SECTION 02890

POST-MOUNTED SIGNS

PART 1 - GENERAL

1.01 SUMMARY

A. Documents affecting work of this Section include, but are not necessarily limited to, General Conditions, Special Provisions and Division 1.

B. Section Includes:
   1. Parking space signs.

1.02 REFERENCES

A. American Society for Testing and Materials.
   1. ASTM A53 - Pipe, Steel, Black and Hot-Dipped galvanized, Zinc-Coated, Welded and Seamless.
   2. ASTM A500 - Cold-Formed Welded and Seamless Carbon Steel Structural Tubing in Rounds and Shapes.

B. California Code of Regulations.
   1. CBC - Part 2, Title 24, CCR, 2010 California Building Code (CBC).

C. Americans with Disabilities Act.
   1. ADA – Title III.

D. Federal Specifications.
   1. FED-STD-595 - Colors used in Government Procurement.

1.03 SUBMITTALS

A. Submit under provisions of Section 01300.

B. Submit product data listing sign styles, lettering and locations and overall dimensions of each sign.

C. Submit three samples illustrating full size sample sign, of type, style and color specified.

1.04 REGULATORY REQUIREMENTS
A. Comply with CBC Chapter 11 and ADA for provisions of the physically disabled.

1.05 DELIVERY, STORAGE AND HANDLING
A. Store and protect products until installation.

PART 2 - PRODUCTS

2.01 CONSTRUCTION
A. Post mounted and wall mounted signs shall be fabricated from 16 gage enameling iron with porcelain enamel finish.

B. Mount signs to posts with minimum two 3/16 inch diameter round head bolts with tamperproof nuts, galvanized.

C. Posts: ASTM A53; galvanized steel, 2 by 2 inch galvanized steel tubing, weighing a minimum of 4.31 lbs per foot and complying with ASTM A500, grade B, 1/8" min. inch thick wall thickness. Refer to drawings.

2.03 PARKING STALL SIGNS
A. Post mounted, not less than 70 square inches with white reflectorized copy on blue background complying with No. 15090, FED-STD 595. Sign shall display the international symbol of accessibility in white on blue background.

B. Position one sign at the end of each parking space designated for disabled usage.

C. One in every eight spaces, but not less than one, also shall display a “Van Accessible” sign below the symbol of accessibility. Comply with layout indicated on Drawings for number, type, spacing and location of parking stall signs.

D. Sign shall be mounted 80 inches from bottom of sign to finish grade of parking space or centered on wall at interior end of parking space at a minimum height of 36 inches above the parking space, finished grade, ground or sidewalk.

PART 3 - EXECUTION

3.01 EXAMINATION
A. Verify that surfaces are ready to receive work.
B. Beginning of installation means installer accepts existing surfaces.

3.02 INSTALLATION

A. Set posts in concrete base. Refer to drawings.

B. Signs set in asphaltic paving surfaces or concrete sidewalks shall be mounted in core drilled holes minimum 8 inch diameter, 18 inches deep with top of base flush to finish.

C. Signs mounted to walls shall be attached firmly with appropriate, non-corrosive, vandal resistant, fasteners. Seal all holes in substrate water tight.

D. Clean and polish.

END OF SECTION
SECTION 03100

CONCRETE FORMWORK

PART 1 - GENERAL

1.01 SUMMARY

A. Documents affecting work of this Section include, but are not necessarily limited to, General Conditions, Supplemental General Conditions, and Division 1.

B. Section Includes:
1. Formwork for cast-in-place concrete.

1.02 REFERENCES

A. American Concrete Institute.
1. ACI 117 - Standard Tolerances for Concrete Construction and Materials.
2. ACI 301 - Specifications for Structural Concrete for Buildings.
3. ACI 301 Chapter 4 - Formwork.
4. ACI 318 - Building Code Requirements for Reinforced Concrete.

B. American Society for Testing Materials:
1. ASTM D1751 - Preformed Expansion Joint Fillers for Concrete Paving and Structural Construction (Non-Extruding and Resilient Bituminous Types).

1. PS 1-95 - Softwood plywood.

D. West Coast Lumber Inspection Bureau.
1. WCLIB No. 16 - Standard Grading and Dressing Rules.

E. International Conference of Building Officials.
1. CBC - Chapter 19 Concrete.

F. California Code of Regulations - Title 8.
1. CAL/OSHA - Construction Safety Orders.

G. South Coast Air Quality Management District.
1. SCAQMD - Rule 1113.

1.03 SYSTEM DESCRIPTION
A. Design Requirements: Design forms to limit deflections to 1/8-inch between supports after placement of concrete.

B. Assume the responsibility of erecting formwork that will ensure the safety of construction personnel and the public and that will protect private and public property from damage.

C. Neither the Architect nor any Owners Representatives consultants have been retained to design the required formwork, nor to determine the means and methods by which such operations are accomplished.

1.05 QUALITY ASSURANCE

A. Regulatory Requirements: Comply with the applicable recommended practice contained in ACI 301 and ACI 318.

B. Formwork construction shall comply with CBC Section 1906.

PART 2 - PRODUCTS

2.01 FORM COATINGS

A. Form Coatings: Provide form-release coating material which complies with the regulations of the SCAQMD in force at the time of application. When recommended by the manufacturer of forming materials, use a chemically active release coating.

2.02 MANUFACTURERS -FORM COATINGS

A. Approved Manufacturers:
  1. Sonneborn Building Productions Division, Chemrex Inc., Shakopee MN. Product: CAST OFF.
  2. Euclid Chemical Co., Cleveland OH. Product: EUCOSLIP.
  5. A. C. Horn, Incorporated, Los Angeles CA. Product: FORMSHIELD.

2.03 MATERIALS

A. Form Materials: Manufactured steel formwork, or materials complying with the following:
1. Exterior Exposed Concrete Surfaces: Exterior grade, high density overlay (HDO) B-B plywood.
   a. When forming below-grade surfaces indicated to receive waterproofing materials, use forming materials specified for exposed concrete.

2. Interior Exposed Concrete: Exterior grade, concrete form B-B plywood, mill-oiled and edge sealed.

3. Unexposed Concrete Surfaces:
   a. Form concrete surfaces which will be unexposed in the finished structure with materials recommended in ACI 301 Chapter 4.
   b. When forms are constructed from lumber, provide lumber that is dressed on at least two edges and one side for tight fit.
   c. Grade and Species: Construction grade or standard grade Douglas fir lumber complying with WCLIB No. 16.

4. Studs and Walers: Construction or standard grade Douglas fir lumber conforming to WCLIB No.16, and not less than 2 by 4 inches nominal size.

PART 3 - EXECUTION

3.01 EXAMINATION

A. Verification of Conditions:
   1. Verify elevations and provide final excavation adjustments required for footings prior to placing concrete.

3.02 PREPARATION

A. Safety Precautions:
   1. Comply with the requirements of CAL/OSHA.
   2. Plan formwork construction procedures in advance to ensure the unqualified safety of personnel engaged in formwork and concrete placement.

3.03 FORM CONSTRUCTION

A. Construct forms to the sizes, shapes, lines, and dimensions indicated, and as required to obtain accurate alignment in finished structure. Provide for openings, offsets, depressions, keyways, recesses, chamfers, formed reveals, blocking, screeds, bulkheads, anchorages, inserts and other features required. Use forming materials appropriate for the required finishes.
B. Construct formwork in accordance with calculations based on recommendations of ACI 301 Chapter 4. Design of formwork for structural stability and sufficiency is the Contractor’s responsibility under this Section.

C. Coordinate size and location of openings, depressions, recesses, and chases required for subsequent work.

D. Avoid the use of stakes within the footing section.

E. Except as otherwise indicated on the Drawings, provide 3/4-inch chamfers at exposed external corners.

F. Construct formwork to be readily removable without impact, shock, or damage to cast-in-place concrete surfaces and adjacent materials.

G. Provide formwork sufficiently tight to prevent leakage of cement paste during concrete placement. Solidly butt joints and provide backup material at joints as required to prevent leakage and fins.

H. Do not use patched forms for exposed concrete surfaces.

I. Earth Forms: If natural soil or compacted fill can be accurately cut and maintained at each earth contact surface, foundations may be poured against earth without forming when requested by Contractor and approved by the Architect.

J. Cleaning and Tightening: Thoroughly clean forms and adjacent surfaces to receive concrete. Remove chips, wood, sawdust, dirt, or other debris just before concrete is to be placed.
   1. Fill joints in forms to produce smooth surfaces, intersections, and arises.
   2. Retighten forms immediately after concrete placement as required to eliminate mortar leaks.

K. Form Coatings:
   1. Coat contact surfaces of wood forms with form-coating compound before reinforcement is placed. Do not allow excess form coating material to accumulate in the forms or to come in contact with reinforcement or surfaces which will be bonded to fresh concrete.
   2. Coat steel forms with a non-staining rust-preventative form oil or otherwise protect against rusting. Rust-stained steel formwork will not be acceptable.
   3. Coat interior surfaces of round column forms with form release agent.
L. Dampen bottom of footing excavations immediately prior to pouring. Remove saturated soil or mud from excavation. Dampen subgrade at slabs placed directly on earth 24 hours in advance of placing. Re-roll as required. Wet wood forms sufficiently to tighten cracks, reduce suction, and maintain workability of concrete mix.

M. Tolerances: Comply with tolerance requirements of ACI 117 for general building cast-in-place concrete construction.

3.04 EQUIPMENT BASES, PITS, TRENCHES, AND CURBS

A. Provide forming for concrete light pole bases, catch basins, and pads for mechanical and electrical equipment in accordance with shop drawings furnished for the equipment.

B. Coordinate size and location of equipment with mechanical, plumbing, and electrical requirements.

C. Provide coved base and bullnosed corners for equipment bases poured on concrete slabs. Tool edges.

3.05 INSTALLATION OF EMBEDDED ITEMS

A. Set and build into the work anchorage devices and other embedded items required for other work that is attached to, or supported by, cast-in-place concrete. Use setting drawings, diagrams, instructions, and directions submitted by suppliers of the items to be attached.

B. Secure conduit, outlet boxes, sleeves, bolts, and other items in place before inspection and commencement of concrete placement. Place conduits under concrete slabs on grade but not within the plane of the slab. Thicken slab 3 inches around conduit.

C. Coordinate setting of items related to mechanical and electrical systems embedded in concrete.

D. Coordinate location of openings for pipes and inserts required for mechanical and electrical systems. Reinforce required openings as approved by Architect.

E. Piping: Do not embed piping in structural concrete unless approved by Architect.

F. Sleeves: Standard or heavier weight galvanized steel pipe sleeves may pass through footings in protected locations. Refer to Drawings for special reinforcing
around sleeves and for method of locating sleeves. Size sleeves to pass largest coupling on pipe.

G. Rough Hardware and Miscellaneous Metal: Set inserts, sleeves, bolts, anchors, angles, and other items to be embedded in concrete. Set embedded bolts and sleeves for fans, motors, pumps, and other equipment to template and shop drawings prepared by those supplying equipment. Verify location of anchor bolts with respect to equipment supports.

3.06 REMOVAL OF FORMS

A. Formwork not supporting weight of concrete, such as sides of beams, walls, columns, and similar parts of the work, may be removed after curing at not less than 50 degrees F for 24 hours after placing concrete, provided concrete is sufficiently cured to not be damaged by form removal operations and provided curing and protection operations are maintained.

B. Formwork supporting weight of concrete, such as beam soffits, joints, slabs and other structural elements, may not be removed in less than 14 days and until concrete has attained design minimum compressive strength at 28 days. Determine potential compressive strength of in-place concrete by testing field-cured specimens representative of concrete in question.

C. Form facing material may be removed 4 days after placement only if shores and other vertical supports have been arranged to permit removal of form facing material without loosening or disturbing shores and supports.

D. Exercise particular care in removing forms from exposed concrete surfaces so that surfaces are not marred or gouged, and that corners are true, sharp, and unbroken.

