - Volatile Organic Compound (VOC) Content Restrictions.

1.06 PROJECT CONDITIONS

A. Water based products are preferred. Contractor to submit solvent based products only if required by environmental conditions indicated in the project schedule.

1.07 SUBMITTALS:

A. Submit product data for specified products under provisions of Section 01 3000. Include all performance and physical data.

B. Submit letter from manufacturer indicating system application to pass the wind driven rain test, including the primer and number of coats to provide dry film thickness required.

C. Submit manufacturer's installation instructions under provisions of Section 01 3000.

D. Submit letter confirming applicators qualifications.

E. Submit minimum 2 samples 8 x 8 inches in size of material applied to appropriate substrate.

F. Submit from manufacturer 3 copies of sample warranty and letter stating intent to provide 5 year warranty.

1.08 MOCK-UP PANELS:

A. At a location approved by Architect, paint one full size concrete wall panel with all base colors and accent stripes. This process may be repeated up to 3 more times (using adjacent panels) at no additional cost to Owner.

B. Accepted mock-up may be included as part of final work.

1.09 ENVIRONMENTAL REQUIREMENTS:

A. Maintain ambient temperature as required by manufacturer for application system.

B. Provide adequate ventilation during application.

C. Provide adequate illumination.

D. Restrict traffic from area where coating is being applied or is curing.

1.10 DELIVERY STORAGE AND HANDLING:

A. Deliver products to site under provisions of Section 01 6000.

B. Deliver materials in original containers with seals unbroken and labels intact.

C. Store materials and equipment in a protected, climate controlled area of project site.

D. Comply with applicable health and fire regulations.

E. Store materials at ambient temperatures as directed by manufacturer for each product in system, in well ventilated area.

1.11 SCAFFOLDS AND PROTECTION:

A. Provide adequate, safe ladders, scaffolds and stages necessary to complete work.

B. Protect completed finish coating work and adjacent finish surfaces from coating splatter, spills and stains. Use adequate drop cloths and masking procedures during progress of work.

1.12 WARRANTY:

A. See Section 01 7800 - Closeout Submittals, for additional warranty requirements.

B. Provide manufacturer's 5 year written warranty for material replacement only due to chipping, flaking, peeling, delamination or blistering of coating from the underlying surface.

1.13 EXTRA MATERIALS:

A. Provide five extra gallons of each color of material used.

PART 2 - PRODUCTS

2.01 TEXTURED COATINGS

A. Provide high-build, weather resistant coating systems that meet the following minimum performance criteria, unless more stringent criteria are specified:
   1. Wind Driven Rain Resistance: Dry film thickness and number of coats in system required to pass when tested according to ASTM D6904 at 98 miles per hour for 24 hours.
   2. Water Vapor Transmission: ASTM E96/E96M; 17 perms, maximum.

2.02 ACCEPTABLE PRODUCTS:

A. Water Based Acrylic:
   1. Textured Coatings of America:
      a. Primer: XL-70 "W" Primer (Water-based).
      b. Finish Coat: Tex-Cote 300 Textured Coating – Course Texture.

c. Accent Color: DF Color-Cote Dead Flat.

2. Sherwin Williams:
   a. Primer: Loxon Concrete & Masonry Primer A24W 8300 Series.
   b. Finish Coat: UltraCrete – Medium Texture A44W800 Series.
   c. Accent Color: Loxon Acrylic Coating A24W300 Series
3. PPG Paints:
   a. Primer: 4-603 Perma-Crete Interior/Exterior Alkali Resistant Primer.
   b. Finish Coat: 4-60 Perma-Crete Texture Coating – Medium Texture.
   c. Accent Color: 4-22/4-30 Perma-Crete High Build Acrylic Topcoat.

B. Solvent Based Acrylic (Only to be used when environmental conditions preclude the use of water based products):
1. Textured Coatings of America:
   a. Primer: XL 70 Primer (Solvent).
   b. Finish Coat: Tex-Cote – XL 70 Textured Coating – Course Texture.
   c. Accent Color: Tex-Cote – XL 70 – Textured Coating – Smooth Texture.
2. Sherwin Williams:
   a. Primer: UltraCrete Solvent Borne – Smooth Texture B46W00850/53 Series.
   b. Finish Coat: UltraCrete Solvent Borne – Medium Texture B46W00810 Series.
   c. Accent Color: UltraCrete Solvent Borne – Smooth Texture B46W00850/53 Series.

2.03 MATERIALS:

A. Materials shall be pre-mixed.

B. Coverage:
1. Apply as required by manufacturer's system to meet specification.
2. Additional coats may be required for uniform textured or color appearance.

C. Color: Custom colors as selected by Architect.

PART 3 - EXECUTION

3.01 EXAMINATION:

A. See concrete wall specification section for surface preparation and repair of minor defects in concrete wall panels.

B. Examine surfaces scheduled to receive coating for conditions that will adversely affect execution, perseverance, or quality of finish work, and which cannot be put into an acceptable condition through normal preparatory work. Notify Architect in writing of such unacceptable conditions.

C. Do not proceed with surface preparation or coating applications until conditions are suitable.

D. Application of coating or finish to surfaces shall constitute acceptance of that surface.

3.02 PREPARATION:

A. Clean surfaces which affect work of this section.

B. Uncoated Steel and Iron Surfaces: Remove grease, scale, dirt, and rust.

C. Shop Primed Steel Surfaces: Sand and scrape to remove loose primer and rust. Feather edges to make touch-up patches inconspicuous. Clean surfaces with solvent. Prime bare steel surfaces.

D. Concrete: Chip or grind off all defective materials and foreign matter. Remove form treatment residue, curing compound, scum and fungus. Repair cracks, breaks, honeycombing, or other surface imperfections with non-expansive patching mortar to attain a finish comparable to adjacent concrete surface.

E. Pressure wash exterior face of concrete surfaces to be coated. Comply with manufacturer's recommendations for cleaning solutions to be used.

3.03 APPLICATION:

A. The intent of these specifications is to produce the highest quality appearance coating and finish surfaces. Employ skilled mechanics only. Comply with manufacturer's printed specifications for application. Allow repairs to properly cure before beginning installation.

B. Do not apply coatings while surface is damp, or during cold, rainy, or frosty weather, or when temperature is below 40 degrees F nor under conditions where temperature may drop below 40 degrees F within 24 hours after application, or as directed by manufacturer's documentation.

C. Spray apply mixture to required thickness.

D. Ensure that finished surfaces are uniform in texture, color, and thickness without noticeable "overlap" marks, or streaky appearance.

