SECTION 03 10 00

CONCRETE FORMWORK

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.

E. Related Sections

1. Section 01 35 16, LEED Submittal Forms.
2. Section 03 20 00 Concrete Reinforcement.
3. Section 03 30 00 Cast-In Place Concrete.

1.02 REFERENCES

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

B. ACI 347R -05 Guide for Shoring/Reshoring of Concrete Multistory Buildings.

C. PS-1 - Construction and Industrial Plywood.

D. California Code of Regulations, Title 8 Subchapter 4. Construction Safety Orders, Article 29, Erection and Construction, Section 1717.

E. ADA – Americans with Disabilities Act of 1990

1. ADA/Standards – ADA Title II Regulations and the DOJ/Standards for Accessible Design.
2. ADA Standards – ADA Title III Regulations and their referenced DOJ Standards for Accessible Design.

F. Chapter 19, 2010 California Building Code.

G. APA - American Plywood Association Design and Construction Guide.

H. CCR - California Code of Regulations, Title 8, Subchapter 4, Construction Safety Orders.

I. Local AQMD - Air Quality Management District.

1.03 DESIGN REQUIREMENTS

A. Design, engineer and construct formwork, shoring and bracing to conform to Section 1906, California Building Code. Resultant concrete to conform to required shape, line and dimension. Design of formwork is Contractor's responsibility.

4/26/2011 4.2

B. The formwork shall be designed for the loads and lateral pressures outlined in Chapter 2 of ACI 347R, and lateral forces as specified by the CBC.

C. Forms shall be designed by a professional Civil / Structural engineer registered in the State of California.

D. Foundation concrete may be placed directly into neat excavations, provided foundation trench walls are stable as determined by Architect, subject to approval of City and Architect. In such case, minimum formwork indicated on drawings is mandatory to insure clean excavations immediately prior to and during placing of concrete.

1.04 COORDINATION

A. Coordinate this Section with other Sections of work that require attachment of components to formwork.

B. If formwork is placed after reinforcement resulting in insufficient concrete cover over reinforcement, request instructions from Architect before proceeding.

1.05 SUBMITTALS

A. Structural engineering calculations and drawings signed by California Licensed Civil / Structural Engineer. Shoring design shall account for all imposed shoring loads on the structure and measures shall be taken to not overload any element of the structure.

B. Special Environmental Requirements Product Submittal Form, found in Appendix A of Section 01 35 43 Special Environmental Requirements. Provide the following information for all concrete formwork:

1. Local/Regional Materials.

PART 2 PRODUCTS

2.01 FORM MATERIALS

A. Plywood: APA - MDO (Medium Density Overlay) Plyform, Group 1, Exterior, PS-1, for exposed surfaces. APA - BB (No-overlay) Plyform, Class 1, Exterior, PS-1 for unexposed surfaces.

B. Tubular [Column] Forms: fiber-reinforced, spirally wound, paperboard forms with integral form-release liner, seamless, Sonotube by Sonoco, Hartsville, SC, or equal, approved in accordance with Division 01, General Requirements, for substitutions.

C. Lumber: Douglas Fir species; construction grade with grade stamp clearly visible.

D. Form Ties: Removable metal of adjustable length, cone ends.

2.02 FORMWORK ACCESSORIES

A. Form Release Agent: Colorless non-staining liquid chemical agent, free of wax or oils which will not absorb water. Material shall comply with AQMD, Local Regulations.

B. Corners: Chamfered type; maximum possible lengths.

C. Under-Slab Vapor Barrier: Vapor Barrier: ASTM E 1745, Class A, 15 mils thick, Permeance as tested before and after mandatory conditioning (ASTM E 1745 Section 7.1 and sub-paragraphs 7.1.1 – 7.1.5): less than 0.01 grains/(ft² · hr · inHg).

1. Acceptable Products
   a. 15 mil Stegowrap Vapor Barrier, Stego Industries LLC
   b. Reef Industries, VaporGuard
   c. Reflex Super, Monarflex USA
   d. Or equal

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

PART 3 EXECUTION

3.01 EXAMINATION

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

3.02 EARTH FORMS

A. Hand trim sides and bottom of earth forms. Remove loose soil prior to placing concrete.

3.03 ERECTION - FORMWORK

A. Erect formwork, shoring and bracing to achieve design requirements in accordance with requirements of Section 1906, 2010 California Building Code.

1. Calculations Required: Provide shoring required to protect all earth banks which cannot be sloped back, due to adjacent structures, walks, streets or property lines. Provide engineering calculations and drawings necessary to perform Work. Calculations to be sealed and signed by licensed California Structural Engineer.
2. Where public areas such as sidewalks and streets are to be shored, drawings and calculations are to be submitted by Contractor to the city or governing agency for approval prior to beginning of any work.
3. Contractor and/or his engineer assume and accept all responsibility for construction and safety of shoring.
4. Upon completion of Work, shoring materials are to be removed from site at expense of Contractor. Certain steel and/or concrete materials may be left in place with written approval of Architect.

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 shoring. Conform to Title 8, Subchapter 4, Construction Safety Orders, CCR.

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

E. Obtain approval before framing openings in structural members that are not indicated on Drawings.

F. Provide chamfer strips on external corners.

G. Surface irregularities, ACI 347R Class A, gradual or abrupt irregularities of 1/8 inch for exposed to view concrete. Class B, 1/4 inch for plaster cement finish.

3.04 APPLICATION - FORM RELEASE AGENT

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

B. Apply prior to placement of reinforcing steel, anchoring devices and embedded items.

C. Do not apply form release agent where concrete surfaces will receive special finishes or applied coverings that are affected by agent. Soak inside surfaces of untreated forms with clean water. Keep surfaces coated prior to placement of concrete.

3.05 INSERTS, EMBEDDED PARTS AND OPENINGS

A. Provide formed openings where required for items to be embedded in or passing through concrete work. No openings or embedded items permitted in structural slabs within 18 inches of columns. Conform to Section 1906, 2010 California Building Code.

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

C. Coordinate work of other Sections in forming and placing openings, slots, reglets, recesses, chases, sleeves, bolts, anchors and other inserts, whether indicated on the structural drawings or not.

D. Install accessories in accordance with manufacturer's instructions, straight, level and plumb. Ensure items are not disturbed during concrete placement.

E. Provide temporary ports or openings in formwork where required to facilitate cleaning and inspection. Locate openings at bottom of forms to allow flushing water to drain.

F. Close temporary openings with tight fitting panels, flush with inside face of forms and neatly fitted so joints will not be apparent in exposed concrete surfaces.

3.06 FORM CLEANING

A. Clean and remove foreign matter within forms as erection proceeds.

B. Clean formed cavities of debris prior to placing concrete.

C. Flush with water or use compressed air to remove remaining foreign matter. Ensure that water and debris drain to exterior through clean-out ports.

3.07 FORMWORK TOLERANCES

A. Construct formwork to maintain tolerances required by ACI 117.

3.08 FIELD QUALITY CONTROL

A. Inspect erected formwork, shoring, and bracing to ensure that work is in accordance with formwork design and that supports, fastenings, wedges, ties and items are secure.

3.09 FORM REMOVAL

A. Do not remove forms or bracing until concrete has gained sufficient strength to carry its own weight and imposed loads. Conform to Section 1906.2, California Building Code.

1. Minimum stripping time for walls and columns: 5 days.
2. Minimum stripping time for beams and structural slabs: 21 days.

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

C. Store removed forms in manner that surfaces to be in contact with fresh concrete will not be damaged. Discard damaged forms. Re-shoring permitted only after 10 days and prior to stripping.

END OF SECTION

SECTION 03 20 00

CONCRETE REINFORCEMENT

PART 1 GENERAL

1.01 SECTION INCLUDES

A. Fabricating and setting reinforcing steel and accessories for cast-in-place concrete.

B. Related Sections:

1. Section 01 35 16 LEED Submittal Forms
2. Section 03 10 00, Concrete Formwork
3. Section 03 30 00, Cast-in-Place Concrete

1.02 REFERENCES

A. ACI 315 - Details and Detailing of Concrete Reinforcing.

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

C. ASTM A615 - Specification for Deformed and Plain Billet-Steel Bars for Concrete Reinforcement.

D. ASTM A706 - Specification for Low-Alloy Steel Deformed Bars for Concrete Reinforcement.

E. AWS D1.4 - Structural Welding Code for Reinforcing Steel.

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

G. Chapter 19, 2010 California Building Code.

1.03 SUBMITTALS

A. Shop Drawings, indicating bar sizes, spacings, locations and quantities of reinforcing steel bending and cutting schedules and supporting and spacing devices.

B. Special Environmental Requirements Product Submittal Form, found in Appendix A of Section 01 35 16 LEED Submittal Forms. Provide the following information for all reinforcing steel:

1. Recycled Content.
2. Local/Regional Materials.

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

D. Submit Mill Test Reports: showing structural strength, destructive and non-destructive test analysis and identification.

1.04 QUALITY ASSURANCE

A. Provide Testing Laboratory with access to fabrication plant to facilitate inspection of reinforcement. Provide notification of commencement and duration of shop fabrication in sufficient time to allow inspection.

B. Comply with the requirements of Division 01 General Requirements.

1.05 COORDINATION

A. Coordinate with placement of formwork, formed openings and other Work.

PART 2 PRODUCTS

2.01 REINFORCEMENT

A. Reinforcing Steel: ASTM A615, deformed billet steel bars, in grades as follows, and conforming to CBC-19, Section 1903A.

1. For No.4 and larger bars, use 60 ksi yield grade.
2. For ties and stirrups, and No. 3 and smaller bars, use 40 ksi yield grade.
3. For welded bars, use ASTM A706 60 ksi yield grade.

B. Welded Wire Reinforcement: Plain type, ASTM A185; in flat sheets; uncoated finish, 6 x 6 - W4.0 x W4.0 unless otherwise noted on drawings.

C. Welding Electrodes: Low Hydrogen grade E70XX for Grade 40, E90XX for Grade 60.

2.02 ACCESSORY MATERIALS

A. Tie Wire: Minimum 16 gauge black annealed type.

B. Chairs, Bolsters, Bar Supports, Spacers: Sized and shaped for strength and support of reinforcement during concrete placement conditions.

C. Special Chairs, Bolsters, Bar Supports, Spacers Adjacent to Weather Exposed Concrete Surfaces: Plastic coated steel type; size and shape as required.

D. Concrete Blocks: Approximately 3 inches dimension each side.

2.03 FABRICATION

A. Fabricate concrete reinforcing in accordance with CRSI Manual of Practice and ACI 315 and ACI 318. Wherever possible, make bends to shape in fabricator's shop.

1. Bars reduced in section will not be accepted.
2. Bars with kinks are unacceptable.
3. Bars shall not be heated to facilitate bending or for any other purpose.
4. Bars with bends not indicated on drawings will not be accepted. Perform no forming in a manner which will damage bars.
5. Rebending of bars prohibited.

B. Weld reinforcement in accordance with AWS D1.4.

C. Locate reinforcing splices not indicated on Drawings at point of minimum stress.

PART 3 EXECUTION

3.01 PLACEMENT

A. Place, support and secure reinforcement against displacement. Do not deviate from required position. Install concrete blocks to support reinforcement over grade. Rocks not permitted.

B. Do not displace or damage vapor barrier where vapor barrier is specified or indicated on drawings.

C. Accommodate placement of formed openings.

D. Prior to placing, thoroughly clean reinforcement of all rust, dirt, dust, oil or any other material deleterious to bonding of concrete.

E. Accurately place and securely tie reinforcement at all intersections and splices with black annealed wire and securely hold in position during placing of concrete by means of precast concrete block supports. Point wire tie ends away from the form. Unless otherwise indicated, the number, type, and spacing of supports shall conform to the ACI 315.

F. During placing of structural concrete slabs, provide a full-time reinforcing steel placer to repair and replace reinforcing to its proper location. Provide additional chairs of the proper size available to place under bars displaced during the concrete pouring operation.

G. Dowels for Walls: Securely tie in place prior to placing of concrete. Do not place dowels in concrete after pour.

H. Conform to Section 1907, California Building Code for concrete cover over reinforcement.

END OF SECTION

SECTION 03 30 00

CAST-IN-PLACE CONCRETE

PART 1 GENERAL

1.01 SECTION INCLUDES

A. Cast-in-place concrete.

B. Concrete curbs for walls, floors and slabs on grade, footings.

C. Control, expansion and contraction joint devices associated with concrete work including joint sealants.

D. Concrete for curbs, gutter, sidewalks, stairs and ramps and other site-related concrete is specified in Section 32 13 13.

E. Related Sections:

1. Section 01 35 16 LEED Submittal Forms
2. Section 03 10 00, Concrete Formwork
3. Section 03 20 00, Concrete Reinforcement
4. Section 03 39 00, Concrete Curing

1.02 REFERENCES

A. CBC - 2010 California Building Code

1. CBC-19 – CBC Chapter 19, Concrete

B. ADA – Americans with Disabilities Act of 1990

1. ADA/Standards – ADA Title II Regulations and the DOJ/Standards for Accessible Design.
2. ADA Standards – ADA Title III Regulations and their referenced DOJ Standards for Accessible Design.

C. ACI 301 - Structural Concrete for Buildings.

D. ACI 318-2005 - Building Code Requirements for Structural Concrete and Commentary -DSA.

E. ASTM C33 - Concrete Aggregate.

F. ASTM C150 - Portland Cement.

G. ASTM C171 - Sheet Materials for Curing Concrete.

H. ASTM C 311 – Standard Methods of Sampling and Testing Fly Ash and Natural Pozzolans for Use as a Mineral Admixture in Portland Cement Concrete.

I. ASTM C330 - Lightweight Aggregates for Structural Concrete.

J. ASTM C618 - Coal Fly Ash and Raw or Calcined Natural Pozzolan for use as a Mineral Admixture in Concrete.

K. ASTM C856 - Petrographic Examination of Hardened Concrete.

L. ASTM C1107 - Packaged Dry, Hydraulic - Cement Grout (Nonshrink).

M. ASTM C1116 – Specification for Fiber-Reinforced Concrete.

N. ASTM D1751 - Preformed Expansion Joint Filler for Concrete Paving and Structural Construction (Bituminous Type).

O. ASTM E96 - Water Vapor Transmission of Materials.

P. ASTM F1869 - Test Method for Measuring Moisture Vapor Emission.

Q. ASTM F2170 – Determining Relative Humidity in Concrete Floor Slabs Using In-Situ Probes.

R. CSS - Caltrans Standard Specifications, Latest Edition.

S. STM C330, Aggregate for lightweight concrete

1.03 SUBMITTALS

A. Placement Schedule: Submit for approval details and/or sketches showing location of each proposed construction joint. Do not deviate from locations of horizontal joints indicated on drawings.

B. Product data for each type of manufactured material and product included.

C. Design mix for each concrete mix stamped & signed by a Registered California Engineer.

D. Steel reinforcement shop drawings, including material, grade bar schedules, spacing, bent bar diagrams, arrangement and supports.

E. Submit contraction (crack control) joint, expansion, isolation and construction joint layout to Architect for approval.

F. Special Environmental Requirements: Submit information regarding recycled content and local/regional materials for all concrete materials. Use the "Material Content Form" Section 01 35 16.04.

1.04 PROJECT RECORD DOCUMENTS

A. Accurately record actual locations of embedded utilities and components that are concealed from view.

B. Maintain an accurate record showing date and time of concrete placement in each portion of structure. Correlate placing record for test cylinders made by testing laboratory. Maintain a separate record giving date of removal of forms, shoring, including first and second halves and re-shoring, if used. Keep records available for inspection at site. Upon completion, deliver two copies of each to Architect in approved form.

1.05 QUALITY ASSURANCE

A. Perform Work in accordance with Section 1905, 2010 California Building Code, and ACI 318.

B. Maintain one copy of all records.

C. Acquire cement and aggregate from same source for all work.

D. Conform to Section 1905.13, 2010 California Building Code, when concreting during hot weather. No concrete placement permitted above 90 degrees Fahrenheit.

E. Conform to Section 1905.12, 2010 California Building Code, when concreting during cold weather. No concrete placement permitted below 50 degrees Fahrenheit.

1.06 COORDINATION

A. Coordinate the placement of joint devices with erection of concrete formwork and placement of form accessories.

PART 2 PRODUCTS

2.01 CONCRETE MATERIALS

A. Cement: ASTM C150, Type I or II. Portland Cement Type, conforming to Section 1903, California Building Code.

B. Aggregates:

1. Aggregate for Stone Concrete: ASTM C33.

C. Conform to requirements specified herein for maximum size of aggregate permitted in individual applications.

D. Water: Clear, from potable source, and not detrimental to concrete.

E. Fly ash: may be used at 15% - 25% replacement of the Portland cement, at a 1:1 replacement ratio by weight. The fly ash shall meet the requirements of ASTM C 618 with the exception that the Loss on Ignition (LOI is a measure of the loss in mass of a fly ash sample when placed in a 750 degrees C oven) shall not exceed 1.0%. Only Class F material is permitted.

F. When fly ash is used the quantity of water shall be determined on a water-cement plus fly ash basis.

2.02 ACCESSORIES

A. Bonding Agent: ASTM C631, Polyvinyl Acetate Latex emulsion; HIBOND, manufactured by Lambert Corporation, Orlando FL, LOCK BOND NO. 906, manufactured by Macklanburg-Duncan Co., City of Industry, CA, or equal as approved in accordance with Division 01, General Requirements for Substitutions.

B. Curing Film: ASTM C171; 10 mil thick, clear polyethylene film, single sheet, manufactured from virgin resin with no scrap or additives, free of visible defects, uniform in appearance, conforming to the following:

1. Moisture Loss: 0.055 g per sq. cm.
2. Tensile Strength: 1700 psi longitudinal, 1200 psi transverse.
3. Elongation: 225 percent longitudinal, 350 percent transverse.

C. Non-Shrink Grout: ASTM C1107, Premixed compound consisting of non-metallic aggregate, cement, water reducing and plasticizing agents; capable of developing minimum compressive strength of 5,000 psi in 24 hours and 8,000 psi in 7 days; of consistency suitable for application and a 30 minute working time.

D. Vapor Barrier: ASTM E 1745, Class A, 15 mils thick, Permeance as tested before and after mandatory conditioning (ASTM E 1745 Section 7.1 and sub-paragraphs 7.1.1 – 7.1.5): less than 0.01 grains/($ft^2 \cdot hr \cdot inHg$).

1. Acceptable Products
   a. 15 mil Stegowrap Vapor Barrier, Stego Industries LLC
   b. Reef Industries, VaporGuard
   c. Reflex Super, Monarflex USA
   d. Or equal

E. Safety Nosings: Style B-41A, 4 inches wide manufactured by Barrycraft Pattern and Foundry, Inc., Birmingham, AL, or equal as approved in accordance with Division 01, General Requirements for Substitutions. Provide contrasting colors (70%) at top and bottom treads. For interior treads use black color nosings unless noted otherwise by Architect. All treads shall have nosings.

1. Aluminum: ASTM B 221, alloy 6063-T5 for extrusions

F. Reinforcement: In accordance with Section 03 20 00.

G. Concrete Formwork: In accordance with Section 03 10 00.

H. Vapor Emission Treatment Systems: In accordance with Section 07 25 00. Do not use for curing compound.

I. Repair Underlayment: Cement-based, polymer-modified, self-leveling product that can be applied in thicknesses from 1/8" and that can be feathered at edges to match adjacent floor elevations. Products by Tile-Tex by Flintkote Co., Webtex #60 or Fixallatex by Dowman Products Co or equal.

J. Combination Hardener, and Sealer: ASHFORD FORMULA by Curecrete Chemical Co., Springville, UT; SHUR-SEAL by Paul M. Wolff Co., Orange, CA; Chemprobe CT Densifier 201 by Tnemec Company; LIQUI-HARD by W.R, Meadows, or equal.

K. Waterstops: Flexible PVC type, factory-installed metal eyelets for embedding in concrete to prevent passage of fluids through joints, factory-fabricated corners, intersections and directional changes. Flat serrated [Serrated] or dumbbell without center bulb [with center bulb] for contraction [for expansion] joints, 6 inches, 1/4 inch thick, unless noted otherwise on drawings. By Greenstreak, Inc. St. Louis, Missouri, BoMetals Inc. Powder Springs, GA or equal.

2.03 JOINT DEVICES AND FILLER MATERIALS

A. Expansion Joint Filler - ASTM D1751: Close cell bituminous aturated fiberboard, 1/2 inch thick; Fiber Expansion Joint manufactured by American Highway Technology, Kankakee, IL, W. R. Meadows, or approved equal.

B. Expansion Joint Top: Integral extruded polystyrene plastic; 1/2 inch thick, with removable top strip exposing sealant trough, JOINT CAPS manufactured by The Burke Company, or equal as approved in accordance with Division 01, General Requirements for substitutions.

C. Joint Backing: ASTM C1330, Cylindrical, Type C, closed cell, polyethylene backer rod; oversized 30 to 50 percent larger than joint width. Green Rod by Nomaco Inc. or equal.

D. Sealant: Polyurethane multi-component type, non-sagging or self leveling at flatwork, as specified in Section 07 90 05.

E. Primer: As recommended by sealant manufacturer.

F. Saw-Cut Joint Filler: Two-component epoxy resin, gray color, non-hardening, self-leveling, SIKADUR 51 (SL), by Sikacorp. Lyndhurst, NJ, or equal as approved in accordance with Division 01 General Requirements for Substitutions.

2.04 CONCRETE MIX

A. Mix and deliver concrete in accordance with Section 1905, 2010 California Building Code. Deliver concrete in transit mixers only. Discharge loads in less than 1-1/2 hours after water is first added.

1. Design Mix: Section 1905.3, ingredients and proportions for design mix by a Testing Laboratory certified by a registered civil engineer licensed in California.
2. Do not exceed 0.50 water-cement ratio by weight for floor slabs and for other concrete.
3. Required Strength: As noted on the structural drawings and below.
4. Grout Mix: 1:3:2 Portland Cement, to sand, to pea gravel, minimum 2000 psi at 28 days.

B. Provide concrete to the following criteria:

Element	Min 28 day Strength PSI	Max Slump	Max Size Aggregate Type
Grade Beams and Foundations	3,000	4 inch	1-1/2 inch Normal wt. Concrete
Floor Slabs on Grade	3,000	4 inch	3/4 inch Normal wt. Concrete
Miscellaneous	2,500	4 inch	3/4 inch Normal wt. Concrete

C. Miscellaneous Sitework Concrete: Specified in Section 32 13 13, Sitework Concrete.

D. Do not use admixtures containing chlorides.

2.05 GRANULAR FILL

A. Crushed Aggregate Base (capillary break): 3/4 inch maximum grading, crushed rock and rock dust conforming to requirements of Section 200-2.2, SSPWC, with 3/8 inch sieve requirement waived, or Class 2 Aggregate Base as defined in Section 26, CSS.

PART 3 EXECUTION

3.01 EXAMINATION

A. Verify site conditions.

B. Verify compaction has been completed per Soil Report.

C. Verify requirements for concrete cover over reinforcement.

D. Verify that anchors, seats, plates, reinforcement and other items to be cast into concrete are accurately placed, positioned securely and will not cause hardship in placing concrete.

3.02 PREPARATION

A. Prepare previously placed concrete by cleaning with sandblasting to remove laitance and expose clean aggregate.

B. In locations where new concrete is doweled to existing work, drill holes in existing concrete, insert steel dowels and pack solid with non-shrink grout.

C. When approved by the Architect, clean previously placed concrete with steel brush and apply bonding agent in accordance with manufacturer's instructions.

D. Under Interior Slabs on Grade: Install 4 inches thick crushed aggregate base per Section 200-2.2, SSPWC or Class 2 CCS as capillary break. Over aggregate base place 15-mil vapor barrier in largest practical sections. Seal all 6-inch lapped seams, penetrations and foundation perimeters using manufacturer-approved tape only and install per manufacturer instructions. Install pipe boots at pipe penetrations. Install a minimum of 2" of clean sand above vapor barrier. Install reinforcement and concrete as scheduled.

1. Installation of vapor barrier shall be in accordance with ASTM E 1643 and manufacturer's instructions.
2. Tapes, mastics, sealants, and other products used with vapor barrier shall be from same manufacturer as, and certified compatible with, vapor barrier.

E. Install steel reinforcing per Section 03 20 00. Place concrete slab as scheduled.

3.03 PLACING CONCRETE

A. Place concrete in accordance with Section 1905, California Building Code. Remove loose dirt from excavations.

B. Notify Architect minimum 24 hours prior to commencement of operations. All excavations, forms and reinforcing shall be inspected and approved by the Architect prior to placement.

C. Ensure reinforcement, inserts, embedded parts, formed joint fillers, joint devices and accessories are not disturbed during concrete placement.

D. Install joint fillers, primer and sealant in accordance with manufacturer's instructions.

E. When detailed on the drawings, separate slabs on grade from vertical surfaces with 1/2 inch thick joint filler.

F. Extend joint filler from bottom of slab to within 1/2 inch of finished slab surface using two-component polyurethane sealant as specified in Section 07 90 05.

G. Install joint devices in accordance with manufacturer's instructions as detailed.

H. Install construction joint device in coordination with floor slab pattern placement sequence. Set top to required elevations. Secure to resist movement by wet concrete.

I. Maintain joint device in correct position to allow joint cover flush with finish.

J. Install joint covers in longest practical length.

K. Place concrete continuously between predetermined expansion, control and construction joints.

1. Install expansion joints at vertical concrete walls at 24 feet on center unless noted otherwise on drawings.
2. Retaining Walls at Buildings: install waterstops in expansion joints to form a continuous waterproofed wall surface condition. Support and protect exposed waterstops during progress of the Work.

L. Do not interrupt successive placement; do not permit cold joints to occur.

M. Avoid segregation of materials. Perform vibrating so as to produce a dense, smooth application free of rock pockets and voids. Do not use vibrators to move concrete horizontally.

N. Provide special mix prepared by the Testing Laboratory and approved by the Architect utilizing smaller aggregates in areas of reinforcing congestion to prevent the formation of rock pockets.

O. The unconfined vertical drop of concrete shall not be greater than 5 feet. Do not allow concrete to fall free from any height that will cause materials to segregate. Maximum height of free fall permitted in any case: 5 feet. Utilize trunks or additional chutes where doubt occurs. Conform to requirements of the 2010 CBC, Section 1905.10.

P. Construction Joints: Wash surface of each joint shortly after pouring to expose clean, sound aggregate. Sandblast surface to remove laitance remaining or loose aggregate as approved by the Architect. Conform to Section 1906, 2010 CBC. Apply bonding agent in accordance with manufacturer's instructions. Locate joints within the middle third of spans of slabs, beams and girders. Coincide construction joints with contraction, isolation, or expansion joints when possible. Locate where they least affect the structural integrity of the element under consideration and are compatible with building's appearance.

Q. Screed floors and slabs on grade level, maintaining surface flatness of maximum 1/8 inch in 10 ft. Slope floors for drains.

R. Contraction Joints: Form contraction joints after initial floating by grooving and finishing each edge of joint to a radius of 1/8 inch, place joints at column lines and at 15 ft. o.c. each way, maximum. Remove groover tool marks on exposed concrete surfaces. Contractor's option: Saw cut joints, early-entry dry-cut, per ACI 302.1R.

S. Saw cut slabs when indicated on drawings or as approved by Architect at 15 ft. on center, within 4-12 hours after placing concrete. Saw cut joints with power saws equipped with shatterproof abrasive re diamond-rimmed blades, cut 1/8" wide joint into concrete when cutting action will not tear, abrade, or otherwise damage surface. Cut no deeper than 1/4 depth of slab thickness. Fill cuts with non-hardening epoxy. Completely fill cut to surface of slab. Saw cut joints, early-entry dry-cut, per ACI 302.1R.

T. Isolation Joints: preformed joint filler depth of slab, fill top 1/2 inch with elastomeric sealant per Section 07 90 05. Locations: at columns, footings, and as noted on drawings.

U. Steel Pan Stairs: Install safety nosings at each tread, all steel pan stairs.

3.04 SEPARATE FLOOR TOPPINGS

A. Prior to placing floor topping, roughen substrate concrete surface and remove deleterious material. Broom and vacuum clean.

B. Place required dividers, edge strips, reinforcing and other items to be cast in.

C. Apply bonding agent to substrate in accordance with manufacturer's instructions.

D. Place concrete floor toppings to required lines and levels. Place topping in checkerboard panels, maximum dimension not to exceed 20 ft.

E. Screed toppings level, maintaining surface flatness of maximum 1/8 inch in 10 ft.

3.05 CONCRETE FINISHING

A. Finish concrete floor surfaces in accordance with ACI 302.1R.

1. Finish floor slabs with highway straightedge with tolerances of FF = SOV: 35 and FL = SOV: 25. And FF = MLV: 24 and FL = MLV: 17. (SOV-Specified Overall Value and MLV - Minimum Local Value).
2. At Exposed Concrete Floors: Finish floor slab with highway straightedge with tolerances of FF = SOV: 45 and FL = SOV: 35. And FF = MLV: 30 and FL = MLV: 24.

B. Provide formed concrete surfaces to be left exposed with smooth rubbed finish.

C. Install Vapor Emission Treatment Systems in accordance with Section 07 25 00 if tests reveal presence of more than acceptable moisture level in accordance with Test Method ASTM F1869 or ASTM F2170.

D. Install concrete combination hardener-sealer, dust proofer at exposed concrete floors.

E. Provide ARDEX TILT WALL PATCH concrete walls to be painted or sealed, apply per manufacturer's instructions, finish in accordance with Section 09 90 00.

3.06 FIELD QUALITY CONTROL

A. Provide free access to Work and cooperate with Testing Laboratory.

B. Measure floor and slab flatness and levelness according to ASTM E1155 (ASTM E 1155M) within 72 hours of finishing.

C. Proposed mix design of each class of concrete shall conform to Section 1905, California Building Code and shall be approved by the Architect prior to commencement of work.

3.07 PATCHING

A. Architect will inspect concrete surfaces and determine imperfections, if any.

B. Patch imperfections as approved and in accordance with ACI 301.

1. Clean all exposed concrete surfaces and all adjoining work stained by leakage of concrete. Remove all fins, butts and projections by grinding. Patch voids, rock pockets, holes, cracks and similar imperfections by chipping loose concrete and exposing clean, sound aggregate.
2. Fill cone form tie recesses with portland cement mortar flush to finish surface.

3.08 DEFECTIVE CONCRETE

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

B. Repair or replacement of defective concrete will be determined by the Architect.

C. Do not patch, fill, touch-up, repair or replace exposed concrete except upon express approval of Architect for each individual area.

3.09 MOISTURE TEST FOR CONCRETE FLOORS

A. It shall be the Contractor's responsibility to provide a concrete floor slab meeting the maximum moisture vapor emissions here-in specified and the Contractor shall exercise care in all aspects of mixing, placing, and curing the concrete floor slabs so that a minimum of mitigation treatment will be required.

B. Prior to ordering adhesives applied floor covering materials or coatings, conduct Calcium-Chloride Test Method in accordance with ASTM F1869 or ASTM F2170 to verify that concrete floor slabs are dry with maximum moisture vapor emissions of 3 pounds per 1,000 square feet in 24 hours and that slabs exhibit negative alkalinity, carbonation or dusting. Apply the moisture test in four (4) different areas of each floor location, with at least one test for each 1,000 square feet of floor area.

C. Prior to ordering adhesive-applied floor covering materials or coatings, conduct Relative Humidity Test Method in accordance with ASTM F1869 or ASTM F 2170 to verify relative humidity and surface pH of concrete floor slabs, the method

1. Requires drilling holes at diameter not to exceed outside diameter of probe by more than 0.04 inch to depth equal to 40 percent of slab's thickness (elevated structural slab shall be tested at depth equal to 20 percent of slab thickness).

2. Place probe to full depth of test hole, place cap over probe.
3. Permit test site to acclimate, or equilibrate, for 72 hours prior to taking relative humidity readings.
4. Remove cap and press button on the probe to obtain reading.
5. Relative humidity readings for substrates receiving non-permeable flooring are 75% or lower.
6. Testing shall require 3 tests in first 1,000 square feet, with one additional test per each additional 1,000 square feet of concrete slab surface.

D. Alkalinity Testing: Concrete floors shall be tested for alkalinity prior to the installation of adhesive-applied floor covering materials or coating. Levels of pH shall not exceed the written recommendations of the flooring covering manufacturer or the adhesive manufacturer, or both.

E. The test area should be at the same temperature and humidity expected during normal use, minimum testing conditions shall be 75+ 10 degrees F. and 50+ 10% relative humidity. Maintain these conditions 48 hours prior to, and during testing.

F. Install Concrete Slab Vapor Emission Treatment as specified in Section 07 25 00 when moisture emissions exceed 3 pounds per 1,000 square feet in 24 hours as specified herein at the time of installation of floor coverings. Submit results to Architect of testing. In the event the moisture tests indicated moisture levels are less than the maximums allowed and results are acceptable to the Architect, and the Concrete Slab Vapor Emissions Treatment is not required as determined by the Architect, Contractor shall provide the Owner a credit for deleting the work specified in Section 07 25 00.

END OF SECTION

SECTION 03 39 00

CONCRETE CURING

PART 1 GENERAL

1.01 SECTION INCLUDES

A. Initial and final curing of horizontal and vertical concrete surfaces, excluding site work concrete.

1.02 REFERENCES

A. ACI 301 - Structural Concrete for Buildings.

B. ASTM C171 - Sheet Materials for Curing Concrete.

1.03 QUALITY ASSURANCE

A. Perform Work in accordance with ACI 301. Proper curing of concrete shall be the Contractor's responsibility. Improperly cured concrete in the opinion of the Architect shall be removed and replaced at no extra cost to the Owner.

1.04 DELIVERY, STORAGE, AND HANDLING

A. Deliver, store, protect and handle sheet film materials to avoid puncturing or damage of any kind.

PART 2 PRODUCTS

2.01 MATERIALS

A. Polyethylene Film ASTM C171; 10 mil thick, clear, manufactured from virgin resin with no scrap or additives, manufactured by Burke By Edoco, Long Beach, CA, or equal as approved in accordance with Division 01, General Requirements for Substitutions.

B. Water: Potable and not detrimental to concrete.

PART 3 EXECUTION

3.01 EXAMINATION

A. Verify substrate conditions.

B. Verify that substrate surfaces are ready to be cured.

3.02 EXECUTION - HORIZONTAL SURFACES

A. Immediately after placement, protect concrete from premature drying, excessively hot or cold temperatures and mechanical injury.

B. Maintain concrete with minimal moisture loss at above 50 degrees F temperature for period necessary for hydration of cement and hardening of concrete. Dusting with dry cement to absorb excess water is prohibited.

C. Cure floor surfaces only as specified herein and in accordance with Section 1905.11 CBC. Membrane curing compound method not permitted for interior cast-in-place concrete slabs.

D. Moisture Retaining Coverings: spread polyethylene film over floor slab areas, lapping edges and sides, minimum 6 inches and sealing with pressure sensitive tape; cover with plywood or otherwise protect film from damage; maintain in place for minimum of seven (7) days unless noted otherwise on drawings. Do not permit traffic over floor slabs during the seven (7) day curing period.

E. Vertical Surfaces: fog spray water over surfaces and maintain wet for 10 days.

F. Quality Control: Proper curing of concrete surfaces shall be the responsibility of the Contractor under this section.

G. Flooding, sprinkling or ponding not permitted.

3.03 EXECUTION - VERTICAL SURFACES

A. Spraying: Spray water over surfaces and maintain wet for 10 days.

3.04 PROTECTION OF FINISHED WORK

A. Protect finished Work from damage caused by the work of other sections.

B. Do not permit traffic over unprotected floor surface.

END OF SECTION

SECTION 04 22 00

UNIT MASONRY

PART 1 GENERAL

1.01 SECTION INCLUDES

A. Concrete Masonry Units (CMU's)

B. Mortar and Grout.

C. Reinforcing Steel

D. Embedded Flashings

E. Ties and anchors

F. Masonry Joint Reinforcement

G. Control Joint materials

H. Accessories.

1.02 RELATED REQUIREMENTS

A. Section 03 20 00 - Concrete Reinforcing: Reinforcing steel for grouted masonry.

B. Section 07 60 00 - Sheet Metal Flashing and Trim: Through-wall masonry flashings.

C. Section 07 84 00 - Firestopping: Firestopping at penetrations of fire-rated masonry and at top of fire-rated walls.

D. Section 07 90 05 - Joint Sealers: Backing rod and sealant at control and expansion joints.

1.03 REFERENCE STANDARDS

A. ACI 530-08/ASCE 5-08/TMS 402-08 - Building Code Requirements for Masonry Structures; American Concrete Institute International; 2005.

B. ACI 530.1-08/ASCE 6-08/TMS 602-08 - Specification For Masonry Structures; American Concrete Institute International; 2005.

C. ASTM C 90 - Standard Specification for Loadbearing Concrete Masonry Units; 2009.

D. ASTM C 91 - Standard Specification for Masonry Cement; 2005.

E. ASTM C 129 - Standard Specification for Nonloadbearing Concrete Masonry Units; 2006.

F. ASTM C 140 - Standard Test Methods of Sampling and Testing Concrete Masonry Units and Related Units; 2010.

G. ASTM C 144 - Standard Specification for Aggregate for Masonry Mortar; 2004.

H. ASTM C 150 - Standard Specification for Portland Cement; 2009.

I. ASTM C 207 - Standard Specification for Hydrated Lime for Masonry Purposes; 2006.

J. ASTM C 270 - Standard Specification for Mortar for Unit Masonry; 2010.

K. ASTM C 404 - Standard Specification for Aggregates for Masonry Grout; 2007.

L. ASTM C 476 - Standard Specification for Grout for Masonry; 2010.

M. ASTM C 780 - Standard Test Method for Preconstruction and Construction Evaluation of Mortars for Plain and Reinforced Unit Masonry; 2009.

N. ASTM D 226 - Standard Specification for Asphalt-Saturated Organic Felt Used in Roofing and Waterproofing; 2009.

O. UL (FRD) - Fire Resistance Directory; Underwriters Laboratories Inc.; current edition.

P. 2010 California Building Code, Chapter 21.

1.04 ADMINISTRATIVE REQUIREMENTS

A. Preinstallation Meeting: Convene a preinstallation meeting one week before starting work of this section; require attendance by all relevant installers.

B. Contractor shall coordinate and document and distribute minutes for the meeting.

1.05 SUBMITTALS

A. See Section 01 33 00 - Submittal Procedures.

B. Product Data: Provide data for masonry units, mortar, and masonry accessories.

C. Samples: Submit four samples of decorative block units to illustrate color, texture, and extremes of color range. Submit four samples of grout.

D. Provide 64" wide X 24" mock-up for architect and owner review.

E. Maintenance Materials: Furnish the following for owner's use in maintenance of project.
1. See Section 01 60 00 - Product Requirements, for additional provisions.

1.06 QUALITY ASSURANCE

A. Comply with provisions of ACI 530/ASCE 5/TMS 402 and ACI 530.1/ASCE 6/TMS 602, except where exceeded by requirements of the contract documents.