E. In the event that accelerated form removal is desired, submit methods to Architect for review and approval.

3.07 RE-USE OF FORMS

A. Clean and repair surfaces of forms to be reused in the Work. Split, frayed, delaminated, or otherwise damaged form facing material will not be approved. Apply new form coating compound material to concrete contact surfaces as specified for new formwork.

B. When forms are extended for successive concrete placement, thoroughly clean surfaces, remove fins and laittance, and tighten forms to close joints. Align and secure joints to avoid offsets.

END OF SECTION
SECTION 03200

REINFORCING STEEL

PART 1 - GENERAL

1.01 SUMMARY

A. Documents affecting work of this Section include, but are not necessarily limited to, General Conditions, Special Provisions and Division 1.

B. Section Includes:
   1. Reinforcing steel for concrete and masonry work.

1.02 REFERENCES

A. American Concrete Institute.
   1. ACI 117 - Standard Tolerances for Concrete Construction and Materials.
   2. ACI 315 - Details and Detailing of Concrete Reinforcement.
   3. ACI 318 - Building Code Requirements for Reinforced Concrete.

B. American Welding Society.
   1. AWS A2.4 - Standard Symbols for Welding, Brazing and Nondestructive Examination.
   3. AWS A5.5 - Specification for Low-Alloy Steel Covered Arc-welding Electrodes
   4. AWS D1.4 - Structural Welding Code - Reinforcing Steel.

C. American Society for Testing Materials.
   1. ASTM A82 - Steel Wire, Plain, for Concrete Reinforcement.
   2. ASTM A185 - Steel Welded Wire, Fabric, Plain, for Concrete Reinforcement.
   3. ASTM A496 - Steel Wire, Deformed, for Concrete Reinforcement.
   4. ASTM A497 - Welded Deformed Steel Wire Fabric for Concrete Reinforcement.
   5. ASTM A615 - Deformed and Plain Billet-Steel Bars for Concrete Reinforcement.
   6. ASTM A616 - Specification for Rail-Steel Deformed and Plain Bars for Concrete Reinforcement.
   7. ASTM A617 - Specification for Axle-Steel Deformed and Plain Bars for Concrete Reinforcement.
8. ASTM A706 - Specification for Low-Alloy Steel Deformed Bars for Concrete Reinforcement.

D. Concrete Reinforcing Steel Institute.

E. California Code of Regulations – Title 24.
   1. CBC - Chapter 1 Administration.
   2. CBC - Chapter 17 Structural Tests and Inspections.
   3. CBC - Chapter 19 Concrete.

1.03 SUBMITTALS

A. Submit under provisions of Section 01300.

B. Quality Control Submittals:
   1. Test Reports: When and as approved by the Architect, submit certified laboratory test reports confirming physical characteristics of materials used in the performance of the Work of this Section.
      a. Where reinforcing bars are subject to welding, use ASTM A706 Reinforcing only.

   2. Certificates: Submit copies of steel producer’s certificates of mill analysis, tensile, and bend tests for reinforcing steel. Transmit copy to installer for welded splices.

1.04 QUALITY ASSURANCE

A. Qualifications:
   1. Fabricators Qualifications: When required by the Architect, show evidence of approval by governmental agencies having jurisdiction.
   2. Welders Qualifications: Employ welders currently qualified in accordance with AWS D1.4.

B. Regulatory Requirements: Comply with the applicable requirements of CBC Chapter 19.

1.05 DELIVERY, STORAGE AND HANDLING

A. Delivery: Deliver reinforcing materials bundled, and with identifying labels or tags affixed and legible. The Architect reserves the right to observe deliveries, to review bills of lading, and to reject the following:
   1. Rebar not accompanied by required mill certificates.
2. Reinforcing exhibiting rusting or other contamination which might prohibit or inhibit bonding of concrete.

B. Storage: Store materials off ground and under cover.
   1. Store welding electrodes in accordance with AWS standards.

PART 2 - PRODUCTS

2.01 MATERIALS

A. Reinforcing Bars: Except as otherwise specified, provide deformed-type reinforcing bars conforming to ASTM A615 for Grade 60 (#5 and larger) Grade 60 (#4 and smaller).
   1. When welding is required, provide reinforcing bars conforming to the requirements of ASTM A706, Grade 60, and conform to the additional requirements of AWS D1.4 as modified by CBC.

B. Welded Wire Fabric:
   1. Where indicated on the Structural Contract Drawings, provide:
      a. Plain-wire Type: Conform to ASTM A185. Plain steel wire shall conform to ASTM A82 with minimum yield strength of 65 ksi.
      b. Deformed-wire Type: Conform to ASTM A497. Deformed steel wire shall conform to ASTM A496 with a minimum yield strength of 70 ksi.

2. Furnish in flat sheets unless rolls are approved by Architect.
3. Provide mesh in sizes indicated on the Drawings.

C. Welding Rods: Comply with AWS A5.1 or A5.5, as referenced in AWS D1.4 for the base metal specification, base metal grade, and welding processes required.

D. Accessory Materials:
   1. Supports for Reinforcement: Provide bolsters, chairs, spacers, and other devices for spacing, supporting, and fastening reinforcement in place,
      a. For formed surfaces, use wire bar-type supports complying with recommendations of the CRSI Manual, unless otherwise indicated on Drawings. Do not use wood, brick, or other materials not approved by the Architect.
      b. For concrete exposed to weather in the finished work, and for concrete in contact with earth, use plastic or plastic-clad supports or ferrous metal supports which have been hot-dip galvanized after fabrication.
      c. For slabs and footings on grade, use precast concrete blocks.
d. For installation over vapor barrier, use precast concrete block bar supports.

2. Tie Wires: ASTM A82; annealed, minimum 16 gage.

2.02 FABRICATION

A. Fabricate reinforcing bars in accordance with required shapes and dimensions. In case of fabricating errors, do not re-bend or straighten reinforcement in a manner that will injure or weaken the material.
1. Do not re-bend bars without Architect’s approval.
2. Do not heat bars to facilitate bending.

B. Unacceptable Materials: Reinforcement with any of the following defects will not be permitted in the Work:
1. Bar lengths, depths, and bends exceeding specified fabrication tolerances.
2. Bends or kinks not indicated on the Drawings.
3. Bars with reduced cross-section due to excessive rusting or other causes.

C. Tolerances: Comply with CRSI Manual and ACI 117.

2.03 SOURCE QUALITY CONTROL

A. Materials for which physical characteristics have been stipulated shall have had such characteristics independently confirmed by laboratory tests employing industry-recognized procedures.

B. Do not weld reinforcement unless it conforms to ASTM A706.

PART 3 - EXECUTION

3.01 PREPARATION

A. Clean reinforcement to remove loose rust and mill scale, earth, and other materials which might reduce or destroy bond with concrete.

3.02 INSTALLATION

A. Comply with the CRSI Manual for details and methods of placing reinforcement placement and supports.
1. Do not displace or damage vapor barrier while placing concrete reinforcing. If damage occurs, repair vapor barrier before placing concrete.
2. Interrupt reinforcement at expansion joints. Provide ¼ inch by 16-inch long doweled joints at 12 inches on centers with one end of dowel wrapped with asphaltic felt or set in capped sleeve.
   a. Approved Prefabricated Expansion Joint Dowels: SPEED DOWEL, by Aztec Concrete Accessories, Costa Mesa CA.

B. Position, support, and secure reinforcement against displacement by formwork, construction, or concrete placement operations. Locate and support reinforcing by metal chairs, runners, bolsters, spacers, and hangers.
   1. Provide sufficient numbers and sizes of supports to carry reinforcement.
      a. Do not place reinforcing bars more than 2 inches beyond the last leg of any continuous bar support.
      b. Do not use supports as bases for runways for concrete conveying equipment and similar construction loads.

C. Place reinforcement to obtain minimum coverages for concrete protection as noted on Drawings. Arrange, space, and securely tie bars and bar supports together with tie wire to hold reinforcement accurately in position during concrete placement operations. Set wire ties so that twisted ends are directly away from exposed concrete surfaces.
   1. Repair and re-support bars which may have moved during concrete placement operations.

D. Provide clearance between parallel bars and between bars and vertical surface of forms of not less than 1-1/2 times the nominal diameter for round bars, but in no case less than 1-1/2 inches or less than 4/3rds the maximum size aggregate.

E. Splicing:
   1. Provide standard reinforcement splices by lapping ends and tying securely with tie wire. Comply with the structural details for minimum lap of spliced bars.
   2. Provide 1-1/2-inch minimum clearance between sets of splices. Stagger horizontal bars so that adjacent splices are greater than 4 feet apart.
   3. Comply with the requirements of AWS D1.4 where field welding is required. Prior to field welding, determine the weldability of reinforcing bars. Only steel conforming to the ASTM A706.

F. Install welded wire fabric in longest lengths practicable. Lap adjoining pieces at least one and one-half full meshes and lace splices with tie wire. Offset end laps in adjacent widths to prevent continuous laps.
   1. Extend fabric to within 1 inch of edge at slabs on grade.
   2. Cut mesh at isolation joints and at full-depth control joints.
   3. Do not make laps midway between supporting beams.
G. Placement tolerances shall conform to CRSI Manual and ACI 117.

3.03 FIELD QUALITY CONTROL

A. Inspection and Tests of Welds: Provide special inspection of field welding in accordance with CBC Chapter 17.
   1. Tests will be made by testing laboratory for reinforcing bar welds, as follows:
      a. Certification of welders engaged in electric-arc welding of reinforcing.
      b. Verification of location of reinforcing for accuracy.
      c. Inspection of reinforcing bar welds.

B. Placing: Provide special inspection when required by CBC Chapter 17.
   1. Placement of Grade 60 reinforcing steel for inspected concrete above grade requires special inspection in accordance with Section 01410.

END OF SECTION
SECTION 03300

CAST-IN-PLACE CONCRETE

PART 1 - GENERAL

1.01 SUMMARY

A. Documents affecting work of this Section include, but are not necessarily limited to, General Conditions, Supplemental General Conditions, and Division 1.

B. Section Includes:
   2. Refer to Landscape Drawings for additional requirements.

1.02 REFERENCES

A. American Concrete Institute - Manual of Practice.
   1. ACI 117 - Concrete Construction and Materials.
   2. ACI 301 - Standard Specifications for Structural Concrete.
   3. ACI 318 - Reinforced Concrete.
   4. ACI 318R - Commentary on Building Code Requirements for Reinforced Concrete.

B. American Society for Testing and Materials.
   1. ASTM C33 - Concrete Aggregates.
   2. ASTM C39 - Compressive Strength of Cylindrical Concrete Specimens.
   3. ASTM C42 - Drilled Cores and Sawed Beams of Concrete.
   4. ASTM C94 - Ready-Mixed Concrete.
   5. ASTM C114 - Chemical Analysis of Hydraulic Cement.
   6. ASTM C143 - Slump of Portland Cement Concrete.
   7. ASTM C150 - Portland Cement.
   9. ASTM C171 - Sheet Materials for Curing Concrete.
   10. ASTM C173 - Air Content of Freshly Mixed Concrete by the Volumetric Method.
   11. ASTM C192 - Making and Curing Concrete Test Specimens in the Laboratory.
   12. ASTM C231 - Air Content of Freshly Mixed Concrete by the Pressure Method.
15. ASTM C494 - Chemical Admixtures for Concrete.
17. ASTM C1059 - Latex Agents for Bonding Fresh to Hardened Concrete.
18. ASTM C1107 - Packaged, Dry, Hydraulic-Cement Grout (Nonshrink).
19. ASTM D994 - Preformed Expansion Joint Filler for Concrete (Bituminous Type).
20. ASTM D1751 - Preformed Expansion Joint Filler for Concrete Paving and Structural Construction (Non-extruding and Resilient Bituminous Types).

C. California Code of Regulations – Title 24.
   1. CBC - Chapter 19 Concrete.

D. South Coast Air Quality Management District.
   1. SCAQMD - Rule 1113, Volatile Emissions.

E. Federal Specifications.
   1. FS TT-S-227 - Sealing Compound, Elastomeric Type, Multi-Component.

1.03 SUBMITTALS

A. Submit under provisions of Section 01300.

B. For proprietary products, including admixtures, curing compounds, hardener/sealers and finish materials to be applied to concrete, submit complete manufacturer’s descriptive literature and specifications.