E. Utilize application equipment specifically recommended by coating manufacturer.

F. The number of coats specified are minimum. At no extra charge to Owner, additional coats shall be provided to achieve color and appearance uniformity.

G. Manufacturer's technical representative shall visit job-site for review and approval of mock-up sample. Do not proceed with work until manufacturer and Architect provide written acceptance of mock-up.

3.04 PROTECTION:

A. Protect elements surrounding the work of this Section from damage or disfiguration.

B. Repair damage to other surfaces caused by work of this Section.

C. Furnish drop cloths, shields, and other protective coverings to prevent spray or drippings from disfiguring other surfaces.

D. Remove empty containers from site.

3.05 CLEANING/TOUCH-UP:

A. As work proceeds, promptly remove coating where spilled, splashed, or spattered.

B. During progress of work, maintain premises free of unnecessary accumulation of tools, equipment, surplus materials, and debris.

C. Collect waste, cloths, and material which may constitute a fire hazard, place in closed metal containers, and remove daily from site.

D. Spot touch-up will be allowed to correct soiled or damaged surfaces only when spot will blend into surrounding finish and is invisible to normal viewing. Otherwise recoat entire section to nearest corners or visible stopping point.

END OF SECTION

SECTION 09 9113
EXTERIOR PAINTING

PART 1 GENERAL

1.01 SECTION INCLUDES

A. Surface preparation.

B. Field application of paints.

C. Scope: Finish exterior surfaces exposed to view, unless fully factory-finished and unless otherwise indicated.

1.02 RELATED REQUIREMENTS

A. Section 05 5000 - Metal Fabrications: Shop-primed items.

B. Section 09 9123 - Interior Painting.

1.03 REFERENCE STANDARDS

A. 40 CFR 59, Subpart D - National Volatile Organic Compound Emission Standards for Architectural Coatings; U.S. Environmental Protection Agency; current edition.

B. ASTM D16 - Standard Terminology for Paint, Related Coatings, Materials, and Applications; 2014.

C. ASTM D4442 - Standard Test Methods for Direct Moisture Content Measurement of Wood and Wood-Base Materials; 2007.

D. CARB (SCM) - Suggested Control Measure for Architectural Coatings; California Air Resources Board; 2007.

E. MPI (APSM) - Master Painters Institute Architectural Painting Specification Manual; Current Edition, www.paintinfo.com.

F. SCAQMD 1113 - South Coast Air Quality Management District Rule No.1113; current edition.

G. SSPC V1 (PM1) - Good Painting Practice: Painting Manual, Volume 1; Fourth Edition.

H. SSPC-SP 1 - Solvent Cleaning; 2015.

I. SSPC-SP 13 - Surface Preparation of Concrete; (Reaffirmed 2015); 2003.

1.04 SUBMITTALS

A. See Section 01 3000 - Administrative Requirements, for submittal procedures.

B. Product Data: Provide complete list of products to be used, with the following information for each:
   1. Manufacturer's name, product name and/or catalog number, and general product category (e.g. "alkyd enamel").
   2. MPI product number (e.g. MPI #47).
   3. Cross-reference to specified paint system(s) product is to be used in; include description of each system.

C. Samples: Submit three paper "draw down" samples, 8-1/2 by 11 inches in size, illustrating range of colors available for each finishing product specified.
   1. Where sheen is specified, submit samples in only that sheen.

D. Maintenance Materials: Furnish the following for Owner's use in maintenance of project.
   1. See Section 01 6000 - Product Requirements, for additional provisions.
   2. Extra Paint and Finish Materials: 1 gallon of each color; from the same product run, store where directed.
   3. Label each container with color in addition to the manufacturer's label.

1.05 QUALITY ASSURANCE

A. Applicator Qualifications: Company specializing in performing the type of work specified with minimum three years experience.

1.06 DELIVERY, STORAGE, AND HANDLING

A. Deliver products to site in sealed and labeled containers; inspect to verify acceptability.

B. Container Label: Include manufacturer's name, type of paint, brand name, lot number, brand code, coverage, surface preparation, drying time, cleanup requirements, color designation, and instructions for mixing and reducing.

C. Paint Materials: Store at minimum ambient temperature of 45 degrees F and a maximum of 90 degrees F, in ventilated area, and as required by manufacturer's instructions.

1.07 FIELD CONDITIONS

A. Do not apply materials when surface and ambient temperatures are outside the temperature ranges required by the paint product manufacturer.

B. Follow manufacturer's recommended procedures for producing best results, including testing of substrates, moisture in substrates, and humidity and temperature limitations.

C. Do not apply exterior paint and finishes during rain or snow, or when relative humidity is outside the humidity ranges required by the paint product manufacturer.

D. Provide lighting level of 80 ft candles measured mid-height at substrate surface.

PART 2 PRODUCTS

2.01 MANUFACTURERS

A. Provide paints and finishes used in any individual system from the same manufacturer; no exceptions.

B. Provide paints and finishes from the same manufacturer.

C. Paints:
   1. Benjamin Moore: www.benjaminmoore.com.
   2. PPG Paints: www.ppgpaints.com/#sle.
   3. Sherwin-Williams Company: www.sherwin-williams.com/#sle.

D. Primer Sealers: Same manufacturer as top coats.

2.02 PAINTS AND FINISHES - GENERAL

A. Paints and Finishes: Ready mixed, unless required to be a field-catalyzed paint.
   1. Provide paints and finishes of a soft paste consistency, capable of being readily and uniformly dispersed to a homogeneous coating, with good flow and brushing properties, and capable of drying or curing free of streaks or sags.
   2. Supply each paint material in quantity required to complete entire project's work from a single production run.
   3. Do not reduce, thin, or dilute paint or finishes or add materials unless such procedure is specifically described in manufacturer's product instructions.

B. Volatile Organic Compound (VOC) Content:
   1. Provide paints and finishes that comply with the most stringent requirements specified in the following:
      a. 40 CFR 59, Subpart D--National Volatile Organic Compound Emission Standards for Architectural Coatings.
      b. SCAQMD 1113 Rule.
      c. CARB (SCM).
      d. Architectural coatings VOC limits of the State in which the Project is located.
   2. Determination of VOC Content: Testing and calculation in accordance with 40 CFR 59, Subpart D (EPA Method 24), exclusive of colorants added to a tint base and water added at project site; or other method acceptable to authorities having jurisdiction.

C. Sheens: Provide the sheens specified; where sheen is not specified, sheen will be selected later by Architect from the manufacturer's full line.