B. Provide Batch Plant inspection(s).

1.07 DELIVERY, STORAGE, AND HANDLING

A. Deliver, handle, and store masonry units by means that will prevent mechanical damage and contamination by other materials.

PART 2 PRODUCTS

2.01 MANUFACTURERS

A. Angelus Block Co., Inc. Fontana, CA 909-350-0244

B. Orco Block Co., Inc. Riverside, CA 951-685-1521

C. Or Equal

2.02 CONCRETE MASONRY UNITS

A. Concrete Block: Comply with referenced standards and as follows:

1. Type: Orco-Split Block (One-Side) – Basis of Design.
2. Size: Standard units with nominal face dimensions of 16 x 8 inches and nominal depth of 8 inches.
3. Load-Bearing Units: ASTM C 90, Grade N, medium weight.
   a. Hollow block, fully grouted, as indicated.
   b. Exposed faces: Manufacturer's standard color and texture where indicated.

2.03 MORTAR AND GROUT MATERIALS

A. Masonry Cement: ASTM C 91, Type S, 1500 psi .

1. Substitutions: See Section 01 25 13 - Product Substitutions.

B. Portland Cement: ASTM C 150, Type I; color as required to produce approved color sample.

C. Hydrated Lime: ASTM C 207, Type S.

D. Mortar Aggregate: ASTM C 144.

E. Grout Aggregate: ASTM C 404.

F. Water: Clean and potable.

G. Grout Admixture: SIKA Chemical Corporation GA Grout Aid, type as required; no substitution.

2.04 REINFORCEMENT AND ANCHORAGE

A. Reinforcing Steel: Type specified in Section 03 20 00; size as indicated on drawings; galvanized finish.

B. Lap Splice Reinforcement and Anchors: Types and sizes required and as indicated on the structural drawings.

2.05 FLASHINGS

A. Provide metal flashing in accordance with Section 07 60 00.

2.06 ACCESSORIES

A. Preformed Control Joints: Rubber material. Provide with corner and tee accessories, fused joints.

B. Joint Filler: Closed cell polyvinyl chloride; oversized 35 percent to joint width; self expanding;

C. Building Paper: ASTM D 226, Type I ("No.15") asphalt felt.

D. Cleaning Solution: Non-acidic, not harmful to masonry work or adjacent materials.

E. Provide anti-graffiti coating on exterior concrete masonry unit walls.

2.07 LINTELS

A. Refer to the requirements, specifications and sizes shown on the structural drawings.

2.08 MORTAR AND GROUT MIXES

A. Mortar for Unit Masonry: ASTM C 270, using the Proportion Specification.
1. Masonry below grade and in contact with earth: Type S.
2. Exterior, load bearing masonry: Type S, 1500 psi.

B. Grout: ASTM C 476. Consistency required to fill completely volumes indicated for grouting; fine grout for spaces with smallest horizontal dimension of 2 inches or less; coarse grout for spaces with smallest horizontal dimension greater than 2 inches. F'c = 2000 psi

PART 3 EXECUTION

3.01 EXAMINATION

A. Verify that field conditions are acceptable and are ready to receive masonry.

B. Verify that related items provided under other sections are properly sized and located.

C. Verify that built-in items are in proper location, and ready for roughing into masonry work.

3.02 PREPARATION

A. Direct and coordinate placement of metal anchors supplied for installation under other sections.

B. Provide temporary bracing during installation of masonry work. Maintain in place until building structure provides permanent bracing.

3.03 COURSING

A. Establish lines, levels, and coursing indicated. Protect from displacement.

B. Maintain masonry courses to uniform dimension. Form vertical and horizontal joints of uniform thickness.

C. Concrete Masonry Units:
   1. Bond: Running.
   2. Coursing: One unit and one mortar joint to equal 8 inches.

3.04 PLACING AND BONDING

A. Lay hollow masonry units with face shell bedding on head and bed joints.

B. Buttering corners of joints or excessive furrowing of mortar joints is not permitted.

C. Remove excess mortar and mortar smears as work progresses.

D. Interlock intersections and external corners.

E. Do not shift or tap masonry units after mortar has achieved initial set. Where adjustment must be made, remove mortar and replace.

F. Perform job site cutting of masonry units with proper tools to provide straight, clean, unchipped edges. Prevent broken masonry unit corners or edges. Chipped or broken masonry units will not be accepted.

G. Cut mortar joints flush where resilient base is scheduled.

H. maximum 4'-0" lifts

I. Contractor shall submit procedures for high-lift grouting, for Structural Engineer's approval prior to proceeding with this method of installation.

J. Consolidate grout by mechanical vibrator.

3.05 REINFORCEMENT AND ANCHORAGE - GENERAL

A. Support and secure reinforcing bars from displacement. Maintain position within 1/2 inch of dimensioned position.

B. Embed anchorages in every second block joint unless otherwise indicated.

3.06 MASONRY FLASHINGS

A. Whether or not specifically indicated, install masonry flashing to divert water to exterior at all locations where downward flow of water will be interrupted.

3.07 LINTELS

A. Install reinforced unit masonry lintels over openings where steel or precast concrete lintels are not scheduled.
   1. Do not splice reinforcing bars.
   2. Support and secure reinforcing bars from displacement. Maintain position within 1/2 inch of dimensioned position.
   3. Place and consolidate grout fill without displacing reinforcing.
   4. Allow masonry lintels to attain specified strength before removing temporary supports.

3.08 GROUTED COMPONENTS

A. Lap splices minimum 48 bar diameters, 30" minimum. Or as specified on structural/ civil drawings.

B. Support and secure reinforcing bars from displacement. Maintain position within 1/2 inch of dimensioned position.

C. Place and consolidate grout fill without displacing reinforcing with mechanical vibrator.

3.09 CONTROL AND EXPANSION JOINTS

A. Install preformed control joint device in continuous lengths. Seal butt and corner joints in accordance with manufacturer's instructions.

B. Form expansion joint as detailed.

3.10 BUILT-IN WORK

A. As work progresses, install built-in metal door frames and other items to be built into the work and furnished under other sections.

B. Install built-in items plumb, level, and true to line.

C. Bed anchors of metal door frames in adjacent mortar joints. Fill frame voids solid with grout.

3.11 TOLERANCES

A. Maximum Variation from Alignment of Columns: 1/4 inch.

B. Maximum Variation From Unit to Adjacent Unit: 1/16 inch.

C. Maximum Variation from Plane of Wall: 1/4 inch in 10 ft and 1/2 inch in 20 ft or more.

D. Maximum Variation from Plumb: 1/4 inch per story.

E. Maximum Variation from Level Coursing: 1/8 inch in 3 ft and 1/4 inch in 10 ft; 1/2 inch in 30 ft.

F. Maximum Variation of Joint Thickness: 1/8 inch in 3 ft.

G. Maximum Variation from Cross Sectional Thickness of Walls: 1/4 inch.

3.12 CUTTING AND FITTING

A. Coordinate with other sections of work to provide correct size, shape, and location.

B. Obtain approval prior to cutting or fitting masonry work not indicated or where appearance or strength of masonry work may be impaired.

3.13 FIELD QUALITY CONTROL

A. An independent testing agency will perform field quality control tests, as specified in Section 01 45 00.

B. Concrete Masonry Unit Tests: Test each variety of concrete unit masonry in accordance with ASTM C 140 for conformance to requirements of this specification.

C. Mortar Tests: Test each type of mortar in accordance with ASTM C 780, testing with same frequency as masonry samples.

D. Contractor is responsible for all remediation work found not in compliance w/ project requirements by the testing agency.

3.14 CLEANING

A. Remove excess mortar and mortar droppings.

B. Replace defective mortar. Match adjacent work.

C. Clean soiled surfaces with cleaning solution.

D. Use non-metallic tools in cleaning operations.

3.15 PROTECTION

A. Without damaging completed work, provide protective boards at exposed external corners that are subject to damage by construction activities.

END OF SECTION

SECTION 05 12 00

STRUCTURAL STEEL

PART 1 GENERAL

1.01 SECTION INCLUDES

A. Structural steel framing members, galvanized and shop-primed.

1.02 REFERENCES

A. AISC MO15L - Manual of Steel Construction. (Thirteenth Edition).

B. AISC S323 - Quality Criteria and Inspection Standards.

C. ASTM A36 & A992 - Structural Steel.

D. ASTM A53 - Hot Dipped, Zinc-Coated Welded and Seamless Steel Pipe.

E. ASTM A108 - Steel Bars, Carbon, Cold-Finished, Standard Quality.

F. ASTM A123 - Zinc (Hot Dipped Galvanized) Coatings on Iron and Steel Products.

G. ASTM A153 - Zinc Coating (Hot Dip) on Iron and Steel Hardware.

H. ASTM A307 - Carbon Steel Externally Threaded Standard Fasteners.

I. ASTM A325 - High Strength Bolts for Structural Steel Joints.

J. ASTM F1852, High Strength Twist – off Bolts.

K. ASTM A500 - Cold Formed Welded and Seamless Carbon Steel Structural Tubing in Round and Shapes.

L. ASTM C1107 - Packaged Dry, Hydraulic Cement Grout (Non-Shrink).

M. AWS A2.4 - Standard Welding Symbols.

N. AWS D1.1 - Structural Welding Code.

O. AWS WHB-1 – Joining and Cutting Processes.

P. AWS A5.1 - Carbon Steel Covered Arc-Welding Electrodes.

Q. SSPC - Steel Structures Painting Council, SP-2, Hand Tool Cleaning.

R. 2010 CBC Chapter 22.

S. AISC – American Institute of Steel Construction, Code of standards practice for steel buildings and bridges.

1.03 SUBMITTALS

A. Submit Shop Drawings:

1. Indicate profiles, sizes, spacing and locations of structural members, connections, openings, attachments and fasteners.
2. Indicate cambers.
3. Indicate welded connections with AWS A2.4 welding symbols. Indicate net weld lengths.

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

C. Submit Mill Test Reports: showing structural strength, destructive and non-destructive test analysis and identification.

D. Submit Manufacturer's Certificates certifying welders employed on the work have been AWS qualified within the previous 12 months, in accordance with AWS-WHB-1.

E. Submit fabricator's and erector's qualifications.

1.04 QUALITY ASSURANCE

A. Fabricate structural steel members and perform work in accordance with AISC-M015L.

B. Perform welding in accordance with AWS D1.1 and 2010 California Building Code Chapter 22.

1.05 QUALIFICATIONS

A. Fabricator: Company specializing in performing structural steel work minimum five years experience.

B. Erector: Company specializing in performing structural steel work with minimum five years experience.

1.06 FIELD MEASUREMENTS

A. Verify field measurements.

PART 2 PRODUCTS

2.01 MATERIALS

A. Structural Steel Members: ASTM A36, A992 and A572 grade 50.

B. Hollow structural steel (HSS) tubes; ASTM A500, Grade B, Fy = 46 ksi.

C. Pipe: ASTM A500, Grade B, Fy = 42 ksi.

D. Shear Stud Connectors: ASTM A108, Grade 1015 forged steel, headed, uncoated, granular flux filled shear connector or anchor studs by Nelson Stud Welding Division of TRW, Lorain, OH, or equal as approved in accordance with Division 01 for substitutions.

E. Bolts, Nuts and Washers: ASTM A307 galvanized to ASTM A153 for galvanized members, American National Course Threaded Series.

F. High Strength Bolts: ASTM A325 Slip-Critical, tension set high strength bolts, by Bristol Machine Co., Walnut, CA, or equal as approved in accordance with Division 01 for substitutions.

G. Welding Materials: AWS A5.1, E70XX, type and procedures required by electrode manufacturer for materials being welded.

H. Grout: ASTM C1107, non-shrink type, pre-mixed compound consisting of non-metallic aggregate, cement, water reducing and plasticizing additives, capable of developing a minimum compressive strength of 8,000 psi at 7 days; of consistency suitable for application and a 30 minute working time.

I. Shop and Touch-Up Primer: Series P10-99 modified alkyd, red color, air dried, by Tnemec or equal as approved in accordance with Division 01 for substitutions.

J. Touch-Up Material for Galvanized Steel: Ready mixed, zinc-rich galvanizing compound, DEVCON Z, by Devcon Corp., Danvers, MA, GALVICON, by Southern Coatings, Sumter, SC, or equal as approved in accordance with Division 01 for substitutions.

2.02 SHEAR STUD CONNECTORS

A. Space shear stud connectors as indicated on the drawings.

B. Completely fuse end of stud to plate. Allow no porosity in weld.

C. Allowable decrease in length of stud during welding:

1. 1/8 inch for 5/8 inch diameter and smaller.
2. 3/16 inch for more than 5/8 inch diameter.

2.03 FINISH

A. Prepare structural component surfaces in accordance with SSPC SP-2.

B. Shop prime structural steel members. Do not prime surfaces that will be fireproofed, field welded, in contact with concrete or high strength bolted.

1. Clean surfaces to be primed, remove mill scale, grease, dirt and foreign matter. Two coats required for parts in contact but inaccessible for painting after erection.
2. Apply primer by brush or spray. Thoroughly work into joints, angles and open spaces. Allow primer to dry and harden prior to handling for delivery to the site.
3. Clean contact surfaces immediately prior to assembly, leave unpainted.
4. Coat machined surfaces with approved removable coating to prevent corrosion.
5. After erection, clean field welds, field bolts and abraded portions and apply one additional brush spot coat using same paint material.
6. All surfaces scheduled to receive sprayed-applied fireproofing shall be free of lubricants, oils, paint or other matter which will impair adhesion of fireproofing.

C. Galvanize structural steel members where indicated to coating thickness in accordance with ASTM A123. All steel exposed to exterior weather conditions shall be galvanized unless otherwise indicated.

PART 3 EXECUTION

3.01 EXAMINATION

A. Verify that field conditions are acceptable and are ready to receive work.

1. Report discrepancies between drawings and field dimensions to Architect before commencing work.

B. Beginning of installation means erector accepts existing conditions and surfaces underlying or adjacent to work of this section.

3.02 ERECTION

A. Allow for erection loads and stresses, and for sufficient temporary bracing to maintain structure safe, plumb and in true alignment until completion of erection and installation of permanent bracing. Provide bracing for dead and live loads and wind loads. Keep bracing in place until required to maintain safe conditions.

B. Contractor shall be responsible for correcting detailing and fabrication errors and for correct fitting of all members and components.

C. Field weld components and shear studs indicated on structural drawings.

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

E. When approved, perform cutting, punching, drilling and tapping to accommodate work. Obtain accurate data as indicated on shop and erection drawings.

F. After erection, prime welds, abrasions and surfaces not shop primed except surfaces to be in contact with concrete.

G. Grout under baseplates with the specified non-shrink grout.

H. Provide anchor bolts with templates and diagrams. Contractor shall be responsible for proper location and installation of bolts. Correct deficiencies or errors.

3.03 ERECTION TOLERANCES

A. Conform to AISC S323.

3.04 HIGH STRENGTH BOLTS

A. Allowable hole sizes: 1/16 inch larger than bolt size.

B. Use friction type connection with standard hardened steel circular, square or rectangular washer under bolt nut.

C. Thoroughly clean area under bolt head, nut and washer. Remove all paint, lacquer, oil or other coatings except organic zinc-rich paints in accordance with SSPC, SP-2.

D. Tighten bolts by power torque wrench or hand wrench until twist-off.

3.05 PUNCHING AND DRILLING

A. Punch material 1/16 inch larger than nominal diameter of bolt, wherever thickness of metal is equal to or less than the diameter of the bolt plus 1/8 inch.

B. Drill or sub-punch and ream where metal is equal to or more than the diameter of the bolt plus 1/8 inch. Make diameter for sub-punched and sub-drilled holes 1/16 inch larger than nominal diameter of bolt.

C. Precisely locate holes to ensure passage of bolt through assembled materials without drifting. Enlarge holes when necessary to receive bolts by reaming. Poorly matched holes will be rejected.

D. Punch and ream holes to receive high strength bolts.

3.06 WELDING

A. Conform to AWS D1.1 and 2010 CBC Chapter 22 and Section 1704.3.1.

B. Perform welding by direct electric arc process. Use operators certified within preceding 12 month period as per AWS "Standard Qualification Procedure."

C. Chip welds to remove slag. Use wire brush to demonstrate uniformity of section, smoothness of welded metal, freedom from undercuts, overlays or feather edges and freedom from porosity and clinkers.

D. Visually inspect edges and ends of fillets and butt joint welds for indication of good fusion and penetration into base metal. Grind smooth all exposed welds.

E. Use of cutting torch will be allowed where metal being cut does not carry stress during the operations, and provided no stresses will be transmitted through a flame-cut surface. Make gas cuts smooth and regular in contour.

F. To determine effective width of members subjected to gas cutting, deduct 1/8 inch from width of gas cut edges. Make radius of gas cut fillets as large as practicable, but in no case less than one inch. Gas cutting to align bolt is not permitted.

3.07 CLEANING AND STRAIGHTENING

A. Before fabrication, thoroughly wire-brush material clean of scale and rust. Straighten by methods that will not injure materials.

B. After punching or working, remove twists or bends before parts are assembled. Make finished members free from twists, bends and open joints when erected.

3.08 FITTING

A. Closely fit members, finished true to line and in precise position required to allow accurate erection and proper joining in the field.

B. Drilling to enlarge unfair holes will not be allowed. Light drifting to draw parts together will be permitted. Do not heat rolled sections, except for minor details.

3.09 QUALITY CONTROL

A. Required testing shall be performed under provisions of Division 01.

3.10 HANDLING

A. Both in shop and in field, transport, handle and erect to preclude damage or overstressing of any component.

END OF SECTION

SECTION 05 30 00

METAL DECKING

PART 1 GENERAL

1.01 SECTION INCLUDES

A. Roof decking and accessories

1. Ridge, valley plates and sump pans
2. Framing for openings
3. Bearing plates and angles

1.02 REFERENCES

A. ASTM A36 - Specification for Structural Steel.

B. ASTM A108 - Specification for Steel Bars, Carbon, Cold-Finished, Standard Quality.

C. ASTM A653/A653M-98 - Sheet Steel, Zinc-Coated (Galvanized) or Zinc - Iron Alloy Coated by the Hot-Dip Process.

D. ASTM A1008 - Steel, Sheet, Cold-Rolled, Carbon, Structural, High-Strength Low-Alloy and High-Strength Low-Alloy with Improved Formability

E. AWS D1.1 - Structural Welding Code.

F. AWS D1.3 - Structural Welding Code, Sheet Steel.

G. CBC 2010, Chapter 22, Division VII - Specification for Design of Cold-Formed Steel Structural Members.

H. CBC 2010, Chapter 22, Division V – Seismic Provisions for Structural Steel Buildings for Use with Allowable Stress Design.

I. ASTM A572 - Grade 50, Structural Steel.

1.03 SUBMITTALS

A. Shop Drawings showing erection and placement drawings of roof deck.

1. Field Measurements: Before starting shop and erection drawings, verify measurements, lines, grades, elevations, locations and details of field conditions and be responsible for correctness, conformance, accuracy and execution of construction to conform actual conditions.
2. Detail the construction in conformance with the AISC Structural Steel Detailing, except where otherwise indicated.
3. Field Connections and placement Diagrams: Show field connections and placement diagrams on the erection drawings with complete details, layouts and dimensions as required so that the construction can proceed without reference to the design drawings.

1.04 QUALITY ASSURANCE

A. Qualification of Welding: Qualify welding procedures and welding operators in accordance with AWS D1.3. Provide certifications that welders to be employed in the construction have satisfactorily passed AWS qualification tests. If recertification of welders is required, retesting will be the Contractor's responsibility.

B. Regulatory Requirements: Furnish and install metal deck in accordance with the manufacturer's current ICC Research Committee Report and UL listing requirements to obtain diaphragm values and fire ratings indicated.

PART 2 PRODUCTS

2.01 MANUFACTURER

A. Products of the following manufacturers form the basis for design and quality intended.

1. Metal Deck Group, a unit of CSI.
2. Verco Manufacturing CO., Phoenix, AZ.
3. Epic Metals Corp., Rankin, PA

B. Or equal as approved in accordance with Division 01 General Requirements for substitutions.

2.02 MATERIALS

A. Galvanized Steel for Deck Units: ASTM A1008, CS Type A, with light commercial galvanizing meeting the requirements of ASTM A653/A653M-98 coating designation G-60.

B. Steel for Accessories: ASTM A108 with light commercial galvanizing meeting the requirements of ASTM A653/A653M-98, coating designation G-60.

C. Small Rolled Steel Shapes and Bars Used for Reinforcing Openings and Holes: ASTM A36.

D. Welding Rod: AWS D5.1, E70XX, Low Hydrogen and CBC Chapter 22A Division I. Section 2204.1.

E. Galvanizing Repair Compound: High zinc dust content galvanizing repair paint or hot applied zinc rich material. Acceptable products include, but are not limited to the following: American Solder & Flux; DRYGALV, Kenco Div.; GALVICON, Metalloy Products Co.; GALVALLOY.

F. Flexible Closure Strips: Manufacturer's standard vulcanized, closed-cell, synthetic rubber. Profiled to fit deck flute design, slight oversized for tight fit. Manufacturer's approved adhesive for permanent installation of neoprene closures.

G. Metal Closures for Exterior Applications: profiled to fit deck flute design, slight oversized for tight fit. 16 gauge, galvanized. Fasteners to penetrate substrate.

H. Concrete Topping: As specified in Section 03 31 00.

2.03 FLOOR AND ROOF DECK UNITS

A. Design Requirements: Except where single spans are indicated, furnish decking in minimum lengths to span 3 spans with telescoping or nested 2 inch end laps and interlocking or nested side laps.

B. Minimum Base Metal Thickness: As specified on the drawings.

C. Sections, shapes and properties for roof decking shall be equivalent to those of the decking types specified herein as verified by ICC Research Reports. These shall include the following:

1. Non-composite flexural effective section modulli and moments of inertia.

D. Standard Roof Deck: Short span wide rib deck, 1-1/2 inches deep, of not lighter than 16 gauge galvanized steel.

2.04 ACCESSORIES

A. Furnish accessories required to provide a complete installation including fillers for end panels, friction caps for closing shop fabricated access holes for welding, flashing at columns and closures for cell ends, roof drain sumps, metal and neoprene partition closures, non-penetrating hanger tabs and other accessories required.

B. Trim, Profile Closure Pieces, Flashings. Same material, thickness and finish as exterior sheets; brake formed to required profiles.

PART 3 EXECUTION

3.01 ERECTION

A. Adjust steel panel units in place before permanently fastening and accurately align. Correct inaccuracies in alignment or level before steel panels are finally placed.

B. Where large predetermined openings for elevators, stairs, ducts and similar elements passing through the panel units occur, furnish prefabricated units to fit job conditions; where other holes or openings are required in decking after erection, reinforce such holes as indicated. Cantilever deck to the edge of slabs as indicated.

C. Provide proper bearing on supporting beams as indicated. Fasten steel panels to supporting beams by electric arc welding by certified welding operators. Weld seams as indicated. Provide all welding attachments as indicated.

D. Provide steel closures, end plates, profile plates and other accessories required for a complete installation. Install tight-fitting neoprene closures profiled to fit deck flute design behind sheet steel closures.

3.02 SUPPORT AT COLUMNS

A. Where due to cutting of deck units at columns bearing support is not provided for the end of a web, such web shall be welded to the column or structural steel material at the column or equivalent support shall be provided. The welding or equivalent support shall be sufficient for the support of the deck, the wet weight of concrete and other construction loads.

3.03 TOUCH UP OF WELDS

A. Upon cooling, touch-up all welds not to be encased in concrete topping with galvanizing repair compound.

3.04 RECORD DRAWINGS

A. After all steel has been erected, correct or revise the shop drawings erection and placement diagrams to correspond with the changes made in the field.

3.05 FIELD QUALITY CONTROL

A. Field testing and inspection are specified in Division 01 General Requirements.

END OF SECTION

SECTION 05 40 00

COLD FORMED METAL FRAMING

PART 1 GENERAL

1.01 SECTION INCLUDES

A. Load-bearing cold-formed structural steel studs.

B. Interior wall framing using Cold Formed Metal Framing at plumbing walls, wall openings and cabinet-supporting walls.

C. Formed steel accessories.

D. Related Sections

1. Section 06 41 16, Casework.
2. Section 07 21 00, Insulation.
3. Section 07 92 00, Joint Sealers.
4. Section 09 22 16, Non-Structural Metal Studs.
5. Section 09 29 00, Gypsum Board.

1.02 REFERENCES

A. ASTM A1003/A1003M - Specification for Steel Sheet, Carbon, Metallic and Nonmetallic Coated for Cold-Formed Framing Members.

B. ASTM A653/A653M - Steel Sheet, Zinc-Coated (galvanized) or Zinc-Iron Alloy - Coated (Galvannealed) by the Hot-Dip Process.

C. ASTM C955 - Load-Bearing Steel Studs, Runners, and Bracing or Bridging for Screw Application of Gypsum Panel Products and Metal Plaster Bases.

D. ASTM C954 - Steel Drill Screws for the Application of Gypsum Panel Products or Metal Plaster Bases to Steel Studs from 0.033 to 0.112 Inches in Thickness.

E. AWS D1.3 – American Welding Society, Structural Welding Code, Sheet Steel.

F. SSMA/ICC ES - 4943P - Steel Stud Manufacturers Association.

G. AISI - American Iron and Steel Institute, Standard for Cold-Formed Steel Framing – General Provisions.

1.03 SUBMITTALS

A. Provide product data on standard framing members. Describe materials and finish, product criteria, limitations and properties.

B. Mill certificates: signed by the steel sheet producer indicating steel sheet complies with requirements.

1.04 QUALITY ASSURANCE

A. Manufacturer: Company specializing in steel studs framing and components with five years minimum experience.

B. Welding: welders certified by AWS.

C. Recycled Content:

1. SABRC (State Agency Buy Recycled Campaign) Standards: Provide recycled content minimums for all steel derived products as described by CIWMB. (Refer to the following website for updated recycled content percentages: http://www.ciwmb.ca.gov/BuyRecycled/StateAgency).
2. Environmental Protection Agency (EPA) Comprehensive Procurement Guidelines Buy-Recycled Series: Construction Products, 2004.

PART 2 PRODUCTS

2.01 FRAMING MATERIALS

A. Studs: ASTM A1003, Structural Grade 33, Type H, sheet steel, formed to "wide flange" shape or "C" shape, punched web, 16 gauge (0.056", SSMA designation 54) thick unless noted otherwise on drawings, 33 ksi steel unless noted otherwise on drawings, sizes required to conform to details and scheduled wall thicknesses, and as required for structural performance. Studs shall be rolled from new sheet steel and shall not be produced from re-rolled steel.

1. Properties: As listed in manufacturer's standard tables for applicable grade of steel and sizes.
2. Conform to SSMA, ICC ES-4943P.
3. Coating: Zinc coated per ASTM A653, G60 or prime painted.

B. Track: ASTM A1003, Structural Grade 33, Type H, sheet steel, channel shaped, deep leg, 16 gauge (0.056", SSMA designation 54) thick unless noted otherwise on drawings, 33 ksi steel unless noted otherwise on drawings, solid web, long leg at ceilings, profile to produce snug fit over adjacent components.

1. Conform to SSMA, ICC ES-4943P.
2. Approved pre-fabricated slotted slip track for top of wall: Slip track, 16 gauge, slotted with bend tab for fire safing, SLP-TRK System by Brady Construction Innovations Inc. ICC ESR 1042, or equal as approved in accordance with Division 01, General Requirements for substitutions.
3. Provide stand-off washers for fasteners.
4. Install in accordance with manufacturer's recommendations and fire rating requirements.
5. Coating: Zinc coated per ASTM A653, G60 or prime painted.

C. Header and Jambs: Dietrich Metal Framing, Heavy Duty Studs and Header Brackets.

1. ProX Header, Brady Construction Innovations Inc. or equal.

D. Stiffener U- Channels and Angles: Minimum Weights as Follows:

1. 3/4 inch - .3 pound per foot, cold- or hot-rolled channel.

2. 1-1/2 inches - .475 pound per foot, cold-rolled channel.
3. 1-1/2 inches - 1.12 pounds per foot, hot-rolled channel.
4. 2 inches - 1.26 pounds per foot, hot-rolled channel.
5. 2 inches - .59 pound per foot, cold-rolled channel.
6. 1-1/2 x 1-1/2 x 3/16 inch angle.

E. Fastening: Self-drilling, Self-tapping Screws, ASTM C954, galvanized, Buildex/Tomarco Type S-12 point, low profile head screws #10 or equal, 1/2 inch long for two layers 16 gauge metal for non load-bearing framing, welded connections for load-bearing framing and for framing of 16 gauge studs and thicker.

1. 1. Welding: In conformance with AWS D1.3, minimum weld size 3/32".

F. Anchorage Devices, Powder Actuated:

1. Conform to Division 01, General Requirements.

G. Powder actuated fasteners

1. Install to conform to the load requirements of this Section and Tables 1, 2, 3 and 4 of ICC-ESR 1663 Hilti. Minimum diameter: 0.145" diameter.
   a. Utilize tools as recommended by the manufacture in compliance with ICC numbers.
   b. ICC-ESR 1663 Hilti Inc., Fasteners – Manual, Pneumatic, or Powder-Driven Steel Studs and Nails

2. Allowable Loads: ICC approved values. Testing required, refer to Division 01.
3. Use of Powder actuated fasteners for tension loads is limited to support of minor loads such as suspended acoustical ceilings, ductwork and conduit:

H. Anchorage Devices, Drilled Expansion Anchors:

1. Conform to Division 01, General Requirements.

I. Anchorage Devices, Drilled Expansion Anchors:

1. Wedge Type: KWIK Bolt TZ Concrete Anchor, 3/8 to 3/4 inch diameter, ICC ESR-1917, by Hilti Inc., Tulsa, OK.
   a. Eyebolt HHDCA drill-in anchor for suspended ceilings. Provide minimum ¼-inch size anchor, requires testing refer to Division 01.
   b. For fully grouted CMU, lightweight concrete, construction per ICC ES-1385, Hilti KWIK Bolt KB3.

2. Adhesive Anchors System:
   a. For Normal Weight concrete with min. compressive of 2000 psi or 4000 psi. Per ICC ESR-2322, Hilti HIT RE 500 SD Adhesive Anchor System.

J. Backing: As indicated on drawings or 6" x 1-1/4" x 14 gauge flush mount backing, preformed with pre-punched screw holes, FLUSH-MOUNT BACKING by Metal-Lite, Inc., Anaheim, CA.

K. Track Bedding Sealant: Per Section 07 92 00.

L. Wall finishes: Per Division 09 Finishes.

2.02 FINISHES

A. Primer: Series L69 Hi Build Epoxoline II, Low VOC epoxy, red color, air dried to minimum 0.001 inch or .026 mm thickness, by Tnemec or equal as approved in accordance with Division 01, General Requirements for substitutions.

PART 3 EXECUTION

3.01 PREPARATION

A. Verify that substrate surfaces and building framing components are ready to receive work.

B. Beginning of installation means acceptance of existing conditions.

3.02 ERECTION OF STUDDING

A. Perform work in accordance with, AISI and SSMA/ ICC ES - 4943P.

B. Align floor and ceiling tracks; locate to wall or partition layout. Secure in place with specified fasteners at spacing as indicated on drawings or maximum 32 inches on centers.

1. Set floor track on continuous sealant, each side of track. Sealant type: Butyl Rubber per ASTM C920.
2. Track Splices: notch flanges to allow sliding tracks past each another 12". Attach as approved by manufacturer of system.

C. Place studs at 16 inches o.c. typically, or 12 inches o.c. in plumbing walls or as noted on drawings. Connect studs to tracks using fastener or welding method.

D. Construct corners using minimum three studs.

E. Install double (boxed) studs at each head, jamb and sill of each exterior and interior door and window opening. Extend studs from floor to underside of structure above. Weld all boxed jamb and header members with interrupted 1/8" welds, one inch long at 12 inches on center.

F. Install 1-1/2 inch standard steel furring channels at right angles to king stud at each door hinge point as permitted by perforations. Weld channel to four studs where possible.

G. Stiffeners: Install 3/4 inch standard steel furring channel stiffeners within 24 inches of top and bottom runners and at mid height of walls eight feet high. At higher walls, install stiffeners spaced maximum 48 inches on centers. Weld stiffeners to each stud and at laps.

H. In areas where a finish material occurs on one side of wall only, provide full width bridging or bracing. Two systems permitted:

1. Install 3/4 inch x 16 gauge continuous brace through stud punch-outs, fastened to studs with angle clips welded or screw fastened, spaced as scheduled below.
2. Install 1-1/4 inch x 16 gauge strap, 3/4 inch x 16 gauge or cold-rolled channel continuous across unrestrained edges of studs spaced as scheduled below, screw fastened or welded to each stud, and connected to one blocking member screw fastened or welded to adjacent studs.

I. Bridging or Bracing Schedule:

Stud Size	Bracing Spacing
3-5/8 or 4 in, "c"	2'-6"
3-5/8 or 4 in, "w"	3'-0"
6 in, "c"	2'-6"
6 in, "w"	3'-0"

J. Erect studs one piece full length. Splicing of studs is not permitted, except where detailed.

1. Where studs have been cut to receive piping conduits and equipment, weld on two 3/4 inch furring channels to restore stability of weakened stud.

K. Erect studs, brace and reinforce full strength to meet design requirements.

L. Extend stud framing through ceiling to underside of floor or roof structure above unless detailed otherwise.

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

N. Install intermediate studs above and below openings to match wall stud spacing.

O. Provide deflection allowance of 1/2 inch minimum in stud track, directly below horizontal building framing for non-load bearing framing.

P. Attach backing as detailed on the drawings for attachment of fixtures anchored to walls.

1. Where Casework is anchored as part of a larger wall or panel: Refer to Section 06 41 16.

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

R. Touch-up field welds and damaged primed surfaces with primer.

S. Erect 2 stud construction at expansion joints, 20 feet on center or as indicated on Drawings.

3.03 CEILING JOIST FRAMING

A. Steel Ceiling Joists: Manufacturer's standard C-shaped steel sections, of web depths indicated, punched with enlarged service holes, with stiffened flanges, and as follows:

1. Minimum Base-Metal Thickness:
   a. 20 GA (0.0329 inch) (0.84 mm).
   b. 18 GA (0.0428 inch) (1.09 mm).
   c. 16 GA (0.0538 inch) (1.37 mm).
   d. 14 GA (0.0677 inch) (1.72 mm).
   e. 12 GA (0.0966 inch) (2.45 mm).

2. Flange Width: 1-5/8 inches (41 mm) minimum.
3. Install per drawings and conform to SSMA.

3.04 TOLERANCES

A. Maximum Variation from True Position: 1/8 inch in 10 feet.

B. Maximum Variation of any Member from Plane: 1/8 inch.

3.05 QUALITY CONTROL

A. Inspection of all field-welding operations shall be performed by qualified and certified Welding Inspector approved by the Structural Engineer, Division of the State Architect.

B. Welding Inspector shall check materials, equipment, procedures, welds and certification of welders. Furnish the Owner with reports verified by the Inspector that welding has been performed in accordance with the Contract Documents.

END OF SECTION

SECTION 05 50 00

METAL FABRICATIONS

PART 1 GENERAL

1.01 SECTION INCLUDES

A. Shop fabricated steel and aluminum items.

1.02 RELATED REQUIREMENTS

A. Section 03 30 00 - Cast-in-Place Concrete: Placement of metal fabrications in concrete.

B. Section 09 90 00 - Painting and Coating: Paint finish.

1.03 REFERENCE STANDARDS

A. ANSI A14.3 - American National Standard for Ladders -- Fixed -- Safety Requirements; 2002.

B. ASTM A 36/A 36M - Standard Specification for Carbon Structural Steel; 2005.

C. ASTM A 53/A 53M - Standard Specification for Pipe, Steel, Black and Hot-Dipped, Zinc-Coated, Welded and Seamless; 2007.

D. ASTM A 123/A 123M - Standard Specification for Zinc (Hot-Dip Galvanized) Coatings on Iron and Steel Products; 2002.

E. ASTM A 153/A 153M - Standard Specification for Zinc Coating (Hot-Dip) on Iron and Steel Hardware; 2005.

F. ASTM A 283/A 283M - Standard Specification for Low and Intermediate Tensile Strength Carbon Steel Plates; 2003 (Reapproved 2007).

G. ASTM A 307 - Standard Specification for Carbon Steel Bolts and Studs, 60,000 PSI Tensile Strength; 2007b.

H. ASTM A 325 - Standard Specification for Structural Bolts, Steel, Heat Treated, 120/105 ksi Minimum Tensile Strength; 2007a.

I. ASTM A 325M - Standard Specification for Structural Bolts, Steel, Heat Treated 830 MPa Tensile Strength (Metric); 2007.

J. ASTM A 500 - Standard Specification for Cold-Formed Welded and Seamless Carbon Steel Structural Tubing in Rounds and Shapes; 2007.

K. ASTM B 209 - Standard Specification for Aluminum and Aluminum-Alloy Sheet and Plate; 2007.

L. ASTM B 209M - Standard Specification for Aluminum and Aluminum-Alloy Sheet and Plate [Metric]; 2007.

M. ASTM B 221 - Standard Specification for Aluminum and Aluminum-Alloy Extruded Bars, Rods, Wire, Profiles, and Tubes; 2006.

N. ASTM B 221M - Standard Specification for Aluminum and Aluminum-Alloy Extruded Bars, Rods, Wire, Profiles, and Tubes [Metric]; 2007.

O. AWS A2.4 - Standard Symbols for Welding, Brazing, and Nondestructive Examination; American Welding Society; 2007.

P. AWS D1.1/D1.1M - Structural Welding Code - Steel; American Welding Society; 2006 and Errata.

Q. SSPC-Paint 15 - Steel Joist Shop Primer; Society for Protective Coatings; 1999 (Ed. 2004).

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

S. SSPC-SP 2 - Hand Tool Cleaning; Society for Protective Coatings; 1982 (Ed. 2004).

1.04 SUBMITTALS

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

B. 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.

C. Welders' Certificates: Submit certification for welders employed on the project, verifying AWS qualification within the previous 12 months.

1.05 QUALITY ASSURANCE

A. Design, fabricate and install metal fabrications in accordance with AISC guidelines.

PART 2 PRODUCTS

2.01 MATERIALS - STEEL

A. Steel Sections: ASTM A 36/A 36M, ASTM A992.

B. Steel Tubing: ASTM A 500, Grade B cold-formed structural tubing.

C. Stainless Steel Mesh: 2.5 lbs/s.f., 36% open

D. Plates: ASTM A 283, ASTM A572.

E. Pipe: ASTM A 500, Grade B, black finish.

F. Bolts, Nuts, and Washers: ASTM A 325 (ASTM A 325M), Type 1, galvanized to ASTM A 153/A 153M 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 MATERIALS - ALUMINUM

A. Extruded Aluminum: ASTM B 221 (ASTM B 221M), 6063 alloy, T6 temper.

B. Sheet Aluminum: ASTM B 209 (ASTM B 209M), 5052 alloy, H32 or H22 temper.

C. Bolts, Nuts, and Washers: Stainless steel.

D. Welding Materials: AWS D1.2/D1.2M; type required for materials being welded.

2.03 FABRICATION

A. Fit and shop assemble items in largest practical sections, for delivery to site.

B. Fabricate items with joints tightly fitted and secured.

C. Grind exposed joints flush and smooth with adjacent finish surface. Make exposed joints butt tight, flush, and hairline. Ease exposed edges to small uniform radius.