C. Shop Drawings, Expansion and Saw-Cut Joints: Comply with layout of joints on Drawings. If not indicated on Drawings, submit layout drawings showing location of slab expansion joints and saw-cut joints for approval prior to installation.

D. Submit the following items to Architect for information only:
   1. Submit design mix data for each type of concrete and each compressive strength required on the Drawings. Submittal of mix designs shall not relieve Contractor of responsibility to furnish concrete of proper consistency and specified strengths.

E. Where used for concrete subject to special inspections, submit mix designs to testing laboratory for review and written approval.
   1. For each material, including admixtures and water, state water-cement ratio and maximum allowable water content.
   2. For each material, state manufacturer’s name, designation, and source.
3. Submit shrinkage and creep factors for each type of aggregate, and each source proposed for use, for approval.

4. For each mix design:
   a. Pay costs associated with mix design preparation.
   b. Consider concrete cover and clear distances between reinforcing bars as indicated on the Drawings in determining the aggregate size for mix designs. This may result in an aggregate size smaller than specified elsewhere in this Specification.
   c. Submit a schedule which identifies the locations within the structure where each mix design is proposed for use.

F. Test Reports: Comply with requirements of Section 01410.

G. Field Reports: Maintain an accurate record of the items listed below. Keep records available for review at the site.
   1. Delivery tickets complying with ASTM C94 for each load of concrete delivered to site.
   2. Concrete Placement: Date and time of placement in each portion of schedule.

1.04 QUALITY ASSURANCE

A. Regulatory Requirements: In addition to complying with CBC Chapter 19, comply with the requirements contained in the standards cited. Where those requirements conflict with this Specification, comply with the more stringent provisions.
   1. Comply with ACI 301, ACI 318 and ACI 318R for interpreting design requirements of reinforced concrete.
   2. Section 1.6 of ACI 301 requires that Contractor keep a copy of ACI 301 and SP-15 in the field office at all times.
   3. Be cognizant of, and comply with, Rule 1113 and other applicable regulations of the SCAQMD in force at the time of the performance of the work of this Section.

1.05 DELIVERY AND HANDLING

A. Provide protective coverings and runways and use appropriate equipment and means of access to Work areas to avoid soiling or damage to existing conditions.

B. Prevent run-off of water contaminated by construction agents and chemicals from soiling existing surfaces and from contaminating existing and future landscape areas.
PART 2 - PRODUCTS

2.01 MANUFACTURERS

A. Approved Manufacturers, Bonders:
   4. American Concrete Systems, Inc., San Jose CA. Product: ACRYLIC 70 BONDER.

B. Equivalent products by the following manufacturers may be submitted for approval:
   1. Concrete Additives California, Costa Mesa, CA.
   2. Custom Building Products, Bell, CA.
   3. Euclid Chemical Company, Cleveland, OH.
   4. Larsen Products Corporation, Rockville, MD.
   5. Master Builders, Cleveland, OH.

2.02 ADMIXTURES AND ADDITIVES

A. Provide admixtures and additives produced by established manufacturers. Do not use admixtures and additives which have not been incorporated and tested in accepted combinations and mixes.

B. The following admixtures may be used only with the written approval of the Architect.

1. Water Reducing: ASTM C494; Type A. Provide an admixture which enhances the characteristics of concrete to extent no less beneficial than the following:
   a. Water Reduction: Not less than 5 percent.
   b. Increase in Compressive Strength: Not less than 10 percent at age 28 days.
   c. Dry Shrinkage: At age 21 days, less than concrete without admixture.

2. High-Range Water-Reducing: ASTM C494; Type F or G.
3. Water-Reducing, Accelerating: ASTM C494; Type E.
4. Accelerating or Retarding: ASTM C494; Type D.
6. Plasticizer: ASTM C494; Type F.
7. Flyash: ASTM A618, Class F (25% max. by weight)

2.03 CONCRETE MATERIALS

A. Portland Cement: ASTM C150; CBC Section 1903 and CBC Standard 19-1, Type V. Type II (Low Alkali) permitted only when approved by the Architect.
   1. Provide Type IIA where air entrainment is required.
   2. Do not use aggregate that is deleteriously reactive.
   3. Do not change source of cement during course of work without prior written approval of Architect.

B. Water: Clean and free from deleterious amount of acids, alkalis, salts, or organic materials.

C. Normal Weight Aggregate: Comply with ASTM C33, ACI 318 and CBC Chapter 19. Do not change source of aggregate during course of work without prior written approval of the Architect.
   1. Fine Aggregate: Washed natural sand consisting of hard, strong particles, containing not more than the maximum limits of deleterious material allowed by ASTM C33.
   2. Fineness modulus shall be in the range of 2.90 to 3.10.
   3. Slabs-on-grade shall have proven concrete shrinkage characteristics of less than 0.05 percent when tested in accordance with ASTM C157.

D. Coarse Aggregate:
   1. Clean washed gravel or sound crushed rock, containing not more than 5 percent flat, thin, elongated, or laminated material, and containing not more than the maximum limits of deleterious material allowed by ASTM C33 of moderate weathering regions.
   2. Grade 1-inch aggregate from No. 100 sieve to 1 Inch.
   3. Grade 1-1/2-inch aggregate from No. 100 sieve to 1-1/2 inches.
   4. Maximum Size: No larger than 3/4th of the clear space between reinforcing bars or between reinforcing bars and forms, nor larger than 1/5th of the narrowest dimension between sides of forms, nor larger than 1/3rd of the depth of slab.
   5. 1-Inch Maximum Aggregate: Use in other than mass concrete.
   6. 1-1/2-inch Maximum Aggregate: Use in mass concrete where reinforcement clearance will permit.

2.04 GROUT MATERIALS

A. Non-Shrink Grout: ASTM C1107; General purpose, premixed compound consisting of natural aggregate, cement, water reducing and plasticizing agents;
capable of developing minimum compressive strength of 5,000 psi in 3 days and 7,000 psi in 28 days.

B. Cement Grout: One part by volume portland cement and 2-1/2 parts fine aggregate. Mix dry. Add only enough water to make mixture flow under its own weight.

C. Dry Pack: One part by volume portland cement and 2-1/2 parts fine aggregate, mixed dry. Add sufficient water to dampen mix to a cohesive packing or tamping consistency.


2.05 ACCESSORY MATERIALS

A. Chemical Bonding Agent: Film-forming, freeze-thaw resistant, acrylic latex emulsion compound suitable for brush or spray application, complying with ASTM C1059.

B. Expansion Joint Filler: ASTM D1751 or ASTM D994; asphalt impregnated fiberboard or felt, 1/2 inch thick, tongue and groove profile.

   1. Approved Products:
      a. MM-80 HEAVY DUTY JOINT FILLER, by Metzger/McGuire Co., Concord, NH.
      b. SIKADUR 51 NS/SL JOINT COMPOUND, by Sika Corp., Lyndhurst NJ.
      c. EP-800 EPOXY RESIN, by Pecora Corporation, Dallas TX.
      d. PENATRON 3003, by ASTC Polymers, Inc., Costa Mesa CA.
      e. EUCO 700, by Euclid Chemical Co., Cleveland OH.


E. Granular Base: Crushed aggregate base, evenly graded mixture of fine and coarse aggregates to provide a smooth and even surface below slabs on grade.

F. Vapor Retarding Membrane: As specified in Section 07190.

G. Sand Cushion: Clean, natural or manufactured sand, installed in conjunction with vapor retarding membrane.

2.06 CONCRETE MIX DESIGN

A. Concrete Mix and Delivery: ASTM C94, minimum compressive strength as identified.

B. Proportioning by Water-Cementitious Materials Ratio: Do not exceed 0.45 water cement ratio, by weight for floor slabs and 0.50 for other concrete.

C. Water/cement ratio shall be determined by laboratory analysis in accordance with ASTM C39 and C192. A curve shall be established to represent the relationship between water/cement ratio and the average 28 day compressive strength (or earlier strength) at which the concrete is to receive full working load. Range of values on the curve shall include all compressive strengths specified.

D. Slump shall not exceed 4 inches.

E. Structural concrete strengths, aggregate sizes and required slumps as follows:

<table>
<thead>
<tr>
<th>Element</th>
<th>Min. 28 day Compressive Strength</th>
<th>Maximum Aggregate Size</th>
<th>Maximum Slump</th>
</tr>
</thead>
<tbody>
<tr>
<td>Slabs on grade</td>
<td>3000 psi</td>
<td>1 inch</td>
<td>5 inches</td>
</tr>
<tr>
<td>Footings</td>
<td>3000 psi</td>
<td>1-1/2 inches</td>
<td>5 inches</td>
</tr>
</tbody>
</table>

F. Non-structural concrete strengths, aggregate sizes and required slumps as follows:

<table>
<thead>
<tr>
<th>Element</th>
<th>Min. 28 day Compressive Strength</th>
<th>Maximum Aggregate Size</th>
<th>Maximum Slump</th>
</tr>
</thead>
<tbody>
<tr>
<td>Equipment pads</td>
<td>2500 psi</td>
<td>1-1/2 inches</td>
<td>5 inches</td>
</tr>
<tr>
<td>Exterior slabs</td>
<td>2500 psi</td>
<td>1-1/2 inches</td>
<td>5 inches</td>
</tr>
<tr>
<td>Pipe and conduit encasement</td>
<td>2000 psi</td>
<td>3/8 inches</td>
<td>5 inches</td>
</tr>
</tbody>
</table>
2.07 PROPORTIONING

A. Accurately control the proportions, water content, and air content. Use weighing equipment accurate to within 1 percent for cement and 2 percent for aggregates, and adjustable for varying aggregate moisture content. A beam auxiliary shall register any part of the last 100 pounds of each aggregate. The aggregate hopper shall have a volume adjustment.

1. Proportion concrete by weight of loose, dry material.
2. Fine aggregate volume shall be at least 35 percent of the sum of the separate fine and coarse aggregate volumes.

B. Admixture (Other than Waterproofing): If admixture is proposed for use by concrete supplier, conform to types approved by Architect in writing. Quantity per sack of cement and method of using admixture shall be in accordance with recommendations of manufacturer and laboratory furnishing mix design.

C. Patching Mortar: Combine dry mix with liquid and add water in proportions recommended by patching mortar manufacturer.

2.08 MIXING CONCRETE

A. The minimum ultimate 28-day compressive strength of concrete shall be controlled in accordance with requirements on Drawings. Mixes may be established by a qualified person based upon previously proven mixes and material tests made by a recognized testing agency.

1. Comply with CBC Chapter 1905.8.
2. Slump: As noted on the Drawings, and determined in accordance with ASTM C143 and ACI 301.
3. Adjust mix as required to counteract effects of anticipated or probable hot weather on strength of concrete. Comply with recommendations of Section 7.6, ACI 301 regarding admixtures, temperature of mixing water, and delivery times.

B. Transit-mixed Concrete: Mix in accordance with provisions of ASTM C94 and CBC Section 1905.8

1. With each load, provide ticket certifying the materials and quantities as well as compliance with the accepted mix design.
2. On the transit mix ticket, state the time water was first added to the mix.
3. At the batch plant, withhold 2-1/2 gallons of water per cubic yard of concrete.
4. Upon arrival at the job site, as directed by the testing laboratory inspector, add all or part of the withheld water before the concrete is discharged from the mixer.
5. Mix concrete for not less than 5 minutes after the withheld water has been added, and not less than 1 minute of that time immediately prior to discharge of the batch.
   a. Drum shall rotate approximately 70 to 100 revolutions at a mixing speed of approximately 6 to 18 rpm.
   b. After mixing, drum shall rotate at an agitating speed of approximately 2 to 6 rpm.
   c. Unless otherwise directed, provide 15 minutes total mixing per batch after first addition of water.

C. Discharge of the concrete shall be completed within 90 minutes after water is introduced into the mix, or before the drum has completed 300 revolutions.