D. Colors: As indicated on drawings.

2.03 PAINT SYSTEMS - EXTERIOR

A. Paint E-OP - Exterior Surfaces to be Painted, Unless Otherwise Indicated: Including concrete and concrete masonry units.
   1. Two top coats and one coat filler/primer.
   2. Filler/Primer:
      a. Benjamin Moore: 285 Super Craft Latex Block Filler.
      b. PPG: 6-7 Speedhide Latex Block
      c. Sherwin Williams: A24W00200 Loxon Block Surfacer.
   3. Top Coat(s): Exterior Latex.
      a. Benjamin Moore: 183 Moorcraft Super Spec 100% Acrylic Flat House Paint.
      b. PPG Paints Speedhide Exterior Latex Flat, 6-610XI Series. (MPI #10).
      c. Sherwin Williams: A-100 A6 Acrylic Flat House Paint or SuperPaint as required to match colors.

B. Paint ME-OP-2A - Ferrous Metals, Primed, Alkyd, 2 Coat:
   1. Touch-up with rust-inhibitive primer recommended by top coat manufacturer.
   2. Gloss: Two coats of alkyd enamel.
      a. Benjamin Moore: M22 I.M.C. Urethane Alkyd Gloss Enamel
      b. PPG: 7-282 Pittsburgh Paints Industrial Oil Gloss
      c. Sherwin Williams: B54Z Industrial Alkyd Gloss Enamel

C. Paint MgE-OP-3A - Galvanized Metals, Alkyd, 3 Coat:
   1. One coat galvanize primer.
      a. Benjamin Moore: MO7 I.M.C. Universal Alkyd Metal Primer
      b. PPG: 90-712 Pitt-Tech Acrylic Metal Primer
      c. Sherwin Williams: B50WZ3 Galvite Galvanized Metal Primer
   2. Gloss: Two coats of alkyd enamel.
      a. Benjamin Moore: 133 Impervo Alkyd High Gloss Enamel
      b. PPG: 7-282 Pittsburgh Paints Industrial Oil Gloss
      c. Sherwin Williams: B54Z Industrial Alkyd Gloss Enamel

D. Paint E-Pav - Pavement Marking Paint:
   1. Yellow: One coat.
      a. Benjamin Moore: M58-10 I.M.C. Acrylic Safety & Zone Yellow Marking Paint
      b. PPG: 11-54 Speedhide Latex Traffic Paint Yellow
      c. Sherwin Williams: TM225 Yellow Latex Traffic Marking Paint
   2. White: One coat.
      a. Benjamin Moore: M58-01 I.M.C. Acrylic Safety & Zone White Marking Paint
      b. PPG: 11-53 Speedhide Latex Traffic Paint White
      c. Sherwin Williams: TM226 White Latex Traffic Marking Paint

2.04 ACCESSORY MATERIALS

A. Accessory Materials: Provide primers, sealers, cleaning agents, cleaning cloths, sanding materials, and clean-up materials as required for final completion of painted surfaces.

B. Patching Material: Latex filler.

C. Fastener Head Cover Material: Latex filler.

PART 3 EXECUTION

3.01 EXAMINATION

A. Verify that surfaces are ready to receive work as instructed by the product manufacturer.

B. Examine surfaces scheduled to be finished prior to commencement of work. Report any condition that may potentially effect proper application.

C. Test shop-applied primer for compatibility with subsequent cover materials.

D. Measure moisture content of surfaces using an electronic moisture meter. Do not apply finishes unless moisture content of surfaces are below the following maximums:
   1. Masonry, Concrete, and Concrete Masonry Units: 12 percent.
   2. Concrete Floors and Traffic Surfaces: 8 percent.

3.02 PREPARATION

A. Clean surfaces thoroughly and correct defects prior to application.

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

C. Remove or mask surface appurtenances, including electrical plates, hardware, light fixture trim, escutcheons, and fittings, prior to preparing surfaces for finishing.

D. Seal surfaces that might cause bleed through or staining of topcoat.

E. Remove mildew from impervious surfaces by scrubbing with solution of tetra-sodium phosphate and bleach. Rinse with clean water and allow surface to dry.

F. Concrete:
   1. Remove release agents, curing compounds, efflorescence, and chalk. Do not coat surfaces if moisture content or alkalinity of surfaces to be coated exceeds that permitted in manufacturer's written instructions.
   2. Prepare surface as recommended by top coat manufacturer and according to SSPC-SP 13.

G. Masonry:
   1. Remove efflorescence and chalk. Do not coat surfaces if moisture content or alkalinity of surfaces or if alkalinity of mortar joints exceed that permitted in manufacturer's written instructions. Allow to dry.
   2. Prepare surface as recommended by top coat manufacturer.

H. Galvanized Surfaces:
   1. Remove surface contamination and oils and wash with solvent according to SSPC-SP 1.

I. Ferrous Metal:
   1. Solvent clean according to SSPC-SP 1.
   2. Shop-Primed Surfaces: Sand and scrape to remove loose primer and rust. Feather edges to make touch-up patches inconspicuous. Clean surfaces with solvent. Prime bare steel surfaces. Re-prime entire shop-primed item.

J. Metal Doors to be Painted: Prime metal door top and bottom edge surfaces.

3.03 APPLICATION

A. Apply products in accordance with manufacturer's written instructions and recommendations in "MPI Architectural Painting Specification Manual".

B. Do not apply finishes to surfaces that are not dry. Allow applied coats to dry before next coat is applied.

C. Apply each coat to uniform appearance.

D. Dark Colors and Deep Clear Colors: Regardless of number of coats specified, apply additional coats until complete hide is achieved.

E. Vacuum clean surfaces of loose particles. Use tack cloth to remove dust and particles just prior to applying next coat.

F. Apply paint, enamel, stain and varnish with suitable brushes, rollers or spraying equipment.
   1. Rate of application shall not exceed that as recommended by paint manufacturer for the surface involved.
   2. Keep brushes and rollers and spraying equipment clean, dry, free from contaminates and suitable for the finish required.
   3. Apply stain by brush.

G. Finish coats shall be smooth, free of brush marks, streaks, laps or pile up of paints and skipped or missed areas.

H. Leave all parts of moldings and ornaments clean and true to details with no undue amount of paint in corners and depressions.

I. Make edges of paint adjoining other materials or colors clean and sharp with no overlapping.

J. Change colors at corner of stop where colors differ between adjoining spaces or rooms and where door frames match wall colors.

K. Finish all edges of exterior doors same as faces.

L. The number of coats specified are minimum. The Contractor shall provide at no additional cost to the Owner, as many coats as necessary for color coverage conformity and uniform appearance.

M. Sand wood and metal surfaces lightly between coats to achieve required finish.

N. Reinstall electrical cover plates, hardware, light fixture trim, escutcheons, and fittings removed prior to finishing.