D. Exposed Mechanical Fastenings: Flush countersunk screws or bolts; unobtrusively located; consistent with design of component, except where specifically noted otherwise.

E. Supply components required for anchorage of fabrications. Fabricate anchors and related components of same material and finish as fabrication, except where specifically noted otherwise.

2.04 FABRICATED ITEMS

A. Ladders: Steel; in compliance with ANSI A14.3; with mounting brackets and attachments; prime paint finish.
   1. Side Rails: 3/8 x 2 inches (9 x 50 mm) members spaced at 20 inches (500 mm).
   2. Rungs: one inch (25 mm) diameter solid round bar spaced 12 inches (300 mm) on center.
   3. Space rungs 7 inches (175 mm) from wall surface.

B. Bollards: Steel pipe, concrete filled, crowned cap, as detailed; prime paint finish.

C. Ledge Angles, Shelf Angles, Channels, and Plates Not Attached to Structural Framing: For support of metal decking; prime paint finish.

2.05 FINISHES - STEEL

A. Prime paint all steel items.

B. Prepare surfaces to be primed in accordance with SSPC-SP2.

C. Clean surfaces of rust, scale, grease, and foreign matter prior to finishing.

D. Prime Painting: One coat.

E. Galvanizing of Structural Steel Members: Galvanize after fabrication to ASTM A 123/A 123M requirements.

F. Galvanizing of Non-structural Items: Galvanize after fabrication to ASTM A 123/A 123M requirements.

2.06 FINISHES – ALUMINUM

A. Exterior/Interior (Visible) Surfaces: High Performance Organic Coating AAMA 2604: two coat thermally-cured fluoropolymer system.

B. Apply one coat of bituminous paint to concealed aluminum surfaces in contact with cementitous or dissimiliar materials.

2.07 FABRICATION TOLERANCES

A. Squareness: 1/8 inch (3 mm) maximum difference in diagonal measurements.

B. Maximum Offset Between Faces: 1/16 inch (1.5 mm).

C. Maximum Misalignment of Adjacent Members: 1/16 inch (1.5 mm).

D. Maximum Bow: 1/8 inch (3 mm) in 48 inches (1.2 m).

E. Maximum Deviation From Plane: 1/16 inch (1.5 mm) in 48 inches (1.2 m).

PART 3 EXECUTION

3.01 EXAMINATION

A. Verify that field conditions are acceptable and are ready to receive work.

3.02 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.

3.03 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. Perform field welding in accordance with AWS D1.1/D1.1M.

D. Obtain approval prior to site cutting or making adjustments not scheduled.

E. After erection, prime welds, abrasions, and surfaces not shop primed or galvanized, except surfaces to be in contact with concrete.

3.04 TOLERANCES

A. Maximum Variation From Plumb: 1/4 inch (6 mm) per story, non-cumulative.

B. Maximum Offset From True Alignment: 1/4 inch (6 mm).

C. Maximum Out-of-Position: 1/4 inch (6 mm).

END OF SECTION

SECTION 05 52 13

PIPE AND TUBE RAILINGS

PART 1 GENERAL

1.01 SECTION INCLUDES

A. Wall mounted handrails.

B. Stair railings and guardrails.

C. Free-standing railings at steps.

D. Balcony railings and guardrails.

1.02 RELATED REQUIREMENTS

A. Section 03 30 00 - Cast-in-Place Concrete: Placement of anchors in concrete.

B. Section 09 90 00 - Painting and Coating: Paint finish.

1.03 REFERENCE STANDARDS

A. ASTM A 53/A 53M - Standard Specification for Pipe, Steel, Black and Hot-Dipped, Zinc-Coated, Welded and Seamless; 2007.

B. ASTM A 123/A 123M - Standard Specification for Zinc (Hot-Dip Galvanized) Coatings on Iron and Steel Products; 2002.

C. ASTM A 500 - Standard Specification for Cold-Formed Welded and Seamless Carbon Steel Structural Tubing in Rounds and Shapes; 2007.

D. ASTM E 935 - Standard Test Methods for Performance of Permanent Metal Railing Systems and Rails for Buildings; 2000 (Reapproved 2006).

E. ASTM E 985 - Standard Specification for Permanent Metal Railing Systems and Rails for Buildings; 2000 (Reapproved 2006).

F. SSPC-Paint 15 - Steel Joist Shop Paint; The Society for Protective Coatings; 1999 (Ed. 2004).

G. SSPC-Paint 20 - Zinc-Rich Primers (Type I, "Inorganic," and Type II, "Organic"); The Society for Protective Coatings; 2002 (Ed. 2004).

1.04 SUBMITTALS

A. See Section 01 33 00 – Submittal Procedures.

B. Shop Drawings: Indicate profiles, sizes, connection attachments, anchorage, size and type of fasteners, and accessories.

PART 2 PRODUCTS

2.01 RAILINGS - GENERAL REQUIREMENTS

A. Design, fabricate, and test railing assemblies in accordance with the most stringent requirements of ASTM E 985 and applicable local code.

B. Design railing assembly, wall rails, and attachments to resist lateral force of 200 lbs at any point

without damage or permanent set. Test in accordance with ASTM E 935.

C. Allow for expansion and contraction of members and building movement without damage to connections or members.

D. Dimensions: See drawings for configurations and heights.

E. Provide anchors and other components as required to attach to structure, made of same materials as railing components unless otherwise indicated; where exposed fasteners are unavoidable provide flush countersunk fasteners.

F. Provide welded connections as indicated on the drawings to join lengths, seal open ends, and conceal exposed mounting bolts and nuts, including but not limited to elbows, T-shapes, splice connectors, flanges, escutcheons, and wall brackets.

2.02 STEEL RAILING SYSTEM

A. Steel Tube: ASTM A 500, Grade B cold-formed structural tubing.

B. Steel Pipe: ASTM A 53/A 53M, Grade B Schedule 40, black finish.

C. Welding Fittings: Factory- or shop-welded from matching pipe or tube; seams continuously welded; joints and seams ground smooth.

D. Galvanizing: In accordance with requirements of ASTM A 123/A 123M.
   1. Touch-Up Primer for Galvanized Surfaces: SSPC-Paint 20, Type I - Inorganic.

E. Shop and Touch-Up Primer: SSPC-Paint 15, complying with VOC limitations of authorities having jurisdiction.

2.03 FABRICATION

A. Accurately form components to suit specific project conditions and for proper connection to building structure.

B. Fit and shop assemble components in largest practical sizes for delivery to site.

C. Fabricate components with joints tightly fitted and secured.

D. Welded Joints:
   1. Exterior Components: Continuously seal joined pieces by continuous welds. Drill condensate drainage holes at bottom of members at locations that will not encourage water intrusion.
   2. Interior Components: Continuously seal joined pieces by continuous welds.
   3. Grind exposed joints flush and smooth with adjacent finish surface. Make exposed joints butt tight, flush, and hairline. Ease exposed edges to small uniform radius.

PART 3 EXECUTION

3.01 EXAMINATION

A. Verify that field conditions are acceptable and are ready to receive work.

3.02 PREPARATION

A. Clean and strip primed steel items to bare metal where site welding is required.

B. Supply items required to be cast into concrete or embedded in masonry with setting templates, for installation as work of other sections.

3.03 INSTALLATION

A. Install in accordance with manufacturer's instructions.

B. Install components plumb and level, accurately fitted, free from distortion or defects, with tight joints.

C. Anchor railings securely to structure.

3.04 TOLERANCES

A. Maximum Variation From Plumb: 1/4 inch per floor level, non-cumulative.

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

C. Maximum Out-of-Position: 1/4 inch.

END OF SECTION

SECTION 06 06 60

SCHEDULES for PLASTIC FABRICATIONS

PART 1 - GENERAL

1.1 SECTION INCLUDES:

A. Plastic Fabrication partitions

1.2 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and other Division 1 Specification sections, apply to this Section.

B. Section 05 50 00 – Metal Fabrications: Supports and fasteners

C. Section 06 20 00 – Finish Carpentry: For installation

1.3 REFERENCE STANDARDS

A. ASTM D635 – Standard Test for Rate of Burning and/or Extent of Burning of Plastics in a Horizon Position

B. ASTM D1929 – Standard Test Method for Determining the Ignition Temperature of Plastics.

C. ASTM D5116 – Standard Guide for Small Scale Environmental Chamber Determinations of Organic Emissions from Indoor Material

D. ANSI Z97.1-2004: Safety Glazing Impact Resistance

1.4 SUBMITTALS

A. General: Submit the following in accordance with conditions of contact and Division 1 specification section 01 33 00 "Submittal Procedures".

B. Product Data: Submit manufacturer's product data; include product description, fabrication information, and compliance with specified performance requirements.

C. Submit product test reports from a qualified independent 3rd party testing agency indicating each type and class of panel system complies with the project performance requirements, based on comprehensive testing of current products. Previously completed test reports will be acceptable if for current manufacturer and indicative of products used on this project.

1. Test reports required are:
   a. Rate of Burning (ASTM D 635)
   b. Self-Ignition Temperature (ASTM D 1929)
   c. Flame spread and Smoke developed testing (ASTM E 84)
   d. Impact strength (ASTM D 3763)
   e. Safety glazing impact resistance (ANSI Z97.1-2004)
   f. Dynamic environmental testing (ASTM standards D 5116 and D 6670)

D. Samples for Verification:

1. Submit minimum 4-inch by 4-inch sample for each type, texture, pattern and color of solid plastic fabrication.

E. Maintenance Data: Submit manufacturer's care and maintenance data, including care, repair and cleaning instructions. Include in Project closeout documents.

1.5 QUALITY ASSURANCE

A. Manufacturers Qualifications

1. Materials and systems shall be manufactured by a company continuously and regularly employed in the manufacture of specified materials for a period of at least five (5) consecutive years and which can show evidence of those materials being satisfactorily used on at least six (6) projects of similar size, scope and location. At least three (3) of the projects shall have been successful for use five (5) years or longer.
2. Manufactured panels must be produced from a minimum of 40% post-industrial recycle content. This recycle content must be certified by a recognized 3rd party certification group, such as Scientific Certification Systems (SCS).

1.6 DELIVERY, STORAGE, AND HANDLING

A. Deliver Plastic Fabrications, systems and specified items in manufacturer's standard protective packaging.

B. Do not deliver Plastic Fabrications, system, components and accessories to Project site until areas are ready for installation.

C. Store materials in a flat orientation in a dry place that is not exposed to exterior elements.

D. Handle materials to prevent damage to finished surfaces. Provide protective coverings to prevent damage or staining following installation for duration of project.

E. Before installing Plastic Fabrications, permit them to reach room temperature.

1.7 PROJECT CONDITIONS

A. Environmental Limitations: Do not install Solid Polymer Fabrications until spaces are enclosed and weatherproof, and ambient temperatures and humidity conditions are maintained at the levels indicated for Project when occupied for its intended use.

1.8 WARRANTY

A. Manufacturer's Special Warranty on Plastic Fabrications: Manufacturer's standard form agreeing to repair or replace units that fail in material or workmanship within the specified warranty period.

B. Warranty Period: 1 year after the date of substantial completion.

C. The warranty shall not deprive the owner of other rights or remedies the Owner may have under other provisions of the Contract Documents, and is in addition to and runs concurrent with other warranties made by the Contractor under the requirements of the Contract Documents.

PART 2 - PRODUCTS

2.1 MANUFACTURER

A. Manufacturer: 3form, Inc., Salt Lake City, Utah, USA / telephone 801-649-2500

2.2 MATERIALS

A. Varia™ produced from ecoresin™ Sheet (Basis for Design)

1. Engineered polyester resin
2. Sheet Size: Maximum 4' x 10'
3. Thickness: Minimum 1/16"

B. Sheet minimum performance attributes:

1. Rate of Burning (ASTM D 635). Material must attain CC1 Rating for a nominal thickness of 1.5 mm (0.060 in.) and greater.
2. Self-Ignition Temperature (ASTM D 1929). Material must have a Self-ignition temperature greater than 650°F.
3. Flame spread and Smoke developed testing (ASTM E 84). Material must be able to meet a level of Class A (Flame spread less than 25 and smoke less than 450) at thickness of 1".
4. Impact strength. Minimum impact strength test as measured by ASTM D 3763 of 20 ft. lbs. (for durability, shipping, installation, and use).
5. Safety Glazing. Material must attain a Class A impact rating in accordance with ANSI Z97.1-2004 at 1/8" thickness.
6. Dynamic environmental testing (ASTM standards D 5116 and D 6670). Panels must not have detectable VOC off-gassing agents and must be have Greenguard™ Indoor Air Quality certified.
7. Panels must be produced from a minimum of 40% post-industrial recycle content. This recycle content must be certified by a recognized 3rd party certification group, such as Scientific Certification Systems (SCS).

2.3 FABRICATION

A. General: Fabricate Plastic Fabrications to designs, sizes and thicknesses indicated and to comply with indicated standards.

B. Comply with manufacturer's written recommendations for fabrication.

C. Machining: Acceptable means of machining are listed below. Ensure that material is not chipped or warped by machining operations.

1. Sawing: Select equipment and blades suitable for type of cut required.
2. Drilling: Drills specifically designed for use with plastic products.
3. Milling: Climb cut where possible.
4. Routing
5. Tapping

D. Laminating: Laminate to substrates indicated using adhesives and techniques recommended by manufacturer.

2.4 MISCELLANEOUS MATERIALS

A. General: Provide products of material, size, and shape required for application indicated, and with a proven record of compatibility with surfaces contacted in installation.

B. Cleaner: Type recommended by manufacturer.

C. Fasteners: Use screws designed specifically for plastics. Self-threading screws are acceptable for permanent installations. Provide threaded metal inserts for applications requiring frequent disassembly such as light fixtures.

D. Bonding Cements: May be achieved with solvents or adhesives, suitable for use with product and application.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Examine substrates, areas, and conditions where installation of Plastic Fabrications will occur, with Installer present, for compliance with manufacturer's requirements. Verify that substrates and conditions are satisfactory for installation and comply with requirements specified.

3.2 INSTALLATION

A. General: Comply with manufacturer's written instructions for the installation of Plastic Fabrications. Sizes, profiles and other characteristics are indicated on the drawings.

B. Manufacturer's shop to fabricate items to the greatest degree possible.

C. Utilize fasteners, adhesives and bonding agents recommended by manufacturer for type of installation indicated. Material that is chipped, warped, hazed or discolored as a result of installation or fabrication methods will be rejected.

D. Install components plumb, level and rigid, scribed to adjacent finishes, in accordance with approved shop drawings and product data.

E. Form field joints using manufacturer's recommended procedures. Locate seams in panels so that they are not directly in line with seams in substrates.

3.3 CLEANING AND PROTECTION

A. Protect surfaces from damage until date of substantial completion. Repair work or replace damaged work, which cannot be repaired to Architect's satisfaction.

END of SECTION

SECTION 06 10 00

ROUGH CARPENTRY

PART 1 - GENERAL

1.01 RELATED DOCUMENTS

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

1.02 SUMMARY

A. This Section includes the following:

1. Rooftop equipment bases and support curbs.
2. Wood grounds, shims, nailers, and blocking.

B. Related Sections: The following Sections contain requirements that relate to this Section:

1. Division 06 Section "Finish Carpentry" for nonstructural carpentry items exposed to view and not specified in another Section.

1.03 SUBMITTALS

A. General: Submit each item in this Article according to the Conditions of the Contract and Division 1 Specification Sections.

B. Wood treatment data as follows, including chemical treatment manufacturer's instructions for handling, storing, installing, and finishing treated materials:

1. Preservative Treatment by Pressure Process: AWPA C2, except that lumber that is not in contact with the ground and is continuously protected from liquid water may be treated according to AWPA C31 with inorganic boron (SBX).
2. Preservatives shall be arsenic- and chromium-free, copper-based wood preservatives, as applicable.
3. For each type of preservative-treated wood product, include certification by treating plant stating type of preservative solution and pressure process used, net amount of preservative retained, and compliance with applicable standards.
4. For waterborne-treated products, include statement that moisture content of treated materials was reduced to levels indicated before shipment to Project site.
5. For fire-retardant-treated wood products, include certification by treating plant that treated materials comply with specified standard and other requirements as well as data relative to bending strength, stiffness, and fastener-holding capacities of treated materials.

C. Material test reports from a qualified independent testing agency indicating and interpreting test results relative to compliance of fire-retardant-treated wood products with performance requirements indicated.

D. Warranty of chemical treatment manufacturer for each type of treatment.

1.04 DELIVERY, STORAGE, AND HANDLING

A. Keep materials under cover and dry. Protect from weather and contact with damp or wet surfaces.

PART 2 - PRODUCTS

2.01 LUMBER, GENERAL

A. Lumber Standards: Comply with DOC PS 20, "American Softwood Lumber Standard," and with applicable grading rules of inspection agencies certified by American Lumber Standards Committee's (ALSC) Board of Review.

B. Inspection Agencies: Inspection agencies, and the abbreviations used to reference them, include the following:

1. NELMA - Northeastern Lumber Manufacturers Association.
2. NLGA - National Lumber Grades Authority (Canadian).
3. RIS - Redwood Inspection Service.
4. SPIB - Southern Pine Inspection Bureau.
5. WCLIB - West Coast Lumber Inspection Bureau.
6. WWPA - Western Wood Products Association.

C. Grade Stamps: Provide lumber with each piece factory marked with grade stamp of inspection agency evidencing compliance with grading rule requirements and identifying grading agency, grade, species, moisture content at time of surfacing, and mill.

2.02 WOOD-PRESERVATIVE-TREATED MATERIALS

A. General: Where lumber or plywood is indicated as preservative treated or is specified to be treated, comply with applicable requirements of AWPA C2 (lumber) and AWPA C9 (plywood). Mark each treated item with the Quality Mark Requirements of an inspection agency approved by ALSC's Board of Review.

1. Do not use chemicals containing chromium or arsenic.
2. For exposed items indicated to receive stained finish, use chemical formulations that do not bleed through, contain colorants, or otherwise adversely affect finishes.

B. Pressure treat aboveground items with waterborne preservatives to a minimum retention of 0.25 lb/cu. ft. After treatment, kiln-dry lumber and plywood to a maximum moisture content of 19 and 15 percent, respectively. Treat indicated items and the following:

1. Wood cants, nailers, curbs, equipment support bases, blocking, stripping, and similar members in connection with roofing, flashing, vapor barriers, and waterproofing.
2. Wood sills, sleepers, blocking, furring, stripping, and similar concealed members in contact with masonry or concrete.

2.03 MISCELLANEOUS LUMBER

A. General: Provide lumber for support or attachment of other construction, including rooftop equipment curbs and support bases, cant strips, bucks, nailers, blocking, furring, grounds, stripping, and similar members.

B. Fabricate miscellaneous lumber from dimension lumber of sizes indicated and into shapes shown.

C. Moisture Content: 19 percent maximum for lumber items are not specified to receive wood preservative treatment.

D. Grade: For dimension lumber sizes, provide No. 3 or Standard grade lumber per ALSC's NGRs of any species. For board-size lumber, provide No. 3 Common grade per NELMA, NLGA, or WWPA; No. 2 grade per SPIB; or Standard grade per NLGA, WCLIB or WWPA of any species.

2.04 FASTENERS

A. General: Provide fasteners of size and type indicated that comply with requirements specified in this Article for material and manufacture. Equal products from other manufacturers shall be acceptable as outlined in the provisions of Division 01 requirements.

1. Where miscellaneous carpentry is exposed to weather, in ground contact, in area of high relative humidity, and/or especially in coastal zones with high salt air conditions, provide fasteners and other components ofType 304 stainless steel only.

B. Nails, Wire, Brads, and Staples: ASTM F 1667.

C. Power-Driven Fasteners: NES-272.

D. Wood Screws: ASME B18.6.1.

E. Bolts: Steel bolts complying with ASTM A 307, Grade A; with ASTM A 563 hex nuts and, where indicated or required, flat washers.

PART 3 - EXECUTION

3.01 INSTALLATION, GENERAL

A. Discard units of material with defects that impair quality of carpentry and that are too small to use with minimum number of joints or optimum joint arrangement.

B. Set carpentry to required levels and lines, with members plumb, true to line, cut, and fitted.

C. Fit carpentry to other construction; scribe and cope as required for accurate fit. Correlate location of furring, nailers, blocking, grounds, and similar supports to allow attachment of other construction.

D. Apply field treatment complying with AWPA M4 to cut surfaces of preservative-treated lumber and plywood.

E. Securely attach carpentry work as indicated and according to applicable codes and recognized standards.

F. Coordinate all installation components integral to roofing systems and exterior sheet metal flashings, including the shop drawings, to provide for a complete and compatible installation for all final assemblies.

3.02 WOOD GROUNDS, NAILERS, BLOCKING, AND SLEEPERS

A. Install where shown and where required for screeding or attaching other work. Cut and shape to required size. Coordinate locations with other work involved.

B. Attach to substrates to support applied loading. Recess bolts and nuts flush with surfaces, unless otherwise indicated.

3.03 PROTECTION

A. Protect wood that has been treated with inorganic boron (SBX) from weather. If, despite protection, inorganic boron-treated wood becomes wet, apply EPA-registered borate treatment. Apply borate solution by spraying to comply with EPA-registered label.

B. Protect rough carpentry from weather. If, despite protection, rough carpentry becomes wet, apply EPA-registered borate treatment. Apply borate solution by spraying to comply with EPA-registered label.

END OF SECTION

SECTION 06 20 00

FINISH CARPENTRY

PART 1 - GENERAL

1.01 SUMMARY: Division 1 applies to this Section. Provide and perform finish carpentry as indicated, specified, and required, complete.

A. Work In This Section: Principal items include:

1. Wood paneling and trim to include installation.
2. Back priming to extent specified.
3. Installation of hollow metal doors and frames.
4. Installation of wood doors.
5. Installation of finish hardware except as otherwise specified.

B. Related Work Not In This Section:

1. Finish painting.
2. Furnishing hollow metal doors and frames.
3. Furnishing plastic-faced wood doors.
4. Furnishing finish hardware for doors.
5. Installation of hardware on aluminum entrance doors.

1.02 SUBMITTALS: Refer to Section 01 33 00 for procedures.

A. Shop Drawings: Submit for the following items, bearing the WI Certified Compliance Grade Stamp.

1. Steel backing plate or wood blocking locations required for anchoring of cabinets, casework, and other Work of this Section.

B. Certificates: Submit as required in Article "Quality Assurance" above for fabricator and for installer.

1.03 QUALITY ASSURANCE: Work of this Section shall conform to the Manual of Millwork of the Woodwork Institute (WI), Current Edition, grades as specified herein or indicated.

A. Installation: Installer of Work of this Section shall be certified by WI and, upon completion of installation, shall furnish to Architect a WI Certified Compliance Certificate for Installation covering all Work of this Section.

1.04 PRODUCT DELIVERY, STORAGE, AND HANDLING: Deliver millwork and casework to the site covered and protected from the weather. Store in a clean dry protected area meeting requirements of WI Manual of Millwork. Handle and transport items by methods that prevent damage or defacing.

1.05 JOB CONDITIONS: After installing, temporarily cover and protect millwork to prevent damage, staining, or marring by subsequent construction operations.

PART 2 - PRODUCTS

2.01 MATERIALS AND MANUFACTURE: Conform to WI Manual unless otherwise shown or specified. Details on Drawings and requirements specified herein govern the type, arrangement, sizes, construction, and fabrication. In all other respects, manufacture Work of this Section to conform to the WI grades specified.

A. Back Priming: Use exterior wood primer or enamel undercoater of the type specified in Section 09 90 00, except use a tinted resin sealer on natural finished woodwork with care not to coat exposed surfaces.

PART 3 - EXECUTION

3.01 INSTALLATION OF FINISH CARPENTRY: Conform to requirements indicated, WI Manual, and approved submittals. Repair all damage as approved.

A. Base and Trim: Conform to WIC "Custom" at base, "Premium" at trim; fasten tightly to walls and frames with countersunk nails, base end joints beveled together; casing and trim in full length pieces; internal angles coped, external angles mitered. Leave no tool marks, blemishes, or gaps.

3.02 INSTALLATION OF HOLLOW METAL WORK: Conform installations to submittals approved under Section 08 11 13 and manufacturer's instructions. Install frames plumb, straight, in correct alignment, rigidly connected to walls and building structure. Erect in proper sequence with other trades to prevent delays. Erect within the tolerances specified or shown in the approved submittals.

3.03 INSTALLATION OF PLASTIC FACED DOORS: Trimming of doors is not permitted. Drill pilot holes for all screws in plastic surfaces, holes of same diameters as screw shanks. Fit doors square and plumb with frames.

3.04 INSTALLATION OF FINISH HARDWARE: Install hardware supplied under Section 08710, excluding only hardware specified to be installed at the factory or under other Sections. Drill pilot holes for screws and screw home; hammer driving of screws is not allowed. After installation and fitting, remove finish hardware items on surfaces to be painted, except prime coat items, repack in original containers, and perform final installation, testing, and adjustment after finish painting is completed. Adjust hinges to swing smoothly but not loosely, without sticking or hingebound conditions. Adjust other hardware for correct operation.

END OF SECTION

SECTION 06 41 00

LAMINATE-CLAD WOOD CASEWORK

PART 1 GENERAL

1.01 SECTION INCLUDES

A. Specially fabricated cabinet units.

B. Countertops. Refer also to Section 12 36 00 for solid surfacing.

C. Cabinet hardware.

D. Factory finishing.

E. Preparation for installing utilities.

1.02 RELATED REQUIREMENTS

A. Section 01 35 15 – LEED Certification Procedures

B. Section 06 10 00 - Rough Carpentry: Support framing, grounds, and concealed blocking.

1.03 REFERENCE STANDARDS

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

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

C. AWI/AWMAC (QSI) - Architectural Woodwork Quality Standards Illustrated; Architectural Woodwork Institute and Architectural Woodwork Manufacturers Association of Canada; 2005, 8th Ed., Version 2.0.

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

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

F. WI (MAN) - Manual of Millwork; Woodwork Institute 11th edition.

1.04 ADMINISTRATIVE REQUIREMENTS

A. Preinstallation Meeting: Convene a preinstallation meeting not less than one week before starting work of this section; require attendance by all affected installers.

1.05 SUBMITTALS

A. See Section 01 33 00 – Submittal Procedures

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

C. Product Data: Provide data for hardware accessories.

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

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

F. LEED Report: Submit for wood products made from sustainably harvested wood, salvaged and reused wood, wood fabricated from recovered timber, and locally-sourced wood, as specified in Section 01 35 15. Submit report verifying particleboard, medium density fiberboard and/or plywood contains no added urea-formaldehyde resins nor that any adhesive used in the fabrication of millwork contains any added urea-formaldehyde resins.

1.06 QUALITY ASSURANCE

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

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

C. Quality Certification: Provide inspection and quality certification of completed custom cabinets in accordance with AWI/AWMAC Quality Certification Program.

1.07 MOCK-UP

A. Provide mock-up of typical base cabinet, wall cabinet, and countertop, including hardware, finishes, and plumbing accessories.

B. Locate where directed.

C. Mock-up may remain as part of the Work.

1.08 DELIVERY, STORAGE, AND HANDLING

A. Protect units from moisture damage.

1.09 FIELD CONDITIONS

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

PART 2 PRODUCTS (Refer also to Section 09 00 00)

2.01 MANUFACTURERS

A. Qualified Millwork Contractor well-versed in the requirements of WI Manual.

B. Substitutions: See Section 01 63 00 - Substitution Requirements.

2.02 WOOD-BASED COMPONENTS

A. Wood fabricated from old growth timber is not permitted.

2.03 PANEL MATERIALS

A. Particleboard: ANSI A208.1; medium density industrial type as specified in AWI/AWMAC Architectural Woodwork Quality Standards Illustrated, composed of wood chips bonded with interior grade adhesive under heat and pressure; sanded faces; thickness as shown on the drawings; use for components indicated on drawings. Materials shall contain no added urea-formaldehyde resins.

B. Medium Density Fiberboard (MDF): ANSI A208.2; type as specified in AWI/AWMAC Architectural Woodwork Quality Standards Illustrated; composed of wood fibers pressure bonded with moisture resistant adhesive to suit application; sanded faces; thickness as shown on the drawings. MDF shall contain no added urea-formaldehyde resins.

2.04 LAMINATE MATERIALS

A. Manufacturers:

1. Arborite
2. Formica Corporation; www.formica.com.
3. Wilsonart International, Inc; www.wilsonart.com.
4. Substitutions: See Section 01 60 00 - Product Requirements.

B. High Pressure Decorative Laminate (HPDL): NEMA LD 3, types as recommended for specific applications.

2.05 COUNTERTOPS

A. Plastic Laminate Countertops: Medium density fiberboard substrate covered with HPDL, conventionally fabricated and self-edge banded.

B. Provide solid surfacing on countertops where indicated on the drawings. See also Sec. 12 3600.

2.06 ACCESSORIES

A. Adhesive: Type recommended by fabricator to suit application. Laminating adhesives shall contain no added urea-formaldehyde resins.

B. Plastic Edge Banding: Extruded PVC, convex shaped; smooth finish; self locking serrated tongue; of width to match component thickness, color as selected from manufacturer's standards.
1. Use at all exposed plywood edges.
2. Use at all exposed shelf edges.

C. Fasteners: Size and type to suit application.

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

E. Concealed Joint Fasteners: Threaded steel.

F. Grommets: Standard plastic, painted metal, or rubber grommets for cut-outs, in color to match adjacent surface.

2.07 HARDWARE

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

B. Adjustable Shelf Supports: Standard side-mounted system using recessed metal shelf standards or multiple holes for pin supports and coordinated self rests, polished chrome finish, for nominal 1 inch spacing adjustments.

C. Drawer and Door Pulls: "U" shaped wire pull, steel with chrome finish, 4 inch centers.

D. Cabinet Locks: Keyed cylinder, two keys per lock, master keyed, steel with chrome finish.

E. Catches: Magnetic.

F. Drawer Slides:
1. Type: Standard extension.
2. Static Load Capacity: Commercial grade.
3. Mounting: Side mounted.
4. Stops: Integral type.
5. Manufacturers:
   a. Accuride International, Inc; www.accuride.com.
   b. Knape & Vogt Manufacturing Company; www.knapeandvogt.com.
   c. Substitutions: See Section 01 60 00 - Product Requirements.

G. Hinges: European style concealed self-closing type, steel with polished finish.
   1. Manufacturers:
      a. Grass America Inc; www.grassusa.com.
      b. Hardware Resources; www.hardwareresources.com.
      c. Julius Blum, Inc; www.blum.com.
      d. Substitutions: See Section 01 63 00 - Substitution Requirements.

2.08 FABRICATION

A. Cabinet Style: Flush overlay.

B. Cabinet Doors and Drawer Fronts: Flush style.

C. Drawer Construction Technique: Dovetail joints.

D. Assembly: Shop assemble cabinets for delivery to site in units easily handled and to permit passage through building openings.

E. Edging: Fit shelves, doors, and exposed edges with specified edging. Do not use more than one piece for any single length.

F. Fitting: When necessary to cut and fit on site, provide materials with ample allowance for cutting. Provide matching trim for scribing and site cutting.

G. Plastic Laminate: Apply plastic laminate finish in full uninterrupted sheets consistent with manufactured sizes. Fit corners and joints hairline; secure with concealed fasteners. Slightly bevel arises. Locate counter butt joints minimum 2 feet from sink cut-outs.
   1. Apply laminate backing sheet to reverse side of plastic laminate finished surfaces.

H. Mechanically fasten back splash to countertops with steel brackets at 16 inches on center.

I. Provide cutouts for plumbing fixtures. Verify locations of cutouts from on-site dimensions. Seal cut edges.

PART 3 EXECUTION

3.01 EXAMINATION

A. Verify adequacy of backing and support framing.

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

3.02 INSTALLATION

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

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

C. Secure cabinets to floor using appropriate angles and anchorages. Refer to details.

3.03 ADJUSTING

A. Adjust installed work.

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

3.04 CLEANING

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

END OF SECTION

SECTION 07 21 00

THERMAL INSULATION

PART 1 GENERAL

1.01 SECTION INCLUDES

A. Batt insulation and vapor retarder in exterior wall and ceiling construction.

B. Batt insulation for filling perimeter window and door shim spaces and crevices in exterior wall and roof.

1.02 RELATED REQUIREMENTS

A. Section 01 3515 – LEED Certification Procedures

A. Section 05 40 00 - Cold-Formed Metal Framing: Supporting construction for batt insulation.

B. Section 07 84 00 - Firestopping.

C. Section 09 21 16 - Gypsum Board Assemblies: Acoustic insulation.

1.03 REFERENCE STANDARDS

A. ASTM C 665 - Standard Specification for Mineral-Fiber Blanket Thermal Insulation for Light Frame Construction and Manufactured Housing; 2006.

B. ASTM E 84 - Standard Test Method for Surface Burning Characteristics of Building Materials; 2010.

C. ASTM E 136 - Standard Test Method for Behavior of Materials in a Vertical Tube Furnace At 750 Degrees C; 2009.

1.04 SUBMITTALS

A. See Section 01 33 00 - Submittal Procedures.

B. Product Data: Provide data on product characteristics, performance criteria, and product limitations.

C. Manufacturer's Installation Instructions: Include information on special environmental conditions required for installation and installation techniques.

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

E. LEED Report: Submit to indicated insulation product regionally extracted and produced (within 500 miles of construction site). Indicate percentage of post-consumer recovered materials.

1.05 FIELD CONDITIONS

A. Do not install insulation adhesives when temperature or weather conditions are detrimental to successful installation.

PART 2 PRODUCTS

2.01 MANUFACTURERS

A. Insulation:
   1. Ecobatt, Knauf Insulation

2. Manville Corp.
3. Certain Teed Corp.
3. Substitutions: See Section 01 60 00 - Product Requirements.

2.02 APPLICATIONS

A. Insulation in Metal Framed Walls: Batt insulation with integral vapor retarder.

2.03 BATT INSULATION MATERIALS

A. Batt Insulation: ASTM C 665; preformed batt; friction fit, conforming to the following:
1. Material: Glass or mineral fiber.
2. Flame Spread Index: 25 or less, when tested in accordance with ASTM E 84.
3. Smoke Developed Index: 450 or less, when tested in accordance with ASTM E 84.
4. Combustibility: Non-combustible, when tested in accordance with ASTM E 136, except for facing, if any.
5. Formaldehyde Content: Zero.
6. Thermal Resistance: R of 19 (61/4").Exterior walls and ceilings where shown.
7. R-11 (3 1/2") at acoustical walls
8. Facing: Kraft facing.

2.04 ACCESSORIES

A. Tape: Bright aluminum self-adhering type, mesh reinforced, 2 inch (50 mm) wide.

B. Nails or Staples: Steel wire; electroplated, or galvanized; type and size to suit application.

PART 3 EXECUTION

3.01 EXAMINATION

A. Verify that substrate, adjacent materials, and insulation materials are dry and that substrates are ready to receive insulation.

B. Verify substrate surfaces are flat, free of honeycomb, fins, irregularities, or materials or substances that may impede adhesive bond.

3.02 BATT INSTALLATION

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

B. Install in exterior wall and ceiling 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. Staple or nail facing flanges in place at maximum 6 inches (150 mm) on center.

F. Tape seal butt ends, lapped flanges, and tears or cuts in membrane.

G. At metal framing, place vapor retarder on warm side of insulation; lap and seal sheet retarder joints over member face.

H. Tape seal tears or cuts in vapor retarder.

I. Extend vapor retarder tightly to full perimeter of adjacent window and door frames and other items interrupting the plane of the membrane. Tape seal in place.

3.03 PROTECTION

A. Do not permit installed insulation to be damaged prior to its concealment.

END OF SECTION

SECTION 07 25 00

WEATHER RESISTIVE BARRIERS

PART 1 - GENERAL

1.01 SECTION INCLUDES

A. Weather barrier membrane
B. Seam Tape
C. Flashing
D. Fasteners

1.02 REFERENCES

A. ASTM International
   1. ASTM C920; Standard Specification for Elastomeric Joint Sealants
   2. ASTM C1193; Standard Guide for Use of Joint Sealants
   3. ASTM D882; Test Method for Tensile Properties of Thin Plastic Sheeting
   4. ASTM D1117; Standard Guide for Evaluating Non-woven Fabrics
   5. ASTM E84; Test Method for Surface Burning Characteristics of Building Materials
   6. ASTM E96; Test Method for Water Vapor Transmission of Materials
   7. ASTM E1677; Specification for Air Retarder Material or System for Framed Building Walls
   8. ASTM E2178; Test Method for Air Permeance of Building Materials
B. AATCC – American Association of Textile Chemists and Colorists
   1. Test Method 127 Water Resistance: Hydrostatic Pressure Test
C. TAPPI
   1. Test Method T-410; Grams of Paper and Paperboard (Weight per Unit Area)
   2. Test Method T-460; Air Resistance (Gurley Hill Method)

1.3 SUBMITTALS

A. Refer to Section 01 33 00 Submittal Procedures.
B. Product Data: Submit manufacturer current technical literature for each component.
C. Samples: Weather Barrier Membrane, minimum 8-1/2 inches by 11 inch.
D. Quality Assurance Submittals
   1. Design Data, Test Reports: Provide manufacturer test reports indicating product compliance with indicated requirements.
   2. Manufacturer Instructions: Provide manufacturer's written installation instructions.
   3. Manufacturer's Field Service Reports: Provide site reports from authorized field service representative, indicating observation of weather barrier assembly installation.
E. Closeout Submittals
   1. Refer to Section 01 70 00 Project Closeout.
   2. Weather Barrier Warranty: Manufacturer's executed warranty form with authorized signatures and endorsements indicating date of Substantial Completion.

1.4 QUALITY ASSURANCE

A. Qualifications

1. Installer shall have experience with installation of commercial weather barrier assemblies under similar conditions.
2. Installation shall be in accordance with weather barrier manufacturer's installation guidelines and recommendations.
3. Source Limitations: Provide commercial weather barrier and accessory materials produced by single manufacturer.

B. Mock-up

1. Install mock-up using approved weather barrier assembly including fasteners, flashing, tape and related accessories per manufacturer's current printed instructions and recommendations.
   a. Mock-up size: 10 feet x 10 feet.
   b. Mock-up Substrate: Match wall assembly construction, including window opening.
   c. Mock-up may remain as part of the work.
2. Contact manufacturer's designated representative prior to weather barrier assembly installation, to perform required mock-up visual inspection and analysis as required for warranty.

C. Pre-installation Meeting

1. Hold a pre-installation conference, two weeks prior to start of weather barrier installation. Attendees shall include Contractor, Architect, Engineer, Installer, Owner's Representative, and Weather Barrier Manufacturer's Designated Representative.
2. Review all related project requirements and submittals, status of substrate work and preparation, areas of potential conflict and interface, availability of weather barrier assembly materials and components, installer's training requirements, equipment, facilities and scaffolding, and coordinate methods, procedures and sequencing requirements for full and proper installation, integration and protection.