2.09 SOURCE QUALITY CONTROL

A. Tests for Concrete Materials: Provide batch plant test records:
   1. Cement: Provide mill test reports certifying that the cement conforms to the requirements of this Specification.
   2. Aggregate: Provide certification of concrete aggregate for grading and soundness before concrete mix designs are established.
   3. Air Content: ASTM C173, volumetric method or ASTM C231, pressure method. One test for each set of compressive strength test specimens.
   4. Minor Placements: Small daily placements (less than 75 cubic yards): Comply with requirements of Testing Laboratory.
   5. Additional Tests: Perform additional tests and designs as required by Testing Laboratory due to defective concrete.

B. Inspection: Accompany each load of materials or concrete with a signed copy of batch plant’s certificate stating quantity of each material, design strength, amount of water added at plant, admixtures, departure time and date, and maximum amount of water allowed to be added at site.

PART 3 - EXECUTION

3.01 EXAMINATION

A. Verification of Conditions:
   1. Verify floor finish elevations and depressions, and be responsible for final excavation required for foundations and footings prior to placing concrete.

3.02 PREPARATION
A. Forms: Immediately before start of pour, remove foreign matter accumulated in forms. Close ports and openings left in formwork.

B. Equipment: Thoroughly clean tools and equipment used in transporting, placing, and consolidating concrete immediately before and after each pour.

3.03 PLACING AND COMPACTING

A. Pouring Schedule: Pour concrete in accordance with accepted pouring schedule and construction joint layout.

B. Conveying: Comply with ACI Section 5.9. Acceptable methods include bucket, cart, wheelbarrow, and buggies. Pumping or belts shall be used only for mixes specifically designed for conveying by such methods.

C. Placing: Comply with CBC Section 1905.10 and ACI 318 Section 5.10. Place concrete continuously between predetermined construction and control joints. Keep surface of concrete level throughout, without flow from one position to another. Deposit at such a rate that mix is plastic and flows readily into space between bars.
   1. Sloped slabs shall be placed uniformly from established points and lines.

D. Compacting:
   1. Spade, rod, vibrate, and consolidate concrete in forms. Comply with CBC Section 1905. Vibrators shall not be left in any one spot longer than 30 seconds and shall be kept constantly in motion. One vibrator shall be assigned to each location where concrete is being placed and a standby vibrator shall be kept ready at all times. Avoid creating rock pockets, air bubbles, honeycomb, or separation of ingredients.
   2. Work concrete thoroughly around reinforcement and embedded items and into corners and angles of forms by spading, rodding, and tamping.
   3. Consolidation: Vibrate to consolidate each layer with previously placed layers, completely embedding reinforcing and fixtures, and bringing fine material to surface of slab to produce proper finish.

E. Compression Test Specimens: Comply with Section 01410.

F. Slab-on-Grade: Install control joints and construction joints in accordance with the Drawings. Set screeds. Rod, tamp, and float to indicated levels and slopes. Maintain reinforcing at proper levels. Slabs depressed to receive finishes specified in other Sections shall be screeded and tamped.
   1. Over vapor barrier use screed pads to hold screed posts.
G. **Hot Weather Placing:** Comply with recommendations of ACI 301 Section 7.6, regarding placing of concrete during hot weather.
   1. Take accepted measures to reduce evaporation and temperature of concrete during hot, dry weather.
   2. Be prepared to use fog spray when required by the Architect, or when rate of evaporation exceeds 0.2 pounds per square foot per hour.

H. **Reinforcement:** Clean bars extending through construction joints while concrete encrustation is soft.

### 3.04 CONCRETE SLAB CURING

A. Protect freshly placed concrete from premature drying and excessive cold or hot temperatures.

B. Use moist curing method only, utilizing moisture-retaining membrane as specified herein. Chemical curing compound not permitted for interior slabs-on-grade.

C. In hot, dry and windy weather conditions protect concrete from rapid moisture loss before and during finishing operations with an evaporation-control material.

D. Start initial curing as soon as free water has disappeared from concrete surface after placing and finishing. Keep continuously moist for not less than 7 days.

E. Protect concrete from rain and wind-driven dust and debris during curing. Protect concrete surface from premature drying.

F. Ensure that continuous moisture curing measures are maintained during nights, weekends and holidays.

### 3.05 FINISHING INTERIOR FLATWORK

A. Comply with Section 03345.

### 3.06 FINISHING, CURING, AND PATCHING FORMED CONCRETE

A. **Curing:** Keep forms containing concrete in a wet condition until removed. After removal of forms, keep concrete continuously moist until the tenth day after placement, or until protected with curing compound.

B. **Patching Exposed Concrete:** After flushing with water, pack tie wire, nail, bolt, and core sample holes which will be exposed as soon as possible after form removal.
C. Grout and repair rough pockets, cracks, or honeycomb. If patches are required, chip defective areas to a uniform depth of at least 1 inch with sides at right angles to surface.


E. Smooth Formed Concrete: Grind off ridges, offsets, and other prominent marks of smooth formed concrete while concrete is green, and grind smooth. Sack exposed concrete surfaces.
   1. Painted concrete shall be considered as being exposed.

F. Patching Unexposed Concrete: Ridges, offsets, and other prominent marks need not be ground off, cleaned, or sacked. This requirement applies to concrete areas that will be concealed by other construction.
   1. Finish below-grade concrete indicated to receive waterproofing in the same manner as exposed, smooth-formed concrete, except that surfaces need not be sacked.

G. Sack Finish: Apply grout mixture consisting of 1 part portland cement, 1-1/2 parts fine sand and sufficient water to produce a mixture with consistency of thick paint. Blend normal and white cement to produce satisfactory color match.

H. Wet areas to be sacked and apply grout mixture evenly by brush or spray. Scrub surface immediately after grout application to fill minor air bubbles, using cork float or stone, and remove excess grout while it is still plastic. After initial drying, rub surfaces vigorously with clean burlap and keep moist for not less than 36 hours.

3.07 CONSTRUCTION AND SAW-CUT JOINTS

A. Saw-Cut Joints: If not indicated, provide shop drawings for location and layout of saw-cut joints.
   1. Saw-cut joints in concrete slab at locations shown on foundation plan.
   2. Saw cut joints as soon as the slab will support the weight of the saw and operator without disturbing the final finish.
   3. The depth of saw-cut shall be a minimum of 1 inch when using a model G-2000 “Soff-Cut” saw. (“Soff-Cut” model 280 not allowed).
   4. The depth of saw-cut when using a wet-cut saw shall be 1/4 the slab thickness.
   5. After concrete has reached full strength, (after 28 days), open all saw-cut joints to 1/4 inch width with 1/4 inch wide blade. Clean and prime edges and apply epoxy filler specified herein. Do not install backer rod.
B. Expansion Joints: Locate as indicated on Drawings. Tool edges to 1/8 inch radius. Install asphalt impregnated fiberboard and FS TT-S-227 two-component self-leveling polyurethane sealant, as specified in Section 07900.

3.08 GROUTING AND DRY PACK

A. Provide required grouting with cement grout. Thoroughly puddle and rod to provide bond.

B. Install non-metallic, non-shrink grout, as specified in Section 05500, beneath bearings of plates, columns, and other structural members in accordance with recommendations by manufacturer for specific application. Form edge past face of baseplate to verify flow of grout.

3.09 FIELD QUALITY CONTROL

A. Tests: In accordance with Section 01410.

B. Additional Tests: The testing service will make additional tests of in-place concrete when test results of specimens indicate specified concrete strengths and other characteristics have not been attained. Testing service may conduct tests to determine adequacy of concrete by cored cylinders complying with ASTM C42, or by other methods as approved by Architect. Contractor shall pay for such tests conducted, and other additional testing as may be required, when unacceptable concrete is verified.

C. Continuous Inspection: Provide the services of a Special Inspector to observe the taking of test specimens and the placing of concrete for all concrete placed in the structure. A complete and accurate record of these tests shall be kept by the Inspector.

1. Require that each load of concrete or materials be accompanied by a signed copy of batch plant's certificate stating the quantity of each material, amount of water, admixtures, departure time and date.

3.10 DEFECTIVE CONCRETE

A. If ultimate compressive strength of test cylinders fall below minimum assumed in design, evaluate current operations and adjust proportions of concrete mixes for remaining portion of structure to produce concrete of desired design strength.

B. Should required test cylinders fail to show minimum design compressive strength, take test cores at locations designated by Architect.
1. If results show compressive strength to be less than design stress, concrete shall be deemed defective and shall be replaced in a manner approved by the Architect. Contractor shall pay costs of patching.

2. If results show compressive strength to conform to design stress, drypack coring holes and finish to match adjacent surface.

C. Concrete work not formed as indicated, not true to intended alignment, not plumb, level, or true to intended grades, cracked, with embedded sawdust or debris, and not fully conforming to the provisions of these Specifications, shall be deemed defective. Remove defective concrete from the job site, as approved by the Architect, and replace with concrete complying with specified requirements.

D. Where defective concrete is found after removal of the forms, cut out the defective concrete, if necessary, and make the surfaces match adjacent surfaces.

E. Work uneven surfaces and angles of concrete to a surface matching adjacent concrete surfaces.

3.11 PROTECTION

A. Protect concrete from marring and damage due to weather and construction activities.

B. Protective measures shall include providing temporary coverings and prohibiting all non-essential construction activities, including cleaning and maintenance of construction equipment.

C. Protect concrete floor slabs from oil, paint and other products which might penetrate and degrade concrete surface.

3.12 CLEANING

A. Wash and clean all cast-in-place surfaces. Leave free from oil, paint, plaster, form coating, and other foreign substances, ready to receive scheduled finishes.

END OF SECTION
SECTION 06100

ROUGH CARPENTRY

PART 1 – GENERAL

1.01 SUMMARY

A. Provide materials, labor, and equipment necessary for the completion of rough carpentry as indicated on the drawings and specified herein.

1.02 SUBMITTALS

A. Product Data: For each type of process and factory-fabricated product indicated. Include data for wood-preservative and fire-retardant treatment from chemical treatment manufacturer and certification by treating plant that materials comply with requirements.

B. Material Certificates: For dimension lumber specified to comply with minimum allowable unit stresses indicated on structural drawings.

PART 2 – PRODUCTS

2.01 WOOD PRODUCTS, GENERAL

A. Lumber: DOC PS 20 and applicable rules of lumber grading agencies certified by the American Lumber Standards Committee Board of Review.

B. Factory mark each piece of lumber with grade stamp of grading agency.

C. For exposed lumber indicated to receive stained or natural finish, mark grade stamp on end or back of each piece, or omit grade stamp and provide certificates of grade compliance issued by grading agency.

D. Provide dressed lumber, S4S, unless otherwise indicated.

E. Provide rough-sawn lumber at fascia and barges – typical.

F. Provide dry lumber with 19 percent maximum moisture content at time of dressing for 2-inch nominal thickness or less, unless otherwise indicated.

G. Engineered Wood Products: Acceptable to authorities having jurisdiction and for which current model code research or evaluation reports exist that show compliance with building code in effect for Project.

H. Allowable Design Stresses: Meet or exceed those indicated per manufacturer's published values determined from empirical data or by rational engineering analysis and demonstrated by comprehensive testing performed by a qualified independent testing agency.
2.02 WOOD STRUCTURAL PANELS:

A. Plywood: Either DOC PS 1 or DOC PS 2, unless otherwise indicated on structural drawings.


2.03 WOOD-PRESERVATIVE-TREATED MATERIALS

A. Preservative Treatment by Pressure Process: AWPA C2 lumber and AWPA C9 plywood, 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.

B. Kiln-dry material after treatment to a maximum moisture content of 19 percent for lumber and 15 percent for plywood.

C. Mark each treated item with treatment quality mark of an inspection agency approved by the American Lumber Standards Committee Board of Review.

D. Application: Treat items indicated on Drawings, and the following:

E. Wood framing, sheathing, exposed to earth grade, cants, nailers, curbs, equipment support bases, blocking, stripping, and similar members in connection with roofing, flashing, vapor barriers, and waterproofing.

F. Wood sills, sleepers, blocking, furring, stripping, and similar concealed members in contact with masonry, concrete or earth grade.