3.04 CLEANING

A. Collect waste material that could constitute a fire hazard, place in closed metal containers, and remove daily from site.

3.05 PROTECTION

A. Protect finishes until completion of project.

B. Touch-up damaged finishes after Substantial Completion.

3.06 SCHEDULE - PAINT SYSTEMS

A. Do Not Paint or Finish the Following Items:
   1. Items factory-finished unless otherwise indicated; materials and products having factory-applied primers are not considered factory finished.
   2. Items indicated to receive other finishes.
   3. Items indicated to remain unfinished.
   4. Fire rating labels, equipment serial number and capacity labels, bar code labels, and operating parts of equipment.
   5. Stainless steel, anodized aluminum, bronze, terne coated stainless steel, and lead items.
   6. Floors, unless specifically indicated.
   7. Ceramic and other tiles.
   8. Glass.
   9. Structural steel roof framing, joists, and bridging
   10. Piping, conduit, and ductwork unless specifically noted
   11. Galvanized exterior stairs and railings
   12. Prefinished wood doors
   13. Bollards.

B. Exterior Surfaces to be painted:
   1. All hollow metal doors and frames.
   2. Dock edge angles.
   3. All exposed piping.
   4. Gas piping on roof.
   5. All other exposed metal except prefinished items.

END OF SECTION

SECTION 09 9123
INTERIOR PAINTING

PART 1 GENERAL

1.01 SECTION INCLUDES

A. Surface preparation.

B. Field application of paints, stains, and varnishes.

C. Scope: Finish interior surfaces exposed to view, unless fully factory-finished and unless otherwise indicated.

1.02 RELATED REQUIREMENTS

A. Section 05 5000 - Metal Fabrications: Shop-primed items.

B. Section 05 5100 - Metal Stairs: Shop-primed items.

C. Section 09 9113 - Exterior Painting.

1.03 REFERENCE STANDARDS

A. 40 CFR 59, Subpart D - National Volatile Organic Compound Emission Standards for Architectural Coatings; U.S. Environmental Protection Agency; current edition.

B. ASTM D16 - Standard Terminology for Paint, Related Coatings, Materials, and Applications; 2014.

C. ASTM D4442 - Standard Test Methods for Direct Moisture Content Measurement of Wood and Wood-Base Materials; 2007.

D. CARB (SCM) - Suggested Control Measure for Architectural Coatings; California Air Resources Board; 2007.

E. MPI (APSM) - Master Painters Institute Architectural Painting Specification Manual; Current Edition, www.paintinfo.com.

F. SCAQMD 1113 - South Coast Air Quality Management District Rule No.1113; current edition.

G. SSPC V1 (PM1) - Good Painting Practice: Painting Manual, Volume 1; Fourth Edition.

H. SSPC-SP 1 - Solvent Cleaning; 2015.

I. SSPC-SP 13 - Surface Preparation of Concrete; (Reaffirmed 2015); 2003.

1.04 SUBMITTALS

A. See Section 01 3000 - Administrative Requirements, for submittal procedures.

B. Product Data: Provide complete list of products to be used, with the following information for each:
   1. Manufacturer's name, product name and/or catalog number, and general product category (e.g. "alkyd enamel").
   2. MPI product number (e.g. MPI #47).
   3. Cross-reference to specified paint system(s) product is to be used in; include description of each system.

C. Samples: Submit three paper "draw down" samples, 8-1/2 by 11 inches in size, illustrating range of colors available for each finishing product specified.
   1. Where sheen is specified, submit samples in only that sheen.

D. Maintenance Materials: Furnish the following for Owner's use in maintenance of project.
   1. See Section 01 6000 - Product Requirements, for additional provisions.
   2. Extra Paint and Finish Materials: 1 gallon of each color; from the same product run, store where directed.
   3. Label each container with color in addition to the manufacturer's label.

1.05 QUALITY ASSURANCE

A. Applicator Qualifications: Company specializing in performing the type of work specified with minimum three years experience.

1.06 DELIVERY, STORAGE, AND HANDLING

A. Deliver products to site in sealed and labeled containers; inspect to verify acceptability.

B. Container Label: Include manufacturer's name, type of paint, brand name, lot number, brand code, coverage, surface preparation, drying time, cleanup requirements, color designation, and instructions for mixing and reducing.

C. Paint Materials: Store at minimum ambient temperature of 45 degrees F and a maximum of 90 degrees F, in ventilated area, and as required by manufacturer's instructions.

1.07 FIELD CONDITIONS

A. Do not apply materials when surface and ambient temperatures are outside the temperature ranges required by the paint product manufacturer.

B. Follow manufacturer's recommended procedures for producing best results, including testing of substrates, moisture in substrates, and humidity and temperature limitations.

C. Do not apply materials when relative humidity exceeds 85 percent; at temperatures less than 5 degrees F above the dew point; or to damp or wet surfaces.

D. Provide lighting level of 80 ft candles measured mid-height at substrate surface.

PART 2 PRODUCTS

2.01 MANUFACTURERS

A. Provide paints and finishes from the same manufacturer.

B. Paints:
   1. Benjamin Moore: www.benjaminmoore.com
   2. PPG Paints: www.ppgpaints.com/#sle.
   3. Sherwin-Williams Company: www.sherwin-williams.com/#sle.

C. Primer Sealers: Same manufacturer as top coats.

2.02 PAINTS AND FINISHES - GENERAL

A. Paints and Finishes: Ready mixed, unless intended to be a field-catalyzed paint.
   1. Provide paints and finishes of a soft paste consistency, capable of being readily and uniformly dispersed to a homogeneous coating, with good flow and brushing properties, and capable of drying or curing free of streaks or sags.
   2. Supply each paint material in quantity required to complete entire project's work from a single production run.
   3. Do not reduce, thin, or dilute paint or finishes or add materials unless such procedure is specifically described in manufacturer's product instructions.

B. Volatile Organic Compound (VOC) Content:
   1. Provide paints and finishes that comply with the most stringent requirements specified in the following:
      a. 40 CFR 59, Subpart D--National Volatile Organic Compound Emission Standards for Architectural Coatings.
      b. SCAQMD 1113 Rule.
      c. CARB (SCM).
      d. Architectural coatings VOC limits of the State in which the Project is located.
   2. Determination of VOC Content: Testing and calculation in accordance with 40 CFR 59, Subpart D (EPA Method 24), exclusive of colorants added to a tint base and water added at project site; or other method acceptable to authorities having jurisdiction.

C. Sheens: Provide the sheens specified; where sheen is not specified, sheen will be selected later by Architect from the manufacturer's full line.