1.5 DELIVERY, STORAGE AND HANDLING

A. Refer to Section 01 60 00 Product Requirements.

B. Deliver weather barrier materials and components in manufacturer's original, unopened, undamaged containers with identification labels intact.

C. Store weather barrier materials as recommended by weather barrier manufacturer.

1.6 SCHEDULING

A. Review requirements for sequencing of installation of weather barrier assembly with installation of windows, doors, louvers and flashings to provide a weather-tight barrier assembly.

B. Schedule installation of weather barrier materials and exterior cladding within nine months of weather barrier assembly installation.

1.7 WARRANTY

A. Refer to General Conditions.

B. Special Warranty

1. Special weather-barrier manufacturer's warranty for weather barrier assembly for a period of ten (10) years from date of final weather barrier installation.
2. Approval by weather barrier manufacturer for warranty is required prior to assembly installation.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

A. DuPont Building Innovations; Tyvek, Commercial Wrap

B. Dow Chemical Co., Weathermate

C. Or equal.

2.2 MATERIALS

A. Performance Characteristics:

1. Air Penetration: 0.001 cfm/ft^2 at 75 Pa, when tested in accordance with ASTM E2178. Type I per ASTM E1677.
2. Water Vapor Transmission: 28 perms, when tested in accordance with ASTM E96, Method B.
3. Water Penetration Resistance: 280 cm when tested in accordance with AATCC Test Method 127.
4. Basis Weight: 2.7 oz/yd^2, when tested in accordance with TAPPI Test Method T-410.
5. Air Resistance: Air infiltration at >1500 seconds, when tested in accordance with TAPPI Test Method T-460.
6. Tensile Strength: 38/35 lbs/in., when tested in accordance with ASTM D882, Method A.
7. Tear Resistance: 12/10 lbs., when tested in accordance with ASTM D1117.
8. Surface Burning Characteristics: Class A, when tested in accordance with ASTM E 84. Flame Spread: 10, Smoke Developed: 10.

2.3 ACCESSORIES

A. Seam Tape: 3 inch wide, manufacturer's tape for commercial applications.

B. Fasteners:

1. Manufacturer's fasteners ASTM F 1667: 1-5/8 inch rust resistant screw with 2-inch diameter plastic cap or manufacturer approved 1-1/4" or 2" metal gasketed washer

C. Sealants

1. Provide sealants that comply with ASTM C920, elastomeric polymer sealant to maintain watertight conditions. Refer also to Section 07 90 05 Sealants.
2. Products:
   a. Tremco 830
   b. Tremco Butyl
   c. Sealants recommended by the weather barrier manufacturer.

D. Adhesives:

1. Provide adhesive recommended by weather barrier manufacturer.
2. Products:

a. Liquid Nails® LN-109
b. Polyglaze® SM 5700
c. Denso Butyl Liquid
d. 3M High Strength 90
e. SIA 655
f. Adhesives recommend by the weather barrier manufacturer.

E. Primers:
1. Provide flashing manufacturer recommended primer to assist in adhesion between substrate and flashing.
2. Products:
a. 3M High Strength 90
b. Denso Butyl Spray
c. SIA 655
d. Permagrip 105
e. ITW TACC Sta' Put SPH
f. Primers recommended by the flashing manufacturer

F. Flashing
1. Flexible flashing: flexible membrane flashing materials for window openings and penetrations.
2. Refer also to Section 07 60 00 Flashing and Sheet Metal and the drawing details.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Verify substrate and surface conditions are in accordance with weather barrier manufacturer recommended tolerances prior to installation of weather barrier and accessories.

3.2 INSTALLATION – WEATHER BARRIER

A. Install weather barrier over exterior face of exterior wall substrate in accordance with manufacturer recommendations.
B. Install weather barrier prior to installation of windows and doors.
C. Start weather barrier installation at a building corner, leaving 6-12 inches of weather barrier extended beyond corner to overlap.
D. Install weather barrier in a horizontal manner starting at the lower portion of the wall surface with subsequent layers installed in a shingling manner to overlap lower layers. Maintain weather barrier plumb and level.
E. Sill Plate Interface: Extend lower edge of weather barrier over sill plate interface 3-6 inches. Secure to foundation with elastomeric sealant as recommended by weather barrier manufacturer.
F. Window and Door Openings: Extend weather barrier completely over openings.
G. Overlap weather barrier
1. Exterior corners: minimum 12 inches.
2. Seams: minimum 6 inches.
H. Weather Barrier Attachment:

1. Attach weather barrier to studs through exterior sheathing. Secure using weather barrier manufacturer recommended fasteners, space 12 -18 inches vertically on center along stud line, and 24 inch on center, maximum horizontally.

I. Apply 4 inch by 7 inch piece of flashing to weather barrier membrane prior to the installation cladding anchors.

3.3 SEAMING

A. Seal seams of weather barrier with seam tape at all vertical and horizontal overlapping seams.

B. Seal any tears or cuts as recommended by weather barrier manufacturer.

3.4 OPENING PREPARATION

A. Flush cut weather barrier at edge of sheathing around full perimeter of opening.

B. Cut a head flap at 45-degree angle in the weather barrier at window head to expose 8 inches of sheathing. Temporarily secure weather barrier flap away from sheathing with tape.

3.5 FLASHING (Refer also to Drawings)

A. Cut 12-inch wide flexible flashing a minimum of 12 inches longer than width of sill rough opening. Apply primer as required by manufacturer.

B. Cover horizontal sill by aligning flashing edge with inside edge of sill. Adhere to rough opening across sill and up jambs a minimum of 6 inches. Secure flashing tightly into corners by working in along the sill before adhering up the jambs.

C. Fan flashing at bottom corners onto face of wall. Firmly press in place. Mechanically fasten fanned edges.

D. Apply 9-inch wide strips of flashing at jambs. Align flashing with interior edge of jamb framing. Start at head of opening and lap sill flashing down to the sill.

E. Spray-apply primer to top 6 inches of jambs and exposed sheathing.

F. Install flexible flashing at opening head using same installation procedures used at sill. Overlap jamb flashing a minimum of 2 inches.

G. Coordinate flashing with window installation.

H. On exterior, install backer-rod in joint between window frame and flashed rough framing. Apply sealant at jambs and head, leaving sill unsealed. Apply sealants in accordance with sealant manufacturer's instructions and ASTM C 1193.

I. Position weather barrier head flap across head flashing. Adhere using 4-inch wide flashing over the 45-degree seams.

J. Tape top of window in accordance with manufacturer recommendations.

K. On interior, install backer rod in joint between frame of window and flashed rough framing. Apply sealant around entire window to create air seal. Apply sealant in accordance with sealant manufacturer's instructions.

3.6 PROTECTION

A. Protect installed weather barrier from damage.

END OF SECTION

SECTION 07 26 00

UNDER-SLAB VAPOR BARRIER

PART 1 – GENERAL

1.01 SUMMARY

A. Products supplied under this section:
   1. Vapor barrier, seam tape, and mastic for installation under concrete slabs.

B. Related sections:
   1. Section 03 30 00 Cast-in-Place Concrete

1.02 REFERENCES

A. American Society for Testing and Materials (ASTM):
   1. ASTM E 1745-09 Standard Specification for Plastic Water Vapor Retarders Used in Contact with Soil or Granular Fill Under Concrete Slabs.
   2. ASTM E 154-99 (2005) Standard Test Methods for Water Vapor Retarders Used in Contact with Earth Under Concrete Slabs, on Walls, or as Ground Cover.
   3. ASTM E 96-05 Standard Test Methods for Water Vapor Transmission of Materials.
   4. ASTM F 1249-06 Standard Test Method for Water Vapor Transmission Rate Through Plastic Film and Sheeting Using a Modulated Infrared Sensor.
   5. ASTM E 1643-09 Selection, Design, Installation, and Inspection of Water Vapor Retarders Used in Contact with Earth or Granular Fill Under Concrete Slabs.

B. American Concrete Institute (ACI):
   1. ACI 302.2R-06 Guide for Concrete Slabs that Receive Moisture-Sensitive Flooring Materials.

1.03 SUBMITTALS

A. Quality control/assurance:
   1. Summary of test results as per paragraph 8.3 of ASTM E 1745.
   2. Manufacturer's samples, literature.
   3. Manufacturer's installation instructions for placement, seaming and penetration repair instructions.

PART 2 – PRODUCTS

2.01 MATERIALS

A. Vapor barrier must have all of the following qualities:
   1. Permeance of less than 0.01 Perms [grains/(ft^2 · hr · inHg)] as tested in accordance with ASTM E 1745 Section 7.
   2. Other performance criteria:
      a. Strength: ASTM E 1745 Class A.

B. Vapor barrier products:
   1. Basis of Design: Stego Wrap Vapor Barrier (15-mil) by Stego Industries LLC, (877) 464-7834 www.stegoindustries.com.

2. Other acceptable products:
   a. Or equal products that meet the specified performance criteria in paragraph A.

2.02 ACCESSORIES

A. Seam tape:
   1. Provide manufacturer's approved seam tape.

B. Vapor-proofing mastic:
   1. Provide manufacturer's approved mastic.

PART 3 – EXECUTION

3.01 PREPARATION

A. Ensure that base material is approved by Architect or Geotechnical Engineer.
   1. Verify that pad is level and compacted to 95% density.

3.02 INSTALLATION

A. Install vapor barrier in accordance with manufacturer's instructions and ASTM E 1643.
   1. Unroll vapor barrier with the longest dimension parallel with the direction of the concrete placement.
   2. Lap vapor barrier over footings and/or seal to foundation walls.
   3. Overlap joints 6 inches and seal with manufacturer's tape.
   4. Seal all penetrations (including pipes) per manufacturer's instructions.
   5. No penetration of the vapor barrier is allowed except for reinforcing steel and permanent utilities.
   6. Repair damaged areas by cutting patches of vapor barrier, overlapping damaged area 6 inches and taping all sides with tape.

END OF SECTION

SECTION 07 41 13

METAL ROOF PANELS

PART 1 GENERAL

1.01 SECTION INCLUDES

A. Architectural roofing system of prefabricated, galvanized steel panels and associated flashings.

C. Rigid roof insulation

D. Fastening system and accessories

E. Factory finishing.

F. Underlayment and slip sheet

1.02 RELATED REQUIREMENTS

A. Section 05 12 00 - Structural Steel Framing: Roof framing and purlins.

B. Section 05 30 00 - Metal Decking: Roof decking material and installation

C. Section 05 40 00 - Cold Formed Metal Framing: Exterior wall framing

D. Section 06 10 00 - Rough Carpentry: Blocking and miscellaneous framing

E. Section 07 62 00 - Sheet Metal Flashing and Trim: Installation requirements

F. Section 07 90 05 - Joint Sealers: Field-installed sealants.

1.03 REFERENCE STANDARDS

A. ASCE 7 - Minimum Design Loads for Buildings and Other Structures; 2005.

B. ASTM A 653/A 653M - Standard Specification for Steel Sheet, Zinc-Coated (Galvanized) or Zinc-Iron Alloy-Coated (Galvannealed) by the Hot-Dip Process; 2009a.

C. ASTM A 792/A 792M - Standard Specification for Steel Sheet, 55% Aluminum-Zinc Alloy-Coated by the Hot-Dip Process; 2009a.

D. ASTM D 226 - Standard Specification for Asphalt-Saturated Organic Felt Used in Roofing and Waterproofing; 2006.

E. ASTM E 84 - Standard Test Method for Surface Burning Characteristics of Building Materials; 2010.

F. ASTM E96 - Standard Test Methods for Water Vapor Transmission of Materials

G. ASTM E 1592 - Standard Test Method for Structural Performance of Sheet Metal Roof and Siding Systems by Uniform Static Air Pressure Difference; 2005.

H. ASTM E 1646 - Standard Test Method for Water Penetration of Exterior Metal Roof Panel Systems by Uniform Static Air Pressure Difference; 1995 (Reapproved 2003).

I. ASTM E 1680 - Standard Test Method for Rate of Air Leakage Through Exterior Metal Roof Panel Systems; 1995 (Reapproved 2003).

J. AAMA 605.2 - Voluntary Specification for High Performance Organic Coatings

K. NRCA - Roofing Manual

L. UL 580 - Standard for Tests for Uplift Resistance of Roof Assemblies; Current Edition, Including All Revisions.

M. UL - Building Materials Directory

1.04 SUBMITTALS

A. See Section 01 33 00 - Submittal Procedures.

B. Product Data: Manufacturer's data sheets on each product to be used, including:
   1. Summary of test results, indicating compliance with specified requirements.
   2. Storage and handling requirements and recommendations.
   3. Installation methods.
   4. Specimen warranty.

C. Shop Drawings: Include layouts of roof panels, details of edge and penetration conditions, spacing and type of connections, flashings, underlayments, and special conditions.
   1. Show work to be field-fabricated or field-assembled.

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

E. Verification Samples: For each roofing system specified, submit samples of minimum size 12 inches square, representing actual roofing metal, thickness, profile, color, and texture.
   1. Include typical panel joint in sample.
   2. Include typical fastening detail.

F. Test Reports: Indicate compliance of preformed metal roofing system to specified requirements.

G. LEED Report: Provide LEED Report regarding Recycled Content for MR 4.1 and 4.2 and report for Locally-Sourced Materials for MR 5.1 and 5.2.

H. Warranty: Submit specified manufacturer's warranty and ensure that forms have been completed in City of Fontana's name and are registered with manufacturer.

1.05 SYSTEM DESCRIPTION

A. Provide UL 90 rated roofing system that has been tested in accordance with UL 580 test procedures.

B. Resistance to air infiltration: 0.014 cfm per lineal foot of joint when tested in accordance with ASTM E1680 at static test pressure differential of 20 psf.

C. Resistance to water infiltration: No leakage through panel joints when tested in accordance with ASTM E1646 at static test pressure differential of 20 psf.

1.06 QUALITY ASSURANCE

A. Manufacturer Qualifications: Company specializing in the manufacture of roofing systems similar to those required for this project, with not less than 5 years of documented experience.

B. Installer Qualifications: Company trained and authorized by roofing system manufacturer.

1.07 DELIVERY, STORAGE, AND HANDLING

A. Store roofing panels on project site as recommended by manufacturer to minimize damage to panels prior to installation.

1.08 WARRANTY

A. See Section 01 78 00 - Closeout Submittals, for additional warranty requirements.

B. Finish Warranty: Provide manufacturer's special warranty covering failure of factory-applied exterior finish on metal roof panels and agreeing to repair or replace panels that show evidence of finish degradation, including significant fading, chalking, cracking, or peeling within specified warranty period of 5 year period from date of Substantial Completion.

C. Waterproofing Warranty: Provide manufacturer's warranty for weathertightness of roofing system, including agreement to repair or replace roofing that fails to keep out water within specified warranty period of 5 years from date of Substantial Completion.

PART 2 PRODUCTS

2.01 MANUFACTURERS

A. Design is based on Klip Rib, manufactured by AEP Span.

B. Acceptable manufacturers are:
   1. AEP Span, Inc www.aepspan.com
   2. Berridge Mfr.; www.berridge.com

C. Substitutions: See Section 01 60 00 - Product Requirements.

2.02 ARCHITECTURAL ROOF PANELS

A. Performance Requirements: Provide complete engineered system complying with specified requirements and capable of remaining weathertight while withstanding anticipated movement of substrate and thermally induced movement of roofing system.

B. Metal Roofing: Factory-formed panels with factory-applied finish.
   1. Steel Panels:
      a. Aluminum-zinc alloy-coated steel conforming to ASTM A 792/A 792M; minimum AZ50 coating. Zincalume or Galvalume sheet 55% aluminum, 1.6% silicon and the balance zinc per ASTM 792; minimum yield 50,000 psi for 24 ga.
      b. Steel Thickness: Minimum 0.0239 inch.
   2. Profile: Standing seam, with minimum 1 5/8 inch seam height; concealed fastener system for field seaming with special tool.
   3. Texture: Smooth.
   4. Length: Maximum possible length to minimize lapped joints. Where lapped joints are unavoidable, space laps so that each sheet spans over three or more supports.
   5. Width: Maximum panel coverage of 16 inches.

2.03 ATTACHMENT SYSTEM

A. Concealed System: Provide manufacturer's standard stainless steel or nylon-coated aluminum concealed anchor clips designed for specific roofing system and engineered to meet performance requirements, including anticipated thermal movement and uplift.

2.04 PANEL FINISH

A. Fluoropolymer Coating System: Manufacturer's standard multi-coat thermocured coating system, including minimum 70 percent fluoropolymer color topcoat with minimum total dry film thickness of 0.9 mil; color and gloss as selected from manufacturer's standards.

2.05 ACCESSORIES AND MISCELLANEOUS ITEMS

A. Miscellaneous Sheet Metal Items: Provide flashings, gutters, downspouts, trim, moldings, closure strips, preformed crickets, caps, and equipment curbs of the same material, thickness, and finish as used for the roofing panels. Items completely concealed after installation may optionally be made of stainless steel.

B. Rib and Ridge Closures: Provide prefabricated, close-fitting components of steel with corrosion resistant finish, closed-cell synthetic rubber, neoprene, or PVC, or combination steel and closed-cell foam.

C. Sealants: Factory-applied by manufacturer. Field-applied panel end: Extruded polymeric butyl tape not easily displaced under compression.
   1. Exposed sealant to be single component polyurethane joint sealant with color to match panel.
   2. Concealed sealant must be non-hardening type.
   3. Seam sealant must be factory-applied, non-skinning, non-drying type.

D. Thermal Insulation: Provide rigid type, faced with white, flexible, non-dusting vapor retarder, permeance of 0.05 or less as determined by ASTM E96 and tested for maximum flame-spread rating of 50, per ASTM E 84; for installation using spacer blocks.
   1. Thickness: As indicated.

E. Underlayment: ASTM D 226 No. 30 asphalt-saturated roofing felt, non-perforated type; covered by water-resistant rosin-sized building paper.

2.06 FABRICATION

A. Panels: Fabricate panels and accessory items at factory, using manufacturer's standard processes as required to achieve specified appearance and performance requirements.

B. Joints: Factory-install captive gaskets, sealants, or separator strips at panel joints to provide weathertight seals, eliminate metal-to-metal contact, and minimize noise from panel movements.

PART 3 EXECUTION

3.01 EXAMINATION

A. Do not begin installation of preformed metal roof panels until substrates have been properly prepared.

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

3.02 PREPARATION

A. Broom clean wood sheathing prior to installation of roofing system.

B. Coordinate roofing work with provisions for roof drainage, flashing, trim, penetrations, and other adjoining work to assure that the completed roof will be free of leaks.

C. Remove protective film from surface of roof panels immediately prior to installation. Strip film carefully, to avoid damage to prefinished surfaces.

D. Separate dissimilar metals by applying a bituminous coating, self-adhering rubberized asphalt sheet, or other permanent method approved by roof panel manufacturer.

E. Where metal will be in contact with wood or other absorbent material subject to wetting, seal joints with sealing compound and apply one coat of heavy-bodied bituminous paint.

3.03 INSTALLATION

A. **Overall:** Install roofing system in accordance with approved shop drawings and panel manufacturer's instructions and recommendations, as applicable to specific project conditions. Anchor all components of roofing system securely in place while allowing for thermal and structural movement.
   1. Install roofing system with concealed clips and fasteners, except as otherwise recommended by manufacturer for specific circumstances. Cleat and seam all joints.
   2. Minimize field cutting of panels. Where field cutting is absolutely required, use methods that will not distort panel profiles. Use of torches for field cutting is absolutely prohibited.

B. **Underlayment:** Apply underlayment in single layer laid perpendicular to slope; weather lap edges 2 inches and fasten in place. Apply slip sheet material over underlayment in similar fashion to underlayment. Cleat and seam all joints. Stagger transverse joints of roofing and slip sheet.

C. **Accessories:** Install all components required for a complete roofing assembly, including flashings, gutters, downspouts, trim, moldings, closure strips, preformed crickets, caps, equipment curbs, rib closures, ridge closures, and similar roof accessory items.

3.04 FIELD QUALITY CONTROL

A. Field inspection will be performed under the provisions of Section 01 45 00.

B. Inspection will involve surveillance of work during installation to ascertain compliance with the specific requirements.

END OF SECTION

C. 07311: Install roofing felt and building paper slip sheet on roof deck before installing preformed metal roof panels. Secure by methods acceptable to roof panel manufacturer, minimizing use of metal fasteners. Apply from eaves to ridge in shingle fashion, overlapping horizontal joints a minimum of 2 inches and side and end laps a minimum of 3 inches. Offset seams in building paper and seams in roofing felt.

D. Roof Panels: Install panels in strict accordance with manufacturer's instructions, minimizing transverse joints except at junction with penetrations.
   1. Form weathertight standing seams incorporating concealed clips, using an automatic mechanical seaming device approved by the panel manufacturer.
   2. Provide sealant tape or other approved joint sealer at lapped panel joints.
   3. Install sealant or sealant tape, as recommended by panel manufacturer, at end laps and side joints.

E. Insulation: Install insulation and protection board between roof covering and substrate to present a neat appearance. Fold, staple, and tape seams per manufacturer's instructions.

3.04 PROTECTION

A. Do not permit storage of materials or roof traffic on installed roof panels. Provide temporary walkways or planks as necessary to avoid damage to completed work. Protect roofing until completion of project.

B. Touch-up, repair, or replace damaged roof panels or accessories before date of Substantial Completion.

END OF SECTION

SECTION 07 54 00

THERMOPLASTIC MEMBRANE ROOFING

PART 1 GENERAL

1.01 SECTION INCLUDES

A. Adhered feltback system with thermoplastic roofing membrane.

B. Insulation, flat and tapered.

C. Vapor retarder.

D. Flashings.

E. Roofing cant strips, stack boots, roofing expansion joints, and walkway pads.

1.02 RELATED REQUIREMENTS

A. Section 06 10 00 - Rough Carpentry: Wood nailers and curbs.

B. Section 06 10 00 - Rough Carpentry: Wood cant strips.

C. Section 07 60 00 – Flashing and Sheet Metal: Counterflashing and reglets

D. Section 22 10 06 - Plumbing Piping Specialties: Roof drains.

1.03 REFERENCE STANDARDS

A. ASTM C 1289 - Standard Specification for Faced Rigid Cellular Polyisocyanurate Thermal Insulation Board; 2007.

B. ASTM C 1396/C 1396M - Standard Specification for Gypsum Board; 2006a.

C. ASTM D 4434 - Standard Specification for Poly(Vinyl Chloride) Sheet Roofing; 2009.

D. NRCA ML104 - The NRCA Roofing and Waterproofing Manual; National Roofing Contractors Association; Fifth Edition, with interim updates.

E. UL (RMSD) - Roofing Materials and Systems Directory; Underwriters Laboratories Inc.; current edition.

1.04 ADMINISTRATIVE REQUIREMENTS

A. Preinstallation Meeting: Convene one week 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 33 00 - Submittal Procedures.

B. Product Data: Provide data indicating membrane materials, flashing materials, insulation, vapor retarder, surfacing, and fasteners.

C. Specimen Warranty: For approval.

D. Shop Drawings: Indicate joint or termination detail conditions, conditions of interface with other materials, and paver layout.

E. Samples for Verification: Submit two samples in size illustrating insulation.

F. Manufacturer's Installation Instructions: Indicate membrane seaming precautions and perimeter conditions requiring special attention.

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

H. Warranty: Submit manufacturer warranty and ensure forms have been completed in County of Riverside's name and registered with manufacturer.

1.06 QUALITY ASSURANCE

A. Installer Qualifications: Company specializing in performing the work of this section:
   1. With minimum 5 years documented experience.
   2. 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 and moisture.

C. Protect foam insulation from direct exposure to sunlight.

1.08 WARRANTY

A. Material Warranty: Provide membrane manufacturer's warranty agreeing to replace material that shows manufacturing defects within 5 years after installation.

B. System Warranty: Provide manufacturer's 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.

C. Technical Inspection Service: Roofing manufacturer to provide technical service inspections to Contractor certified by the manufacturer in the installation of the warranty system. Cost of inspections shall be included as a part of the work of the Contract.

PART 2 PRODUCTS

2.01 MANUFACTURERS

A. Thermoplastic Polyolefin Membrane Materials:
   1. Carlisle SynTec; www.carlisle-syntec.com.
   2. Firestone Building Products Co: www.firestonebpco.com.
   3. GenFlex Roofing Systems www.genflex.com.
   4. Tremco Inc. www.tremcoinc.com

B. PVC Membrane Materials:
   1. IB Roof Systems; www.ibroof.com.
   2. Johns Manville Corporation; www.jm.com.
   3. Sika Sarnafil, Inc; www.sarnafilus.com.
   4. Substitutions: See Section 01 60 00 - Product Requirements.

C. Insulation:
   1. Substitutions: See Section 01 60 00 - Product Requirements.

2.02 ROOFING - UNBALLASTED APPLICATIONS

A. Thermoplastic Membrane Roofing: One ply membrane, mechanically fastened, over vapor retarder and insulation.

B. Acceptable Insulation Types - Constant Thickness Application: Any of the types specified.
   1. Minimum 2 layers of cellulose, perlite, molded polystyrene, polyisocyanurate, glass fiber, extruded polystyrene, or composite board.

   2. Bottom layer of cellulose, perlite, molded polystyrene, polyisocyanurate, glass fiber, extruded polystyrene, composite, or cellular glass board covered with single layer of cellulose, perlite, molded polystyrene, polyisocyanurate, glass fiber, extruded polystyrene, or composite board.

C. Acceptable Insulation Types - Tapered Application: Any of the types specified.
   1. Tapered perlite, extruded polystyrene, or cellular glass board covered with uniform thickness cellulose, perlite, molded polystyrene, polyisocyanurate, glass fiber, extruded polystyrene, or composite board.
   2. Uniform thickness cellulose, perlite, composite, polyisocyanurate, extruded polystyrene, molded polystyrene, glass fiber, or cellular glass board covered with tapered extruded polystyrene, or perlite board.

2.03 ROOFING MEMBRANE AND ASSOCIATED MATERIALS

A. Membrane:
   1. Material: Thermoplastic polyolefin (TPO) complying with ASTM D 6878 or Thermoplastic Polyvinyl Chloride complying with ASTM D4434-09
   2. Reinforcing: Internal fabric.
   3. Thickness: ASTM D638 0.045 inch, minimum.
   4. Sheet Width: Factory fabricated into largest sheets possible.
   5. Color: White.
   6. Solar reflectance index (SRI): 95.
   7. Tensile Strength: D638 1500 psi

B. Seaming Materials: As recommended by membrane manufacturer.

C. Membrane Adhesive: As recommended by the membrane manufacturer

D. Vapor Retarder: Reinforced Kraft paper laminate complying with requirements of fire rating classification; compatible with roofing and insulation materials.
   1. Fire-retardant adhesive.

E. Flexible Flashing Material: Same material as membrane.

F. Deck Sheathing: Gypsum sheathing, ASTM C 1396/C 1396M, Type X special fire-resistant type, paper face, 5/8 inch thick.

G. Walkway Protection: Manfacturer's standard

2.04 ACCESSORIES

A. Stack Boots: Prefabricated flexible boot and collar for pipe stacks through membrane; same material as membrane.

B. Sheathing Joint Tape: Paper type, self adhering.

C. Membrane Adhesive: As recommended by membrane manufacturer.

D. Insulation Adhesive: As recommended by insulation manufacturer.

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 frost.

E. Verify that roof openings, curbs, and penetrations through roof are solidly set, and cant strips are in place.

3.03 METAL DECK PREPARATION

A. Install deck sheathing on metal deck:
   1. Lay with long side at right angle to flutes; stagger end joints; provide support at ends.
   2. Cut sheathing cleanly and accurately at roof breaks and protrusions to provide smooth surface.
   3. Tape joints.

3.04 VAPOR RETARDER AND INSULATION - UNDER MEMBRANE

A. Apply vapor retarder to deck surface with adhesive in accordance with manufacturer's instructions.
   1. Extend vapor retarder under cant strips and blocking to deck edge.
   2. Install flexible flashing from vapor retarder to air seal material of wall construction, lap and seal to provide continuity of the air barrier plane.

B. Ensure vapor retarder is clean and dry, continuous, and ready for application of insulation.

C. Attachment of Insulation: Embed insulation in adhesive in full contact, in accordance with roofing and insulation manufacturers' instructions.

D. Lay subsequent layers of insulation with joints staggered minimum 6 inch from joints of preceding layer.

E. Place tapered insulation to the required slope pattern in accordance with manufacturer's instructions.

F. On metal deck, place boards parallel to flutes with insulation board edges bearing on deck flutes.

G. Lay boards with edges in moderate contact without forcing. Cut insulation to fit neatly to perimeter blocking and around penetrations through roof.

H. Do not apply more insulation than can be covered with membrane in same day.

3.05 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 contact adhesive, minimum 3 inches. Seal permanently waterproof. Apply uniform bead of sealant to joint edge.

D. Mechanical Attachment: Apply membrane and mechanical attachment devices in accordance with manufacturer's instructions.

E. At intersections with vertical surfaces:
   1. Extend membrane over cant strips and up a minimum of 4 inches onto vertical surfaces.
   2. Fully adhere flexible flashing over membrane and up to nailing strips.

F. Around roof penetrations, seal flanges and flashings with flexible flashing.

G. Coordinate installation of roof drains and sumps and related flashings.

3.06 FINISHING UNBALLASTED SURFACES

A. Apply finish coating to membrane and flashing surfaces exposed to view, in accordance with manufacturer's instructions.
   1. Prime membrane.
   2. Apply number of coats at rate and thickness as recommended by the manufacturer.
   3. Finish with colored coating.

B. Install walkway pads. Space pad joints to permit drainage.

3.07 FIELD QUALITY CONTROL

A. See Section 01 45 00 - Quality Control, for general requirements for field quality control and inspection.

B. Require site attendance of roofing and insulation material manufacturers daily during installation of the Work.

3.08 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.

3.09 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 60 00

FLASHING AND SHEET METAL

PART 1 - GENERAL

1.01 SUMMARY: Division 1 applies to this Section. Provide flashing and sheet metal items, complete.

A. Work Included:

1. Reglet and counterflashing assemblies.
2. Miscellaneous metal flashing and counterflashing as required, except where provided by mechanical and electrical trades.
3. Drip flashings.
4. Downspouts.
5. Conductor heads.
6. Shop priming and field touch-up.
7. Calking.

B. Related Work:

1. Sheet metal flashings in connection with plumbing, air conditioning, and electrical.
2. Metal accessories for drywall, lathing, and acoustical treatments.
3. Finish painting.
4. Sleeves for embedded items.
5. Steel decking.

1.02 SUBMITTALS: Refer to Section 01 33 00 for procedures. Submit Shop Drawings for fabricated sheet metal showing details, methods of joining, anchoring and fastening, thicknesses and gages of metals, concealed reinforcement, expansion joint details, sections, and profiles.

A. Submit material cost data for all materials required to construct the Work in place. The cost data should be as marked up to the General Contractor. If the Work is self performed, the material cost shall reflect the actual cost of material without mark up.

B. Submit manufacturer's information/data sheets or a letter from the manufacturer indicating the amount of recycled content, post consumer and post industrial in the product.

1.03 QUALITY ASSURANCE: Drawings and requirements specified govern. Conform to the current "Architectural Sheet Metal Manual" published by Sheet Metal and Air Conditioning Contractors National Association, Inc. (SMACNA) for conditions not indicated or specified and for general fabrication of sheet metal items.

PART 2 - PRODUCTS

2.01 BASIC MATERIALS:

Galvanized steel: ..... ASTM A525 with coating G90, mill phosphatized for paint adhesion, 24 gage unless otherwise shown or specified.

Aluminum extrusions: .	ASTM B221, 6063-T5 or T6.
Aluminum sheet:	ASTM B209, Alclad or 5052 alloy.
Stainless steel:	ASTM A167, Type 302 or 304, 18-8.
Solder:	ASTM B32, type required for welding conditions.
Solder flux:	Standard brand non-corrosive acid-base type.
Fasteners:	Zinc or cadmium coated steel or stainless steel.
Felt:	ASTM D226, 15-pound type.
Primer:	Galvanized metal primer approved for use under Section 09900 with manufacturer's pretreatment materials.
Sealant:	Conforming to Section 07920.

2.02 RELATED MATERIALS:

A. Reglets and Counterflashings: Fry Reglet Corp. flashing systems complete with unions and preformed corners of necessary types for particular locations, of 24 gage galvanized iron, or approved equals by Metco Metal Products Co., Pacific Loxtite Flashing Co., National Cornice Works, Redco, Lane-Air, or equal. Use a single manufacturer's products, equivalent to Type CO at concrete, Type MA at masonry, Type ST at plaster, or Type SM, as required by Drawings and details.

2.03 GENERAL FABRICATION REQUIREMENTS: Fabricate items to avoid distortion and overstressing of fastenings due to expansion and contraction. Provide expansion joints where necessary in continuous runs of sheet metal, constructed watertight and spaced 30-feet apart maximum. Lock and solder corners and blind hem exposed edges. Make joints with 4" lap and solder unless otherwise shown or specified. Fill single lock seams with sealant where soldering is infeasible. Run flanges 4" minimum onto roof and wall surfaces. Fabricate sheet metal items in nominal 8-foot lengths unless otherwise shown or specified.

A. Soldering: Do soldering slowly immediately after application of flux, all seams showing evenly flowed solder. Clean and neutralize finished soldering.

B. Shop Priming: Clean completed items, apply pretreatment, and prime all exposed surfaces with specified primer.

C. Joints In Sheet Aluminum: Lock all joints, rivet where required for strength, and fill joints with polymer sealant supplied or recommended by the parent metal manufacturer. Soldering is not permitted.

2.04 FABRICATED ITEMS: Of 24 gage galvanized iron unless otherwise indicated or specified.

A. Downspouts: Fabricate of 24 gage galvanized, seams locked and soldered. Secure with galvanized brackets as detailed or required, evenly spaced. Provide 1/4" mesh balloon strainers at downspout outlets.

B. Conductor Head: Of 20 gage galvanized, all joints locked and soldered, top edge beaded for stiffening, outlet flange riveted and soldered. Provide a 1/4" mesh galvanized leaf strainer at top, secured in place but removable.

C. Drip Flashings: Hemmed exposed edges, 1-piece lengths.

D. Roof Pipe Flashings: Provide welded seam 4 pound lead flashings. Field fabricated flashings shall also be welded.

F. Miscellaneous Flashing: Unless otherwise indicated, miscellaneous flashing shall be fabricated of galvanized iron. Exterior doors and windows, unless covered by overhangs shall be provided with 22 gage galvanized iron drip flashing as detailed.

PART 3 - EXECUTION

3.01 INSTALLATION REQUIREMENTS: Install sheet metal items as shown, according to approved submittals, and as required to complete the entire Work. Securely fasten and assemble, and make watertight and weathertight.

A. Coordination: Coordinate sheet metal items in connection with roofing for correct installation, and furnish in sufficient time to avoid delay in roofing construction. Install roofing sheet metal simultaneously with roofing.

B. Calking: Provide sealant calking as indicated and as required to seal and complete Work of this Section. Conform to Section 07 90 05.

C. Isolation: Isolate sheet metal from contact with concrete or masonry with one layer of roofing felt or, where shown, vinyl underlayment, except embedded items. Isolate all aluminum from dissimilar metals and materials other than non-magnetic stainless steel. At metals, apply a heavy coat of alkali-resistant bituminous paint; or coat both surfaces with a fluid-applied neoprene or urethane membrane material. Conceal all isolation in the finished Work.

3.02 COMPLETION: Examine installed sheet metal items, water test if necessary or directed, and correct damaged or defective items.

END OF SECTION

SECTION 07 81 00

APPLIED FIREPROOFING

PART 1 GENERAL

1.01 SECTION INCLUDES

A. Fireproofing of interior structural steel.

1.02 RELATED REQUIREMENTS

A. Section 05 12 00 - Structural Steel Framing.

B. Section 05 30 00 - Metal Decking.

C. Section 07 84 00 - Firestopping.

1.03 REFERENCE STANDARDS

A. ASTM E 84 - Standard Test Method for Surface Burning Characteristics of Building Materials; 2008.

B. ASTM E 605 - Standard Test Methods for Thickness and Density of Sprayed Fire-Resistive Material (SFRM) Applied to Structural Members; 1993 (Reapproved 2006).

C. ASTM E 736 - Standard Test Method For Cohesion/Adhesion of Sprayed Fire-Resistive Materials Applied to Structural Members; 2000 (Reapproved 2006).

D. ASTM E 760 - Standard Test Method for Effect of Impact on Bonding of Sprayed Fire-Resistive Material Applied to Structural Members; 1992 (Reapproved 2005).

E. ASTM E 761 - Standard Test Method for Compressive Strength of Sprayed Fire-Resistive Material Applied to Structural Members; 1992 (Reapproved 2005).

F. UL (FRD) - Fire Resistance Directory; Underwriters Laboratories Inc.; current edition.

1.04 ADMINISTRATIVE REQUIREMENTS

A. Preinstallation Meeting: Convene one week before starting work of this section.

1.05 SUBMITTALS

A. See Section 01 33 00 - Submittals Procedures.

B. Product Data: Provide data indicating product characteristics.

C. Test Reports: Reports from reputable independent testing agencies for proposed products, indicating compliance with specified criteria, conducted under conditions similar to those on project, for:
   1. Bond Strength.
   2. Bond Impact.
   3. Compressive Strength.
   4. Fire tests using substrate materials similar those on project.

D. Manufacturer's Installation Instructions: Indicate special procedures.

E. Manufacturer's Certificate: Certify that sprayed-on fireproofing products meet or exceed requirements of contract documents.

1.06 QUALITY ASSURANCE

A. Manufacturer Qualifications: Company specializing in manufacturing products specified in this section, with not less than three years of documented experience.

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

1.07 MOCK-UP

A. Construct mock-up of a typical application.

B. Conform to project requirements for fire ratings.

C. Locate where directed.

D. Examine installation within one hour of application to determine variances from specified requirements due to shrinkage, temperature, and humidity.

E. Where shrinkage and cracking are evident, adjust mixture and method of application as necessary. Remove materials and re-construct mock-up.

F. Mock-up may remain as part of the Work.

1.08 FIELD CONDITIONS

A. Do not apply spray fireproofing when temperature of substrate material and surrounding air is below 40 degrees F (4 degrees C).

B. Provide ventilation in areas to receive fireproofing during application and 24 hours afterward, to dry applied material.

C. Provide temporary enclosure to prevent spray from contaminating air.

1.09 WARRANTY

A. See Section 01 79 00 – Warranties and Guarantees for additional requirements

B. Correct defective Work within a five year period after Date of Substantial Completion.
   1. Include coverage for fireproofing to remain free from cracking, checking, dusting, flaking, spalling, separation, and blistering.
   2. Reinstall or repair failures that occur within warranty period.

PART 2 PRODUCTS

2.01 MANUFACTURERS

A. Sprayed-On Fireproofing:
   1. Carboline Company; www.carboline.com.
   2. Grace Construction www.na.graceconstruction.com.
   3. Isolatek International Inc; www.isolatek.com.
   4. Substitutions: See Section 01 60 00 - Product Requirements.