G. Wood framing members less than 18 inches above grade.

H. Wood floor plates that are installed over concrete slabs directly in contact with earth.

2.04 FIRE-RETARDANT-TREATED MATERIALS

A. General: Where fire-retardant-treated materials are indicated, provide materials that comply with performance requirements in AWPA C20 lumber and AWPA C27 plywood. Identify fire-retardant-treated wood with appropriate classification marking of UL, U.S. Testing, Timber Products Inspection, or another testing and inspecting agency acceptable to authorities having jurisdiction.

B. Use treatment for which chemical manufacturer publishes physical properties of treated wood after exposure to elevated temperatures, when tested by a qualified independent testing agency according to ASTM D 5664, for lumber and ASTM D 5516, for plywood.

C. Use treatment that does not promote corrosion of metal fasteners.
D. Use Exterior type for exterior locations and where indicated.
E. Use Interior Type A High Temperature HT, unless otherwise indicated.

2.05 DIMENSION LUMBER

A. General: Of grades indicated according to the American Lumber Standards Committee National Grading Rule provisions of the grading agency indicated.

B. Framing Other Than Non-Load-Bearing Partitions: Construction, Stud, or No. 2 grade and any of the following species unless replaced with structural plastic material, and on structural drawings. Douglas fir-larch, WCLIB, or WWPA.

C. Framing Other Than Non-Load-Bearing Partitions: Any species of machine stress-rated dimension lumber with a grade of not less than 2400f-2.0E

D. Exposed Framing: Hand select material for uniformity of appearance and freedom from characteristics that would impair finish appearance. Species and Grade: As indicated above for load-bearing construction of same type.

2.06 TIMBER AND MISCELLANEOUS LUMBER

A. For timbers of 5-inch nominal size and thicker, provide material complying with the following requirements: Species and Grade: Douglas fir-larch, WCLIB, or WWPA.

B. Provide miscellaneous lumber for support or attachment of other construction, including the following:
   1. Blocking.
   2. Nailers.
   3. Furring.

C. For items of dimension lumber size, provide Standard, Stud, or No. 3 grade lumber with 19 percent maximum moisture content of any species.

D. For concealed boards, provide lumber with 19 percent maximum moisture content and any of the following species and grades: Douglas fir-larch, see structural notes for grade.

2.07 ENGINEERED WOOD PRODUCTS

A. Structural Component Lumber (SCL): Composite of wood veneers with grain primarily parallel to member length, manufactured with exterior-type adhesive complying with ASTM D2559. Allowable design determined according to ASTM D 5456, to comply with structural drawings.

B. Available Manufacturers:
2. Georgia-Pacific Corporation
3. Louisiana-Pacific Corporation.
4. Pacific Woodtech Corp.
6. Union Camp Corp, Building Products Division
7. Willamette Industries

C. Extreme Fiber Stress in Bending, Edgewise 2800 psi.

D. Modulus of Elasticity, Edgewise: 2,000,000 psi

E. Shear stress parallel to grain: 260 psi

F. Wood I-Joists: Prefabricated units complying with APA PRI-400; depths and performance ratings not less than those indicated.

G. Available Manufacturers:
2. Georgia-Pacific Corporation.
3. Louisiana-Pacific Corporation.
4. Pacific Woodtech Corp.
5. Poutrelles International Inc.
7. Stark Truss Company, Inc.
8. Superior Wood Systems, Inc.

H. Union Camp Corp.; Building Products Division

I. Web Material: Either oriented strand board or plywood, Exposure I or Plywood, Exposure I, or Plywood, Exterior grade.

J. Structural Capacities: Establish and monitor structural capacities according to ASTM D 5055.

K. Trademark: Factory mark I-joists with APA trademark indicating nominal joist depth, joist class, span ratings, mill identification, and I-joist compliance with APA standar


M. Material: Mat-formed panels all-veneer panels composite panels glulams or structural composite lumber.

N. Thickness and Grade: 1-inch Trademark: Factory mark with APA trademark indicating thickness, grade, and compliance with APA standards.

2.08 SHEATHING
GOMEZ COMMUNITY CENTER RENOVATION PROJECT

Placentia, California

A. Plywood Wall Sheathing: Exposure 1, APA Standard sheathing, exterior grade CDX. See drawings for thickness, layout pattern, attachments, etc.

2.09 PLYWOOD BACKING PANELS

A. Telephone and Electrical Equipment Backing Panels: DOC PS 1, Exposure 1, A-D Plugged, fire-retardant treated, in thickness indicated or, if not indicated, not less than 3/4 inch thick.

2.10 MISCELLANEOUS MATERIALS

A. Fasteners:
   1. Where rough carpentry is exposed to weather, in ground contact, or in area of high relative humidity, provide fasteners with hot-dip zinc coating complying with ASTM A 153/A 153M

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

C. Metal Framing Anchors: Made from hot-dip, zinc-coated steel sheet complying with ASTM A 653/A 653M, G60 coating designation.

D. Available Manufacturers:

E. Research/Evaluation Reports: Provide products acceptable to authorities having jurisdiction and for which model code research/evaluation reports exist that show compliance of metal framing anchors, for application indicated, with building code in effect for Project.

F. Allowable Design Loads: Meet or exceed those indicated per manufacturer's published values determined from empirical data or by rational engineering analysis and demonstrated by comprehensive testing performed by a qualified independent testing agency.


H. Building Wrap: Air-retarder sheathing made from polyolefins; cross-laminated films, woven strands, or spun-bonded fibers; coated or uncoated; with or without perforations; and complying with ASTM E 1677, Type I.

I. Available Manufacturers:
   1. Celotex Corporation The; Building Products Division.
   3. Parsec, Inc.
   4. Raven Industries, Inc.
5. Reemay, Inc.
6. Simplex Products.
7. Sto-Cote Products, Inc.
8. Tenneco Building Products.

J. Thickness: Not less than 3 mils

K. Permeance: Not less than 10 perms

L. Flame-Spread Index: 25 or less per ASTM E 84.

M. Allowable Exposure Time: Not less than three months.

N. Building Wrap Tape: Pressure-sensitive plastic tape recommended by building wrap manufacturer for sealing joints and penetrations in building wrap.

O. Sheathing Tape: Pressure-sensitive plastic tape for sealing joints and penetrations in sheathing and recommended by sheathing manufacturer for use with type of sheathing required.

P. Sill-Sealer Gaskets: Glass-fiber-resilient insulation, fabricated in strip form, for use as a sill sealer; 1-inch nominal thickness, compressible to 1/32 inch; selected from manufacturer's standard widths to suit width of sill members indicated.

Q. Adhesives for Field Gluing Panels to Framing: Formulation complying with APA AFG-01 that is approved for use with type of construction panel indicated by both adhesive and panel manufacturers.

PART 3 – EXECUTION

3.01 INSTALLATION

A. Set rough carpentry to required levels and lines, with members plumb, true to line, cut, and fitted. Fit rough carpentry to other construction; scribe and cope as needed for accurate fit. Locate furring, nailers, blocking, grounds, and similar supports to comply with requirements for attaching other construction.

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

C. Securely attach rough carpentry work to substrate by anchoring and fastening as indicated, complying with the following:
   1. CABO NER-272 for power-driven fasteners.

D. Published requirements of metal framing anchor manufacturer.

F. Use finishing nails for exposed work, unless otherwise indicated. Countersink nail heads and fill holes with two part wood filler for wood items, or recycled wood products with stainless steel fasteners.


H. Framing with Engineered Wood Products: Install engineered wood products to comply with manufacturer's written instructions.


J. Fastening Methods:
   1. Combination Subfloor-Underlayment: Glue and nail to wood framing.
   2. Subflooring: Glue and nail to wood framing.
   4. Underlayment: Nail or staple to subflooring.
   5. Plywood Backing Panels: Nail or screw to supports.

K. Apply building paper horizontally with 2-inch overlap and 6-inch end lap; fasten to sheathing with galvanized staples or roofing nails. Cover upstanding flashing with 4-inch overlap.

L. Building Wrap Application: Cover wall sheathing with building wrap with 12" lap and double layer at corners, unless indicated otherwise. Cover upstanding flashing with 4-inch overlap. Seal seams, edges, and penetrations with tape.

M. Apply sheathing tape to joints between sheathing panels and at items penetrating sheathing. Apply at upstanding flashing to overlap both flashing and sheathing.

END OF SECTION
SECTION 06210

DOOR, FRAME AND HARDWARE INSTALLATION

PART 1 - GENERAL

1.01 SUMMARY

A. Documents affecting work of this Section include, but are not necessarily limited to, General Conditions, Special Provisions and Division 1.

B. Section Includes:
   1. Installation of Steel Door Frames.
   2. Installation of Steel Doors.
   3. Installation of Steel Gates.

1.02 RELATED WORK

A. Section 08110 - Steel Door Frames.
B. Section 08115 - Steel Doors.

1.03 REFERENCES

A. Builders Hardware Manufacturers Association Standards.
   1. BHMA A156.1 through 24.

B. Steel Door Institute.
   1. SDI-107 - Hardware on Steel Doors.

C. Hollow Metal Manufacturers Association.
   1. HMMA 840 - Installation and Storage of Hollow Metal Doors and Frames.

D. California Code of Regulations.
   1. CBC - Part 2, Title 24, CCR, 2010 California Building Code (CBC),
      (based on 2009 International Building Code 2010 California Amendments)
      CBC Title 24—Accessibility.

E. Americans with Disabilities Act.
   1. ADA – Title III.

G. Underwriters Laboratories, Inc.
1. UL 10C – Positive Pressure Testing for Fire Door Assemblies.

PART 2 - PRODUCTS

2.01 DOOR MATERIALS

A. Steel Frames: As specified in Section 08110.

B. Steel Doors: As specified in Section 08115.

C. Door Hardware: As specified in Section 08710.

PART 3 - EXECUTION

3.01 EXAMINATION

A. Verify that openings are ready to receive work and field measurements are as shown on shop drawings. Examine frames prior to hanging doors and verify that frames comply with requirements for type, size, location and swing characteristics and have been installed with plumb jambs and level heads. Correct deficiencies before proceeding with installation.

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

C. Examine doors. Reject doors with defects, imperfections or damage.

D. Beginning of installation means acceptance of existing conditions.

3.03 INSTALLATION OF STEEL DOORS

A. Install doors in accordance with HMMA 840 or SDI 122 recommendations.

B. Fit steel doors accurately in frames, within clearances specified in SDI-100.

C. Make repairs to damaged steel surfaces as specified herein. Otherwise, replace defective units.

D. Coordinate installation of glass or louveres where indicated.

E. Prepare doors to receive finish hardware in accordance with applicable BHMA standards requirements.
3.04 INSTALLATION OF STEEL FRAMES

A. Prior to installation, frames shall be checked and corrected for size, swing, squareness, alignment, twist and plumbness.

B. Install frames in accordance with SDI-100 or HMMA standards.

C. Coordinate with type of wall construction for anchor placement.

D. Coordinate installation of frames with installation of hardware specified in Section 08710.

E. Maintain proper door clearances in accordance with SDI 122 and HMMA 840, except for special conditions otherwise noted. Where necessary, metal hinge shims may be used.

F. Install anchors for stud partitions on hinge jamb immediately above each hinge reinforcing plate and below the top hinge reinforcement, minimum 4 per jamb, and locate anchors directly opposite on the strike jamb.

G. Install anchors for connection to concrete at each jamb for each 30 inches of height or fraction thereof, starting at 12 inches above finished floor. Provide minimum 4 per jamb.

H. Fully grout frames in place in masonry, precast concrete or poured concrete construction.

I. Install frame solid in the wall, plumb and square, with proper opening width and height.

J. Fasten clip angles to floor construction and brace frames so as to retain their position and clearance during construction of adjacent work.

K. Install roll formed steel reinforcement channels between two abutting frames.

L. Where embedment anchors are used, remove jamb faces, move frames into openings until frame anchors contact matching embedment anchors, field weld anchors, and reinstall jamb faces.

M. Where expansion bolt anchors are used, weld bolt heads in place after bolts are properly tightened, and grind smooth.

N. Make repairs to damaged steel surfaces as specified herein. Otherwise, replace defective units.
O. Touch up primed or painted surfaces which have been scratched or otherwise marred during field welding and installation.