D. Colors: As indicated on drawings.

2.03 PAINT SYSTEMS - INTERIOR

A. Concrete Walls, Opaque, Latex
   1. One top coat and one coat primer.
   2. Primer:
      a. Benjamin Moore: Fresh Start All Purpose 100% Acrylic Primer
      b. PPG: 6-2 Speedhide Latex Primer Sealer
      c. Sherwin Williams: B28W200 Prep-Rite 200 Latex Wall Primer
   3. Top Coat(s):
      a. Benjamin Moore: Eco Spec Interior
      b. PPG: 6-70 Speedhide Interior Latex Flat Wall Paint
      c. Sherwin-Williams: ProMar 200 Zero VOC Interior Latex, Flat

B. Concrete Walls, Opaque, Waterborne Epoxy
   1. Two top coats.
   2. Top Coat(s):
      a. Benjamin Moore: Super Spec Acrylic Epoxy 256-86, Semi-Gloss
      b. PPG: 16-510C Pitt-Glaze WB1 Pre-Catalyzed Acrylic Semi Gloss Epoxy
      c. Sherwin-Williams: Pro Industrial Pre-Catalyzed Waterbased Epoxy, K46-150 Semi-Gloss

C. Concrete Masonry Walls, Opaque, Latex
   1. Two top coats and one coat primer.
   2. Filler/Primer:
      a. Benjamin Moore: Eco Spec Interior Latex Primer Sealer 231
      b. PPG: PPG 6-7 Speedhide Acrylic Latex Block Filler
      c. Sherwin Williams: S-W Loxon Acrylic Masonry Primer, A24W8300
   3. Top Coat(s):
      a. Benjamin Moore: Eco Spec Interior Latex Semi-Gloss Enamel 224
      b. PPG: 6-70 Speedhide Interior Latex Flat Wall Paint
      c. Sherwin-Williams: ProMar 200 Zero VOC Interior Latex, Flat

D. Paint I-OP-DF - Dry Fall: Metals; exposed structure and overhead-mounted services, including shop primed steel deck, structural steel, metal fabrications, and galvanized ducts, one coat.
   1. Top Coat: Latex Dry Fall, Flat.
      a. Benjamin Moore: Sweep-Up Spray Latex Flat K153
      b. PPG: 6-725XI Speedhide SuperTech WB Interior Flat Dry Fog
      c. Sherwin Williams: PRO Waterborne Acrylic Dryfall

E. Paint I-TR -W - Transparent Finish on Wood.
   1. 2 top coats, no stain.
   2. Top Coats: Polyurethane Water Based, Clear Satin/Low Lustre, .
      a. Benjamin Moore: Benwood Stays Clear Acrylic Polyurethane, N423.
      b. PPG: Olympic Premium Interior Water Based Polyurethane, 42786.
      c. Sherwin Williams: Wood Classics Waterborne Polyurethane Varnish, A68F00090.

F. Paint MI-OP-2A - Ferrous Metals, Primed, Alkyd, 2 Coat:
   1. Touch-up Primer:
      a. Benjamin Moore: Super Spec HP. Acrylic Metal Primer
      b. PPG: 90-712 Pitt Tech DTM Acrylic Metal Primer
      c. Sherwin Williams: B66-310 Series Pro Industrial ProCryl Universal Primer
   2. Semi-gloss Top coats:
      a. Benjamin Moore: M29 I.M.C. DTM 100% Acrylic Semi-Gloss Enamel
      b. PPG: 7-374 Pittsburgh Paints Semi Gloss Acrylic Metal Finish
      c. Sherwin Williams: B66-600 Pro Industrial 0 VOC Acrylic Semi-Gloss

G. Paint MgI-OP-3A - Galvanized Metals, Alkyd, 3 Coat:

1. Primer:
    a. Benjamin Moore: Super Spec HP. Acrylic Metal Primer
    b. PPG: 90-712 Pitt Tech DTM Acrylic Metal Primer
    c. Sherwin Williams: B66-310 Series Pro Industrial ProCryl Universal Primer
2. Semi-gloss Top coats:
    a. Benjamin Moore: M29 I.M.C. DTM 100% Acrylic Semi-Gloss Enamel
    b. PPG: 7-374 Pittsburgh Paints Semi Gloss Acrylic Metal Finish
    c. Sherwin Williams: B66-600 Pro Industrial 0 VOC Acrylic Semi-Gloss

H. Paint GI-OP-3A - Gypsum Board/Plaster, Alkyd, 3 Coat:
1. One coat of latex primer sealer.
    a. Benjamin Moore: Fresh Start All Purpose 100% Acrylic Primer 023
    b. PPG: 6-2 Speedhide Latex Primer Sealer
    c. Sherwin Williams: B28W200 Prep-Rite 200 Latex Primer
2. Eggshell: Two coats of latex-acrylic enamel; .
    a. Benjamin Moore: C274 Super Spec Acrylic Latex Eggshell Enamel
    b. PPG: 6-411 Speedhide Latex Eggshell Enamel
    c. Sherwin Williams: B20W2251 ProMar 200 Acrylic Latex Eggshell Enamel

I. Electrical Room Mounting Boards, Fire Retardant Latex, 2 Coat:
1. Two coats as required for full coverage.
    a. Benjamin Moore: Super Spec HP Fire Retardant P59
    b. PPG: 42-7 Speedhide Interior Fire Retardant Flat Latex.
    c. Flame Control Coatings Canada, Ltd.: Flame Control No. 20-20A.

J. Dry Erase Coating:
1. 1 Coat to provide full coverage
    a. Benjamin Moore: Notable Dry Erase 0500
    b. Sherwin Williams: Dry Erase Clear Gloss Coating, KB65C2000 Kit.
    c. Visu Wall: Dry Erase Clear Wallcoat.
    d. Wolf Gordon: Wink Clear Write and Erase Finish.

2.04 ACCESSORY MATERIALS

A. Accessory Materials: Provide primers, sealers, cleaning agents, cleaning cloths, sanding materials, and clean-up materials as required for final completion of painted surfaces.

B. Patching Material: Latex filler.

C. Fastener Head Cover Material: Latex filler.

PART 3 EXECUTION

3.01 EXAMINATION

A. Verify that surfaces are ready to receive work as instructed by the product manufacturer.

B. Examine surfaces scheduled to be finished prior to commencement of work. Report any condition that may potentially effect proper application.

C. Test shop-applied primer for compatibility with subsequent cover materials.

D. Measure moisture content of surfaces using an electronic moisture meter. Do not apply finishes unless moisture content of surfaces are below the following maximums:
1. Gypsum Wallboard: 12 percent.
2. Masonry, Concrete, and Concrete Masonry Units : 12 percent.
3. Interior Wood: 15 percent, measured in accordance with ASTM D4442.
4. Concrete Floors and Traffic Surfaces: 8 percent.