2.02 MATERIALS

A. Low Density Sprayed Fire-Resistive Material: Factory mixed, cementitious material blended for uniform texture with vermiculite or lightweight synthetic aggregate, and conforming to the following requirements:
   1. Bond Strength: ASTM E 736, 200 psf (9.6 kPa) when set and dry.
   2. Bond Impact: ASTM E 760, no cracking, flaking or delamination.
   3. Dry Density: ASTM E 605, minimum average density of 14 lb/cu ft (225 kg/cu m), with minimum individual density of any test sample of 13 lb/cu ft (210 kg/cu m).
   4. Compressive Strength: ASTM E 761, minimum 7.0 psi (50 kPa).

5. Surface Burning Characteristics: Maximum flame spread of 0 and maximum smoke developed of 0, when tested in accordance with ASTM E 84.

2.03 ACCESSORIES

A. Primer Adhesive: Of type recommended by fireproofing manufacturer.

B. Water: Clean, potable.

PART 3 EXECUTION

3.01 EXAMINATION

A. Verify that surfaces are ready to receive fireproofing.

B. Verify that clips, hangers, supports, sleeves, and other items required to penetrate fireproofing are in place.

C. Verify that ducts, piping, equipment, or other items that would interfere with application of fireproofing have not been installed.

D. Verify that voids and cracks in substrate have been filled. Verify that projections have been removed where fireproofing will be exposed to view as a finish material.

3.02 PREPARATION

A. Perform tests as recommended by fireproofing manufacturer in situations where adhesion of fireproofing to substrate is in question.

B. Remove incompatible materials that could affect bond by scraping, brushing, scrubbing, or sandblasting.

C. Prepare substrates to receive fireproofing in strict accordance with instructions of fireproofing manufacturer.

D. Apply fireproofing manufacturer's recommended bonding agent on primed steel.

E. Protect surfaces not scheduled for fireproofing and equipment from damage by overspray, fall-out, and dusting.

F. Close off and seal duct work in areas where fireproofing is being applied.

3.03 APPLICATION

A. Apply primer adhesive in accordance with manufacturer's instructions.

B. Apply fireproofing in sufficient thickness to achieve required ratings, with as many passes as necessary to cover with monolithic blanket of uniform density and texture.

3.04 FIELD QUALITY CONTROL

A. Inspect the installed fireproofing after application and curing for integrity, prior to its concealment. Ensure that actual thicknesses, densities, and bond strengths meet requirements for specified ratings.

B. Re-inspect the installed fireproofing for integrity of fire protection, after installation of subsequent Work.

3.05 CLEANING

A. Remove excess material, overspray, droppings, and debris.

B. Remove fireproofing from materials and surfaces not required to be fireproofed.

END OF SECTION

SECTION 07 84 00

FIRESTOPPING

PART 1 GENERAL

1.01 SECTION INCLUDES

A. Firestopping systems.

B. Firestopping of all joints and penetrations in fire-resistance rated and smoke-resistant assemblies, whether indicated on drawings or not, and other openings indicated.

1.02 RELATED REQUIREMENTS

A. Section 01 35 15 – LEED Certification Procedures

B. Section 01 70 00 - Project Closeout Requirements: Cutting and patching.

C. Section 07 81 00 - Applied Fireproofing.

D. Section 09 21 16 - Gypsum Board Assemblies: Gypsum wallboard fireproofing.

1.03 REFERENCE STANDARDS

A. ASTM E 119 - Standard Test Methods for Fire Tests of Building Construction and Materials; 2008a.

B. ASTM E 814 - Standard Test Method for Fire Tests of Through-Penetration Fire Stops; 2006.

C. ITS (DIR) - Directory of Listed Products; Intertek Testing Services NA, Inc.; current edition.

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

E. SCAQMD 1168 - South Coast Air Quality Management District Rule No.1168; current edition; www.aqmd.gov.

F. UL (FRD) - Fire Resistance Directory; Underwriters Laboratories Inc.; current edition.

1.04 SUBMITTALS

A. See Section 01 33 00 - Submittal Procedures.

B. Schedule of Firestopping: List each type of penetration, fire rating of the penetrated assembly, and firestopping test or design number.

C. Product Data: Provide data on product characteristics, performance ratings, and limitations.

D. LEED Report: Submit VOC content documentation for all non-preformed materials.

1.05 QUALITY ASSURANCE

A. Fire Testing: Provide firestopping assemblies of designs that provide the scheduled fire ratings when tested in accordance with methods indicated.
   1. Listing in the current-year classification or certification books of UL, FM, or ITS (Warnock Hersey) will be considered as constituting an acceptable test report.

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

C. Installer Qualifications: Company specializing in performing the work of this section and:
   1. Licensed by authority having jurisdiction.

1.06 FIELD CONDITIONS

A. Comply with firestopping manufacturer's recommendations for temperature and conditions during and after installation. Maintain minimum temperature before, during, and for 3 days after installation of materials.

B. Provide ventilation in areas where solvent-cured materials are being installed.

PART 2 PRODUCTS

2.01 FIRESTOPPING SYSTEMS

A. Firestopping: Any material meeting requirements.
   1. Fire Ratings: Use any system listed by UL and tested in accordance with ASTM E 814 that has F Rating equal to fire rating of penetrated assembly and T Rating Equal to F Rating and that meets all other specified requirements.

2.02 MATERIALS

A. Firestopping Sealants: Provide only products having lower volatile organic compound (VOC) content than required by South Coast Air Quality Management District Rule No.1168.

B. Foam Firestoppping: Single component silicone foam compound; conforming to the following:
   1. Manufacturers:
      a. 3M Fire Protection Products; www.3m.com/firestop.
      b. Hilti, Inc; www.us.hilti.com.
      c. Substitutions: See Section 01 60 00 - Product Requirements.

C. Fibered Compound Firestopping: Formulated compound mixed with incombustible non-asbestos fibers; conforming to the following:
   1. Manufacturers:
      a. USG; www.usg.com.
      b. Thermafiber; www.thermafiber.com
      c. Substitutions: See Section 01 60 00 - Product Requirements.

D. Fiber Firestopping: Mineral fiber insulation used in conjunction with elastomeric surface sealer forming airtight bond to opening; conforming to the following:
   1. Manufacturers:
      a. USG; www.usg.com
      b. Thermafiber; www.thermafiber.com
      a. Substitutions: See Section 01 60 00 - Product Requirements.

E. Firestop Devices - Wrap Type: Mechanical device with incombustible filler and sheet stainless steel jacket, intended to be installed after penetrating item has been installed; conforming to the following:

F. Primers, Sleeves, Forms, Insulation, Packing, Stuffing, and Accessories: Type required for tested assembly design.

PART 3 EXECUTION

3.01 EXAMINATION

A. Verify openings are ready to receive the work of this section.

3.02 PREPARATION

A. Clean substrate surfaces of dirt, dust, grease, oil, loose material, or other matter that could adversely affect bond of firestopping material.

B. Remove incompatible materials that could adversely affect bond.

3.03 INSTALLATION

A. Install materials in manner described in fire test report and in accordance with manufacturer's instructions, completely closing openings.

B. Do not cover installed firestopping until inspected by authority having jurisdiction.

END OF SECTION

SECTION 07 90 05

JOINT SEALERS

PART 1 GENERAL

1.01 SECTION INCLUDES

A. Sealants and joint backing.

B. Precompressed foam sealers.

1.02 RELATED REQUIREMENTS

A. Section 01 35 15 – LEED Certification Procedures

B. Section 07 25 00 - Weather Barriers: Sealants required in conjunction with air barriers and vapor retarders.

C. Section 07 84 00 - Firestopping: Firestopping sealants.

E. Section 08 11 13 – Hollow Metal Doors and Frames

F. Section 08 43 13 – Aluminum Framed Storefront

G. Section 08 51 13 – Aluminum Windows

H. Section 08 81 00 - Glazing: Glazing sealants and accessories.

I. Section 09 21 16 - Gypsum Board Assemblies: Acoustic sealant.

J. Section 09 30 00 - Tiling: Sealant used as tile grout.

1.03 REFERENCE STANDARDS

A. ASTM C 834 - Standard Specification for Latex Sealants; 2010.

B. ASTM C 919 - Standard Practice for Use of Sealants in Acoustical Applications; 2008.

C. ASTM C 920 - Standard Specification for Elastomeric Joint Sealants; 2010.

D. ASTM C 1193 - Standard Guide for Use of Joint Sealants; 2009.

E. ASTM D 1056 - Standard Specification for Flexible Cellular Materials--Sponge or Expanded Rubber; 2007.

F. SCAQMD 1168 - South Coast Air Quality Management District Rule No.1168; current edition; www.aqmd.gov.

1.04 ADMINISTRATIVE REQUIREMENTS

A. Coordinate the work with other sections referencing this section.

1.05 SUBMITTALS

A. See Section 01 33 00 - Submittal Procedures.

B. Product Data: Provide data indicating sealant chemical characteristics.

C. LEED Report: Submit VOC content documentation for all non-preformed sealants and primers.

1.06 QUALITY ASSURANCE

A. Manufacturer Qualifications: Company specializing in manufacturing the Products specified in

this section with minimum three years documented experience.

B. Applicator Qualifications: Company specializing in performing the work of this section with minimum five years experience.

1.07 FIELD CONDITIONS

A. Maintain temperature and humidity recommended by the sealant manufacturer during and after installation.

1.08 WARRANTY

A. See Section 01 79 00 – Warranties for additional warranty requirements.

B. Correct defective work within a five year period after Date of Substantial Completion.

C. Warranty: Include coverage for installed sealants and accessories which fail to achieve airtight seal, exhibit loss of adhesion or cohesion, or do not cure.

PART 2 PRODUCTS

2.01 MANUFACTURERS

A. Silicone Sealants:
   1. Bostik Inc; www.bostik-us.com.
   2. Pecora Corporation; www.pecora.com.
   3. Tremco;
   4. Substitutions: See Section 01 60 00 - Product Requirements.

B. Polyurethane Sealants:
   1. Bostik Inc; www.bostik-us.com.
   2. Pecora Corporation; www.pecora.com.
   3. Tremco;
   4. Substitutions: See Section 01 60 00 - Product Requirements.

C. Acrylic Sealants:
   1. Tremco Global Sealants; www.tremcosealants.com.
   2. Pecora Corp.
   3. Substitutions: See Section 01 60 00 - Product Requirements.

D. Butyl Sealants:
   1. Bostik Inc; www.bostik-us.com.
   2. Pecora Corporation; www.pecora.com.
   3. Tremco;
   4. Substitutions: See Section 01 60 00 - Product Requirements.

E. Acrylic Emulsion Latex Sealants:
   1. Bostik Inc; www.bostik-us.com.
   2. Pecora Corporation; www.pecora.com.
   3. Tremco;
   4. Substitutions: See Section 01 60 00 - Product Requirements.

F. Preformed Compressible Foam Sealers:
   1. Substitutions: See Section 01 60 00 - Product Requirements.

2.02 SEALANTS

A. Sealants and Primers - General: Provide only products having lower volatile organic compound

(VOC) content than required by South Coast Air Quality Management District Rule No.1168.

B. Type B - General Purpose Exterior Sealant: Polyurethane; ASTM C 920, Grade NS, Class 25, Uses M, G, and A; multi- component.
   1. Color: Standard colors matching finished surfaces.
   2. Applications: Use for:
      a. Control, expansion, and soft joints in masonry.
      b. Joints between concrete and other materials.
      c. Joints between metal frames and other materials.
      d. Other exterior joints for which no other sealant is indicated.

C. Type E - General Purpose Interior Sealant: Acrylic emulsion latex; ASTM C 834, Type OP, Grade NS single component, paintable.
   1. Color: Standard colors matching finished surfaces.
   2. 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. Type C - Plumbing Fixture/Tile Sealant: White silicone; ASTM C 920, Uses I, M and A; single component, mildew resistant.
   1. Applications: Use for:
      a. Joints between plumbing fixtures and floor and wall surfaces.
      b. Joints between toiletroom countertops and wall surfaces.

E. Type D - Acoustical Sealant: Butyl or acrylic sealant; ASTM C 920, Grade NS, Class 12-1/2, Uses M and A; single component, solvent release curing, non-skinning.
   1. Applications: Use for concealed locations only:
      a. Sealant bead between top stud runner and structure and between bottom stud track and floor.
      b. Junction boxes and gypsum board.
      c. Under thresholds

F. Type A - Silicone Sealant: ASTM C 920, Grade NS, Class 25, Uses NT, A, G, M, O; single component, non-acid curing, non-sagging, non-staining, fungus resistant, non-bleeding.
   1. Color: Standard colors matching finished surfaces.
   2. Applications: Use for:
      a. Exterior door, entrance and window frames.
      b. Vertical joints in concrete and masonry flashing.

2.03 ACCESSORIES

A. Primer: Non-staining type, recommended by sealant manufacturer to suit application.

B. Joint Cleaner: Non-corrosive and non-staining type, recommended by sealant manufacturer; compatible with joint forming materials.

C. Joint Backing: Round foam rod compatible with sealant; ASTM D 1667, closed cell PVC; oversized 30 to 50 percent larger than joint width;

D. Bond Breaker: Pressure sensitive tape recommended by sealant manufacturer to suit application.

PART 3 EXECUTION

3.01 EXAMINATION

A. Verify that substrate surfaces are ready to receive work.

B. Verify that joint backing and release tapes are compatible with sealant.

3.02 PREPARATION

A. Remove loose materials and foreign matter that could impair adhesion of sealant.

B. Clean and prime joints in accordance with manufacturer's instructions.

C. Perform preparation in accordance with manufacturer's instructions and ASTM C 1193.

D. Protect elements surrounding the work of this section from damage or disfigurement.

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 C 1193.

C. Perform acoustical sealant application work in accordance with ASTM C 919.

D. 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.

E. Install bond breaker where joint backing is not used.

F. Install sealant free of air pockets, foreign embedded matter, ridges, and sags.

G. Apply sealant within recommended application temperature ranges. Consult manufacturer when sealant cannot be applied within these temperature ranges.

H. Tool joints concave.

3.04 PROTECTION

A. Protect sealants until cured.

END OF SECTION

SECTION 08 11 13

HOLLOW METAL DOORS AND FRAMES

PART 1 GENERAL

1.01 SECTION INCLUDES

A. Non-fire-rated steel doors and frames.

B. Steel frames for wood doors.

C. Fire-rated steel doors and frames.

D. Thermally insulated steel doors.

E. Sound-rated steel doors and frames.

1.02 RELATED REQUIREMENTS

A. Section 08 71 00 - Door Hardware.

B. Section 08 81 00 - Glazing: Glass for doors and borrow lites.

C. Section 09 90 00 - Painting and Coating: Field painting.

1.03 REFERENCE STANDARDS

A. ANSI/ICC A117.1 - American National Standard for Accessible and Usable Buildings and Facilities; International Code Council; 2003.

B. ANSI A250.8 - SDI-100 Recommended Specifications for Standard Steel Doors and Frames; 2003.

C. ANSI A250.10 - Test Procedure and Acceptance Criteria for Prime Painted Steel Surfaces for Steel Doors and Frames; 1998 (R2004).

D. ANSI A250.11 – Recommended Erection Standards for Steel Frames 2001.

E. ASTM A 653/A 653M - Standard Specification for Steel Sheet, Zinc-Coated (Galvanized) or Zinc-Iron Alloy-Coated (Galvannealed) by the Hot-Dip Process; 2007.

F. ASTM E 90 - Standard Test Method for Laboratory Measurement of Airborne Sound Transmission Loss of Building Partitions and Elements; 2009.

G. ASTM E 413 - Classification for Rating Sound Insulation; 2004.

H. BHMA A156.115 - Hardware Preparation in Steel Doors and Steel Frames; 2006.

I. NAAMM HMMA 840 - Guide Specifications for Installation and Storage of Hollow Metal Doors and Frames; The National Association of Architectural Metal Manufacturers; 2007.

J. NFPA 80 - Standard for Fire Doors and Fire Windows; National Fire Protection Association; 2007.

K. UL (BMD) - Building Materials Directory; Underwriters Laboratories Inc.; current edition.

L. UL 10C - Standard for Positive Pressure Fire Tests of Door Assemblies; 1998.

1.04 SUBMITTALS

A. See Section 01 33 00 - 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 identifying location of different finishes, if any.

D. Manufacturer's Certificate: Certification that products meet or exceed specified requirements.

1.05 QUALITY ASSURANCE

A. Manufacturer Qualifications: Company specializing in manufacturing the products specified in this section with minimum ten years documented experience.

B. Maintain at the project site a copy of all reference standards dealing with installation.

1.06 DELIVERY, STORAGE, AND HANDLING

A. Store in accordance with NAAMM HMMA 840.

B. Protect with resilient packaging; avoid humidity build-up under coverings; prevent corrosion.

PART 2 PRODUCTS

2.01 MANUFACTURERS

A. Steel Doors and Frames:
1. Assa Abloy Ceco, Curries, or Fleming: www.assaabloydss.com.
2. Windsor Republic Doors; www.republicdoor.com.
3. Steelcraft; www.steelcraft.com.
4. Substitutions: See Section 01 60 00 - Product Requirements.

2.02 DOORS AND FRAMES

A. Requirements for All Doors and Frames:
1. Accessibility: Comply with ANSI/ICC A117.1.
2. Door Top Closures: Flush with top of faces and edges.
3. Door Edge Profile: Beveled on both edges.
4. Door Texture: Smooth faces.
5. Glazed Lights: Non-removable stops on non-secure side; sizes and configurations as indicated on drawings.
6. Hardware Preparation: In accordance with BHMA A156.115, with reinforcement welded in place, in addition to other requirements specified in door grade standard.
7. Galvanizing: All components hot-dipped zinc-iron alloy-coated (galvannealed), manufacturer's standard coating thickness.
8. 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, (Refer to schedule for types):
   1. Grade: ANSI A250.8 Level 3, physical performance Level A, Model 2, seamless.
   2. Core: Polystyrene or mineral core with 16-20 lb density (non-combustible).
   3. Galvanizing: All components hot-dipped zinc-iron alloy-coated (galvannealed) in accordance with ASTM A 653/A 653M, with manufacturer's standard coating thickness.

B. Interior Doors, Non-Fire-Rated:
   1. Grade: ANSI A250.8 Level 1, physical performance Level C, Model 1, full flush.
   2. Core: Impregnated Cardboard honeycomb.
   3. Thickness: 1-3/4 inches.

C. Interior Doors, Fire-Rated:
   1. Grade: ANSI A250.8 Level 2, physical performance Level B, Model 1, full flush.
   2. Fire Rating: As indicated on Door and Frame Schedule, tested in accordance with UL 10C ("positive pressure").
      a. Provide units listed and labeled by UL.
      b. Attach fire rating label to each fire rated unit.
   3. Core: Mineral fiberboard.

D. Interior Doors, Sound-Rated:
   1. Grade: ANSI A250.8 Level 2, physical performance Level B, Model 2, seamless.
   2. STC Rating of Assembled Door, Frame, and Seals: 35, calculated in accordance with ASTM E 413, tested in accordance with ASTM E 90 or ASTM E 1408.
   3. Core: Mineral fiberboard.
   4. Sound Seals: Integral, concealed in door or frame.
   5. Force to Open and Close and Latch: Not more than 5 pounds.

2.04 STEEL FRAMES

A. General:
   1. Comply with the requirements of grade specified for corresponding door, except:
      a. ANSI A250.8 Level 3 Doors: 14 gage frames.
      b. Frames for Wood Doors: Comply with frame requirements specified in ANSI A250.8 for Level 1, 16 gage
   2. Finish: Same as for door.

B. Exterior Door Frames: Face welded, seamless with joints filled.
   1. Galvanizing: All components hot-dipped zinc-iron alloy-coated (galvannealed) in accordance with ASTM A 653/A 653M, with manufacturer's standard coating thickness.
   2. Weatherstripping: Separate, see Section 08 71 00.

C. Interior Door Frames, Non-Fire-Rated: Face welded type.

D. Interior Door Frames, Fire-Rated: Face welded type.
   1. Fire Rating: Same as door, labeled.

E. Sound-Rated Door Frames: Face welded type.

F. 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; factory-painted finish, color as selected; factory-installed.
   1. In Fire-Rated Doors: UL-listed fusible link louver, same rating as door.
   2. Style: Standard straight slat blade.

B. Glazing: As specified in Section 08 81 00, factory installed.

C. 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.

D. Temporary Frame Spreaders: Provide for all factory- or shop-assembled frames.

2.06 FINISH MATERIALS

A. Primer: Rust-inhibiting, complying with ANSI 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.

3.02 INSTALLATION

A. Install in accordance with the requirements of the specified door grade standard and NAAMM HMMA 840.

B. In addition, install fire rated units in accordance with NFPA 80.

C. Coordinate frame anchor placement with wall construction.

D. Coordinate installation of hardware.

E. Coordinate installation of glazing.

3.03 TOLERANCES

A. Maximum Diagonal Distortion: 1/16 in measured with straight edge, corner to corner.

3.04 ADJUSTING

A. Adjust for smooth and balanced door movement.

B. Adjust sound control doors so that seals are fully engaged when door is closed.

END OF SECTION

SECTION 08 14 16

FLUSH WOOD DOORS

PART 1 GENERAL

1.01 SECTION INCLUDES

A. Flush wood doors; flush configuration; fire rated, non-rated, and acoustical.

1.02 RELATED REQUIREMENTS

A. Section 06 20 00 - Finish Carpentry.

B. Section 08 11 13 - Hollow Metal Doors and Frames.

C. Section 08 71 00 - Door Hardware.

D. Section 08 81 00 - Glazing.

E. Section 09 90 00 - Painting and Coating: Site finishing of doors.

1.03 REFERENCE STANDARDS

A. AWI/AWMAC (QSI) - Architectural Woodwork Quality Standards Illustrated; Architectural Woodwork Institute and Architectural Woodwork Manufacturers Association of Canada; 2005, 8th Ed., Version 2.0.

B. ICC (IBC) - International Building Code; 2006.

C. ITS (DIR) - Directory of Listed Products; Intertek Testing Services NA, Inc.; current edition.

D. NFPA 80 - Standard for Fire Doors and Fire Windows; National Fire Protection Association; 2007.

E. UL (BMD) - Building Materials Directory; Underwriters Laboratories Inc.; current edition.

F. WDMA I.S.1-A - Architectural Wood Flush Doors; Window and Door Manufacturers Association; 2004.

1.04 SUBMITTALS

A. See Section 01 33 00 -Submittal Procedures.

B. Product Data: Indicate door core materials and construction; veneer species, type and characteristics.

C. Specimen warranty.

D. Shop Drawings: Illustrate door opening criteria, elevations, sizes, types, swings, undercuts required, special beveling, special blocking for hardware, factory machining criteria, factory finishing criteria, identify cutouts for glazing.

E. Samples: Submit two samples of door veneer, 4 x 4 inch in size illustrating wood grain, stain color, and sheen.

F. Warranty, executed in County of Riverside's name.

1.05 QUALITY ASSURANCE

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

B. Installed Fire Rated Door Assembly: Conform to NFPA 80 for fire rated class as indicated.

1.06 DELIVERY, STORAGE, AND HANDLING

A. Package, deliver and store doors in accordance with specified quality standard.

B. Accept doors on site in manufacturer's packaging. Inspect for damage.

C. Protect doors with resilient packaging sealed with heat shrunk plastic. Do not store in damp or wet areas; or in areas where sunlight might bleach veneer. Seal top and bottom edges with tinted sealer if stored more than one week. Break seal on site to permit ventilation.

1.07 WARRANTY

A. See Section 01 79 00 for additional warranty requirements.

B. Interior Doors: Provide manufacturer's warranty for the life of the installation.

C. Include coverage for delamination of veneer, warping beyond specified installation tolerances, defective materials, and telegraphing core construction.

PART 2 PRODUCTS

2.01 MANUFACTURERS

A. Wood Veneer Faced Doors:
1. Graham Wood Doors: www.grahamdoors.com.
2. Eggers Industries: www.eggersindustries.com.
3. Substitutions: See Section 01 60 00 - Product Requirements.

2.02 DOORS AND PANELS

A. All Doors: See drawings for locations and additional requirements.
1. Quality Level: Premium Grade, in accordance with AWI/AWMAC Architectural Woodwork Quality Standards Illustrated, Section 1300.
2. Wood Veneer Faced Doors: 5-ply unless otherwise indicated.

B. Interior Doors: 1-3/4 inches thick unless otherwise indicated; flush construction.
1. Provide solid core doors at all locations.
2. Fire Rated Doors: Tested to ratings indicated on drawings in accordance with International Building Code ("positive pressure"); UL or WH (ITS) labeled without any visible seals when door is open.
3. Wood veneer facing with factory transparent finish where indicated on drawings.

2.03 DOOR AND PANEL CORES

A. Non-Rated Solid Core and 20 Minute Rated Doors: Type particleboard core (PC), plies and faces as indicated above.

B. Fire Rated Doors: Mineral core, Type FD, plies and faces as indicated above; with core blocking as required to provide adequate anchorage of hardware without through-bolting.

C. Sound Retardant Doors: Equivalent to Type PC construction with core as required to achieve rating specified; plies and faces as indicated above.

2.04 DOOR FACINGS

A. Wood Veneer Facing for Transparent Finish: Species as specified above, veneer grade as specified by quality standard, plain sliced, book veneer match, running assembly match; unless otherwise indicated.

1. Vertical Edges: Same species as face veneer.
2. Pairs: Pair match each pair; set match pairs within 10 feet of each other when doors are closed.

B. Facing Adhesive: Type I - waterproof.

2.05 ACCESSORIES

A. Metal Louvers: Specified in Section 08 91 00.

B. Glazing Stops: Wood, of same species as door facing, butted corners; prepared for countersink style tamper proof screws.

C. Astragals for Fire Rated Double Doors: Steel, T shaped, overlapping and recessed at face edge, specifically for double doors.

2.06 DOOR CONSTRUCTION

A. Fabricate doors in accordance with door quality standard specified.

B. Cores Constructed with Stiles and Rails:
1. Provide solid blocks at lock edge for hardware reinforcement.

C. Factory machine doors for hardware other than surface-mounted hardware, in accordance with hardware requirements and dimensions.

D. Factory fit doors for frame opening dimensions identified on shop drawings, with edge clearances in accordance with specified quality standard.
1. Exception: Doors to be field finished.

E. Provide edge clearances in accordance with AWI Quality Standards Illustrated Section 1700.

2.07 FACTORY FINISHING - WOOD VENEER DOORS

A. Factory finish doors in accordance with specified quality standard:
1. Transparent Finish: Transparent catalyzed polyurethane, Premium quality, matte sheen.

B. Factory finish doors in accordance with approved sample.

PART 3 EXECUTION

3.01 EXAMINATION

A. Verify existing conditions before starting work.

B. Verify that opening sizes and tolerances are acceptable.

C. Do not install doors in frame openings that are not plumb or are out-of-tolerance for size or alignment.

3.02 INSTALLATION

A. Install doors in accordance with manufacturer's instructions and specified quality standard.
1. Install fire-rated doors in accordance with NFPA 80 requirements.

B. Factory-Finished Doors: Do not field cut or trim; if fit or clearance is not correct, replace door.

C. Use machine tools to cut or drill for hardware.

D. Coordinate installation of doors with installation of frames and hardware.

E. Coordinate installation of glazing.

3.03 TOLERANCES

A. Conform to specified quality standard for fit and clearance tolerances.

B. Conform to specified quality standard for maximum diagonal distortion.

3.04 ADJUSTING

A. Adjust doors for smooth and balanced door movement.

B. Adjust closers for full closure.

3.05 SCHEDULE - See Drawings

END OF SECTION

SECTION 08 31 00

ACCESS DOORS AND PANELS

PART 1 GENERAL

1.01 SECTION INCLUDES

A. Access door and frame units, fire-rated and non-fire-rated, in ceiling and/or wall locations.

1.02 RELATED REQUIREMENTS

C. Section 09 21 16: Openings in ceilings.

D. Section 09 90 00 - Painting and Coating: Field paint finish.

E. Division 23: Mechanical components requiring access.

1.03 REFERENCE STANDARDS

A. ITS (DIR) - Directory of Listed Products; Intertek Testing Services NA, Inc.; current edition.

B. UL (FRD) - Fire Resistance Directory; Underwriters Laboratories Inc.; current edition.

1.04 SUBMITTALS

A. See Section 01 33 00 - Submittal Procedures.

B. Product Data: Provide sizes, types, finishes, hardware, scheduled locations, and details of adjoining work.

C. Project Record Documents: Record actual locations of all access units.

PART 2 PRODUCTS

2.01 MANUFACTURERS

A. Access Doors:
   1. Acudor Products Inc; www.acudor.com.
   2. Karp Associates, Inc; www.karpinc.com.
   3. Milcor Inc; www.milcorinc.com.
   4. Substitutions: See Section 01 60 00 - Product Requirements.

2.02 ACCESS DOORS AND PANELS

A. All Units: Factory fabricated, fully assembled units with corner joints welded, filled, and ground flush; square and without rack or warp; coordinate requirements with assemblies units are to be installed in.

B. Units in Fire Rated Assemblies: Fire rating equivalent to the fire rated assembly in which they are to be installed.
   1. Provide products listed and labeled by UL or ITS (Warnock Hersey) as suitable for the purpose specified and indicated.

2.03 WALL AND CEILING UNITS

A. Door and Frame Units: Formed steel.
   1. Frames and flanges: 0.058 inch steel.
   2. Door panels: 0.070 inch single thickness steel sheet.
   3. Size: As indicated.

4. Hardware:
   a. Hinge: Concealed constant force closure spring type.
   b. Lock: Screw driver slot for quarter turn cam lock.
5. Galvanized, hot dipped finish.
6. Prime coat with alkyd primer.
7. Finish: One coat baked enamel, color as selected.

PART 3 EXECUTION

3.01 EXAMINATION

A. Verify that rough openings are correctly sized and located.

3.02 INSTALLATION

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

B. Install frames plumb and level in openings. Secure rigidly in place.

C. Position units to provide convenient access to the concealed work requiring access.

END OF SECTION

SECTION 08 43 13

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. Perimeter sealant.

1.02 RELATED REQUIREMENTS

A. Section 07 90 05 - Joint Sealers: Perimeter sealant and back-up materials.

B. Section 08 71 00 - Door Hardware

C. Section 08 81 00 - Glazing: Glass and glazing accessories.

1.03 REFERENCE STANDARDS

A. AAMA CW-10 - Care and Handling of Architectural Aluminum From Shop to Site; American Architectural Manufacturers Association; 2004.

B. AAMA 501.2 - Field Check of Metal Storefronts, Curtain Walls, and Sloped Glazing Systems for Water Leakage; American Architectural Manufacturers Association; 2003 (part of AAMA 501).

C. AAMA 611 - Voluntary Specification for Anodized Architectural Aluminum; American Architectural Manufacturers Association; 1998.

D. AAMA 1503.1 - Voluntary Test Method for Thermal Transmittance and Condensation Resistance of Windows, Doors and Glazed Wall Sections; American Architectural Manufacturers Association; 2009.

E. ASTM B 209 - Standard Specification for Aluminum and Aluminum-Alloy Sheet and Plate; 2007.

F. ASTM B 221 - Standard Specification for Aluminum and Aluminum-Alloy Extruded Bars, Rods, Wire, Profiles, and Tubes; 2008.

G. ASTM E 283 - 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.

H. ASTM E 330 - Standard Test Method for Structural Performance of Exterior Windows, Doors, Skylights and Curtain Walls by Uniform Static Air Pressure Difference; 2002.

I. ASTM E 331 - Standard Test Method for Water Penetration of Exterior Windows, Skylights, Doors, and Curtain Walls by Uniform Static Air Pressure Difference; 2000.

1.04 ADMINISTRATIVE REQUIREMENTS

A. Coordinate with installation of other components that comprise the exterior enclosure.

B. Preinstallation Meeting: Conduct a preinstallation meeting one week before starting work of this section; require attendance by all affected installers.

1.05 SUBMITTALS

A. See Section 01 33 00 - 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. Design Data: Provide framing member structural and physical characteristics, engineering calculations, dimensional limitations.

E. Samples: Submit two samples 2 x 2 inches in size illustrating finished aluminum surface, glass, infill panels, glazing materials.

F. Warranty: Submit manufacturer warranty and ensure forms have been completed in County of Riverside's name and registered with manufacturer.

1.06 QUALITY ASSURANCE

A. Manufacturer and Installer Qualifications: Company specializing in manufacturing aluminum glazing systems with minimum three years of documented experience.

B. Test reports from AAMA certifying performance as required by ASTM standards cited above in article 1.03.

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 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.

1.09 WARRANTY

A. See Section 01 79 00 for additional warranty requirements.

B. Correct defective Work within a five year period after Date of Substantial Completion.

C. Provide five year manufacturer warranty against failure of glass seal on insulating glass units, including interpane dusting or misting. Include provision for replacement of failed units.

PART 2 PRODUCTS

2.01 MANUFACTURERS

A. Basis of Design: Efco Corporation; Series 401 (NT); Thermal Flush-Glazed Screw Spline; www.efcocorp.com

B. Other Acceptable Manufacturers:
1. United States Aluminum Corp; Product: Series 451: www.usalum.com.
2. Vistawall Architectural Products; Product: Series 3000 Multiplane: www.vistawall.com.
3. Substitutions: See Section 01 63 00 - Substitution Requirements.

2.02 STOREFRONT

A. Aluminum-Framed Storefront: Screw spline assembly. Factory fabricated, factory finished aluminum framing members with infill, and related flashings, anchorage and attachment

devices.

1. Glazing Rabbet: For 1 inch insulating glazing.
2. Glazing Position: Outside.
3. Vertical Mullion Dimensions: 2 inches wide by 4-1/2 inches deep.
4. Design Wind Load: 20 lbf/sq ft, positive and negative.
5. Water Leakage Test Pressure Differential: 8 lbf/sq ft.
6. Air Infiltration Test Pressure Differential: 6.24 psf.
7. Finish: Class I natural anodized.

B. Performance Requirements:
   1. Design and size components to withstand the specified 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.
      a. Member Deflection: Limit member deflection to 1/175 in any direction, with full recovery of glazing materials.
   2. Movement: Accommodate movement between storefront and perimeter framing and deflection of lintel, without damage to components or deterioration of seals.
   3. Air Infiltration: Limit air infiltration through assembly to 0.06 cu ft/min/sq ft of wall area, measured at specified differential pressure across assembly in accordance with ASTM E 283.
   4. 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.
   5. 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.

2.03 COMPONENTS

A. Aluminum Framing Members: Extruded 6063-T6 alloy aluminum sections, thermally broken with interior section insulated from exterior, drainage holes and internal weep drainage system.
   1. Glazing stops: Applied.
   2. Structurally Reinforced Members: Extruded aluminum with internal reinforcement of structural steel member.

B. Doors: Glazed aluminum.
   1. Thickness: 1-3/4 inches.
   2. Top Rail: 4 inches wide.
   3. Vertical Stiles: 4-1/2 inches wide.
   4. Bottom Rail: 6 inches wide.
   5. Finish: Same as storefront.

C. Operable Sash: Aluminum project-in; finished to match storefront; turn handle latch.

2.04 MATERIALS

A. Extruded Aluminum: ASTM B 221 (ASTM B 221M).

B. Fasteners: Stainless steel.

C. Perimeter Sealant: Type B (Two-part Polyurethane) specified in Section 07 90 05.

D. Glass: As specified in Section 08 81 00.

E. Glazing Gaskets: Type to suit application to achieve weather, moisture, and air infiltration requirements.

2.05 FINISHES

A. Class I Natural Anodized Finish: AAMA 611 AA-M12C22A41 Clear anodic coating not less than 0.7 mils thick.

2.06 HARDWARE

A. Door Hardware: As specified in Section 08 71 00.

B. Weatherstripping: Wool pile, continuous and replaceable; provide on all doors.

C. Sill Sweep Strips: Resilient seal type, retracting, of neoprene; provide on all doors.

2.07 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.

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. Install operating sash.

K. Set thresholds in bed of mastic and secure.

L. Install glass and infill panels in accordance with Section 08 81 00, using glazing method required to achieve performance criteria.

M. Install perimeter sealant in accordance with Section 07 90 05.

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 FIELD QUALITY CONTROL

A. See Section 01 45 00 – Quality Control, for independent testing and inspection requirements. Inspection will monitor quality of installation and glazing.

B. Test installed storefront for water leakage in accordance with AAMA 501.2.

3.05 ADJUSTING

A. Adjust operating hardware and sash for smooth operation.

3.06 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 81 00

GLAZING

PART 1 - GENERAL

1.01 DESCRIPTION: Division 1 applies to this Section. Provide glass, glazing, and glazing accessories, complete.

A. Related sections include:

1. 08 43 13 Aluminum Framed Storefronts

1.02 QUALITY ASSURANCE:

A. Quality Standards: In addition to Code, glass installations shall comply with ANSI Z97.1, as applicable, and Federal Safety Standard 16 CFR 1201.

B. Glass Manufacturers' Usage Recommendations: Furnish each manufacturer's written analysis of glass usage for the exterior glass installations regarding adverse shading conditions and other problems that may occur as a result of the building geometry and glass exposures, with recommended solutions. If no such problems are anticipated by a glass manufacturer, the pertinent written analysis shall so state.

C. Safety Glazing: Provide safety glazing at all openings subject to human impact per CBC.

1.03 SUBMITTALS: Refer to Section 01 33 00 for procedures.

A. Samples and Product Data: Obtain color instructions from the Architect prior to submission. Submit the following:

1. Samples of various glasses called for on the drawings, 9" square with smooth edges.
2. Each glass manufacturer's detailed recommendations and instructions for preparation of glazed openings and installation of glass. With the instructions, submit glass manufacturer's written recommendations for setting blocks and shims, jamb blocks and shims, wedge glazing gaskets, and fixed glazing gaskets to be used for installation of the manufacturer's glasses; include type and placement for each item.
3. Glazing channels or gaskets, 12" long.
4. Manufacturer's technical data for glazing gaskets, weathering gaskets, tapes, separators, setting and side blocks, and other glass setting material showing conformance with requirements specified, including warranties, coordinated with glass manufacturer's recommendations and instructions.
5. Samples of cured glazing sealants in designated colors, with technical Product Data.
6. Wall mirrors, 12" square with manufacturer's data for mirror, stainless steel J-moldings, primer and adhesive, and warranty.

B. Full-Size Samples: Install full-size samples of glasses specified below, installed in the frames forming a part of the Work. Locations shall be designated by the Architect. Glass showing defects, including excessive distortion, which detract from artistic effect, appearance, and design

concept of the building, in the Architect's opinion, shall be removed and acceptable glass installed at no extra cost to the Owner. Approved sample installations establish the standard of quality required for glass installations of the same kinds and types. Full-size samples are required for:

1. Each type of tempered glass.
2. Insulating glass units, to include translucent and spandrel units.

C. Certificates: Submit from manufacturer stating the quality, thickness, and type of all unlabeled glass delivered to the site for field cutting.

1.04 JOB CONDITIONS: Protect glazing until completion and final acceptance of the Work. Repair or replace damaged or defective glazing to original specified condition, at no extra cost to the Owner. Damaged or defective glazing includes glass that cannot be properly cleaned.