P. Remove any grout or other bonding material from surfaces immediately following installation. Maintain surfaces free of materials which will adversely affect specified finish coatings.

3.05 INSTALLATION OF HARDWARE

A. Install hardware in accordance with manufacturer’s instructions.

B. Use the templates and fasteners provided by hardware item manufacturer.

C. Mounting heights for hardware:
   1. Locksets: 40-5/16 inches from floor to centerline of strike. Distance from floor to centerline of lever handle, hand operated opener or exit hardware shall be between 30 and 44 inches, in accordance with CBC and ADA requirements.
   2. Butts: Five inches from head of opening to top of top butt; 10 inches from finish floor to bottom of bottom butt, intermediate butt spaced equidistant between top and bottom butts.

D. Comply with CBC and ADA for positioning requirements for the physically disabled.

E. After fitting hardware to doors which are scheduled for field painting, remove all finish hardware, carefully replace in properly marked boxes, and place in storage until painting and finishing is completed. After painting and finishing is completed, permanently install finish hardware.

F. Secure finish hardware with suitable fasteners of the same material and finish as the item being attached. Refer to Section 08710. Do not install surface mounted items until finishes have been completed on the substrate.

G. Provide expansion anchors for attaching hardware items to concrete or masonry.

H. Mount exit devices and closers with closed head sex bolts.

I. Prepare contacts for security alarm system, when specified in Section 08710 or otherwise required. Doors identified to have alarm contacts shall be installed in factory-fabricated frames, to suit alarm contact requirements. Security alarm preparations shall not void fire rating of door frame, as applicable.
J. Comply with SDI-107 and SDI-109 for hardware on steel doors.

3.06 INSTALLATION TOLERANCES

A. Maximum Diagonal Distortion: 1/16 inch measured with straight edge corner to corner, or as required to meet door warranty.
   1. Frames, Maximum Diagonal Distortion: 1/8 inch measured with straight edge, crossed corner to corner, as required by SDI-100.
   2. Between doors and frames at head and jambs: 1/8-inch.
   4. At door sills where a threshold is installed: 3/8-inch.
   5. At door sills where no threshold is installed: 3/4-inch.

B. Comply with applicable BHMA requirements for hardware fit tolerances.

C. Units exceeding specified and allowable tolerances, including warp, shall be replaced.

D. Fire-rated doors, frames or hardware, when installed, shall have been tested, and shall be approved to meet positive pressure test standards as required by UL 10C.

3.07 REPAIRS

A. Make repairs or completely replace damaged components without added cost or time to Contract.

B. Fill surface depressions in non-galvanized frames or doors with metallic paste filler. Allow to thoroughly cure, sand flush and smooth for an invisible appearance with adjacent metal surfaces.

C. Sand smooth all rusted areas and re-prime.

D. Touch-Up Primer for Galvanized Surfaces: Ready mixed Zinc rich galvanizing compound. Approved Manufacturers:
   2. Southern Coatings, Sumter SC. Product: GALVICON.
   3. Perma-Pipe, Niles IL. Product: GALVA-GARD.

E. Immediately after installation, sand smooth all corroded, damaged or deteriorated areas of prime coat and apply touch-up coat of compatible air-drying primer. Primer shall comply with requirements for type of paint to be applied.
3.08 **ADJUSTING, CLEANING AND PROTECTION**

A. Perform cleaning operations under provisions of Section 01710.

B. Adjust for smooth and balanced door movement. Doors, when open in any position, shall remain fixed without influence from gravity.

C. Check each hardware installation for proper function. Replace units, which cannot be adjusted to operate freely and smoothly.

D. Re-adjust hardware for proper function as required after doors and frames are finished. Check for free operation and proper clearances. Refit and refinish where necessary.

E. Protect installed doors, frames and hardware from damage.

F. Provide protective coverings and other devices as necessary, to protect installations.

G. Protect installed components as recommended by manufacturer to ensure that units will be without damage or deterioration at Date of Substantial Completion. Provide protective wrappers and coverings as necessary to prevent marring, soiling and discoloration.

**END OF SECTION**
SECTION 06410

CASEWORK

PART 1 - GENERAL

1.01 SUMMARY

A. Documents affecting work of this Section include, but are not necessarily limited to, General Conditions, Special Provisions, and Division 1.

B. Section Includes:
   1. Special fabricated plastic laminate casework units.
   2. Countertops.
   3. Cabinet hardware.

1.02 RELATED WORK

A. Section 06100 - Rough Carpentry
B. Division 15 - Plumbing

1.03 REFERENCES

A. Builders Hardware Manufacturing Association.
   1. BHMA A156.9 - Cabinet Hardware.

B. Woodwork Institute of California.

C. National Electrical Manufacturers Association.
   1. NEMA LD3 - High Pressure Decorative Laminates.

   1. PS 1 - Construction and Industrial Plywood.
   3. PS 51 - American Hardwood and Decorative Plywood Standard.
   4. PS 58 - American Basic Hardwood

E. California Code of Regulations – Title 24.
   1. CBC - Chapter 11 Accessibility.
   2. CBC Chapter 16A Structural Forces.

F. Americans with Disabilities Act.
1. ADA – Title III.

1. ANSI A135.4 - Hardboard.
2. ANSI A208.1 - Wood Particle Board.
3. ANSI A208.2 – Medium Density Fiberboard for Interior Use.

H. South Coast Air Quality Management District.
1. SCAQMD - Rule 1113.


1.04 SUBMITTALS

A. Submit under provisions of Section 01300 and WI Technical Bulletin 434.

B. Shop Drawings: Indicate materials, component profiles and elevations, assembly methods, joint details, fastening methods, accessory listings, hardware location, and schedule of finishes.
1. Indicate grounds, backing, blocking and other items required for casework installation.
2. The first page of the shop drawings shall bear the WI Certified Compliance Label. Shop drawings not complying with this requirement will be returned without approval.
3. A statement shall appear prominently on the shop drawings certifying that all casework construction complies to the structural requirements of CBC Table 16A-O, for the required horizontal force factor for anchorage of non-structural components.

C. Submit three samples illustrating cabinet and countertop finish.

D. Submit three samples of drawer pulls, hinges and cabinet locks and latches, illustrating hardware finish.

E. Provide a complete line of plastic laminate chips, in wood grains and solid colors, identified with the manufacturer’s name and chip number.

1.05 QUALITY ASSURANCE

A. Perform work in accordance with WI Custom quality.
B. Cabinets and countertops shall be manufactured in accordance with Section 15 and 16 of WI for Style A Frameless Construction or to higher standards as specified herein.

C. If the manufacturer is not a WI Licensee, the Contractor shall furnish a Certificate of Reinspection by the WI indicating that the work meets the requirements of the WI grade specified.

D. Each unit of work shall bear the WI Certified Compliance grade stamp indicating the grade specified.

E. WI Certified Compliance Certificates shall indicate that the products furnished fully meet the requirements for the grade specified.

F. One copy of the referenced WI Manual of Millwork shall be made available for reference at the job site throughout the installation period.

G. Inspections by authorized WI inspectors shall be made in accordance with the following schedule:
   1. Shop inspection at place of manufacture, prior to initial shipment of casework components to the site.
   2. Site inspection immediately following installation of the first casework components.
   3. Site inspection immediately following completed installation of all casework components.
   4. Additional site inspections may be required at the option of the Architect and at no cost or time to the Contract when certified WI inspection reports indicate unsatisfactory conformance with WI standards of quality and specified requirements.

1.06 QUALIFICATIONS

A. Manufacturer and Installer: Company specializing in manufacturing the products specified in this section with minimum five years experience.

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

1.08 DELIVERY, STORAGE AND HANDLING.

A. Deliver, store and handle casework products under the provisions of WI Technical Bulletin 419R.
B. Provide additional protection as needed to assure that the work of this Section remains undamaged during fabrication, installation, and the time between completion of installation and actual acceptance of the total Work.

C. Do not deliver cabinets and fixture materials or products to the job site until concrete and plaster installations are completed and dry.

D. Protect units from moisture damage prior to installation.

E. Use all means necessary to protect delivered units from possible damage from other trades, before, during and after installation.

F. All casework units delivered to the job-site shall be properly identified as to the location in the structure.

G. In the event of damage to the work of this Section, immediately make all necessary repairs and replacement.

1.09 FIELD MEASUREMENTS

A. Verify that field measurements are as indicated on shop drawings

B. Report discrepancies to Architect prior to fabrication.

1.10 COORDINATION

A. Coordinate the work with plumbing and electrical rough-in.

B. Coordinate rough-in for items installed through or in millwork and trim. Locate rough-ins for proper alignment with edges, faces and reveals.

1.11 ENVIRONMENTAL REQUIREMENTS

A. Condition interior casework and trim products to building environment. Maintain temperature and humidity at completed Work and accordance with requirements for storage.

B. Do not install casework and trim until required temperature and relative humidity conditions have been stabilized and will be maintained in installation areas.

PART 2 - PRODUCTS
2.01 WOOD MATERIALS

A. Softwood Lumber: PS 20; graded in accordance with WI Custom Grade.
   1. Moisture content shall be a minimum of 6 percent and shall not exceed 12 percent up to 2 inch nominal thickness and shall not exceed 19 percent for pieces thicker than 2 inches up to 4 inch nominal thickness.
   2. Provide solid stock lumber at all locations except where other material is specified or is called for on the Drawings.

B. Hardwood Lumber: PS 58; graded in accordance with WI Custom Grade.
   1. Moisture content shall be a minimum of 6 percent and shall not exceed 12 percent up to 2 inch nominal thickness and shall not exceed 19 percent for members thicker than 2 inches up to 4 inch nominal thickness.
   2. Provide solid stock capable of receiving transparent finish, with grain and uniform color matching the adjacent work.

2.02 SHEET MATERIALS

A. Softwood Plywood: PS 1; graded in accordance with WI Premium Grade, Grade A for opaque and transparent finish, core materials as specified herein.

B. Hardwood Plywood: PS 51; graded in accordance with WI Premium Grade, Grade B for opaque finish, Grade AA for transparent finish, core materials as specified herein, type of glue recommended for application, face veneer and types of veneer cuts as selected by Architect.

C. Wood Particleboard: ANSI 208.1; Grades 2-M-2 and 2-M-3, composed of wood chips matrix, medium density, bound with high, moisture resistant, polyurea resin binders complying with ASTM D1037, or water resistant adhesive of grade to suit application, sanded faces.

D. Core, One of Following:
   1. ANSI A208.1 wood particle board.
   2. ANSI A208.2; medium density fiberboard, sanded.
   3. Plywood, constructed of an odd number of plies, with inner plies in pairs, except innermost ply. Grain of each ply shall be at right angles to the grain of the adjacent ply.

2.03 LAMINATE MATERIALS

A. Plastic Laminate: NEMA LD3; decorative high pressure laminate, general purpose type. Comply with Section 15 WI. Color, pattern, gloss and surface texture as selected by Architect. Refer to drawings for manufacturer series, color, texture, and additional requirements. Minimum required thicknesses:
1. Countertops: 0.050 inch
2. Vertical surfaces: 0.028 inch
3. Vertical post forming: 0.030 inch
4. Horizontal surfaces other than countertops: 0.040 inch
5. Self-edge bands: 0.028 inch
6. Cabinet liners: 0.020 inch
7. Backing sheets: 0.020 inch

B. Laminate Backing Sheet: NEMA LD-3; backing grade, undecorated plastic laminate, for backing at countertops and other concealed locations.

C. Cabinet Liner: NEMA LD-3; high pressure liner material, Melamine brand, white color, unless indicated otherwise on Drawings. (Note: black melamine color does occur on this project).

2.04 ACCESSORIES

A. Adhesive: Urea-formaldehyde resin, cold setting, or phenol type with catalytic agent set under a pressure of not less than 30 lbs psi or any contact adhesive that has been approved by WIC for the area in which the Work is located.
   1. Adhesives shall comply with SCAQMD Rule 1113.