3.02 PREPARATION

A. Clean surfaces thoroughly and correct defects prior to application.

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

C. Remove or mask surface appurtenances, including electrical plates, hardware, light fixture trim, escutcheons, and fittings, prior to preparing surfaces or finishing.

D. Seal surfaces that might cause bleed through or staining of topcoat.

E. Remove mildew from impervious surfaces by scrubbing with solution of tetra-sodium phosphate and bleach. Rinse with clean water and allow surface to dry.

F. Concrete:
   1. Remove release agents, curing compounds, efflorescence, and chalk. Do not coat surfaces if moisture content or alkalinity of surfaces to be coated exceeds that permitted in manufacturer's written instructions.
   2. Prepare surface as recommended by top coat manufacturer and according to SSPC-SP 13.

G. Masonry:
   1. Remove efflorescence and chalk. Do not coat surfaces if moisture content or alkalinity of surfaces or if alkalinity of mortar joints exceed that permitted in manufacturer's written instructions. Allow to dry.
   2. Prepare surface as recommended by top coat manufacturer.

H. Gypsum Board: Fill minor defects with filler compound. Spot prime defects after repair.

I. Galvanized Surfaces:
   1. Remove surface contamination and oils and wash with solvent according to SSPC-SP 1.

J. Ferrous Metal:
   1. Solvent clean according to SSPC-SP 1.
   2. Shop-Primed Surfaces: Sand and scrape to remove loose primer and rust. Feather edges to make touch-up patches inconspicuous. Clean surfaces with solvent. Prime bare steel surfaces. Re-prime entire shop-primed item.

K. Wood Surfaces to Receive Opaque Finish: Wipe off dust and grit prior to priming. Seal knots, pitch streaks, and sappy sections with sealer. Fill nail holes and cracks after primer has dried; sand between coats. Back prime concealed surfaces before installation.

L. Wood Surfaces to Receive Transparent Finish: Wipe off dust and grit prior to sealing, seal knots, pitch streaks, and sappy sections with sealer. Fill nail holes and cracks after sealer has dried; sand lightly between coats. Prime concealed surfaces with gloss varnish reduced 25 percent with thinner.

M. Metal Doors to be Painted: Prime metal door top and bottom edge surfaces.

3.03 APPLICATION

A. Apply products in accordance with manufacturer's written instructions and recommendations in "MPI Architectural Painting Specification Manual".

B. Do not apply finishes to surfaces that are not dry. Allow applied coats to dry before next coat is applied.

C. Apply each coat to uniform appearance in thicknesses specified by manufacturer.

D. Dark Colors and Deep Clear Colors: Regardless of number of coats specified, apply as many coats as necessary for complete hide.

E. Sand wood and metal surfaces lightly between coats to achieve required finish.

F. Vacuum clean surfaces of loose particles. Use tack cloth to remove dust and particles just prior to applying next coat.

G. Apply paint, enamel, stain and varnish with suitable brushes, rollers or spraying equipment.
   1. Rate of application shall not exceed that as recommended by paint manufacturer for the surface involved.
   2. Keep brushes and rollers and spraying equipment clean, dry, free from contaminates and suitable for the finish required.
   3. Apply stain by brush.

H. Finish coats shall be smooth, free of brush marks, streaks, laps or pile up of paints and skipped or missed areas.

I. Leave all parts of moldings and ornaments clean and true to details with no undue amount of paint in corners and depressions.

J. Make edges of paint adjoining other materials or colors clean and sharp with no overlapping.

K. Change colors at corner of stop where colors differ between adjoining spaces or rooms and where door frames match wall colors.

L. The number of coats specified are minimum. The Contractor shall provide at no additional cost to the Owner, as many coats as necessary for color coverage conformity and uniform appearance.

M. Wood to Receive Transparent Finishes: Tint fillers to match wood. Work fillers into the grain before set. Wipe excess from surface.

N. Reinstall electrical cover plates, hardware, light fixture trim, escutcheons, and fittings removed prior to finishing.

O. Apply dry erase coating per manufacturer's direction.

3.04 CLEANING

A. Collect waste material that could constitute a fire hazard, place in closed metal containers, and remove daily from site.

3.05 PROTECTION

A. Protect finishes until completion of project.

B. Touch-up damaged finishes after Substantial Completion.

3.06 SCHEDULE - PAINT SYSTEMS

A. Do Not Paint or Finish the Following Items:
   1. Items factory-finished unless otherwise indicated; materials and products having factory-applied primers are not considered factory finished.
   2. Items indicated to receive other finishes.
   3. Items indicated to remain unfinished.
   4. Fire rating labels, equipment serial number and capacity labels, bar code labels, and operating parts of equipment.
   5. Stainless steel, anodized aluminum, bronze, terne coated stainless steel, and lead items.
   6. Floors, unless specifically indicated.
   7. Ceramic and other tiles.
   8. Glass.
   9. Structural steel roof framing, joists, and bridging
   10. Piping, conduit, and ductwork unless specifically noted
   11. Galvanized exterior stairs and railings
   12. Prefinished wood doors

B. Interior Surfaces to be painted:
   1. All walls scheduled for paint
   2. Interior concrete wall panels scheduled to be painted
   3. All hollow metal doors and frames
   4. In staging bay structural steel columns and structural steel braces shall be painted safety yellow up to 12' AFF, paint remainder to underside of joist girder white. In other areas paint column white from floor to underside of joist girder.
   5. Bollards
   6. Ladders, safety cages
   7. Stairs and railings
   8. Guardrails
   9. Sprinkler risers up to the turn out at ceiling level to be painted red

10. Protection for sprinkler risers, downspout or other protection to be painted saefty yellow
11. Prep and repaint all columns and joists that exhibit rust, scaling or discoloration to match original primer

END OF SECTION

SECTION 10 4400
FIRE PROTECTION SPECIALTIES

PART 1 GENERAL

1.01 SECTION INCLUDES

A. Fire extinguishers.

B. Accessories.

1.02 RELATED REQUIREMENTS

1.03 REFERENCE STANDARDS

A. NFPA 10 - Standard for Portable Fire Extinguishers; 2013.

B. UL (DIR) - Online Certifications Directory; current listings at database.ul.com.

1.04 PERFORMANCE REQUIREMENTS

A. Conform to NFPA 10.

B. Provide extinguishers classified and labeled by Underwriters Laboratories Inc. for the purpose specified and indicated.