1.05 WARRANTY: Warranty exterior glass installations against loosening, air or water leakage, glass pop-outs, deterioration, and all other defects for 5 years from the date of final acceptance by the owner.

A. Glazing Channels and Gaskets: Warranty for 5 years against all defective material or deterioration including, without limitation, shrinkage causing loss of seal and physical failure due to exposure to sun, ozone, elements, smog and other air pollution, and commercial glass cleaners.

B. Insulating Glass Units: Warranty against loss of hermetic seal or other defect for 10 years from date of final acceptance by the owner of the facility.

C. Unframed Wall Mirrors: Warranty against silver spoilage for 10 years from the date of final acceptance.

PART 2 - PRODUCTS

2.01 GLASS MATERIALS: Glass of domestic manufacture, conforming to ASTM C1036 and ASTM C1048, except total distortion tolerances of ASTM C1048 do not govern over requirements in this Section, and to ANSI Z97.1, by Viracon, PPG Industries, Inc., Libby-Owens-Ford or approved equal. Label all factory cut panes and do not remove labels until directed. Do not cut unlabeled glass delivered to site as material for field cutting until glass is approved by Architect.

A. Plate Glass: Clear Type I, Class 1, quality q3 float, 1/2" thick unless otherwise indicated or specified, heat strengthened unless tempered glass is indicated or required.

B. Heat Strengthened and Tempered Glass: Heat strengthen or temper the above glasses as shown, required by Code, or required to meet wind load or performance requirements. Handle and size glass according to manufacturer's instructions. On each sheet of tempered vision glass, provide an inconspicuous visible label fused to glass and placed in lower corner, identifying tempered glass. Provide fireman's tempered glass label where shown or required by local Fire Department. Furnish clear, tinted plate glass, or reflective glass as indicated, specified, or required.

1. Process: Perform heat strengthening and tempering by the horizontal roller gas hearth process only. Process that produce tong or gripper marks are not acceptable.

2. Glass Heat Soak Tests: Subject all tempered glass to a heat soak test in the manufacturer's plant. Glass surface temperature and duration of the test shall be sufficient to produce the highest probability of breakage for lights containing inclusions, but not less than 554 deg F for 6 hours. Submit written record of heat soak test to Architect. Record shall indicate test conditions, date of test, number and size of lights tested per load, spacing of lights in oven, time glass was in the heat soak furnace, and test results (i.e. number of lights which broke). Heat soak tests are subject to inspection by Architect.

C. Heat Reflecting Coating: Where scheduled, provide above glasses with a Low 'E' coating with following characteristics:
   1. Visible Light Transmittance: 0.53
   2. Visible Light Reflectance (Exterior): 30%
   3. Relative Heat Gain: 81 Btu/(hr x sq. ft.).

D. Fire-rated Safety Glass: 1/4" glass ceramic safety glazing; UL labeled for fire rated openings. Fire rated as shown on the drawings. Comply with 16 CFR 1201 test requirements.

E. Insulating Glass Units: Provide all insulating glass units certified to Class CBA by ASTM E773 test method and to ASTM E774 specification requirements through the IGCC. Units shall have the IGCC label and A Classification etched in the corner of the unit. Furnish manufacturer's IGCC Class CBA certification.

   1. Type: As selected or scheduled, nominal 1/4" thick, with Low E coating and nominal 1/2" dessicated air space at windows and doors, sloped or flat glazing bead as shown or selected but consistent for all insulating units and doors.

   2. Panes: Fully temper one or both panes where shown, required by Code, or required by Quality Standards under "Quality Assurance". Provide glass as shown including Low E coating.
      a. Where translucent glazing is called for, apply simulated acid-etch frit (Viracon V-1085 shall be the basis of design) to the number two pane.

   3. Altitude Adjustment: Include altitude adjustment provisions of type standard with unit manufacturer and that preserves the integrity of dessicated air space as required for transportation to the site.

   4. Precaution: Verify that polymer glazing sealants are chemically and physically compatible with insulating glass unit separators and sealants and are approved by the insulating glass unit manufacturer.

F. Wall Mirrors: Mirror quality float glass, 1/4" thick, edges finished and polished, double silvered with electro-deposited copper coating plus an organic protective coating. Provide stainless steel angle frame as shown on the drawings.

G. Intent: Tempered glasses are an important part of the artistic effect of the building design, and shall conform to the standard of quality established by the approved full-size Sample installations.

2.02 GLASS SETTING MATERIALS:

A. Glazing Channels and Gaskets: Extruded neoprene conforming to AAMA SG-1, meeting 5 year warranty requirements, approved colors, sponge units of 40 +/- 5 Durometer Shore A, designed for 20% to 35% compression; dense units of 70 +/- 5 Durometer Shore A for hollow profiles and 60 +/- 5 for solid profiles. Vulcanize gasket corners, both sponge and dense. Provide units designed to produce glass edge pressure of 4 pounds minimum and 10 pounds maximum per linear inch.

B. Blocks and Spacers: Setting blocks of solid neoprene or silicone rubber having 85 +/- 5 Durometer Shore A, block length equal to 0.1" per square foot of glass area but minimum 4" length with length increased as required to eliminate point loading, width not less than width of glazing pocket less 1/8", profiled and secured not to slip during installation and not to obstruct proper drainage of glazing cavity. Provide shims of same material, hardness, width, and length as setting blocks. Provide neoprene or silicone rubber side blocks of 55 +/- 5 Durometer Shore A.

C. Glazing Sealants: For use at glazing perimeters, acceptable sealants are GE Silglaze 2400, GE Silpruf, GE 1200 Silicone, and Dow Corning 795 or 995. For other joints select appropriate sealant for joint size, movement, and substrate; acceptable sealants include GE 1200 Silicone or Silpruf, or Dow Corning 795 and 995, or, where approved, 790. Polybutylene, oleoresinous, asphalt, and oil base sealants are not allowed for any use. Provide sealants of approved colors.

D. Mirror Setting Materials: Palmer Products Corp. "Mirro-Mastic" adhesive, "Mirro-Mastic Bond" primer, and "Mirro-Bac" backing paint.

PART 3 - EXECUTION

3.01 GLAZING: Employ skilled and experienced glaziers. Set glass airtight and true with glazing channels or gaskets according to the "Glazing Manual" of Flat Glass Marketing Association, glass manufacturer's instructions, and as required herein to obtain weatherproof and waterproof installations. Conform glass edge clearances, and face and edge laps (bite), to Code and requirements herein. Set glass in rabbets with glazing blocks and spacers so glass does not contact frame and to preclude looseness and rattling. Use glass with straight smooth-finished edges free of cracks, chips, swiping, seaming, stress foci, or any other defects on surfaces or edges for all glass installations.

A. Setting Blocks: Unless otherwise recommended by glass manufacturer or in the FGMA "Glazing Manual" for type of glass installation, provide setting blocks of the correct size located at the bottom quarter points of each glass pane, and side blocks in both jambs in upper half of panes retained by metal caps.

B. Glazing Gaskets and Channels: Compress at least 15% by stops and at least 5% lengthwise to prevent corner pullout, but do not exceed allowable compressive forces on glass.

C. Glazing Sealant: Ensure sealant installations form a continuous airtight and watertight seal for entire perimeter of each glass pane. For glass secured by metal frames or stops on two or more edges, hold glazing gaskets or channels back at least 1/8" from the sight lines and fill the voids with glazing sealant finished flush with stops, sealant installed on interior side of glass.

D. Exposed Glass Edges or Butt Glazing: Provide glass with the exposed edges ground straight, smooth, and slightly rounded where edges remain exposed or are butt glazed with sealant. Where sealant is indicated at interior installations, set joints close but not in contact and fill with glazing sealant of approved color, free of bubbles or voids and tool slightly concave. Immediately remove smears from glass.

E. Insulating Glass Units: Conform tolerances, edge clearances, frame laps, and setting of blocks and spacers to manufacturer's published requirements with spacing and sizes of blocks adequate to prevent improper point loadings. Place units with glazing gaskets or channels compressed at least 5% lengthwise during setting. Cut gasket legs down at least 1/8" below sight lines and fill the void with a clear silicone sealant having minimum 1/8" sealant-to-glass contact with sealant finished flush with stops. Do not block weep holes in supporting frame members.

F. Mirrors: Clean backings, apply primer, and allow to dry. Verify organic coating on the backs of mirrors is compatible with the adhesive; if not, apply the mirror adhesive manufacturer's recommended backing paint and allow to dry. Conform to the adhesive manufacturer's instructions and apply adhesive in spots that, when compressed, will cover not less than 60% of the mirror area. Allow 3/16" space between mirror back and substrate. If mirror is cut from a larger mirror sheet, apply backing paint on cut backing edge. Brace installed mirrors in place until adhesive is fully set.

3.02 COMPLETION: Conform to Section 01 74 00. Do not use any harsh or abrasive cleaning agents, caustics, or acids for cleaning. Wash and polish vision glass both sides and leave glass free of soiling, streaks and labels. Wash and polish mirrors.

END OF SECTION

SECTION 08 91 00

LOUVERS

PART 1 GENERAL

1.01 Summary

A. Furnish and install louvers, bird screens, blank-off panels, structural supports and attachment brackets as shown on the drawings, as specified, and as needed for a complete and proper installation.

B. The louvers to be furnished include the following:

1. Fixed extruded storm resistant louvers.

C. Related sections include:

1. Division 7 Section "Joint Sealants" for sealants installed in perimeter joints between louver frames and adjoining construction.

1.02 References

A. Air Movement and Control Association International, Inc.

1. AMCA Standard 500-L-07 Laboratory Methods of Testing Louvers for Rating
2. AMCA Publication 501 Application Manual for Louvers

B. The Aluminum Association Incorporated

1. Aluminum Standards and Data
2. Specifications and Guidelines for Aluminum Structures

C. American Society of Civil Engineers

1. Minimum Design Loads for Buildings and Other Structures

D. American Society for Testing and Materials

1. ASTM B209
2. ASTM B211
3. ASTM B221
4. ASTM E90-90

E. Architectural Aluminum Manufacturers Association

1. AAMA 800 Voluntary Specifications and Test Methods for Sealants
2. AAMA 605.2 Voluntary Specification for High Performance Organic Coatings on Aluminum Extrusions and Panels.
3. AAMA TIR Metal Curtain Wall Fasteners
4. AAMA 2605-98 Superior Performing Organic Coatings on Aluminum Extrusions and Panels

1.03 Submittals

A. Product Data

1. Air flow and water entrainment performance test results.
2. Material types and thickness.

B. Shop Drawings

1. Include elevations, sections and specific details for each louver.
2. Show anchorage details and connections for all component parts.
3. Include signed and sealed structural calculations.

C. Samples: Provide samples showing all components and assembly of each type of louver called for in the documents.

D. Submit color chips for approval.

1.04 Quality Assurance

A. Single source responsibility: Product shall be the work of a single firm that has had not less than six years experience in the design and manufacturing of work similar to that shown and required.

B. Performance Requirements: Provide AMCA and BSRIA test data as required to confirm that the louvers have the specified air and water performance characteristics.

C. Acoustical Performance: Where applicable, submit test reports to confirm that the louvers meet the specified STC and Noise Reduction requirements.

D. Structural Requirements: Design all materials to withstand wind and snow loads as required by the applicable building code. Maximum allowable deflection for the louver structural members to be l/180 or 0.75 inch, whichever is less. Maximum allowable deflection for the louver blades to be l/120 or 0.50 inch across the weak axis, whichever is less.

E. Warranty: Provide written warranty to the owner that all products will be free of defective materials or workmanship for a period of twenty years from date of acceptance.

1.05 Delivery, Storage and Handling

A. Delivery: At the time of delivery all materials shall be visually inspected for damage. Any damaged boxes, crates, louver sections, etc. shall be noted on the receiving ticket and immediately reported to the shipping company and the material manufacturer.

B. Storage:

1. Material may be stored flat, on end or on its side.

2. Material may be stored either indoors or outdoors.

3. If stored outdoors the material must be raised sufficiently off the ground to prevent it being flooded.

4. If stored out doors the material must be covered with a weather proof flame resistant sheeting or tarpaulin.

C. Handling:

1. Material shall be handled in accordance with sound material handling practices and in such a way as to minimize racking.

2. Louver sections may be hoisted by attaching straps to the jambs and lifting the section while it is in a vertical position.

3. Louver sections should only be lifted and carried by the jambs. Heads, sills and blades are not to be used for lifting or hoisting louver sections.

PART 2 PRODUCTS

2.01 Manufacturers

A. Louvers:
1. C/S Specialties: www.c-sgroup.com
2. Nystrom, Inc.: www.nystrom.com
3. Airflex, Inc.: www.airflexind.com

B. Substitutions: Refer to 01 6000 Product Requirements.

2.02 Materials

A. Aluminum Extrusions: ASTM B211, Alloy 6063-T5, 6063-T6 or 6061-T6.

B. Aluminum Sheet: ASTM B3209, Alloy 1100, 3003 or 5005.

2.03 Fabrication, General

A. Provide louver models, bird screens, blank-off panels, structural supports and accessories as specified and/or shown on the drawings. Materials, sizes, depths, arrangements and material thickness to be as indicated or as required for optimal performance with respect to strength; durability; and uniform appearance.

B. Louvers to be mechanically assembled using stainless steel or aluminum fasteners.

C. Include supports, anchorage, and accessories required for complete assembly.

2.04 Louver Models

A. 5" (127mm) Deep Storm Resistant Fixed Horizontal Louver

1. Material: Heads, sills, jambs and mullions to be one-piece structural aluminum members with integral caulking slot and retaining beads. Mullions shall be sliding interlock type. Blades to be one-piece aluminum extrusions with front lip gutter and multiple secondary gutters designed to catch and direct water to sill. Louvers to be supplied with 4" (101.6mm) high by full depth sill flashings formed from minimum 0.050" (1.27mm) thick aluminum. Sill flashings to have welded side panels. Louvers and sill flashings to be installed in accordance with the manufacturer's recommended procedures to ensure complete water integrity performance of the louver system. Material thickness to be as follows: Heads, sills, jambs and mullions: Minimum of 0.075" (1.91mm). Fixed blades: 0.060" (1.52mm).

2. AMCA Performance: A 4' x 4' unit shall conform to the following:

Free Area	7.32 sq. ft. (0.68 sq. m.)
Free Area Velocity at Beginning Point of Water Penetration	1169 ft/min (5.94m/s)
Intake Pressure drop at 900 fpm free area velocity (4.57 m/s)	0.13 in. H_2O (31.5 Pa)
Exhaust pressure drop at 900 fpm free area velocity (4.57 m/s)	0.15 in. H_2O (37.3 Pa)

3. Wind Driven Rain Performance: AMCA certified and licensed to bear the AMCA seal. The louver test was based on a 39.370"(1.00m) x 39.370" (1.00 m) core area. Unit tested at a rainfall rate of 3.0 inches per hour (75 mm/hr) with a wind directed to the face of the louver at a velocity 29.1-mph (13 m/s) and a rainfall rate of 8.0 inches per hour (203 m/s) with a wind directed at the face of the louver at a velocity of 50 mph (22.3m/s). The test data shall show the water penetration effectiveness rating at each corresponding ventilation rate.

Core Ventilation Rate (m/s):	0.0	0.5	1.0	1.5	2.0	2.5	3.0	3.5	4.0	4.5	5.0
Core Ventilation Rate (ft/min):	0	117	190	299	381	495	585	673	779	858	963
Free Area Ventilation Rate (ft/min):	0	232	377	593	756	982	1161	1336	1546	1703	1911
Rating effectiveness @ 29 mph & 3 in/hr:	A	A	A	A	A	A	A	A	A	B	C
Rating effectiveness @ 50 mph & 8 in/hr:	B	B	B	B	B	B	B	B	B	C	C
Effectiveness Rating:	A = 1 to 0.99		B = 0.989 to 0.95		C = 0.949 to 0.80		D = 0.80 to 0				

2.05 Finishes

A. General: Comply with NAAMM "Metal Finishes Manual" for finish designations and application recommendations, except as otherwise indicated. Apply finishes in factory. Protect finishes on exposed surfaces prior to shipment. Remove scratches and blemishes from exposed surfaces that will be visible after completing finishing process. Provide color as indicated or, if not otherwise indicated, as selected by architect.

B. Three Coat Fluorocarbon Coating

1. Louvers to be finished with a minimum 1.4 mil (0.035mm) thick full strength 70% resin, 3 coat Fluoropolymer system.

2. All aluminum shall be thoroughly cleaned, etched and given a chromated conversion pre-treatment before application of the Kynar/Hylar coating. The coating shall consist of a primer, a high metallic color coat and a clear PVF_2 topcoat. It shall receive a bake cycle of 17 minutes at 450^0F. All finishing procedures shall be one continuous operation in the plant of the manufacturer.

3. Manufacturer to furnish an extended 20 limited warranty for the Kynar/Hylar coating. This limited warranty shall begin on the date of material shipment.

2.06 Bird Screens

A. Unless otherwise indicated, all louvers to be furnished with mill finish bird or insect screens.

B. Screens to be 5/8" (15.9mm) mesh, 0.050" (1.27mm) thick expanded and flattened aluminum bird screen secured within 0.055" (1.40mm) thick extruded aluminum frames. Frames to have mitered corners and corner locks.

PART 3 EXECUTION

3.01 Examination: Examine openings to receive the work. Do not proceed until any unsatisfactory conditions have been corrected.

3.02 Installation

A. Comply with manufacturer's instructions and recommendations for installation of the work.

B. Verify dimensions of supporting structure at the site by accurate field measurements so that the work will be accurately designed, fabricated and fitted to the structure.

C. Anchor louvers to the building substructure as indicated on architectural drawings.

D. Erection Tolerances:

1. Maximum variation from plane or location shown on the approved shop drawings: 1/8" per 12 feet of length, but not exceeding 1/2" in any total building length or portion thereof (non-cumulative).

2. Maximum offset from true alignment between two members abutting end to end, edge-to-edge in line or separated by less than 3": 1/16" (shop or field joints). This limiting condition shall prevail under both load and no load conditions.

E. Cut and trim component parts during erection only with the approval of the manufacturer or fabricator, and in accordance with his recommendations. Restore finish completely. Remove and replace members where cutting and trimming has impaired the strength or appearance of the assembly.

F. Do not erect warped, bowed, deformed or otherwise damaged or defaced members. Remove and replace any members damaged in the erection process as directed.

G. Set units level, plumb and true to line, with uniform joints.

3.03 Protection

A. Protect installed materials to prevent damage by other trades. Use materials that may be easily removed without leaving residue or permanent stains.

3.04 Adjusting and cleaning

A. Immediately clean exposed surfaces of the louvers to remove fingerprints and dirt accumulation during the installation process. Do not let soiling remain until the final cleaning.

B. Before final inspection, clean exposed surfaces with water and a mild soap or detergent not harmful to the to the material finishes. Thoroughly rinse surfaces and dry.

C. Restore louvers and accessory components damaged during installation and construction so no evidence remains of corrective work. If results of restoration are unsuccessful, as determined by the Architect, remove damaged materials and replace with new materials.

1. Touch up minor abrasions in finishes with a compatible air-dried coating that matches the color and gloss of the factory applied coating.

END OF SECTION

SECTION 09 21 16

GYPSUM BOARD ASSEMBLIES

PART 1 GENERAL

1.01 SECTION INCLUDES

A. Performance criteria for gypsum board assemblies.

B. Metal stud wall framing.

C. Shaft wall system.

D. Gypsum sheathing.

E. Gypsum wallboard.

F. Joint treatment and accessories.

G. Water-resistive barrier over exterior wall sheathing.

H. Gypsum board ceilings

1.02 RELATED REQUIREMENTS

A. Section 05 40 00 - Cold-Formed Metal Framing: Exterior wind-load-bearing metal stud framing.

B. Section 07 21 00 - Thermal Insulation: Acoustic insulation.

C. Section 07 25 00 - Weather Barriers: Water-resistive barrier over sheathing.

D. Section 07 84 00 - Firestopping: Top-of-wall assemblies at fire rated walls.

E. Section 07 90 05 - Joint Sealers: Acoustic sealant.

F. Section 09 22 16 - Non-Structural Metal Framing.

G. Section 09 30 00 - Tiling (Tile): Tile backing board.

1.03 REFERENCE STANDARDS

A. ASTM C 475/C 475M - Standard Specification for Joint Compound and Joint Tape for Finishing Gypsum Board; 2002 (Reapproved 2007).

B. ASTM C 645 - Standard Specification for Nonstructural Steel Framing Members; 2009.

C. ASTM C 754 - Standard Specification for Installation of Steel Framing Members to Receive Screw-Attached Gypsum Panel Products; 2009.

D. ASTM C 840 - Standard Specification for Application and Finishing of Gypsum Board; 2008.

E. ASTM C 954 - Standard Specification for Steel Drill Screws for the Application of Gypsum Panel Products or Metal Plaster Bases to Steel Studs From 0.033 in. (0.84 mm) to 0.112 in. (2.84 mm) in Thickness; 2007.

F. ASTM C 1002 - Standard Specification for Steel Self-Piercing Tapping Screws for the Application of Gypsum Panel Products or Metal Plaster Bases to Wood Studs or Steel Studs; 2007.

G. ASTM C 1047 - Standard Specification for Accessories for Gypsum Wallboard and Gypsum Veneer Base; 2010a.

H. ASTM C 1177/C 1177M - Standard Specification for Glass Mat Gypsum Substrate for Use as Sheathing; 2008.

I. ASTM C 1278/C 1278M - Standard Specification for Fiber-Reinforced Gypsum Panel; 2007a.

J. ASTM C 1280 - Standard Specification for Application of Gypsum Sheathing; 2009.

K. ASTM C 1396/C 1396M - Standard Specification for Gypsum Board; 2009.

L. ASTM C 1629/C 1629 - Standard Classification for Abuse-Resistant Nondecorated Interior Gypsum Panel Products and Fiber-Reinforced Cement Panels; 2006.

M. ASTM C 1658/C 1658M - Standard Specification for Glass Mat Gypsum Panels; 2006.

N. ASTM D 3273 - Standard Test Method for Resistance to Growth of Mold on the Surface of Interior Coatings in an Environmental Chamber; 2000 (Reapproved 2005).

O. ASTM E 72 - Standard Test Methods of Conducting Strength Tests of Panels for Building Construction; 2005.

P. ASTM E 90 - Standard Test Method for Laboratory Measurement of Airborne Sound Transmission Loss of Building Partitions and Elements; 2009.

Q. ASTM E 413 - Classification for Rating Sound Insulation; 2010.

R. GA-216 - Application and Finishing of Gypsum Board; Gypsum Association; 2007.

S. GA-600 - Fire Resistance Design Manual; Gypsum Association; 2006.

T. UL (FRD) - Fire Resistance Directory; Underwriters Laboratories Inc.; current edition.

1.04 SUBMITTALS

A. See Section 01 33 00 - Submittal Procedures.

B. Product Data: Provide data on gypsum board, glass mat faced gypsum board, accessories, and joint finishing system.

C. Test Reports: For all stud framing products that do not comply with ASTM C 645 or C 754, provide independent laboratory reports showing maximum stud heights at required spacings and deflections.

D. Samples: Submit two samples of gypsum board finished with proposed texture application, 12 by 12 inches (300 by 300 mm) in size, illustrating finish color and texture.

E. LEED Submittals:
   1. For gypsum wallboard, submit documentation of recycled content and location of manufacture, MR 4.1 and 4.2.

1.05 QUALITY ASSURANCE

A. Installer Qualifications: Company specializing in performing gypsum board application and finishing, with minimum 10 years of experience.

PART 2 PRODUCTS

2.01 GYPSUM BOARD ASSEMBLIES

A. Provide completed assemblies complying with ASTM C 840 and GA-216.

B. Interior Partitions: Provide completed assemblies with the following characteristics:

1. Acoustic Attenuation: STC of 45-49 calculated in accordance with ASTM E 413, based on tests conducted in accordance with ASTM E 90.

C. Shaft Walls at HVAC Shafts: Provide completed assemblies with the following characteristics:
   1. Air Pressure Within Shaft: Sustained loads of 5 lbf/sq ft (0.24 kPa) with maximum mid-span deflection of L/240.
   2. Acoustic Attenuation: STC of 35-39 calculated in accordance with ASTM E 413, based on tests conducted in accordance with ASTM E 90.

D. Shaft Walls at Elevator Shafts: Provide completed assemblies with the following characteristics:
   1. Air Pressure Within Shaft: Intermittent loads of 5 lbf/sq ft (0.24 kPa) with maximum mid-span deflection of L/240.
   2. Acoustic Attenuation: STC of 35-39 calculated in accordance with ASTM E 413, based on tests conducted in accordance with ASTM E 90.

E. Fire Rated Assemblies: Provide completed assemblies with the following characteristics:
   1. Fire Rated Partitions: UL listed assembly No. U465 and U445; 1 hour rating.
   2. Fire Rated Shaft Walls: UL listed assembly No. U415 1 & 2 hour rating.
   3. UL Assembly Numbers: Provide construction equivalent to that listed for the particular assembly in the current UL Fire Resistance Directory.

2.02 BOARD MATERIALS

A. Manufacturers - Gypsum-Based Board:
   1. CertainTeed Corporation: www.certainteed.com.
   2. Georgia-Pacific Gypsum LLC: www.gp.com/gypsum.
   3. National Gypsum Company: www.nationalgypsum.com.
   4. USG Corporation: www.usg.com.
   5. Substitutions: See Section 01 60 00 - Product Requirements.

B. Wallboard: Paper-faced gypsum wallboard as defined in ASTM C 1396/C 1396M; sizes to minimize joints in place; ends square cut.
   1. Application: Use for vertical surfaces and ceilings, unless otherwise indicated.
   2. Glass-mat-faced gypsum panels as defined in ASTM C 1658/C 1658M, suitable for paint finish, of the same core type and thickness may be substituted for paper-faced board.
   3. Mold Resistance: Score of 10, when tested in accordance with ASTM D 3273.
      a. Mold-resistant board is required whenever board is being installed before the building is enclosed and conditioned.
   4. 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.
   5. Thickness:
      a. Vertical Surfaces: 5/8 inch (16 mm).
      b. Ceilings: 5/8 inch (16 mm).
      c. Multi-Layer Assemblies: Thicknesses as indicated on drawings.
   6. Glass-Mat-Faced Products:
      a. Georgia-Pacific Gypsum LLC; DensArmor Plus Abuse Guard.
      b. Substitutions: See Section 01 60 00 - Product Requirements.

C. Impact-Rated Wallboard: Tested to Level 3 soft-body and hard-body impact in accordance with ASTM C 1629.
   1. Application: All Corridors.
   2. Mold Resistance: Score of 10, when tested in accordance with ASTM D 3273.
   3. Paper-Faced Type: Gypsum wallboard as defined in ASTM C 1396/C 1396M.
   4. Unfaced Type: Interior fiber-reinforced gypsum panels as defined in ASTM C 1278/C 1278M.
   5. Type: Fire-resistance rated Type X, UL or WH listed.

6. Thickness: 5/8 inch (16 mm).
7. Edges: Tapered.
8. Products:
   a. National Gypsum Company; Gold Bond Hi-Impact Brand XP Wallboard.
   b. USG Corporation; Fiberock Brand Panels--VHI Abuse-Resistant.
   c. Substitutions: See Section 01 60 00 - Product Requirements.

D. Backing Board For Non-Wet Areas: Water-resistant gypsum backing board as defined in ASTM C 1396/C 1396M; sizes to minimum joints in place; ends square cut.
1. Application: Vertical surfaces behind thinset tile, except in wet areas.
2. Type: Regular and Type X, in locations indicated.
3. Type X Thickness: 5/8 inch (16 mm).
4. Regular Board Thickness: 1/2 inch (13 mm).
5. Edges: Tapered.
6. Products:
   a. American Gypsum; M-Bloc.
   b. CertainTeed Corporation; ProRoc Brand Moisture Resistant Gypsum Board ("Greenboard").
   c. Georgia-Pacific Gypsum LLC; ToughRock Moisture-Guard Gypsum Board ("Greenboard").
   d. National Gypsum Company; Gold Bond Brand XP Gypsum Board.
   e. USG Corporation; Sheetrock Brand Mold Tough Gypsum Panels.
   f. Substitutions: See Section 01 60 00 - Product Requirements.

E. Exterior Sheathing Board: Sizes to minimize joints in place; ends square cut.
1. Application: Exterior sheathing, unless otherwise indicated.
2. Glass-Mat-Faced Sheathing: Glass mat faced gypsum substrate as defined in ASTM C 1177/C 1177M.
3. Core Type: Regular.
4. Regular Board Thickness: 1/2 inch (13 mm).
5. Edges: Square, for vertical application.
6. Glass-Mat-Faced Products:
   a. CertainTeed Corporation; GlasRoc Brand.
   b. Georgia-Pacific Gypsum LLC; DensGlass Gold Sheathing.
   c. National Gypsum Company; Gold Bond Brand e2XP Extended Exposure Sheathing.
   d. Substitutions: See Section 01 60 00 - Product Requirements.

F. Shaftwall and Coreboard: Type X; 1 inch (25 mm) thick by 24 inches (610 mm) wide, beveled long edges, ends square cut.
1. Paper Faced Type: Gypsum shaftliner board or gypsum coreboard as defined ASTM C 1396/C 1396M; water-resistant faces.
2. Products:
   a. American Gypsum; Shaft Liner.
   b. CertainTeed Corporation; ProRoc Brand Shaftliner Type X.
   c. National Gypsum Company; Gold Bond Brand 1" Fire-Shield Shaftliner.
   d. National Gypsum Company; Gold Bond Brand 1" Fire-Shield Shaftliner XP (mold-resistant).
   e. Pacific Coast Building Products, Inc; PABCORE Gypsum Shafliner Board type X.
   f. Temple-Inland Inc; SilentGuard Gypsum Shaftliner.
   g. USG Corporation; Sheetrock Gypsum Liner Panels.
   h. USG Corporation; Sheetrock Gypsum Liner Panels--Enhanced (mold-resistant).
   i. Substitutions: See Section 01 60 00 - Product Requirements.

2.03 ACCESSORIES

A. Acoustic Insulation: As specified in Section 07 21 00.

B. Acoustic Sealant: As specified in Section 07 90 05.

C. Finishing Accessories: ASTM C 1047, galvanized steel or rolled zinc, unless otherwise indicated.
   1. Types: As detailed or required for finished appearance.
   2. Special Shapes: In addition to conventional cornerbead and control joints, provide U-bead at exposed panel edges.

D. Joint Materials: ASTM C 475 and as recommended by gypsum board manufacturer for project conditions.

E. High Build Drywall Surfacer: Vinyl acrylic latex-based coating for spray application, designed to take the place of skim coating and separate paint primer in achieving Level 5 finish.

F. Screws for Attachment to Steel Members Less Than 0.03 inch (0.7 mm) In Thickness, to Wood Members, and to Gypsum Board: ASTM C 1002; self-piercing tapping type; cadmium-plated for exterior locations.

G. Screws for Attachment to Steel Members From 0.033 to 0.112 inch (0.8 to 2.8 mm) in Thickness: ASTM C 954; steel drill screws for application of gypsum board to loadbearing steel studs.

PART 3 EXECUTION

3.01 EXAMINATION

A. Verify that project conditions are appropriate for work of this section to commence.

3.02 SHAFT WALL INSTALLATION

A. Shaft Wall Framing: Install in accordance with GA-600 requirements.
   1. Install studs at spacing required to meet performance requirements.

B. Shaft Wall Liner: Cut panels to accurate dimension and install sequentially between special friction studs.

3.03 FRAMING INSTALLATION

A. Metal Framing: Install in accordance with ASTM C 754.

B. Studs: Space studs as indicated.
   1. Extend partition framing to structure where indicated and to ceiling in other locations.
   2. Partitions Terminating at Ceiling: Attach ceiling runner securely to to ceiling framing in accordance with details.

3.04 ACOUSTIC ACCESSORIES INSTALLATION

A. Acoustic Insulation: Place tightly within spaces, around cut openings, behind and around electrical and mechanical items within partitions, and tight to items passing through partitions.

B. Acoustic Sealant: Install in accordance with manufacturer's instructions.

3.05 BOARD INSTALLATION

A. Comply with ASTM C 840, GA-216, and manufacturer's instructions. Install to minimize butt end joints, especially in highly visible locations.

B. Fire-Rated Construction: Install gypsum board in strict compliance with requirements of

assembly listing.

C. Exterior Sheathing: Comply with ASTM C 1280. Install sheathing vertically, with edges butted tight and ends occurring over firm bearing.

3.06 INSTALLATION OF TRIM AND ACCESSORIES

A. Control Joints: Place control joints consistent with lines of building spaces and as indicated.

B. Corner Beads: Install at external corners, using longest practical lengths.

C. Edge Trim: Install at locations where gypsum board abuts dissimilar materials and as indicated.

3.07 JOINT TREATMENT

A. Finish gypsum board in accordance with levels defined in ASTM C 840, as follows:

1. Level 4: Walls and ceilings to receive paint finish or wall coverings, unless otherwise indicated.
2. Level 3: Walls to receive textured wall finish.
3. Level 2: In utility areas, behind cabinetry, and on backing board to receive tile finish.
4. Level 1: Fire rated wall areas above finished ceilings, whether or not accessible in the completed construction.

B. 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 (0.8 mm).
2. Taping, filling and sanding is not required at base layer of double layer applications.

C. Where Level 5 finish is indicated, spray apply high build drywall surfacer over entire surface after joints have been properly treated; achieve a flat and tool mark-free finish.

END OF SECTION

SECTION 09 22 16

NON-STRUCTURAL METAL FRAMING

PART 1 GENERAL

1.01 SECTION INCLUDES

A. Metal partition, ceiling, and soffit framing.

1.02 RELATED REQUIREMENTS

A. Section 07 21 00 - Thermal Insulation: Acoustic Insulation.

B. Section 09 21 16 - Gypsum Board Assemblies: Metal studs for gypsum board partition framing.

1.03 REFERENCE STANDARDS

A. ASTM C 645 - Standard Specification for Nonstructural Steel Framing Members; 2009.

B. ASTM C 754 - Standard Specification for Installation of Steel Framing Members to Receive Screw-Attached Gypsum Panel Products; 2009.

C. ASTM C 1002 - Standard Specification for Steel Self-Piercing Tapping Screws for the Application of Gypsum Panel Products or Metal Plaster Bases to Wood Studs or Steel Studs; 2007.

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

1.04 SUBMITTALS

A. See Section 01 33 00 - Submittal Procedures.

B. Shop Drawings:
   1. Indicate prefabricated work, component details, stud layout, framed openings, anchorage to structure, acoustic details, type and location of fasteners, accessories, and items of other related work.
   2. Describe method for securing studs to tracks, splicing, and for blocking and reinforcement of framing connections.

C. Product Data: Provide data describing framing member materials and finish, product criteria, load charts, and limitations.

D. LEED Submittal: Documentation of recycled content and location of manufacture, MR 4.1 and 4.2

1.05 QUALITY ASSURANCE

A. Installer Qualifications: Company specializing in performing the work of this section with minimum ten years experience.

PART 2 PRODUCTS

2.01 MANUFACTURERS

A. Metal Framing, Connectors, and Accessories:
   1. Dietrich Metal Framing; www.dietrichindustries.com.

2. Clark Western; www.clarkwestern.com.
3. Substitutions: See Section 01 60 00 - Product Requirements.

2.02 FRAMING MATERIALS

A. Fire Rated Assemblies: Comply with applicable code and as indicated on drawings.

B. Non-Loadbearing Framing System Components: ASTM C 645; galvanized sheet steel, of size and properties necessary to comply with ASTM C 754 for the spacing indicated, with maximum deflection of wall framing of L/240 at 5 psf.
   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.

C. Partition Head to Structure Connections: Provide track fastened to structure with legs of sufficient length to accommodate deflection, for friction fit of studs cut short and fastened as indicated on drawings.

D. Tracks and Runners: Same material and thickness as studs, bent leg retainer notched to receive studs with provision for crimp locking to stud.

E. Furring and Bracing Members: Of same material as studs; thickness to suit purpose; complying with applicable requirements of ASTM C 754.

F. Fasteners: ASTM C 1002 self-piercing tapping screws.

G. Sheet Metal Backing: 0.036 inch thick, galvanized.

H. Anchorage Devices: Power actuated.

I. Acoustic Insulation: As specified in Section 07 21 00.

J. Acoustic Sealant: As specified in Section 07 90 05.

K. Touch-Up Primer for Galvanized Surfaces: SSPC-Paint 20, Type I - Inorganic.

2.03 FABRICATION

A. Fabricate assemblies of framed sections to sizes and profiles required.

B. Fit, reinforce, and brace framing members to suit design requirements.

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 C 754.

B. Extend partition framing to structure where indicated and to ceiling in other locations.

C. Partitions Terminating at Ceiling: Attach ceiling runner securely to structure as detailed.

D. Partitions Terminating at Structure: Attach extended leg top runner to structure, maintain clearance between top of studs and structure, and brace both flanges of studs as indicated.

E. Align and secure top and bottom runners at 24 inches on center.

F. Fit runners under and above openings; secure intermediate studs to same spacing as wall studs.

G. Align stud web openings horizontally.

H. Secure studs to tracks using crimping 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. Coordinate installation of bucks, anchors, and blocking with electrical, mechanical, and other work to be placed within or behind stud framing.

3.03 CEILING AND SOFFIT FRAMING

A. Install furring after work above ceiling or soffit is complete. Coordinate the location of hangers with other work.

B. Install furring independent of walls, columns, and above-ceiling work.

C. 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.

D. Space main carrying channels at maximum 72 inch on center, and not more than 6 inches from wall surfaces. Lap splice securely.

E. Securely fix carrying channels to hangers to prevent turning or twisting and to transmit full load to hangers.

F. Place furring channels perpendicular to carrying channels, not more than 2 inches from perimeter walls, and rigidly secure. Lap splices securely.

3.04 TOLERANCES

A. Maximum Variation From True Position: 1/8 inch in 10 feet.

B. Maximum Variation From Plumb: 1/8 inch in 10 feet.

END OF SECTION

SECTION 09 24 23

PORTLAND CEMENT STUCCO

PART 1 - GENERAL

1.01 WORK INCLUDED

A. Metal lathing and accessories.

B. Lathing using stucco netting and acessories.

C. Three coat stuccowork for paint finish.

D. Plastering accessories.

1.02 RELATED WORK

A. Non-Struct'l Metal Framing: Section 09 22 16

B. Hollow Metal Frames: Section 08 11 13.

C. Painting: Section 09 90 00.

1.03 QUALITY ASSURANCE AND CONTROL

A. Conform to the California Building Code, 2007 Edition.

B. Slump Test ASTM C143, modified slump cone 2" x 4" x 6"; maximum slump 2-1/2".

1.04 REFERENCE STANDARDS

A. American Society For Testing and Materials (ASTM):

1. ASTM C 144, Aggregate For Masonry Mortar.

2. ASTM C 150, Portland Cement.

3. ASTM C 206, Finishing Hydrated Lime.

B. American National Standard Institute (ANSI):

1. ANSI A 42.2 Specifications for Portland Cement Stucco.

C. Federal Specifications (FS):

1. FS UU-B-790a.

1.05 SUBMITTALS

A. Refer to Section 01 33 00 for administrative requirements.
B. PRODUCT DATA: Provide data on materials, characteristics and limitations of products Specified.