B. Anchors: Select material, type, size and finish required by each substrate for secure anchorage. Provide non-ferrous metal or hot-dip galvanized anchors and inserts on inside face of exterior walls and elsewhere as required for corrosion resistance.
   1. Select appropriate anchors or fasteners, and spacing thereof, consistent with requirements of CBC Table 16A-O for seismic resistance.

C. Fasteners: Size and type to suit application. Material, color and finish shall be same as metal to which applied, except use only stainless steel at aluminum materials and use cadmium plated at interior pre-painted steel products.

D. Bolts, Nuts, Washers, Lags, Pins, and Screws: Of size and type to suit application; white metal finish in all locations.

E. Nails: Select material, type, size and finish required for each use.

F. Concealed Joint Fasteners: Threaded steel.

2.05 HARDWARE

A. Hardware: BHMA A156.9. Comply with WI Approved Hardware Listings, applicable to Sections 14 and 15 of WI Manual of Millwork, effective May 1,
2003. Any hardware listed therein may be installed, except where these standards are exceeded or not permitted, as described herein.

1. Cabinet pulls for doors and drawers at accessible casework shall comply with provisions of CBC Chapter 11A and 11B, and ADA, shall be operable with one hand and shall not require tight grasping, pinching or twisting of the wrist. Pulls shall be U-shaped.

2. Adjustable Cabinet Shelf Standards: As listed in WI Approved Hardware Listings, pin type not permitted.

3. Locks: Unless otherwise indicated on Drawings, provide all doors and drawers with one brand of lock systems listed in WI Approved Hardware Listings.

B. Hinges:

1. Provide concealed European frameless type. ANSI/BHMA Grade 1, meeting “Performance and Permanent Set” test requirements of ANSI/BHMA No. B01602.

2. Install with a minimum of four No. 8 full-thread screws to the jamb, and four No. 8 full-thread screws to the door.

3. On doors over 48 inches in height, provide three hinges.

2.07 HARDWARE FINISH

A. Exposed hardware: Bright chromium plated steel BHMA 651 (US26) at food preparation areas, satin chromium plated steel BHMA 652 (US26D) at non-food preparation areas.

B. Concealed hardware: Polished or satin chrome or stainless steel.

2.08 FABRICATION - PLASTIC-COVERED CASEWORK

A. Casework Components:

1. Construction: Custom grade, style A, frameless, in accordance with WI Section 15 and 16. (including supplements).
   a. Wall cabinet depth: 12 inches, typically unless noted otherwise, excluding door and drawer front thicknesses. Height: refer to drawings. Verify sizes indicated on Drawings.
   b. Base cabinet height: Standard: 36 inches, typically. Accessible: 34 inches typically. Depth: 24 inches, (or as noted on drawings), excluding door and drawer front thicknesses. Verify sizes indicated on Drawings.
   c. Cabinet Width: Align wall cabinet and end panels with base cabinet and panels and not countertop edge.
   d. Shelves: Unless otherwise indicated, wall cabinets shall have two adjustable shelves. Refer to drawings for additional requirements.
e. Toe-kicks: Separate base unit for casework, 4 inches high by 3 inches deep at front and 4 inches high by 3/4 inch deep at exposed ends. Provide accessible toe-kicks for units serving the disabled.

2. Use solid stock for frames, jambs, heads, stops, mounting strips and edges.
   a. Provide minimum two mounting strips, 1/2 inch by 2-1/2 inches, at top and bottom of each case. Provide intermediate mounting strip a middle of casework 60 inches high or higher.

3. Use plywood or particleboard core material for body construction of cabinets where members are more than 11 inches wide.

4. Where plywood or particleboard is used, trim exposed edges with hardwood, without face nailing.

5. Backs: 1/4 inch thick tempered hardboard, dadoed into top rail, sides and bottom of cabinet.

B. Shop assemble casework for delivery to site in units easily handled and to permit passage through building openings.
   1. Accurately fit and align the separate parts.
   2. Provide ample screw, glue-and-bolt blocks, draw-bolts, tongues, grooves, splines, dowels, tenons, mortises, and other means of fastening to render the work substantial, rigid, and permanently secured in the proper position.
   3. Provide sufficient additional material to permit scribing to walls, floors, and related work.
   4. Provide adequate allowance for shrinkage occurring after installation.

C. Cap exposed plastic laminate finish edges with material of same finish and pattern.

D. Drawers: 0.735 inch thick front faced with 0.028 inch thick plastic laminate, with 0.020 inch thick plastic laminate backing or cabinet liner, 5/8 inch thick sides, backs and sub-fronts, and 1/4 inch thick bottoms, style A Frameless construction in accordance with WI Supplement 2.
   1. Provide slip dovetail construction, well glued, or other joinery type consistent with specified grade of casework.
   2. Provide full extension slides at all drawers.

E. Doors: Flush overlay construction, minimum 0.735 inch thick, faced with 0.028 inch thick plastic laminate and 0.020 inch thick cabinet liner backs, all four edges edge-banded. Face pattern shall be continuous with drawer fronts and trim.
   1. Provide rubber stops at ends and backs of doors.
   2. Fit and adjust as necessary to achieve smooth and noiseless operation.
F. When necessary to cut and fit on site, provide materials with ample allowance for cutting.
   1. Assemble with bolted and screwed connections, securing to structural backings with cinch anchors, expansion screws, or toggle bolts.
   2. Mortise-and-tenon all rails and stiles, neatly miter and member throughout, make butt joints flush and smooth, and make up permanent joints with water resistant glue.
   3. Assemble fixtures without exposed face nails or face screws.

G. 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.

H. Shop apply laminate backing sheet to reverse side of plastic laminate finished surfaces.

I. Mechanically fasten or firmly glue back splash to countertops.

J. Provide cutouts for plumbing fixtures, inserts, appliances, outlet boxes fixtures and fittings. Verify locations of cutouts from on-site dimensions. Prime paint contact surfaces of cut edges.

K. Rout, drill, and otherwise prepare the surfaces as needed, and firmly install all finish hardware and accessories in accordance with the approved design and the manufacturers' recommendations.

L. Adjustable Shelves: Support shelves on vertical metal shelf standards, recessed-mounted on sides of cabinet, spaced not more than 2 inches from front and back, provided with shelf clips which lock into standards with thumb-press.
   1. Thickness and lengths of shelves shall comply with WI Technical Bulletin 435, for 50 lbs/sf loading.
   2. When approved by the Architect, provide adjustable shelves supported by metal shelf rests inserted into vertical rows of cleanly-bored holes in cabinet sides, not exceeding 2 inches oc. Locate rows between 1-1/2 and 2 inches from front and back faces of cabinet body. Row size, spacing and location shall be identical throughout all casework units.

M. Closures: Minimum 1 inch and maximum 3 inches wide total, scribed to wall. Close all gaps at face, bottom and top of cabinets. Provide closure at all cabinet sides abutting walls, to ensure clearance for door to swing open fully.

2.09 FABRICATION - COUNTERTOPS
A. Provide WI Premium Grade at locations with sinks and WI Custom Grade at all other locations.

B. Provide water-resistant, medium density fiberboard or plywood core, 3/4 inch thick at countertops with sinks.

C. Provide medium density fiberboard or plywood core, 3/4 inch thick at countertops in all other locations.

D. Locate counter butt joints minimum 24 inches from sink cut-outs.

E. Countertops shall extend 1/2 inch beyond faces of doors and drawer fronts along the front face of base cabinets and 1-1/4 inch beyond the exposed ends of base cabinets, where not abutting walls.

F. Unless indicated otherwise on the Drawings, back and side splashes shall be 4 inches high.

G. Provide support from below countertop, either by base cabinets or corbels spaced so that unsupported length does not exceed 36 inches.

H. At each knee space and other locations where communications or electrical receptacles are installed below countertop, provide one 1-1/2 inch i.d. chrome plated metal grommet, installed directly over the outlet, centered 1-1/2 inches from the back wall, or 1-3/4 inches from face of backsplash.

I. Countertop Edges:
   1. Front Edge, Countertops Without Sinks: Square.
   2. Front Edge, Countertops With Sinks: No-drip bullnose.
   4. Backsplash, Countertops Without Sinks: Square butt joint, side or back mount at mill option.
   5. Backsplash, Top Edge: Square.

PART 3 - EXECUTION

3.01 EXAMINATION

A. Verify adequacy of backing and support framing.

3.02 INSTALLATION
A. Set and secure casework in place; rigid, plumb, and level. Secure casework to walls or floors or both. Install toe kick bases first and level before setting casework bodies. Secure to floor structure with appropriate angles and anchors, concealed.

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

C. Use concealed joint fasteners to align and secure adjoining cabinet units and counter tops. Use threaded steel fasteners where possible.

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

E. Attach plastic laminate-covered countertops with screws or other approved mechanical fasteners. Do not use adhesive. Finish cut-edges at sink cut-outs with one coat of oil-based wood primer.

F. Countersink anchorage devices at exposed locations. In locations where plastic laminate is not applied, conceal anchorage devices with solid wood plugs of species to match surrounding wood. Finish flush with surrounding surfaces.

3.03 ADJUSTING

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

B. Adjust doors, drawers, hardware, fixtures and other moving or operating parts to function smoothly and correctly, without binding or squeaking.

3.04 CLEANING

A. Perform cleaning operations under provisions of Section 01710.

B. Visually inspect each installed casework unit and countertop and thoroughly clean all surfaces using the cleaning material recommended by the manufacturer of the finish being cleaned and carefully adjust all operating components for optimum operation after the cleaning operation.

C. Remove all rubbish, debris, tools and equipment and leave the immediate work areas and casework units and countertops in a clean and acceptable condition.

3.05 FIELD INSPECTIONS

A. Contractor shall schedule and request field inspection of completed installation, as required herein, by WI, and in accordance with WI Reinspection Service Program.
B. All fees, if any, for WI field inspection shall be included in the work of this Section.

END OF SECTION
SECTION 07200

THERMAL INSULATION

PART 1 - GENERAL

1.01 SUMMARY

A. Documents affecting work of this Section include, but are not necessarily limited to, General Conditions, Supplemental General Conditions, and Division 1.

B. Section Includes:

1.02 REFERENCES

A. American Society for Testing and Materials.
   1. ASTM C665 - Mineral Fiber Blanket Thermal Insulation for Light Frame Construction and Manufactured Housing.
   2. ASTM D1790 Test Method for Temperature

B. International Conference of Building Officials.
   1. CBC - Chapter 7 Fire-resistant Materials and Construction.

1.03 SYSTEM DESCRIPTION

A. Materials of This Section: Provide continuity of thermal barrier at building enclosure elements.

B. Materials shall comply with CBC Section 707 for fire resistivity.

1.04 SUBMITTALS

A. Submit under provisions of Section 01300.

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

C. Samples: Provide samples of exposed insulation in the form of actual units or sections of units, showing the full range of colors available for each type of exposed insulation, where indicated.
D. Test Reports: Provide product test reports from and based on tests performed by a qualified independent testing agency, evidencing compliance of insulation products with specified requirements, including those for thermal resistance, fire-test response characteristics, water-vapor transmission, water absorption, and other properties, based on comprehensive testing of current products.

1.05 COORDINATION

A. Coordinate the work with other trades associated with the work of this Section, including, but not limited to pre-fabricated metal building, wood or metal wall framing, plaster or gypsum board applications and plumbing and electrical.

1.06 QUALITY ASSURANCE

A. Thicknesses indicated are for thermal conductivity specified for each material. Provide adjusted thicknesses as approved for equivalent use of material having a different thermal conductivity. Where insulation is identified by R value, provide thickness required to achieve indicated value.

B. Flame Spread and Smoke Density Ratings: Comply with fire-resistance and flammability ratings required by CBC Chapter 7, and comply with regulations as interpreted by building authority having jurisdiction.

C. Obtain each type of building insulation from a single source with resources to provide products complying with requirements indicated without delaying the Work.

1.07 DELIVERY, STORAGE AND HANDLING

A. Deliver materials to site in manufacturer's original packaging. Clearly identify manufacturer, contents, brand name, applicable standard, and R-value.