1.05 SUBMITTALS

A. See Section 01 3000 - Administrative Requirements, for submittal procedures.

B. Product Data: Provide extinguisher operational features.

PART 2 PRODUCTS

2.01 MANUFACTURERS

A. Fire Extinguisher Cabinets and Accessories:
   1. JL Industries, Inc: www.jlindustries.com.
   2. Larsen's Manufacturing Co: www.larsensmfg.com.
   3. Potter-Roemer: www.potterroemer.com.
   4. Substitutions: See Section 01 6000 - Product Requirements.

2.02 FIRE EXTINGUISHERS

A. Fire Extinguishers - General: Comply with product requirements of NFPA 10 and applicable codes, whichever is more stringent.

B. Multi-Purpose Dry Chemical Type: Steel tank, with pressure gage.
   1. Size and classification:
      a. Office Areas: 5 lb. minimum, 2A-10B:C.
      b. Warehouse Areas: 10 lb. minimum, 4A-60B:C.
   2. Finish: Baked enamel, red color.

2.03 ACCESSORIES

A. Extinguisher Brackets: Formed steel, galvanized and enamel finished. Heavy duty bracket providing top and bottom support fore extinguisher.

PART 3 EXECUTION

3.01 EXAMINATION

A. Verify existing conditions before starting work.

B. Verify rough openings for cabinet are correctly sized and located.

3.02 INSTALLATION

A. Install in accordance with manufacturer's instructions.

B. Secure rigidly in place.

C. Place extinguishers on wall brackets.

D. Install wall/column mounted fire extinguishers in Warehouse as directed by Fire Marshall.

3.03 SCHEDULES

A. Warehouse area: Unless indicated otherwise, provide wall/column mounted extinguishers at a rate of 1 per 6,000 sq. ft.

B. Office Area: Unless indicated otherwise, provide fire extinguisher and cabinet at a rate of 1 per 3,000 sq.ft.

C. Maximum Travel Distance: Fire extinguisher provided within 75 feet.

END OF SECTION

SECTION 10 7320
DOCK CANOPY

PART 1 - GENERAL

1.01 DESCRIPTION OF WORK:

A. Pre-engineered, pre-finished aluminum canopies.
   1. Restraint hanger type and Cantilevered hanger type with custom bullnose fascia.

1.02 RELATED WORK SPECIFIED ELSEWHERE:

A. Section 05 5000 - Metal Fabrications: cantilevered structural steel support.

B. Section 07 9005 - Caulking and Sealants: caulking joint between canopy and wall.

1.03 PERFORMANCE REQUIREMENTS:

A. Design canopy and framing to support local design loads:
   1. Design Loads: See General Notes on Structural Drawings.

1.04 SUBMITTALS:

A. Product Data: Submit fabricator's specifications and installation instructions for products specified in this Section.

B. Shop Drawings: Submit shop drawings for the fabrication of each item of metal work. Information noted shall include plans, elevations, and details showing jointings, anchorage, and all accessory items with finishes noted.

C. Design Calculations: Design structural support framing components under direct supervision of a Professional Structural Engineer experienced in design of this Work and licensed at the State in which the project is located. Furnish stamped engineered calculations.

D. Samples: Submit two samples for finish approval:
   1. 4 x 4 inch color sample of bullnose fascia metal.

1.05 STORAGE AND HANDLING

A. Handle materials to prevent damage to prefinished surfaces. Install no components which have been damaged or stained beyond repair. The Architect shall be the sole judge of whether a damaged or stained member may be repaired or refinished for use

B. Protect all installations for remainder of project from damage caused by work of other trades.

1.06 COORDINATION:

A. Work under this Section shall be coordinated with other trades so that a single installer shall have responsibility for the complete assembly.

1.07 ASSURANCE STANDARDS:

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

B. Shop Assembly: Pre-assemble items in the shop to the greatest extent possible. Disassemble units only to the extent necessary for shipping and handling limitations. Clearly mark units for reassembly and coordinate installation.

C. Inserts and anchorages shall be furnished. Provide setting drawings, templates and instructions for installation of items. Coordinate delivery to avoid delays.

1.08 QUALITY CRITERIA:

A. Comply with the provisions of the following standards except where specified to the contrary elsewhere in this Section.
   1. The Aluminum Association (A.A.)
      a. “Designation System of Aluminum Finishes.”
      b. “Aluminum Standards and Data.”
   2. The National Association of Architectural Metal Manufacturers (NAAMM).

PART 2 - PRODUCTS

2.01 GENERAL REQUIREMENTS:

A. Materials shall be free from defects impairing strength, durability or appearance, having structural properties to sustain or withstand strains and stresses to which subjected. Exposed surfaces throughout project shall have the same inherent texture and color for like locations. Fasteners shall be non-corrosive, non-staining and concealed, except as indicated on approved shop drawings.

B. Fasteners which must be exposed shall be of same materials, color and finish as materials to which applied. Countersink and finish flush all fasteners unless indicated otherwise on shop drawings. Exposed welds shall be ground smooth to form a neat uniform fillet without weakening base metal. Unexposed welds shall have slag removed before applying shop coating. Moulded, bent or shaped members shall be formed with clean, sharp arises, without dents, scratches, cracks and other defects, provide anchors, bolts, shims, and accessory items for building into and fastening to adjacent work.

2.02 SYSTEM DESCRIPTION:

A. Dock Canopy:
   1. Description: consists of structural aluminum panels bounded by break metal fascia which act as gutters. Canopy and the connections to the structural support shall be designed to resist design windloads. Gutters shall drain through the bottom of fascia by means of scuppers.
   2. Method of Support:
      a. Canopies shall be supported from cantilevered structural steel supports anchored to wall. See drawings for locations.

B. Canopy Roof Panel: Self-supporting aluminum panel 3 inches deep.
   1. Equal to Mason Corporation - "Structural W Panel”.
   2. Thickness: 0.032 inches minimum.
   3. Finish: Factory-applied baked-on enamel.
   4. Color: White.

C. Gutter/Fascia: Rolled formed aluminum properties are:
   1. Equal to Mason Corporation – ".050" R-F Fascia".
   2. Size: 6 inches high.
   3. Thickness: 0.050 inches.
   4. Finish: Factory-applied baked-on enamel.
   5. Color: Matte Black, or as indicated on drawings.

D. Custom Bullnose Fascia: 0.032" aluminum bullnose fascia with smooth radius. Finish to be Kynar 500 based on manufacturer's premium (non-metalic) color selection.
   1. “PAC-CLAD Architectural Sheet”; Peterson Aluminum Corporation.

E. Hardware: All hardware up to 1/4 " inch in diameter shall be stainless steel. Items larger shall be galvanized steel and comply with ASTM B117 (Hass Test) for 200 hours.