C. SAMPLES: Submit 24" x24" samples illustrating colors and texture and samples of all accessories to include expansion joints and reveals.

1.06 FIELD MOCK-UP

A. Construct 10' x 10' panel to include one control joint, reveal, edge condition at window opening and one corner condition, using materials and methods specified herein, for review by Architect. Reviewed and approved mock-ups may be left in place as part of the work.

B. Accepted surface finish of mock-up establishes minimum standard of quality and workmanship of lath and stuccowork for project.

C. Advise Architect of start date of finish coat of stucco work 48 hours prior to commencing. Contractor shall apply approximately 100 square feet of finish coat of stuccowork, in all colors scheduled, to building for Architect's review of color texture and other portions of specifications before proceeding. Architect shall determine location(s) for initial application.

D. Any work installed that fails to meet these guidelines shall be subjected to removal and replacement at the Contractor's expense.

1.06 ENVIRONMENTAL CONDITIONS

A. Cold Weather Requirements:

1. Do not use frozen materials in stucco mixes.

2. Do not apply stucco when ambient temperature is less than 45◦ F.

3. Do not apply stucco in fog, rain or high humidity conditions without approval from Architect.

4. Protect stucco from uneven and excessive moisture gain during cold, wet weather.

B. Hot Weather Requirements:

1. Protect stucco from uneven and excessive evaporation during hot, dry weather.

PART 2 - PRODUCTS

2.01 LATHING MATERIALS

A. Paperbacked Stucco Netting at Walls:

1. Stucco netting conforming to ANSI A 42.2.

2. Mesh: 1-1/2", 17 gauge, galvanized, 1.8 lbs. per sq. yd. minimum weight.

3. Paper: Waterproofed and conforming to FS UU-B-790a, Type 1, Grade D, 2 layers.

4. Material: K-Lath Corp., Type SFB or approved equal.

B. Expanded Metal Lath at Soffits:

1. Gold Bond Building Products, or approved equal.
2. 3/8" high ribbed expanded metal lath.

3. Paper: Waterproofed and conforming to FS UU-B-790a, Type 1, Grade D, 2 layers.

C. Lathing Accessories:

1. Furring Nails: ½" wide, 1-1/2" long No. 9 gauge ring shank.

2. Expansion joints: Inryco, Inc. Milcor No. 15 or approved equal.

3. Casting beads: Inryco, Inc. Milcor No. 60 or approved equal.

4. Tie wire: 18 gage galvanized.

D. Provide J-Hooks at soffits as required by CBC.

2.02 STUCCO MATERIALS

A. Portland Cement: ASTM C 150, Type I.

B. Plastic Cement: ASTM C 150, Type I cement with added plasticizers not exceeding 12% total volume of cement.

C. Lime: ASTM C 206.

D. Sand: Clean and well-graded from coarse to fine, conforming to ASTM C 144 except that gradation of sand for base coats shall be graded within the following limits:

Percent Retained by Weight (±2%)

Sieve Size	Maximum	Minimum
No. 4	0	0
No. 8	10	0
No. 16	40	10
No. 30	65	30
No. 50	90	70

No. 100 100 95

E. Water: Clean, free of injurious amounts of oil, acids, alkalis, salts, organic materials, or other substances which may be deleterious to lath or stucco.

F. Finish Coat: Factory prepared plaster as required to achieve scheduled finish to match existing buildings.

G. Bonding Compound:

1. ASTM C 631, non-oxidizing, non-crystallizing.

2. Unaffected by re-application of moisture.

2.03 STUCCO MIXES

A. Generai:

1. Accurately proportion materials for each plaster batch with measuring devices of known volume.

2. Size batches for complete use within maximum of one hour after mixing.

3. Retemper plaster stiffened from evaporation, but do not use or retemper partially hydrated cement plaster.

4. Do not use frozen, caked, or lumping materials, and remove such materials from job site immediately.

5. Mix factory prepared cement plaster in accordance with manufacturer's written instructions.

6. Use moist, loose, sand in mix proportions.

7. Withhold 10% of mixing water until mixing is almost complete, then add as needed to produce necessary consistency.

B. Mechanical Mixing:

1. Clean mixer of set or hardened materials before loading for new batch.

2. Maintain mixer in continuous operation while adding materials.

3. Conform to mixing sequence, cycle of operations, and time recommended by manufacturer of plaster materials.

C. Hand Mixing:

1. Do not hand mix unless authorized by Architect.

2. Use waterproof mixing boxes and water barrels when mixing in building.

D. Mix and proportion stucco as follows:

1. Base coats:
   a. First (scratch) Coat: 1 part cement to 4 parts sand by volume.
   b. Second (brown) Coat: 1 part cement to 5 parts sand by volume.
   c. One part portland cement and 0 to 1/12 parts lime or one part plastic cement for first and second coats.
   d. Polypropylene fiber: Maximum 1 lb. per 1000 lbs. of dry stucco or mortar mix. Provide in first and second coats only.

2. Finish Coat:
   a. One part portland cement and 3/4 to 2 parts lime, or one part plastic cement.
   b. Three parts sand per sum of cementitious material.
   c. Provide integral color cement finish.
   d. Finish Texture: Medium Dash.

2.04 PLASTERING ACCESSORIES

A. Casing Beads: Square Edge, Fry Reglet Corporation #JPM-75, or approved equal.

B. Soffit Drip Screeds: Fry Reglet Corporation #DS875, or approved equal.

C. Corner Beads: Small nose, United States Gypsum #1-A, or approved equal.

D. Reveals: Flannery, Inc. 2" reveal with built-in weep; ¼" channel screed with alignment splices, J mold with alignment splices.

PART 3 - EXECUTION

3.01 LATHING

A. Paper Backed Stucco Netting:

1. General Installation Requirements:
   a. Install lath in accordance with ANSI Standard 42.2 unless indicated otherwise herein.
   b. Install true to lines and levels and to provide surface flatness with maximum variation of 1/8" in 10' in any direction.

2. Screw or staple to wood supports at 6" o.c. vertically and 6" o.c. horizontally. Engage the back wires securely at the crimps with the fasteners.

3. Lap lath one mesh and lace with tie wire. Stagger vertical laps. Lap paper weatherboard style.

4. Openings: Cut wire and paper to fit snug to the opening, take care to cut paper from behind any vents.

5. Provide 1/4" continuous clearance between lath and building paper.

B. Expanded Metal Lath:

1. Apply metal lath taut, with long dimension perpendicular to supports. Place projections of lath against supports.

2. Lap ends minimum 1 inch. Adequately secure end laps with tie wire where they occur between supports.

3. Lap sides of diamond mesh lath minimum 1-1/2 inches. Nest outside ribs of rib lath together.

4. Attach metal lath to wood supports using nails at maximum 6 inches on center.

5. Continuously reinforce all internal angles with cornerite, except where the metal lath forms the angle reinforcement. Fasten cornerite at extreme edges only.

6. Place 4 inch wide x 12 inch long strips of metal lath diagonally at corners of all openings. Secure rigidly in place.

C. Install lath in conformance with California Building Code (CBC).

3.02 MISCELLANEOUS PLASTER ACCESSORIES

A. Install miscellaneous vent screens, control joints, casing beads, drip screeds, corner beads weep screeds and reveals true to lines and levels and to surface requirements to maintain smooth level of finish coats. Cut any paper backing from behind vent screeds to maintain required air flows. Install control joints at maximum 10'-0" spacing on walls and soffits if not shown otherwise on drawings.

B. Architect to review layout of all control joints prior to application of first coat of stucco.

C. Miter all corners on vent screens and control joints.

D. Align wall and soffit expansion joints.

3.03 STUCCO APPLICATION

A. Apply stucco using three coat system.

B. First Coat:

1. Apply to minimum thickness of 3/8", completely embedding the lath.

2. Scratch to provide mechanical key.

3. Moist cure for a minimum of 7 days before applying second coat.

C. Second Coat:

1. Dampen first coat immediately before applying second coat.

2. Apply to minimum thickness of 3/8".

3. Bring to true, even plane by rodding and floating. Maintain surface flatness, with maximum variation of 1/8" in 10'.

4. Moist cure for a minimum of 48 hours and allow to dry for at least 7 days.

D. Finish Coat:

1. Provide integral color finish from custom color selected by Architect.

2. Dampen second coat evenly before applying finish coat.

3. Apply to minimum thickness of 1/8".

4. Moist cure for a minimum of 48 hours.

5. Texture shall be a medium dash.

6. Provide smooth finish in locations to accommodate mounting of identification devices.

3.04 ADJUST AND CLEAN

A. Patching:

1. Upon completion point-up plaster around trim and other locations where plaster meets dissimilar materials.

2. Cut out and patch defective, damaged, discolored or mottled plaster.

3. Stucco containing cracks and blisters shall be removed and replaced.

4. Match patch of defective or damaged plaster to existing work in form and texture.

B. Cleaning:

1. Remove plaster and protective materials from expansion beads, perimeter beads, and adjacent surfaces.

2. Remove stains from plaster surfaces that would adversely affect finish painting.

3.05 CLEANING AND PROTECTION

A. General: In addition to all other protection, protect all adjacent finished surfaces from the accidental application of plaster.

B. Cleaning Up: Upon completion of the work of this Section promptly inspect all adjacent surfaces and remove all traces of spilled and splashed plaster.

END OF SECTION

SECTION 09 30 00

TILE

PART 1 - GENERAL

1.01 SUMMARY

PROVISION OF DIVISION 01 APPLIES TO THIS SECTION.

A. Section Includes:

1. Ceramic and porcelain tile.
2. Waterproof membrane for tile.
3. Stone thresholds related to tile.
4. Mortar setting beds for floor and wall tile.

B. Related Sections:

1. Section 03 30 00: Cast-In-Place Concrete.
2. Section 07 90 05: Joint Sealants.
3. Section 08 31 00: Access Doors and Panels.
4. Section 09 21 16: Gypsum Board Assemblies
5. Division 22: Plumbing

1.02 SUBMITTALS

A. Product Data: Manufacturer's data, standard specifications, Material Safety Data Sheets, and other technical information for each product specified.

B. Material Samples: Manufacturer's standard palette, indicating full range of tile colors, textures, and grout colors.

C. Mock-Ups: For each type, color, and texture, minimum 1' x 1' or three full tile courses, on plexiglas to demonstrate proper bond mortar and coverage; grout color, hardness and depth.

D. Installation Instructions: Manufacturer's preparation and installation instructions.

E. Product Certificates: Signed by manufacturer certifying that the products furnished comply with requirements of this Specification.

F. Reference Methods: Copies of TCA and ANSI Methods.

1.03 QUALITY ASSURANCE

A. Comply with applicable parts of the following codes or standards as a minimum requirement:

1. ANSI A108. American National Standard Specifications for the Installation of Ceramic Tile.
2. ANSI A118. American National Standard Specifications for Ceramic Tile Installation Materials.
3. ANSI A137.1, Standard Specifications for Ceramic Tile.
4. ASTM A 185 - Steel Welded Wire Fabric, Plain, for Concrete Reinforcement.
5. ASTM C 150 - Portland Cement.
6. ASTM C-144 – Sand.
7. ASTM C 206 - Finishing Hydrated Lime.

8. ASTM C-206 or C 207 - Hydrated Lime for Masonry Purposes.
9. ASTM C 645 - Nonstructural Steel Framing Members.
10. ASTM C 1028 - Determining the Static Coefficient of Friction of Ceramic Tile and other like surfaces by the Horizontal Dynamometer Pull-Meter Method.
11. ASTM D 4551 - Poly Vinyl Chloride (PVC) Plastic Flexible Concealed Water-Containment Membrane.
12. Tile Council of America (TCA) – Handbook for Ceramic Tile installation.

B. Grade Certificate and Labeling: With each delivery of tile, furnish manufacturer's "Master Grade Certificate" to the Project Inspector.

C. Laboratory Testing: Tile shall be tested for compliance with ASTM C 1028 by a testing laboratory approved by DSA.

D. Source of Materials: Provide materials obtained from one source for each type and color of tile, grout, and setting materials.

E. Comply with all requirements of 2010 California Building Code and ADA.

F. Qualifications of Tile Manufacturer: Company specializing in ceramic tile, mosaics, pavers, trim units, and thresholds with five years minimum experience. Obtain tile from a single source with resources to provide products of consistent quality in appearance and physical properties.

G. Qualification of Installation System Manufacturer: Company specializing in installation systems/ mortars, grouts/ adhesives with ten years minimum experience. Obtain products from single source manufacturer to insure consistent quality and compatibility.

H. Qualifications of Installer: Company specializing in installation of ceramic tile, mosaics, pavers, trim units and thresholds with five years experience with installations of similar scope, materials, and design.

I. Pre-Construction Meetings:

1. Prior to start of the Work of this section and after approval of submittals, schedule an on-site meeting with the Contractor, OAR, Architect, IOR, and representatives of the material manufacturer and tile installer to review construction conditions and Drawings for conformance with the requirements of this Specification for each substrate.
2. Prior to laying tile and after surfaces to receive tile are installed (mortar beds, backing boards, joint separators) and after testing of waterproof membrane, schedule an on-site meeting with the Contractor, OAR, Architect, IOR and representatives of the material manufacturer and tile installer to review tile, tile installation materials, and finishing equipment for conformance with the requirements of this Specification.

1.04 DELIVERY, STORAGE AND HANDLING

A. Deliver tile in sealed containers, with manufacturer's labels intact.

B. Deliver other products in manufacturer's unopened containers.

C. Keep all materials clean and dry.

1.05 MAINTENANCE

A. Extra Materials: Provide a minimum of 5 percent of each type and color of tile and accessory shapes, from the same run or lot as the installed tile, in manufacturers' cartons and labeled.

1.06 WARRANTY

A. Manufacturer shall provide a 5 year material warranty from the date of final acceptance of the facility.

B. Installer shall provide a 5 year labor warranty from the date of final acceptance.

C. For waterproofing, manufacturer shall provide a 10 year material warranty for waterproofing installation, tile setting, and grouting materials.

PART 2 - PRODUCTS (Refer also to Section 09 00 00)

2.01 GENERAL

A. Tile: To establish quality, the Specification is based on ANSI A.137.1 Standard Grade. Equivalent tile products from the following manufacturers may be provided:

1. Daltile Ceramic and Porcelain Floor Tile and Ceramic Wall Tile
2. American Olean Ceramic and Porcelain Floor Tile and Ceramic Wall Tile.
3. Mohawk Ceramic and Porcelain Floor Tile and Ceramic Wall Tile.
4. Or approved equal.

B. Installation Materials: To establish quality, the Specification is based on setting and waterproofing materials and methods by Laticrete International, Inc. Bethany, CT. Telephone: (800) 243-4788. Website: www.laticrete.com. Equivalent products and methods of the following manufacturers may be provided:

1. Custom Building Products, Seal Beach, CA. Telephone: (562) 598-8808; (800) 272-8786. Telefax: (800) 200-7765. Website: www.custombuildingproducts.com.
2. Mapei, Deerfield Beach, FL. Telephone: (800) 42-MAPEI. Local Distributor (Anaheim, CA): (714) 385-0155. Telefax: (714) 978-0614. Website: www.mapei.com.

C. Colors, Textures, and Patterns: Tile from manufacturer's standard product line, 90% from price group 2, 10% from price group 3, except as indicated otherwise. Tile trim and accessories shall match adjoining tile. Grout color shall match tile unless otherwise indicated.

D. Tile sizes: Tile sizes specified are modular dimensions unless otherwise indicated.

2.02 TILE

A. Through-body Porcelain Floor Tile:

1. Size: As shown in Section 09 00 00, Colors and Materials.
2. Colors and patterns by Architect from price groups specified.
3. Slip Resistance: Resistant to slipping appropriate to the installed conditions of use, as required by the California Building Code and ADA.
    a. As a minimum, the coefficient of friction as measured by ASTM C 1028 shall be 0.6.

B. Glazed Ceramic Wall Tile

1. Size: As shown in Section 09 00 00, Color and Materials

2. Colors and patterns by Architect from price groups specified

3. Slip Resistance for floor tile: Resistant to slippage appropriate to the installed conditions of use, as required by the CBC and the ADA.

a. As a minimum, the coefficient of friction as measured by ASTM C 1028 shall be 0.6.

C. Trim:

1. Integral bullnose at external corners.
2. Provide bullnose where tile projects from jamb.
3. Tile coved base with wall tile above: Mfr's product.
4. Tile coved base without wall tile above: Mfr's product (6-inch high sanitary coved base).
5. Cap at wainscot: Mfr's product.

D. Stone Thresholds:

1. ASTM C 503 for exterior installation. Marble thresholds with minimum abrasive hardness value of 10 per ASTM C 241.
2. White honed marble complying with Marble Institute of America Group "A," unless other color indicated.
3. Size and profile shaped to provide transition between tile surfaces and adjoining finished floor surfaces, or as indicated. Width not less than 4." Edges beveled on a slope of no greater than 1:2. Cut to fit door frame profile.

2.03 INSTALLATION MATERIALS

A. Mortar Sand: ASTM C 144.

B. Portland Cement: ASTM C 150, Type I or II.

C. Hydrated Lime: ASTM C 207, Type S; or ASTM C 206.

D. Portland Cement Mortar: ANSI 108.1B

E. Latex Portland Cement Mortar: Sand-cement mortar mix gauged with Laticrete 38 Acrylic Admix or Custom Building Products Acrylic Mortar Admix.

F. Latex Portland Cement Bond Mortar: Laticrete 317 Floor & Wall Thinset gauged with Laticrete 3701 Admix, or Custom Building Products Master Blend mixed with Acrylic Mortar Admix.

G. Latex Portland Cement Bond Mortar over Waterproof Membrane: Laticrete 317 Floor & Wall Thinset gauged with Laticrete 3701 Admix.

H. Waterproof Membrane: Thin, cold-applied, single component liquid with embedded reinforcing fabric equal in performance characteristics to Laticrete 9235 Waterproof Membrane.

I. Reinforcing Wire Fabric: 2-inch x 2-inch, 16 x 16 gage, galvanized electrically welded wire mesh, ASTM A 185.

J. Latex Portland Cement Grout: Laticrete Sanded Grout (1500 Series) or Unsanded Grout (1600 Series, for joints smaller than 1/8").

K. Cleavage Membrane and Wall Backing Paper: ASTM D 226, Type I (No. 15) 15-pound asphalt-saturated felt.

L. Separation Material (for all caulked joints including perimeters): Quality Foam, QF 200 white, 3/8" wide x 5" high.

M. Backer Rod for sealants (for ceramic mosaic fields): Polyethylene foam, closed-cell, flexible and compressible, 3/16" diameter.

N. Cleaner and Sealer:

1. Cleaner and sealer shall be from one manufacturer, acceptable to tile and grout manufacturers. To establish quality, the Specification is based on DuPont StoneTech® Professional Stone and Tile Care Products, as appropriate for the application. Equivalent products from Aqua Mix, Miracle Sealants Co. or Watco Tile and Brick shall be considered suitable equal products.
2. Cleaner (cement-based or epoxy-based grout): For standard cleaning DuPont StoneTech Professional Klenz-All Cleaner. For heavy-duty and stubborn stain cleaning, in addition to Klenz-All Cleaner treatment, DuPont StoneTech Professional Oil Stain Remover. For removal of efflorescence, grout haze, salts, mineral deposits and calcium-based stains DuPont StoneTech Professional Restore Acidic Cleaner.
3. Sealer (cement-based grout): DuPont StoneTech Professional Heavy-Duty Grout Sealer or Advanced Grout Sealer.

PART 3 - EXECUTION

3.01 EXAMINATION AND PREPARATION

A. Examine substrates, areas, and conditions where tile will be installed for compliance with requirements for installation tolerances and other conditions affecting performance of installed tile. Verify that all vents, drains, piping, and other projections through substrate have been installed. Proceed with Work only after all conditions are in compliance.

B. Verify that substrates for setting tile are firm; dry; clean and within flatness tolerances required by relevant ANSI A108 tile installation standards. Prepare surfaces as follows:

1. Concrete Floors: Allow concrete floors to cure for 28 days minimum before beginning tile and grout installation. Remove laitance, sand, dust, and loose particles with air blast. If coatings remain, including curing compounds and other substances that contain soap, wax, oil, or silicone and are incompatible with tile-setting materials, remove them by using a terrazzo or concrete grinder, a drum sander, a polishing machine equipped with a heavy-duty wire brush, or a shot-blast system.

C. Substrates to receive wall tile and base shall be:

1. Scratch coat of cement plaster, as specified in Section 09 24 23: Portland Cement Stucco. Ribbed metal lath is not acceptable
2. Cementitious backing panels, as specified in Section 09 21 16: Gypsum Board.
3. Tile Backer Board panels, as specified in Section 09 21 16: Gypsum Board.

D. Verify that installation of grounds, anchors, recessed frames, electrical and mechanical items of Work, and similar items located in or behind tile have been completed before installing tile.

E. Verify that joints and cracks in tile substrates are coordinated with tile caulked- joint locations; if not coordinated, adjust as required by the Architect.

F. Do not install tile until construction in spaces is completed and ambient temperature and humidity conditions are being maintained to comply with referenced standards and manufacturer's written instructions.

G. Protect adjacent surfaces during progress of the Work of this section.

3.02 TILE INSTALLATION, GENERAL

A. Install tile in grid pattern, unless otherwise indicated. Align joints when adjoining tiles on floor, base, walls, and trim are the same size. Lay out Work and center tile fields in both directions in each space or on each wall area. Adjust to minimize tile cutting. Provide uniform joint widths, unless otherwise indicated.

B. For tile mounted in sheets, install joints between tile sheets the same width as joints within tile sheets so joints between sheets are not apparent in finished Work.

C. Extend Work into recesses and under or behind equipment and fixtures to form a complete covering without interruptions, unless otherwise indicated. Terminate Work neatly at obstructions, edges, and corners without disrupting pattern or joint alignments.

D. Accurately form intersections and returns. Perform cutting and drilling of tile without marring visible surfaces. Carefully grind cut edges of tile abutting trim, finish, or built-in items for straight aligned joints. Fit tile closely to electrical outlets, piping, fixtures, and other penetrations so plates, collars, or covers overlap tile.

E. Locate expansion, control, contraction or isolation joints and other sealant-filled joints, directly above joints in concrete substrates, at horizontal and vertical changes in plane, or where indicated during installation of mortar beds. In quarry tile floors, provide at 12 feet on center maximum. Use foam to provide 3/8-inch width. Do not saw-cut joints after installing tiles.

F. Prepare and clean joints to be caulked, and apply sealants to comply with requirements of Division 7 Section "Joint Sealants."

G. Conform to manufacturers printed instructions, and applicable requirements of ANSI and TCA Standards.

3.03 TILE INSTALLATION, FLOOR

A. Install reinforcing and latex Portland-cement mortar setting bed over cured concrete slab. Lap reinforcing at least one full mesh, and support or lift so that it is approximately in the middle of mortar bed. Do not abut against vertical surfaces. Install foam separation material at perimeters and expansion joint locations for caulked joints.

B. Mix setting mortar in accordance with ANSI A.108.1a.2.2..

C. Once begun, mortar installation must continue until room is completely filled. Discard any batch not floated and finished within ½ hour of mixing. Firmly compact before screeding. Screed to true plane and pitch as indicated. Slope mortar bed sufficiently that water flows to drain and no puddling will occur. Slope mortar down to floor drains for proper installation of waterproof membrane. After screeding, firmly rub down with steel or wood float.

D. Cure mortar bed with a light fog spray of water and cover with 6-mil Visqueen for 72 hours.

E. Waterproof Membrane:

1. Install waterproof membrane where required per TCA Standard F121-07. Extend membrane up wall mortar or backing board as follows:
   a. 6 inches minimum, or 3 inches above top of curb wall.
   b. 12 inches minimum at shower locations (hot-mopped asphalt)

2. Insure that all layers of membrane are fully inserted into clamping ring of floor drain. After membrane installation and before tile setting, install pea gravel around sub drain to prevent blockage of weep holes and place mortar to proper level for setting tile.
3. Before setting tile and after seven (7) days curing, water test the membrane by damming drains and doors, filling floor with water to 4-inch minimum depth, and leaving for 24 hours. Correct any leaks and re-test before proceeding. After testing, protect membrane from traffic until tile Work begins.

F. Install tile over properly cured setting bed or waterproof membrane utilizing "thin-set" method with latex Portland cement bond mortar, in accordance with manufacturer's printed instructions and ANSI A108.5. Confirm substrate is completely clean and free of dust. Cut foam at floor perimeters flush with top of mortar bed. Insure that bond coats do not intrude into joints to be caulked.

G. Minimum coverage of bond mortar shall be 80%. Place tile into fresh mortar and move and press or beat in tile to insure full contact. Before setting proceeds, set and remove three tiles or sheets of tiles to confirm specified coverage of bond mortar. If coverage is insufficient, utilize a larger toothed trowel or back butter tiles until proper coverage is provided.

H. Install tile on floors with the following joint widths:

1. Ceramic Mosaic Tile: 1/16 to 1/8 inch.

3.04 TILE INSTALLATION, WALLS

A. Install wall mortar beds before floor mortar beds.

B. On plaster walls, clean scratch coat surface of loose or foreign materials, fog spray with water, and install brown coat mortar bed over scratch coat to a thickness not less than 3/8" and not greater than 3/4 inch. Once started, wall mortar installation must continue until wall is completely floated. Discard any batch not floated and finished within ½ hour of mixing. As soon as wall mortar is dried to sufficient hardness but still in a plastic condition, firmly rub down with wood float and scribe all plane interfaces the full depth.

C. Cover cure with 40 wt. Kraft paper for 72 hours minimum.

D. Install tile over properly cured setting bed, waterproof membrane, or cementitious backing panels utilizing "thin-set" method with latex Portland cement bond mortar, in accordance with manufacturer's printed instructions and ANSI A108.5. Confirm substrate is completely clean and free of dust. Insure that bond coats do not intrude into joints to be caulked.

E. Minimum coverage of bond mortar shall be 80%.

F. Lay out the Work so tiles will be centered on each wall or section of wall in order to minimize tile cuts. Lay out tile wainscots to next full tile beyond dimensions indicated. Spot setting bed with mortared tile, set plumb and true, to accurately indicate plane of finished tile surfaces.

G. Install tile on walls with following joint widths:

1. Glazed Wall Tile: 1/16 inch.
2. Ceramic Mosaic Tile: 1/16 to 1/8 inch.

H. Horizontal joints shall be level, vertical joints plumb with surfaces true and plumb, edges of tiles flushed.

I. Rub exposed cuts smooth with a fine stone; no cut edge shall be set against a fixture or adjoining surface without a 1/16 inch joint to be caulked.

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

3.05 GROUTING

A. Prior to starting, ensure that all wall and floor tile surfaces are clean and any excessive bond mortar is scraped and vacuumed from joints (approximately 2/3 depth of tile should be open for grouting). Follow manufacturer's instructions for mixing grout. Once grout Work commences, proceed until complete wall or floor area is finished utilizing one batch of grout.

B. Latex Portland cement grouting: Dampen tile surface and joints with water using sponge, but leaving no puddles in joints. Force grout into joints using sufficient pressure on rubber float so as to fill joints completely, and scrape excess grout off tile surface with rubber float. Smooth or tool grout to uniform joint finish. Do not over water.

C. Curing latex Portland cement grout: Remove final grout haze with clean soft cloth, and cover with 40-weight Kraft paper to cure. Leave paper in place for protection. Cover wall surfaces with 40-weight Kraft paper for 72 hours.

3.06 CLEANING AND SEALING

A. If grout scum is not visible on tile surface after curing, clean tile surface with clear water. Remove and replace cracked, broken or defective Work with proper material.

B. If, when curing membrane is removed, grout scum is visible on tile surface, follow this cleaning method:

1. Immediately recover floor with paper or felt and allow to continue curing for a minimum of 14 days; uncover floor and maintain entire tile surface saturated with clean cool water for not less than 2 hours.
2. Utilize a neutral cleaner acceptable to manufacturers of tile and grout, and follow manufacturer's instruction. Do not provide generic acid cleaners.
3. Wet tile floors and apply cleaning solution to floor surface, then scrub with a brush. Rinse area several times with clean water to flush solution off floor surface.

C. Apply penetrating sealer in accordance with manufacturer's instructions utilizing a dense sponge applicator, paint pad, sprayer or brush. Avoid overlapping, puddling, and rundown. Completely wipe surface dry within 3 to 5 minutes using cotton or paper towels; do not allow sealer to dry on tile. After 2 hours, test surface by applying water droplets to surface. If water is absorbed, apply a second coat. Avoid surface traffic for 24 hours.

3.07 CAULKING

A. Insure joints to be caulked are free and clear of all setting and grouting materials and construction debris. Do not permit any foot traffic on installed caulking for a minimum of 48 hours or protect with hardboard strips.

B. Install in accordance with Section 07 90 05: Joint Sealants.

3.08 PROTECTION

A. Admit no traffic where tile is installed until mortar and grout has set for a minimum of 72 hours.

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

3.09 CLEAN UP

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

END OF SECTION

SECTION 09 51 00

ACOUSTICAL CEILINGS

PART 1 GENERAL

1.01 SECTION INCLUDES

A. Suspended metal grid ceiling system.

B. Acoustical units.

1.02 RELATED REQUIREMENTS

A. Section 07 21 00 - Thermal Insulation: Acoustical insulation.

B. Section 07 90 05 - Joint Sealers: Acoustical sealant.

C. Section 08 31 00 - Access Doors and Panels: Access panels.

D. Section 21 13 13 – Wet-Pipe Sprinkler Systems: Sprinkler heads in ceiling system.

E. Section 23 37 00 - Air Outlets and Inlets: Air diffusion devices in ceiling.

F. Section 26 51 00 - Interior Lighting: Light fixtures in ceiling system.

1.03 REFERENCE STANDARDS

A. ASTM C 635 - Standard Specification for the Manufacture, Performance, and Testing of Metal Suspension Systems for Acoustical Tile and Lay-in Panel Ceilings; 2007.

B. ASTM C 636/C 636M - Standard Practice for Installation of Metal Ceiling Suspension Systems for Acoustical Tile and Lay-in Panels; 2008.

C. ASTM E 580/E 580M - Standard Practice for Application of Ceiling Suspension Systems for Acoustical Tile and Lay-in Panels in Areas Requiring Seismic Restraint; 2010a.

D. ASTM E 1264 - Standard Classification for Acoustical Ceiling Products; 1998 (Reapproved 2005).

E. LEED NC version 3.0 - Low-Emitting Materials Product List; Green Seal Standard 36; www.greenseal.org

F. UL (FRD) - Fire Resistance Directory; Underwriters Laboratories Inc.; current edition.

1.04 ADMINISTRATIVE REQUIREMENTS

A. Sequence work to ensure acoustical ceilings are not installed until building is enclosed, sufficient heat is provided, dust generating activities have terminated, and overhead work is completed, tested, and approved.

B. Do not install acoustical units until after interior wet work is dry.

1.05 SUBMITTALS

A. See Section 01 33 00 -Submittal Procedures.

B. Shop Drawings: Indicate grid layout and related dimensioning.

C. Samples: Submit two full size samples illustrating material and finish of acoustical units.

D. Maintenance Materials: Furnish the following for County of Riverside's use in maintenance of project.

1. See Section 01 60 00 - Product Requirements, for additional provisions.
2. Extra Acoustical Units: Quantity equal to 5 percent of total installed.

E. LEED Submittal: Documentation of recycled content, location of manufacture and low-emitting materials.

1.06 QUALITY ASSURANCE

A. Suspension System Manufacturer Qualifications: Company specializing in manufacturing the products specified in this section with minimum ten years documented experience.

1.07 FIELD CONDITIONS

A. Maintain uniform temperature of minimum 60 degrees F, and maximum humidity of 40 percent prior to, during, and after acoustical unit installation.

PART 2 PRODUCTS

2.01 ACOUSTICAL UNITS (Refer also to Section 09 00 00)

A. Manufacturers:
1. Armstrong World Industries, Inc; www.armstrong.com. Basis of design.
2. CertainTeed Corporation; www.certainteed.com.
3. USG; www.usg.com.
4. Substitutions: See Section 01 63 00 - Substitution Requirements.

B. Acoustical Units - General: ASTM E 1264, Class A.

C. Acoustical Tile Types C-3: Mineral Fiber, ASTM E 1264 Type IV, with to the following characteristics:
1. VOC Content: Certified as Low Emission by one of the following :
   a. Low-Emitting Materials per Green Seal Standard 36; www.greenseal.org/certification/standard
   b. ASHRAE Standard 62.1-2004
2. Size: 24" x 24" x ¾"
3. Light Reflectance: 0.90, determined as specified in ASTM E 1477.
4. NRC Range: 0.70, determined as specified in ASTM C 423.
5. Ceiling Attenuation Class (CAC):.35 to .39, determined as specified in ASTM E 1111.
6. Edge: Beveled tegular.
7. Surface Color: White.
8. Surface Texture: Fine.
9. Antimicrobial Protection: Inherent

D. Additional Ceiling Materials refer to Specification Section 09 54 26

2.02 SUSPENSION SYSTEM(S)

A. Manufacturers:
1. Same as for acoustical units.
2. Substitutions: See Section 01 63 00 - Substitution Requirements.

B. Suspension Systems - General: ASTM C 635; die cut and interlocking components, with stabilizer bars, clips, splices, perimeter moldings, and hold down clips as required.

C. Flush Steel Suspension System: Formed galvanized steel, commercial quality cold rolled; heavy-duty.
1. Profile: Tee; HD 9/16" Bolt Slot System.
2. Construction: Double web.

3. Finish: White painted.
4. Compression Strut: ASTM A513, telescoping design as detailed on drawings, galvanized 3/4 inch diameter 14 gauge rigid steel tubing crimped and attached to structure per details.

2.03 ACCESSORIES

A. Support Channels and Hangers: Galvanized steel; size and type to suit application, seismic requirements, and ceiling system flatness requirement specified.

B. Perimeter Moldings: Same material and finish as grid.
   1. At Exposed Grid: Provide L-shaped molding for mounting at same elevation as face of grid.

C. Acoustical Insulation: Specified in Section 07 21 00.

D. Gypsum Board: Fire rated type; 5/8 inch thick, ends and edges square, paper faced.

PART 3 EXECUTION

3.01 EXAMINATION

A. Verify existing conditions before starting work.

B. Verify that layout of hangers will not interfere with other work.

3.02 INSTALLATION - SUSPENSION SYSTEM

A. Install suspension system in accordance with ASTM C 636/C 636M, ASTM E 580/E 580M, and manufacturer's instructions and as supplemented in this section.

B. Rigidly secure system, including integral mechanical and electrical components, for maximum deflection of 1:360.

C. Install after major above-ceiling work is complete. Coordinate the location of hangers with other work.

D. Hang suspension system independent of walls, columns, ducts, pipes and conduit. Where carrying members are spliced, avoid visible displacement of face plane of adjacent members.

E. Where ducts or other equipment prevent the regular spacing of hangers, reinforce the nearest affected hangers and related carrying channels to span the extra distance.

F. Do not support components on main runners or cross runners if weight causes total dead load to exceed deflection capability.

G. Support fixture loads using supplementary hangers located within 6 inches of each corner, or support components independently.

H. Do not eccentrically load system or induce rotation of runners.

I. Perimeter Molding: Install at intersection of ceiling and vertical surfaces and at junctions with other interruptions.
   1. Use longest practical lengths.
   2. Overlap and rivet corners.

J. Install light fixture boxes constructed of gypsum board above light fixtures in accordance with fire rated assembly requirements and light fixture ventilation requirements.

3.03 INSTALLATION - ACOUSTICAL UNITS

A. Install acoustical units in accordance with manufacturer's instructions.

B. Fit acoustical units in place, free from damaged edges or other defects detrimental to appearance and function.

C. Fit border trim neatly against abutting surfaces.

D. Install units after above-ceiling work is complete.

E. Install acoustical units level, in uniform plane, and free from twist, warp, and dents.

F. Cutting Acoustical Units:
   1. Make field cut edges of same profile as factory edges.

G. Where round obstructions occur, provide preformed closures to match perimeter molding.

H. Install hold-down clips on panels within 20 ft of an exterior door.

3.04 TOLERANCES

A. Maximum Variation from Flat and Level Surface: 1/8 inch in 10 feet.

B. Maximum Variation from Plumb of Grid Members Caused by Eccentric Loads: 2 degrees.

END OF SECTION

SECTION 09 54 26

WOOD PANEL CEILINGS

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

Drawings and general conditions of Contract, including General and Supplementary Conditions and Divisions-1 Specification sections apply to work of this section.

1.2 SUMMARY

A. Section Includes:
   1. Wood veneer ceiling planks.
   2. Concealed grid suspension system.
   3. Wire hangers, fasteners, main runners, wall angle moldings and accessories.

B. Related Sections:
   1. Section 06 42 00 Wood Wall Panels
   2. Section 09 51 00 - Acoustical Ceilings
   3. Section 09 21 16 - Gypsum Board Assemblies
   4. Divisions 23 - HVAC
   5. Division 26 Sections - Electrical Work

C. Alternates
   1. Prior Approval: Unless otherwise provided for in the Contract documents, proposed product substitutions may be submitted no later than TEN (10) working days prior to the date established for receipt of bids. Acceptability of a proposed substitution is contingent upon the Architect's review of the proposal for acceptability and approved products will be set forth by the Addenda. If included in a Bid are substitute products, which have not been approved by Addenda, the specified products shall be provided without additional compensation.
   2. Submittals, which do not provide adequate data for the product evaluation, will not be considered. The proposed substitution must meet all requirements of this section, including but not necessarily limited to, the following: Single source materials suppliers (if specified in Section 1.5); panel design, size, composition, color, and finish; suspension system component profiles and sizes; compliance with the referenced standards.

1.3 REFERENCES

A. American Society for Testing and Materials (ASTM): Took some out
   1. ASTM A 641 Standard Specification for Zinc-Coated (Galvanized) Carbon Steel Wire.
   2. ASTM A 653 Standard Specification for Steel Sheet, Zinc-Coated (Galvanized) by the Hot- Dip Process.
   3. ASTM A 1008 Standard Specification for Steel, Sheet, Cold Rolled, Carbon, Structural, High-Strength Low-Alloy and High-Strength Low-Alloy with Improved Formability.
   4. ASTM C 635 Standard Specification for Metal Suspension Systems for Acoustical Tile and Lay-in Panel Ceilings.
   5. ASTM C 636 Recommended Practice for Installation of Metal Ceiling Suspension Systems for Acoustical Tile and Lay-in Panels.

6. ASTM E 84 Standard Test Method for Surface Burning Characteristics of Building Materials.
7. ASTM E 580 Application of Ceiling Suspension Systems for Acoustical Tile and Lay-In Panels in Areas Requiring Seismic Restraint.
8. ASTM E 1264 Classification for Acoustical Ceiling Products.