2.03 MISCELLANEOUS MATERIALS:

A. Inserts and anchorage items: Provide appropriate types with hot dip galvanized coatings where metal components are fixed into concrete panels. Select fasteners of type, grade and class required for installation of metal components as indicated on the drawings and specified herein.
   1. Bolts and nuts: Regular hexagon type.
   2. Machine screws: Cadmium plated.
   3. Plain washers: Round, carbon steel.
   4. Lock washers: Helical spring type carbon steel.
   5. Lead expansion shields and lag bolts: Approved types.

B. Gasket and sealant materials noted on drawings shall comply with Section 07920.

2.04 FINISHES:

A. The finish on all miscellaneous aluminum extrusions shall be mill finished, unless noted otherwise on drawings.

PART 3 - EXECUTION

3.01 FABRICATION:

A. Form metalwork to the required shapes and sizes with true curves lines and angles. Use concealed fasteners wherever possible the metal from which principal components are fabricated.

B. Where permanent joinery of components is required perform the joining process by brazing. Whenever possible, blind or concealed joints shall be used and all joints shall be ground, buffed, and polished to minimize color differences.

C. Mill all joints to a tight hairline fit. Where right angles or tight radius corners are indicated, provide prefabricated members.

D. Complete the cutting, fitting, forming, drilling and grinding of all metal work prior to cleaning and finishing. Remove arises from cut edges and ease edges and corners.

E. Maintain continuity of line and accurate relation of planes and angles. Provide secure attachment and support at mechanical joints, with hairline fit of contacting members.

F. Separate aluminum from dissimilar metals with bituminous paint or preformed separators which will prevent corrosion.

3.02 INSTALLATION:

A. Install work with a minimum of field cutting and drilling. Set the work accurately in location, alignment and elevation, plumb and true to levels and curvatures measured from established lines and levels.
   1. Maximum variation from plumb, level or designated position: 1/8" in 10 feet, not to exceed 1/4" in a total run.
   2. Maximum offset in alignment between two consecutive members in line, end to end: 1/16".
   3. Maximum offset between framing members at corners: 1/32".

B. Form tight hairline joints at all field connections. Where cutting, grinding or brazing is required for proper fit and jointing of the work, restore finishes to eliminate any evidence of such work. Do not cut or abrade finishes which cannot be completely restored in the field. Return items with such finishes to the shop for required alterations followed by complete refinishing or provide new units at Contractor's option.

C. Protect aluminum in contact with concrete, steel and other dissimilar materials with isolating gaskets of bituminous coating.

D. Fixing of fascias and soffits shall be accomplished with concealed fasteners or adhesives approved by the metal fabricator.

3.03 CLEANING AND PROTECTION:

A. Contractor shall correct damaged work to meet finish requirements found elsewhere in the Specifications.

END OF SECTION

SECTION 31 3116
TERMITE CONTROL

PART 1 GENERAL

1.01 SECTION INCLUDES

A. Chemical soil treatment.

1.02 REFERENCE STANDARDS

A. Title 7, United States Code, 136 through 136y - Federal Insecticide, Fungicide and Rodenticide Act; 1947 (Revised 2001).

B. Florida Department of Agriculture and Consumer Services.

1.03 SUBMITTALS

A. Product Data: Indicate toxicants to be used, composition by percentage, dilution schedule, intended application rate.

B. Manufacturer's Application Instructions: Indicate caution requirements .

1.04 QUALITY ASSURANCE

A. Installer Qualifications: Company specializing in performing this type of work and:
   1. Having minimum of 2 years documented experience.
   2. Licensed in the State in which the Project is located.

1.05 REGULATORY REQUIREMENTS

A. Conform to applicable code for requirements for application and authority to use toxicant chemicals, and comply with EPA regulations.

1.06 SEQUENCING

A. Do not apply soil treatment solution until excavation, filling and grading operations are completed, except as otherwise required in construction operations.

B. Apply toxicant immediately prior to installation of vapor barrier under slabs-on-grade.

1.07 WARRANTY

A. Provide five year installer's warranty against damage to building caused by termites.
   1. Include coverage for repairs to building and to contents damaged due to building damage. Repair damage and, if required, re-treat.
   2. Warranty shall state dates of application and chemicals used, including quantities and concentrations.
   3. Warranty shall be renewable on a year-to-year basis at end of five year period at Owner's option, for a fee to be agreed upon at time of renewal by Owner.
   4. Re-treatment upon evidence of subterranean insect activity shall be made at no charge to the Owner.

PART 2 PRODUCTS

2.01 MATERIALS

A. Use an industry recognized, federal, state and locally approved, emulsible concentrate insecticide for dilution with water, uniform composition, and specially formulated to prevent infestation by termites. Fuel oil will not be permitted as a diluent.

B. Toxicant Chemical: EPA approved; synthetically color dyed to permit visual identification of treated soil.

C. Diluent: Recommended by toxicant manufacturer.

D. Mixtures of chemicals are prohibited, except as premixed from manufacturer.

PART 3 EXECUTION

3.01 EXAMINATION

A. Verify that soil surfaces are unfrozen, sufficiently dry to absorb toxicant, and ready to receive treatment.

B. Verify final grading is complete.

3.02 APPLICATION

A. Comply with requirements of U.S. EPA and applicable state and local codes.

B. Spray apply toxicant in accordance with manufacturer's instructions.

C. Schedule:
   1. Make application during normal working hours.
   2. Allow not less than 12 hours for drying after application, before covering treated area.

D. Apply toxicant at following locations:
   1. Under Slabs-on-Grade.
   2. At Both Sides of Foundation Surface.

E. Under slabs, apply toxicant immediately prior to installation of vapor barrier.

F. At foundation walls, apply toxicant immediately prior to finish grading work outside foundations.

G. Apply extra treatment to structure penetration surfaces such as pipe or ducts, and soil penetrations such as grounding rods or posts.

H. Re-treat disturbed treated soil with same toxicant as original treatment.

I. If inspection or testing identifies the presence of termites, re-treat soil and re-test.

J. Coordinate soil treatment at foundation perimeter with finish grading and landscaping work to avoid disturbance of treated soil. Retreat disturbed treated soil.

3.03 PROJECT RECORD DOCUMENTS

A. Accurately record moisture content of soil before treatment, date and rate of application, areas of application, diary of meter readings and corresponding soil coverage.

B. A Certificate of Compliance shall be issued to the building department by the licensed applicator.

3.04 PROTECTION

A. Do not permit soil grading over treated work.

B. Post signs in areas of application, warning that soil treatment has been applied. Remove signs before treated areas are covered by other construction.

END OF SECTION

MACGREGOR
ASSOCIATES
ARCHITECTS