1.4 SUBMITTALS

A. Product Data: Submit manufacturer's technical data for each type of ceiling unit and suspension system required.
B. Installation Instructions: Submit manufacturer's installation instructions as referenced in Part 3, Installation.
C. Samples: Minimum 3-1/2 inch x 5-1/2 inch samples of specified acoustical panel; 8 inch long samples of exposed wall molding and suspension system, including main runner.
D. Shop Drawings: Layout and details of ceilings. Show locations of items which are to be coordinated with, or supported by the ceilings.
E. Certifications: Manufacturer's certifications that products comply with specified requirements, including laboratory reports showing compliance with specified tests and standards.
F. All products not conforming to manufacturer's current published values must be removed, disposed of and replaced with complying product at the expense of the Contractor performing the work.

1.5 QUALITY ASSURANCE

A. Single-Source Responsibility: Provide ceiling panel units and grid components by a single manufacturer.
B. Fire Performance Characteristics: Identify ceiling components with appropriate markings of applicable testing and inspecting organization.
    1. Surface Burning Characteristics: As follows, tested per ASTM E 84 and complying with ASTM E 1264 for Class A products.
        a. Flame Spread: 25 or less
        b. Smoke Developed: 50 or less
    2. HPVA (Hardwood Plywood and Veneer Association) certification and audit program per ASTM E-84 tunnel test.
C. Woodworking Standards: Manufacturer must comply with specified provisions of Architectural Woodworking Institute quality standards.
D. Coordination of Work: Coordinate ceiling work with installers of related work including, but not limited to building insulation, gypsum board, light fixtures, mechanical systems, electrical systems, and sprinklers.

1.6 DELIVERY, STORAGE, AND HANDLING

A. Store ceiling components in a dry interior location in their cartons prior to installation to avoid damage. Store cartons in a flat, horizontal position. The protectors between the panels should not be removed until installation.
B. Do not store in unconditioned spaces with humidity greater than 55 percent or lower than 25 percent relative humidity and temperatures lower than 50 degrees F or greater than 86 degrees F. Panels must not be exposed to extreme temperatures, for example, close to a heating source or near a window with direct sunlight.
C. Handle ceiling units carefully to avoid chipped edges or damage to units in any way.

1.7 PROJECT CONDITIONS

A. Wood veneer ceiling materials should be permitted to reach room temperature and have a stabilized moisture content for a minimum of 72 hours before installation.
B. The wood veneer panels should not be installed in spaces where the temperature or humidity conditions vary greatly from the temperatures and conditions that will be normal in the occupied space.
C. As interior finish products, the wood veneer panels are designed for installation in temperature conditions between 50 degrees F and 86 degrees F, in spaces where the building is enclosed and HVAC systems are functioning and will be in continuous operation. Relative humidity should not fall below 25 percent or exceed 55 percent.

1.8 WARRANTY

A. Wood Veneer Panel: Submit a written warranty executed by the manufacturer, agreeing to repair or replace panels that fail within the warranty period. Failures include, but are not limited to:
    1. Ceiling Panels: Defects in materials or factory workmanship.
    2. Grid System: Rusting and manufacturing defects.
B. Warranty Period:
    1. Wood veneer panels: One (1) year from date of final acceptance.
    2. Grid: Ten years from date of final acceptance.
C. The Warranty shall not deprive the Owner of other rights the Owner may have under other provisions of the Contract Documents and will be in addition to and run concurrent with other warranties made by the Contractor under the requirements of the Contract Documents.

1.9 MAINTENANCE

A. Extra Materials: Deliver extra materials to Owner. Furnish extra materials described below that match products installed. Packaged with protective covering for storage and identified with appropriate labels.
    1. Ceiling Units: Furnish quality of full-size units equal to 2.0 percent of amount installed.
    2. Exposed Suspension System Components: Furnish quantity of each exposed suspension component equal to 1.0 percent of amount installed.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

A. Ceiling Panels:
    1. Armstrong World Industries, Inc. , Lissa Blyth 310-294-0493
    2. Sound Seal
    3. Rulon Company
B. Suspension Systems:
    1. Armstrong World Industries, Inc. , Lissa Blyth 310-294-0493
    2. Sound Seal
    3. Rulon Company

2.2.0 WOOD CEILING UNITS

A. Ceiling Panels Type C-1:

    1. Surface Texture: Smooth
    2. Composition: Wood
    3. Finish: Manufacturer's standard natural veneer

4. Species: Manufacturers standard: Natural Variations Light Cherry (NLC).
5. Size: 3-3/4 inch X 96 inch X 3/4 inch
6. Reveal: 3/4 inch reveal
7. Edge Banding and Trim: To match face veneer
8. Perimeter Treatment: Manufacturer's standard
9. Fire Performance: Class A per IBC, Flame Spread 25 or less, Smoke Developed 50 or less
10. NRC Rating: 0.50
11. Dimensional Stability: Standard.
12. Acceptable Product:
    1. Armstrong World Industries: WoodWorks Linear: Item #6640W1-NLC, (FSC-certified)
    2. Sound Seal: Wood Trends Standard (Plank)
    3. Rulon Company: Linear Open

13. Suspension System: Armstrong Product 5370-12' HD linear carriers (concealed) w/integral clips (factory-applied), Dimensions: 12'x15/16"x1-11/16".

B. Ceiling Panels Type C-2 All aspects same as C-1 except for the following:

5. Size: 2'x6'x3/4"

10. NRC Rating: 0.65

12. Acceptable Product:

    1. Armstrong World Industries: WoodWorks Concealed Model: 5984W4NLC, (FSC-certified)

13. Suspension System: Armstrong Product: Prelude XL HD 15/16" Grid, Color: Tech Black

C. Accessories:
1. Wood Biscuits for joining and aligning planks end-to-end.
2. Linear Splice Plate for joining and aligning planks end-to-end to meet seismic requirements

2.2.1 SUSPENSION SYSTEMS

A. Components: All linear carriers shall be commercial quality hot dipped galvanized steel as per ASTM A 653. Linear carriers are double-web steel construction with 15/16 inch type concealed flange design. Exposed surfaces chemically cleansed, capping prefinished galvanized steel in baked polyester paint. Linear carriers shall have rotary stitching.
   1. Structural Classification: ASTM C 635, Heavy Duty.
   2. Color: Black, unless noted otherwise.
   3. Clips: Integral, factory-applied, spring steel clips on linear carriers in sufficient number to receive 8 foot linear wood nominal 6 inch planks.
   4. Acceptable Product: Manufacturer's recommended heavy duty carrier system
B. Attachment Devices: Size for five times design load indicated in ASTM C 635, Table 1, Direct Hung unless otherwise indicated.
C. Wire for Hangers and Ties: ASTM A 641, Class 1 zinc coating, soft temper, pre-stretched, with a yield stress load of at least time three design load, but not less than 12 gauge.

D. Accessories/Edge Moldings and Trim:
   1. Beam End Retaining Clip, 0.034 inch thick, hot-dipped galvanized cold-rolled steel per ASTM A568 - used to join main beam or cross tee to 7/8" wall molding.
   2. Linear Splices for splicing planks together end-to-end
   3. Wall Molding: 1-1/2 inch x 1-1/2 inch. Color by Architect

PART 3 - EXECUTION

3.1 EXAMINATION

A. Do not proceed with installation until all wet work such as concrete, terrazzo, plastering and painting has been completed and thoroughly dried out.
B. Proper designs for both supply air and return air, maintenance of the HVAC filters and building interior space are essential to minimize soiling. Before starting the HVAC system, make sure supply air is properly filtered and the building interior is free of construction dust.

3.2 PREPARATION

A. Measure each ceiling area and establish layout of acoustical units to balance border widths at opposite edges of each ceiling. Avoid use of less than half width units at borders, and comply with reflected ceiling plans. Coordinate panel layout with mechanical and electrical fixtures.

3.3 INSTALLATION

A. Install suspension system and panels in compliance with ASTM C636, ASTM E580, with the authorities having jurisdiction, and in accordance with the manufacturer's installation instructions.
B. Suspend linear carriers from overhead construction with hanger wires spaced 4 feet on center along the length of the linear carrier. Install hanger wires plumb and straight. Install linear carriers 24 inches on center (or less).
C. Install wall moldings at intersection of suspended ceiling and vertical surfaces.

3.4 ADJUSTING AND CLEANING

A. Replace damaged and broken panels.
B. Clean exposed surfaces of ceilings panels, including trim, edge moldings, and suspension members. Comply with manufacturer's instructions for cleaning and touch up of minor finish damage. Remove and replace work that cannot be successfully cleaned and repaired to permanently eliminate evidence of damage.

END OF SECTION

SECTION 09 65 00

RESILIENT FLOORING

PART 1 GENERAL

1.01 SECTION INCLUDES

A. Resilient sheet flooring.

B. Resilient tile plank flooring.

C. Resilient base and stair nosing

D. Installation accessories.

1.02 RELATED REQUIREMENTS

A. Section 03 30 00 - Cast-in-Place Concrete: Restrictions on curing compounds for concrete slabs and floors.

B. Section 07 90 05: Joint Sealants

1.03 REFERENCE STANDARDS

A. ASTM E 648 - Standard Test Method for Critical Radiant Flux of Floor-Covering Systems Using a Radiant Heat Energy Source; 2010.

B. ASTM F 710 - Standard Practice for Preparing Concrete Floors to Receive Resilient Flooring; 2008.

C. ASTM F 1066 - Standard Specification for Vinyl Composition Floor Tile; 2004.

D. ASTM F 1344 - Standard Specification for Rubber Floor Tile; 2010.

E. ASTM F 1861 - Standard Specification for Resilient Wall Base; 2008.

F. ASTM F 2034 - Standard Specification for Sheet Linoleum Floor Covering; 2008.

G. BAAQMD 8-51 - Bay Area Air Quality Management District Regulation 8, Rule 51, Adhesive and Sealant Products; www.baaqmd.gov; 2002.

H. NFPA 253 - Standard Method of Test for Critical Radiant Flux of Floor Covering Systems Using a Radiant Heat Energy Source; National Fire Protection Association; 2006.

I. SCAQMD 1168 - South Coast Air Quality Management District Rule No.1168; current edition; www.aqmd.gov.

J. SCS (CPD) - SCS Certified Products; Scientific Certification Systems; current listings at www.scscertified.com.

1.04 SUBMITTALS

A. See Section 01 33 00 - Submittal Procedures.

B. Product Data: Provide data on specified products, describing physical and performance characteristics; including sizes, patterns and colors available; and installation instructions.

C. Shop Drawings: Indicate seaming plan.

D. Selection Samples: Submit manufacturer's complete set of color samples for Architect's initial selection.

E. Concrete Testing Standard: Submit a copy of ASTM F 710.

F. Certification: Prior to installation of flooring, submit written certification by flooring manufacturer and adhesive manufacturer that condition of sub-floor is acceptable.

G. Maintenance Data: Include maintenance procedures, recommended maintenance materials, and suggested schedule for cleaning, stripping, and re-waxing.

H. LEED Report: Report recycled content and VOC emission of flooring; VOC content of adhesives.
   1. For linoleum flooring, report rapidly-renewable content and urea-formaldehyde content.

I. Maintenance Materials: Furnish the following for Owner's use in maintenance of project.
   1. See Section 01 60 00 - Product Requirements, for additional provisions.
   2. Extra Flooring Material: 100 s.f. of rolled material and one additional carton of tile material of each type and color.
   3. Extra Wall Base: 10 linear feet of each type and color.

J. LEED Submittal: Documentation of recycled content and location of manufacture.

1.05 DELIVERY, STORAGE, AND HANDLING

A. Protect roll materials from damage by storing on end.

1.06 FIELD CONDITIONS

A. Maintain temperature in storage area between 55 degrees F and 90 degrees F.

PART 2 PRODUCTS (Refer also to Section 09 00 00)

2.01 SHEET FLOORING

A. Linoleum Sheet Flooring: Homogeneous wear layer bonded to backing, with color and pattern through wear layer thickness:
   1. Minimum Requirements: Comply with ASTM F 2034, Type corresponding to type specified.
   2. VOC Content: Certified as Low Emission by one of the following :
      a. SCS Floorscore; www.scscertified.com.
      b. Greenseal; www.greenseal.org
   3. Backing: Jute fabric. PVC layer with polyester mesh at MPR
   4. Wear Layer Thickness: 0.080 inch, minimum, excluding backing.
   5. Pattern: Refer to Section 09 00 00.
   6. Color: Refer to Section 09 00 00.
   7. Seams: Heat welded.
   8. Manufacturers:
      a. Forbo Linoleum, Inc; Product: (Refer to Section 09 00 00) www.forbo-industries.com.
      b. Naturelife at MPR: (Refer to Section 09 00 00).
      b. Or equal.
      c. Substitutions: See Section 01 60 00 - Product Requirements.

B. Linoleum Welding Rod: Solid color linoleum produced by flooring manufacturer for heat welding seams, in color in color matching predominant flooring color.

2.02 PLANK FLOORING

A. Vinyl Plank Tile: Homogeneous, with color extending throughout thickness, and:
   1. Minimum Requirements: Comply with ASTM F 1700, of Class III, type B .

2. Critical Radiant Flux (CRF): Minimum 0.45 watt per square centimeter, when tested in accordance with ASTM E 648 or NFPA 253.
3. Size: 4" x 36".
4. VOC Content: Certified as Low Emission by one of the following :
   a. SCS Floorscore; www.scscertified.com.
5. Thickness: 0.125 inch.
6. Pattern: Refer to Section 09 00 00.
7. Manufacturers:
   a. Armstrong World Industries, Inc: www.armstrong.com.
   b. Mannington Mills, Inc: www.mannington.com.
   c. Or equal.
   d. Substitutions: See Section 01 63 00 - Substitution Requirements.

2.03 RUBBER BASE

A. Rubber Base: ASTM F 1861, Type TS rubber, vulcanized thermoset; top set Style B, Cove, and as follows:
   1. Critical Radiant Flux (CRF): Minimum 0.45 watt per square centimeter, when tested in accordance with ASTM E 648 or NFPA 253.
   2. Height: 4 inch.
   3. Thickness: 0.125 inch thick.
   4. Finish: Satin.
   5. Color: Refer to Section 09 00 00.
   6. Accessories: Premolded external corners and end stops.
   7. Manufacturers:
      a. Johnsonite, Inc: www.johnsonite.com.
      b. Roppe Corp: www.roppe.com.
      c. Or equal.
      d. Substitutions: See Section 01 63 00 - Substitution Requirements.

2.04 STAIR NOSING

A. Stair Nosing: Homogenous composition of PVC
   1. Minimum Requirements: Comply with ASTM F 2169, Class 1 and 2, Type TV
   2. Critical Radiant Flux: Class 1
   3. Size: Minimum 2" deep for Title 24; verify undercut with carpet and/or flooring type
   4. Product: Refer to Section 09 0000
   5. Manufacturers:
      a. Armstrong World Industries, Inc: www.armstrong.com
      b. Mannington Mills, Inc.: www.mannington.com
      c. Substitutions: See Section 01 6300 Substitution Requirements.

2.04 ACCESSORIES

A. Subfloor Filler: White premix latex; type recommended by adhesive material manufacturer.

B. Primers, Adhesives, and Seaming Materials: Waterproof; types recommended by flooring manufacturer.
   1. Provide only products having lower volatile organic compound (VOC) content than required by the more stringent of the South Coast Air Quality Management District Rule No.1168 and the Bay Area Air Quality Management District Regulation 8, Rule 51.

C. Moldings, Transition and Edge Strips: Refer to Section 09 00 00.

D. Sealer and Wax: Types recommended by flooring manufacturer.

PART 3 EXECUTION

3.01 PREPARATION

A. Prepare sub-floor surfaces as recommended by flooring and adhesive manufacturers.

B. Remove sub-floor ridges and bumps. Fill minor low spots, cracks, joints, holes, and other defects with sub-floor filler to achieve smooth, flat, hard surface.

C. Prohibit traffic until filler is cured.

3.02 INSTALLATION

A. Starting installation constitutes acceptance of sub-floor conditions.

B. Install in accordance with manufacturer's instructions.

C. Spread only enough adhesive to permit installation of materials before initial set.

D. Fit joints tightly.

E. Set flooring in place, press with heavy roller to attain full adhesion.

F. Where type of floor finish, pattern, or color are different on opposite sides of door, terminate flooring under centerline of door.

G. Install edge strips at unprotected or exposed edges, where flooring terminates, and where indicated.

H. Scribe flooring to walls, columns, cabinets, floor outlets, and other appurtenances to produce tight joints.

3.03 SHEET FLOORING

A. Lay flooring with joints and seams parallel to longer room dimensions, to produce minimum number of seams. Lay out seams to avoid widths less than 1/3 of roll width; match patterns carefully at seams.

B. Seams are prohibited in bathrooms, kitchens, toilet rooms, and custodial closets.

C. Double cut sheet at seams.

D. Lay flooring with tightly butted seams, without any seam sealer unless otherwise indicated.

E. Finish seams in linoleum by heat welding.

3.04 TILE FLOORING

A. Mix tile from container to ensure shade variations are consistent when tile is placed, unless manufacturer's instructions say otherwise.

3.05 RESILIENT BASE

A. Fit joints tightly and make vertical. Maintain minimum dimension of 18 inches between joints.

B. Install base on solid backing. Bond tightly to wall and floor surfaces.

3.06 CLEANING

A. Remove excess adhesive from floor, base, and wall surfaces without damage.

B. Clean in accordance with manufacturer's instructions.

3.07 PROTECTION

A. Prohibit traffic on resilient flooring for 48 hours after installation.

END OF SECTION

SECTION 09 68 13

TILE CARPETING

PART 1 GENERAL

1.01 SECTION INCLUDES

A. Carpet tile, fully adhered.

1.02 RELATED REQUIREMENTS

A. Section 03 30 00 - Cast-in-Place Concrete: Restrictions on curing compounds for concrete slabs and floors.

1.03 REFERENCE STANDARDS

A. ASTM D 2859 - Standard Test Method for Ignition Characteristics of Finished Textile Floor Covering Materials; 2006.

B. ASTM E 648 - Standard Test Method for Critical Radiant Flux of Floor-Covering Systems Using a Radiant Heat Energy Source; 2008b.

C. ASTM F 710 - Standard Practice for Preparing Concrete Floors to Receive Resilient Flooring; 2008.

D. CRI 104 - Standard for Installation of Commercial Textile Floorcovering Materials; Carpet and Rug Institute; 2002.

E. CRI (GLA) - Green Label Testing Program - Approved Adhesive Products; Carpet and Rug Institute; Current Edition.

F. CRI (GLP) - Green Label Plus Carpet Testing Program - Approved Products; Carpet and Rug Institute; Current Edition.

G. NFPA 253 - Standard Method of Test for Critical Radiant Flux of Floor Covering Systems Using a Radiant Heat Energy Source; National Fire Protection Association; 2006.

1.04 SUBMITTALS

A. See Section 01 33 00 - Submittal Procedures.

B. Shop Drawings: Indicate layout of joints.

C. Product Data: Provide data on specified products, describing physical and performance characteristics; sizes, patterns, colors available, and method of installation. Provide certification of fire resistance requirements per CBC 2007.

D. Samples: Submit two carpet tiles illustrating color and pattern design for each carpet color selected.

E. LEED Report: Submit data documenting VOC content of carpet tile and adhesives; copy of current CRI Approved Products Listing is acceptable.

F. Maintenance Data: Include maintenance procedures, recommended maintenance materials, and suggested schedule for cleaning.

G. Maintenance Materials: Furnish the following for Owner's use in maintenance of project.
   1. See Section 01 60 00 - Product Requirements, for additional provisions.
   2. Extra Carpet Tiles: Quantity equal to 5 percent of total installed of each color and pattern installed.

1.05 QUALITY ASSURANCE

A. Manufacturer Qualifications: Company specializing in manufacturing specified carpet tile with minimum three years documented experience.

B. Installer Qualifications: Company specializing in installing carpet with minimum 5 years experience.

1.06 FIELD CONDITIONS

A. Store materials in area of installation for minimum period of 24 hours prior to installation.

PART 2 PRODUCTS (Refer to Section 09 00 00 for materials and manufacturers)

2.01 MATERIALS

A. Carpet Tile:, Refer to drawings and Spec Section 09 00 00.
   1. Critical Radiant Flux: Minimum of 0.22 watts/sq cm, when tested in accordance with ASTM E 648 or NFPA 253.
   2. Surface Flammability Ignition: Pass ASTM D 2859 (the "pill test").
   3. VOC Content: Provide CRI Green Label Plus certified product; in lieu of labeling, independent test report showing compliance is acceptable.
   4. Max. Electrostatic Charge: 3 Kv. at 20 percent relative humidity.

PART 3 EXECUTION

3.01 EXAMINATION

A. Verify that sub-floor surfaces are smooth and flat within tolerances specified for that type of work and are ready to receive carpet tile.

B. Verify that concrete sub-floor surfaces are dry enough and ready for flooring installation by testing for moisture emission rate and alkalinity in accordance with ASTM F 710; obtain instructions if test results are not within limits recommended by carpet tile manufacturer and adhesive materials manufacturer.

3.02 INSTALLATION

A. Starting installation constitutes acceptance of sub-floor conditions.

B. Install carpet tile in accordance with manufacturer's instructions and CRI 104.

C. Blend carpet from different cartons to ensure minimal variation in color match.

D. Cut carpet tile clean. Fit carpet tight to intersection with vertical surfaces without gaps.

E. Lay carpet tile in square pattern, with pile direction parallel to next unit, set parallel to building lines.

F. Fully adhere carpet tile to substrate.

G. Trim carpet tile neatly at walls and around interruptions.

H. Complete installation of edge strips, concealing exposed edges.

3.03 CLEANING

A. Remove excess adhesive without damage, from floor, base, and wall surfaces.

B. Clean and vacuum carpet surfaces.

END OF SECTION

SECTION 09 90 00

PAINTING

PART 1 - GENERAL

1.01 SUMMARY

A. This section includes the following:
   1. Surface preparation.
   2. Prime coat application.
   3. Finish coat application.
   4. Upon completion of Work under this Contract, all surfaces within the Contract limits and within vision, shall have a painted finish on the interior and exterior except excluded items defined herein. Include all roof mounted mechanical and electrical equipment factory primed or factory finished and in full view.

1.02 WORK NOT INCLUDED

A. Surfaces Not To Be Painted:
   1. Prefinished wall, ceiling and floor coverings.
   2. Items with factory-applied final finish except roof-mounted equipment as defined above.
   3. Concealed ducts, pipes and conduit.
   4. Glass, plastic laminate, ceramic tile, anodized aluminum.
   5. Steel items embedded in concrete.
   6. Surfaces specifically scheduled or noted on the Drawings not be painted.
   7. Fire-Rated Labels on doors or frames.

1.03 REFERENCES

A. AQMD – Air Quality Management District, Local Regulations.

B. ASTM D4442 – Direct Moisture Content Measurement of Wood and Wood-Base Materials.

C. ASTM D4444 – Use and Calibration of Hand-Held Moisture Meters.

D. CIWMB – California Integrated Waste Management Board

E. EPA – Environmental Protection Agency

F. GS – Green Seal™ Standards and Certification. GS – 11: Green Seal™ Environmental Standard for Paints and Coatings, 2nd Edition. May 12, 2008.

G. IAQ – California Indoor Air Quality Program.

H. LEED – Leadership in Energy and Environmental Design (Green Building Rating System).

I. MPI – Master Painters Institute.

J. OSHA – Occupational Safety and Health Administration

K. USGBC – United States Green Building Council

1.04 SUBMITTALS

A. Provide product data on all finishing products.

B. Three samples 8-1/2 by 11 inches in size illustrating range of colors and textures available for each surface-finishing product scheduled for selection.

C. Prepare wood samples on type and quality of wood specified.

D. Manufacturer's application instructions.

E. Submit LEED report with compliant VOC content of all paint materials.

1.05 QUALITY ASSURANCE

A. Product Manufacturer: Company specializing in manufacturing quality paints and finish products with ten years experience.

B. Applicator: Company specializing in commercial painting and finishing with five years experience.

C. Regulatory Requirements
1. Conform to AQMD and local regulations for maximum VOC limits.
2. Comply with applicable codes and regulations of governmental agencies having jurisdiction including those having jurisdiction over airborne emissions and industrial waste disposal. Where those requirements conflict with this Specification, comply with the more stringent provisions.

D. Field Samples
1. Provide field sample panel, illustrating coating color, texture and finish for each color scheduled.
2. Locate as approved by Architect.
3. Approved sample may remain as part of Work.
4. Do not proceed with coating application until sample panel has been approved.

E. All opaque top coat interior paints shall conform to the maximum VOC content limits set by Green Seal™ Standard GS-11.

1.06 DELIVERY, STORAGE AND HANDLING

A. Deliver products to site in sealed and labeled containers.

B. Container labeling to include manufacturer's name, type of paint, brand name, brand code, coverage, surface preparation, drying time, cleanup, color designation and instructions for mixing and reducing.

C. Store paint materials at minimum ambient temperature of 45 degrees F and maximum of 90 degrees F, in well ventilated area unless permitted otherwise by manufacturer's instructions.

D. Take precautionary measures to prevent fire hazards and spontaneous combustion.

1.07 ENVIRONMENTAL REQUIREMENTS

A. Provide continuous ventilation and heating facilities to maintain surface and ambient temperatures above 45 degrees F for 24 hours before, during and 48 hours after application of finishes, unless permitted otherwise by manufacturer's instructions.

B. Do not apply exterior coatings during rain, or when relative humidity is above 50 percent, unless permitted otherwise by manufacturer's instructions.

C. Minimum Application Temperatures for Latex Paints: 45 degrees F for interiors; 50 degrees F for exterior; unless required otherwise by manufacturer's instructions.

D. Minimum Application Temperature for Varnish and transparent Finishes: 65 degrees F for interior or exterior, unless permitted otherwise by manufacturer's instructions.

E. Provide lighting level sufficient to conduct painting operations.

1.08 EXTRA STOCK

A. Provide one (1) five-gallon unopened container of each color, type and gloss of paint used in the work.

B. Label each container with color, texture and room locations in addition to the manufacturer's label.

1.09 GUARANTEE

A. Guarantee the painting Work against peeling, fading, cracking, blistering or crazing for a period of three years from the Date of Substantial Completion.

PART 2 - PRODUCTS (Refer also to Section 09 00 00).

2.01 MANUFACTURERS

A. Products of following manufacturers:

1. Frazee, Lo-Sheen, Low VOC Formula (Basis of Design)
2. Dunn Edwards.
3. ICI Dulux.
4. Sherwin Williams Company Harmony Low Odor.

B. Or equal as approved in accordance with Division 01, General Requirements for Substitutions.

2.02 MATERIALS

A. Coatings: Ready mixed, except field-catalyzed coatings. Process pigments to soft paste consistency, capable of being readily and uniformly dispersed to homogeneous coating.

B. Colors and Glosses: Architect will select color and hue to be used in various types of paint specified and will be sole judge of acceptability of various glosses obtained from materials proposed to be used in Work. During actual painting, Architect may make minor modifications in tone and shade to adjust for actual surface and lighting conditions encountered.

C. Undercoats and Thinners: Provide undercoat paint produced by same manufacturer as finish coat. Use only thinners recommended by paint manufacturer and use only to recommended limits. Use undercoat, finish coat and thinner material as parts of a unified system of paint finish.

D. Coatings: Good flow and brushing properties; capable of drying or curing free of streaks or sags.

E. Accessory Materials: Linseed oil, shellac, turpentine, paint thinners and other materials not specifically indicated but required to achieve the finishes specified of commercial quality.

2.03 APPLICATION EQUIPMENT

A. For application of the approved paint, use only such equipment as is recommended by the manufacturer.

B. Compatibility: Prior to actual use of application equipment, use all means necessary to verify that the proposed equipment is actually compatible with the material to be applied and that the integrity of the finish will not be jeopardized by use of the proposed application equipment.

2.04 FINISHES

A. Refer to schedule at end of Section for surface finish. Notwithstanding product numbers listed in schedule, Contractor shall conform to most recent product numbers as published by the manufacturer.

PART 3 - EXECUTION

3.01 INSPECTION

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 affect proper application.

C. Measure moisture content of new surfaces using an electronic moisture meter. Do not apply finishes unless moisture content of surfaces are below the following maximums:
1. Plaster and Gypsum Wallboard: 12 percent.
2. Masonry, Concrete and Concrete Unit Masonry: 12 Percent.
3. Interior Located Wood: 15 percent, measured in accordance with ASTM D4442 and ASTM D4444.
4. Exterior Located Wood: 19 percent, measured in accordance with ASTM D4442 and ASTM D4444.

D. Beginning of installation means acceptance of existing surfaces.

3.02 MATERIALS PREPARATION

A. Mix and prepare painting material in accordance with manufacturer's recommendations.

B. Store materials not in actual use in tightly covered containers.

C. Maintain containers used in storage, mixing and application of paint in a clean condition, free from foreign materials and residue.

D. Stir all materials before application to produce a mixture of uniform density and as required during the application of materials. Do not stir into the material any film that may form on the surface. Remove the film and strain the material before using.

3.03 SURFACE PREPARATION

A. Remove electrical plates, hardware, light fixture trim and fittings prior to preparing surfaces for finishing.

B. Correct minor defects and clean surfaces which affect Work of this Section.

C. Shellac and seal marks which may bleed through surface finishes.

D. Impervious Surfaces: Remove mildew by scrubbing with solution of tri-sodium phosphate and bleach. Rinse with clean water and allow surface to dry.

E. Insulated Coverings: Remove dirt, grease and oil from canvas and cotton.

F. Gypsum Board Surfaces: Fill minor defects, joints and nail head depressions with spackling compounds. Prime in accordance with primer manufacturer's recommendations. Apply primer over skim coat for Level 5 finish.

G. Galvanized Surfaces: Remove surface contamination and oils and wash with solvent. Apply coat of etching primer as specified in Schedule for existing painted surfaces, remove existing paint thoroughly to bare metal and paint per Schedules at the end of this Section.

H. Concrete and Unit Masonry Surfaces Scheduled to Receive Paint Finish: Remove dirt, loose mortar, scale, salt or alkali powder and other foreign matter. Remove oil and grease with a solution of tri-sodium phosphate; rinse well and allow to dry. Remove stains caused by weathering or corroding metals with a solution of sodium metasilicate after thoroughly wetting with water. Allow to dry.

I. Plaster Surfaces: Fill hairline cracks, small holes and imperfections with patching plaster. Make smooth and flush with adjacent surfaces. Wash and neutralize high alkali surfaces.

J. 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. Spot prime bare steel surfaces to match existing primer.

K. Wood Scheduled to Receive Paint Finish: Remove dust, grit and foreign matter. Seal knots, pitch streaks and sappy sections. Fill nail holes with tinted exterior caulking compound after prime coat has been applied.

L. Wood Doors and Cabinet Work scheduled for field-applied transparent or solid stain finish:
1. Sand surfaces thoroughly with a 5/0, 180 grit sandpaper.
2. Apply coatings as specified in the schedule to all surfaces, sides and edges. Avoid streaking or uneven application Use multiple coats to produce a glass-smooth surface film of even luster. Provide a finish free of laps, runs, cloudiness, color irregularity, brush marks, orange peel, nail or screw holes, or other surfaces imperfections.
3. Stains as selected by Architect from manufacturer's full range of colors.

4. Provide satin finish for final coats.

M. Wood Doors Scheduled for Painting: Seal top and bottom edges with primer. Leave labels intact and readable.

N. Exterior Wood-Clear coats: apply exterior grade varnish.

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 protective methods to prevent spray or droppings from disfiguring other surfaces.

D. Remove empty paint containers from site.

3.05 APPLICATION

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

B. Do not apply finishes to surfaces that are not dry.

C. Apply each coat to uniform finish. Number of coats specified is a minimum. Additional coats shall be applied at no extra cost, if coatings show evidence of uneven application, uneven pigmentation, brush strokes or otherwise unsatisfactory distribution of material. For bidding purposes, all 24 hours minimum duration between all required coats.

D. Under coats shall be lighter and brighter in tint than finish coat.

E. Sand lightly between coats to achieve required finish.

F. Allow applied coat to dry before next coat is applied.

G. Where clear finishes are required, tint fillers to match wood. Work fillers into the grain before set. Wipe excess from surface.

H. Prime back surfaces of interior and exterior woodwork with primer paint.

I. Prime back surfaces of interior woodwork scheduled to receive stain or varnish finish with gloss varnish reduced 25 percent with mineral spirits.

J. Seal Tops, bottoms and cutouts for hardware and accessories of wood doors and plastic-laminate covered doors.

K. Split paint door frames to match color of walls on each side of opening.

L. Interior walls shall receive accent paint colors.

3.06 FINISHING MECHANICAL AND ELECTRICAL EQUIPMENT

A. Refer to Section Divisions 22, 23 and 26 for color coding and identification banding requirements of equipment, ductwork, piping and conduit.

B. Paint shop primed equipment.

C. Remove unfinished louvers, grilles, covers, and access panels on mechanical and electrical components and paint separately.

D. Prime and paint insulated and exposed pipes, conduit, boxes, insulated and exposed ducts, hangers, metal louvers, brackets, collars and supports, except where items are prefinished.

E. Replace identification markings on mechanical or electrical equipment when painted accidentally.

F. Paint interior surfaces of air ducts that are visible through grilles and louvers with one coat of flat black paint, to limit of sight line. Paint dampers exposed behind louvers and grilles to match face panels.

G. Paint exposed conduit and electrical equipment occurring in finished areas.

H. Paint both sides and edges of plywood backboards for electrical and telephone equipment before installing equipment.

I. Color code equipment, piping, conduit and exposed ductwork in accordance with requirements indicated. Color band and identify with flow arrows names and numbering, using stencils or other approved systems.

J. Replace electrical plates, hardware, light fixture trim and fittings removed prior to finishing.

3.07 CLEANING

A. As Work proceeds, promptly remove paint 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 cotton waste, cloths, and material that may constitute a fire hazard, place in closed metal containers and remove daily from site.

D. Disposal: Observe all applicable requirements per California Integrated Waste Management Board (CIWMB) and other California governing regulations as pertains to the disposal and recycling of paintings and coatings.

3.08 SCHEDULE

Note: The referenced product standards are listed as the Dunn-Edwards product first and the equal ICI Dulux product second.

Ferrous Metal (Exterior):

First Coat	CORROBAR, White Alkyd Corrosion Inhibitive Primer (43-5) DEVFLEX Direct to Metal Primer (4020 PF)
Second Coat	PERMAGLOSS, 100% Acrylic Gloss Enamel (W 960V) DULUX Professional 100% Acrylic Finish (2406 Semi-Gloss)
Third Coat	PERMAGLOSS, 100% Acrylic Gloss Enamel (W 960V) DULUX Professional 100% Acrylic Finish (2406 Semi-Gloss)

Non-Ferrous Metal (Exterior):

First Coat	ULTRA-GRIP, Premium Multi-Purpose Latex Primer (W 715) DEVOE Coatings Truglaze WB Waterborne Epoxy Primer (4030)
Second Coat OR	EVERSHIELD, 100% Acrylic Exterior Masonry Finish (W 701V) PERMAGLOSS, 100% Acrylic Gloss Enamel (W 960V) DULUX Professional 100% Acrylic Finish (2406 Semi-Gloss)
Third Coat OR	EVERSHIELD, 100% Acrylic Exterior Masonry Finish (W 701V) PERMAGLOSS, 100% Acrylic Gloss Enamel (W 960V) DULUX Professional 100% Acrylic Finish (2406 Semi-Gloss)

Plaster (Interior) Walls:

First Coat	ECOSHIELD, Low-Odor/Zero-VOC Interior Latex Primer (W 600) PREP & PRIME Odorless Interior Water-Based Sealer (9116)
Second Coat – Low Sheen	ECOSHIELD, Low-Odor/Zero-VOC Interior Late Low Sheen Paint (W 602) DULUX LifeMaster Interior Enamel (9300 Eggshell)
Third Coat – Low Sheen	ECOSHIELD, Low-Odor/Zero-VOC Interior Late Low Sheen Paint (W 602) DULUX LifeMaster Interior Enamel (9300 Eggshell)

Gypsum Board (Interior) Walls:

First Coat	ECOSHIELD, Low-Odor/Zero-VOC Interior Latex Primer (W 600) DULUX LifeMaster Interior Enamel (9300 Eggshell)
Second Coat – Low Sheen	ECOSHIELD, Low-Odor/Zero-VOC Interior Late Low Sheen Paint (W 602) DULUX LifeMaster Interior Enamel (9300 Eggshell)
Third Coat – Low Sheen	ECOSHIELD, Low-Odor/Zero-VOC Interior Late Low Sheen Paint (W 602) DULUX LifeMaster Interior Enamel (9300 Eggshell)

Gypsum Board (Interior) Ceilings:

First Coat	ULTRA-GRIP, Premium Multi-Purpose Latex Primer (W 715) PREP & PRIME Odorless Interior Water-Based Sealer (9116)
Second Coat OR	ECOSHIELD, Low-Odor/Zero-VOC Interior Later Flat Paint(W 601) WALLTONE, Int. Latex Flat Wall Finish (W 420) DULUX LifeMaster Interior Enamel (9100 Flat)
Third Coat OR	ECOSHIELD, Low-Odor/Zero-VOC Interior Later Flat Paint(W 601) WALLTONE, Int. Latex Flat Wall Finish (W 420) DULUX LifeMaster Interior Enamel (9100 Flat)

Ferrous Metal Interior:

First Coat	CORROBAR, White Alkyd Corrosion Inhibitive Primer (43-5)
	DEVFLEX Direct to Metal Primer (4020 PF)
Second Coat – Semi-Gloss ECOSHIELD, Low-Odor/Zero-VOC Interior Later Semi-Gloss Paint	(W 603)
	DULUX LifeMaster Interior Enamel (9200 Semi-Gloss)
Third Coat – Semi-Gloss ECOSHIELD, Low-Odor/Zero-VOC Interior Later Semi-Gloss Paint	(W 603)
	DULUX LifeMaster Interior Enamel (9200 Semi-Gloss)

Non-Ferrous Metal Interior:

First Coat	ULTRA-GRIP, Premium Multi-Purpose Latex Primer (W 715)
	DEVOE Coatings Truglaze WB Waterborne Epoxy Primer (4030)
Second Coat – Semi-Gloss ECOSHIELD, Low-Odor/Zero-VOC Interior Later Semi-Gloss Paint	(W 603)
	DULUX LifeMaster Interior Enamel (9200 Semi-Gloss)
Third Coat – Semi-Gloss ECOSHIELD, Low-Odor/Zero-VOC Interior Later Semi-Gloss Paint	(W 603)
	DULUX LifeMaster Interior Enamel (9200 Semi-Gloss)

Ferrous Metal Exterior:

First Coat	INTERSEAL 670 HS, High Solids Surface Tolerant Epoxy
	DEVFLEX Direct to Metal Primer (4020 PF)
Second Coat	INTERTHANE 990 HS, High Solids Polyurethane, High Gloss
	DULUX LifeMaster Interior Enamel (9200 Semi-Gloss)
Third Coat	INTERTHANE 990 HS, High Solids Polyurethane, High Gloss
	DULUX LifeMaster Interior Enamel (9200 Semi-Gloss)

END OF SECTION