B. Store materials off ground. Protect against weather, condensation, damage, soiling or foreign substances. Immediately remove damaged material from site.

C. Do not expose to sunlight, except to extent necessary for period of installation and concealment. Protect against ignition at all times.

D. Comply with manufacturers recommendations for handling, storage and protection during installation.

PART 2 - PRODUCTS
2.01 MANUFACTURERS

A. Approved Manufacturer: Owens-Corning Fiberglass Corp., Toledo, OH

B. Equivalent products by the following manufacturers may be submitted for approval:
   1. Certainteed Corporation, Valley Forge PA.
   2. Thermafiber Division of USG Corp., Chicago IL.

2.02 MATERIALS

A. Insulation: ASTM C665; preformed glass fiber batt, blanket, roll or type, complying with the following:
   1. Thermal Resistance:
   2. Roof: R-30 Batt at New Lobby #113, Meeting Room #114, Storage #115, & Mechanical #116.

B. Facing:
   1. Type I: Unfaced at encapsulated.
   2. Type II: Foil faced batts or blankets with flame-resistant Kraft-foil laminate facings. Vapor barrier to room side.
   3. Type III: Faced on one side with flame resistant, reflective foil. Flame Spread: ASTM E84; less than 25, smoke density less than 50.

C. In exterior walls, ceilings and roof install Type III foil-faced, batt, blanket or roll type, in sizes as required to fully fill cavity.

D. Tape: Bright aluminum, polyethylene or polyester, self-adhering type, mesh reinforced, 2 to 2-1/2 inch wide.

E. Wire Mesh: Galvanized steel, hexagonal wire mesh.

PART 3 - EXECUTION

3.01 EXAMINATION

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

B. Do not proceed with insulation work until unsatisfactory conditions have been corrected in a manner acceptable to the manufacturer.
3.02 INSTALLATION

A. Coordinate installation sequence with construction of pre-manufactured steel building. Install insulation in accordance with insulation manufacturers instructions. Comply with manufacturers instructions for particular conditions of installation in each case. If printed instructions are not available or do not apply to project conditions, consult manufacturer’s technical representative for specific recommendations before proceeding with the work.

B. Install in cavities designated to receive thermal insulation without gaps or voids.
   1. Fill all exterior stud-construction walls with thermal insulation, thickness as required to fill entire cavity, whether indicated on Drawings or not.
   2. Below Roof Deck: Install thermal insulation between roof joists or trusses. Install string wires as required. Leave at least 1 inch air space between bottom of roof deck and top of insulation.

C. Do not compress insulation. Extend material to full height of cavity to structure above and as otherwise required to produce a completely insulated building envelope.

D. Trim insulation neatly to fit spaces. Insulate miscellaneous gaps and voids.

E. Fit insulation tight in spaces and tight to exterior side of mechanical and electrical services within the plane of insulation.

F. Install with factory applied foil facing inside (warm in winter) of building spaces. Lap ends and side flanges of membrane over framing members.

G. Tape seal butt ends, lapped flanges and tears or cuts in foil or batts.

H. In metal construction place insulation fasteners at 36 inches oc vertically in two rows at each stud cavity.

I. Apply insulation units to substrate by method indicated, complying with manufacturers recommendations. If no specific method is indicated, bond units to substrate with adhesive or use mechanical anchorage to provide permanent placement and support of units.

J. To preclude slippage, retain insulation in place with nails, screws, staples, wires or wire mesh secured to framing members. Tape seal tears or cuts in vapor retarder.
K. Where tight, congested, difficult or otherwise unforeseen conditions are encountered, employ alternate application methods or materials to effect the intended insulation envelope system. Alternate methods or materials shall be approved by the Architect.

L. Stuff loose insulation into miscellaneous voids and cavity spaces where required to maintain the completely insulated building envelope. Compact to approximately 40 percent of normal maximum volume, or to a density of approximately 2.5 lbs per cu ft.

3.03 PROTECTION

A. Protect installed insulation and vapor barriers from harmful weather exposures and from possible physical abuses, where possible by non-delayed installation or concealing work, or, where that is not possible, by temporary covering or enclosure.

B. Contractor shall advise Architect of exposure hazards, including possible sources of deterioration and fire hazards.

END OF SECTION
SECTION 07310
ASPHALT SHINGLE ROOFING

PART 1 – GENERAL

1.01 SECTION INCLUDES

A. Asphalt roofing shingles and underlayment.

B. Metal flashing and accessories associated with shingle roofing.

1.02 RELATED SECTIONS

A. Section 01900 - Demolition for Remodeling:

B. Section 06100 - Rough Carpentry: Framing, wood decking, and roof sheathing.

C. Section 07620 - Flashing and Sheet Metal: Sheet metal flashing not associated with shingle roofing.

D. Section 07900 - Sealants and Caulking.

1.03 REFERENCES

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


L. Asphalt Roofing Manufacturers Association (ARMA)
M. National Roofing Contractors Association (NRCA)

1.04 SUBMITTALS

A. Submit copies of product data sheets, detail drawings and samples for each type of roofing product.

1.05 QUALITY ASSURANCE

A. Manufacturer Qualifications: Provide all primary roofing products, including shingles, underlayment, leak barrier, and ventilation, by a single manufacturer.

B. Installer Qualifications:
   1. Installer must have minimum 5 years experience for installation of all roofing products to be installed under this section.
   2. Installer must be an Authorized Contractor as defined and certified by manufacturer.
   3. Employ full-time Field Technical Services Representative available for final roof inspection.
   4. Provide local Field Representative to make periodic site visits, report work quality and job progress.
   5. The presence and activity of the manufacturer's representative and/or City’s Representative shall in no way relieve the contractor of contractual responsibilities or duties.

1.06 REGULATORY REQUIREMENTS

A. Provide a roofing system achieving an Underwriters Laboratories (UL) 790 Class A fire classification and Factory Mutual.

B. Install all roofing products in accordance with all federal, state and local building codes.

C. All work shall be performed in a manner consistent with current OSHA guidelines.
D. Asbestos containing materials shall not be furnished or installed.

1.07 FINAL INSPECTION
A. Will be scheduled by roofing material manufacturer and a representative of the City upon job completion.
   1. Attendance:
      a. Contractor.
      b. Roofing material manufacturer.
      c. City’s Representative.
   2. Minimum agenda:
      a. Walkover inspection.
      b. Identification of problems which may impede issuance of warranty.

1.08 DELIVERY, STORAGE, AND HANDLING
A. Store all products in manufacturer's unopened, labeled packaging until they are ready for installation.
B. Store products in a covered, ventilated area, at temperature not more than 110 degrees F (43 degrees C); do not store near steam pipes, radiators, or in direct sunlight.
C. Store bundles on a flat surface. Maximum stacking height shall not exceed manufacturer’s recommendations. Store all rolls on end.
D. Store and dispose of solvent-based materials in accordance with all federal, state and local regulations.

1.09 WEATHER CONDITIONS
A. Proceed with work only when existing and forecasted weather conditions will permit work to be performed in accordance with manufacturer’s recommendations

1.10 WARRANTY
A. Roofing Contractor shall guarantee to maintain the roofing and base flashing in a water tight condition for a period of one year from the date of final acceptance. Guarantee shall cover materials and workmanship. Materials limited warranted for 40 years
B. The following types of failure will be adjudged as defective: leaking, failure to stay in place, splitting tearing, undue expansion.

PART 2 PRODUCTS

ASPHALT SHINGLE ROOFING - 07310 - 3
2.01 MANUFACTURERS


B. Requests for substitutions will be considered in accordance with provisions of Section 01600.

2.02 SHINGLES

A. Heavyweight, granule surfaced, self sealing asphalt shingle with a strong fiberglass reinforced core and a mineral granule surfacing. Meets ASTM D 3018, ASTM D 3161, and ASTM D 3462; UL 790 Class A rated with UL 997 Wind Resistance Label. **Timberline Prestique 40 Shingles**, by GAFMC or equal. Any equal submitted must match the profile and shadow line of specified product, as well as, all other criteria.

B. Color: As selected from manufacturer’s full range by owner.

2.03 HIP AND RIDGE SHINGLES

A. Self sealing hip and ridge cap shingle matching the color of selected roof shingle. Each bundle covers approx. 33 lineal feet. **Universal** Ridge Cap Shingles, by GAFMC or equal. Any equal submitted must match the profile and shadow line of specified product, as well as, all other criteria.

2.04 STARTER SRTIPS

A. Self sealing starter course. Each strip measures 17” tall by 40” wide.

2.05 LEAK BARRIER

A. Self-adhering, self sealing, bituminous leak barrier surfaced with a smooth polyethylene film. Each Roll contains approx. 200 sq ft, 85 lbs (38.6 kg), 36” X 66.7’. 60 mils thick. **StormGuard**, by GAFMC or equal, no known equal.

2.06 SHINGLE UNDERLAYMENT

A. Water repellent, breather type cellulose/glass fiber composite roofing underlayment. **Deck Armor** by GAFMC or equal, no known equal.

2.07 ROOFING CEMENT

A. General purpose asphalt roofing cement meeting the requirements of ASTM D 4586, Type I or II.
2.08 NAILS

A. Standard round wire, zinc-coated steel or aluminum; 10 to 12 gauge, barbed or deformed shank, with heads 3/8 inch (9.5 mm) to 7/16 inch (11 mm) in diameter. Length must be sufficient to penetrate into solid wood at least 3/4 inch (19 mm) or substrate by at least 3/4 inch.

2.09 METAL FLASHING


B. 0.032-inch (0.8 mm) aluminum sheet, complying with ASTM B 209.

PART 3 - EXECUTION

3.01 EXAMINATION

A. Do not begin installation until the roof deck has been properly prepared. Starting of work shall imply acceptance of roof deck condition.

3.02 PREPARATION

A. Remove all existing roofing down to the roof deck.

B. Verify that the deck is dry, sound, clean and smooth. It shall be free of any depressions, waves, and projections. Cover with sheet metal, all holes over 1 inch (25 mm) in diameter, cracks over 1/2 inch (12 mm) in width, loose knots and excessively resinous areas.

C. Replace damaged deck with new materials.

D. Clean deck surfaces thoroughly prior to installation of eaves protection membrane and underlayment.

3.03 UNDERLayment APPLICATION

A. General:
   1. Install using methods recommended by manufacturer’s, in accordance with local building codes. When local codes and application instructions are in conflict, the more stringent requirements shall take precedence.

B. Eaves:
   1. Install eaves edge metal flashing tight with fascia boards; lap joints 2 inches (50 mm) and seal with plastic cement; nail at the top of the flange.
C. Valleys:
   1. Install eaves protection membrane at least 36 inches wide and centered on the valley. Lap ends 6 inches (150 mm) and seal.
   2. Where valleys are indicated to be "open valleys", install metal flashing over eaves protection membrane before roof deck underlayment is installed; DO NOT nail through the flashing. Secure the flashing by nailing at 18 inches (457 mm) on center just beyond edge of flashing so that nail heads hold down the edge.

D. Roof Deck:
   1. Install one layer of roof deck underlayment over the entire area not protected by eaves or valley membrane. Install sheets horizontally so water sheds and nail in place.
   2. On roofs sloped at more than 4 in 12, lap horizontal edges at least 2 inches (50 mm) and at least 2 inches (50 mm) over eaves protection membrane.
   3. On roofs sloped between 2 in 12 and 4 in 12, lap horizontal edges at least 19 inches (480 mm) and at least 19 inches (485 mm) over eaves protection membrane.
   4. Lap ends at least 4 inches (100 mm). Stagger end laps of each layer at least 36 inches (915 mm).
   5. Lap underlayment over valley protection at least 6 inches (150 mm).

E. Penetrations:
   1. Vent pipes: Install a 24 inch (610 mm) square piece of eaves protection membrane lapping over roof deck underlayment; seal tightly to pipe.
   2. Vertical walls: Install eaves protection membrane extending at least 6 inches (150 mm) up the wall and 12 inches (305 mm) on to the roof surface. Lap the membrane over the roof deck underlayment.
   3. Rake Edges: Install metal edge flashing over eaves protection membrane and roof deck underlayment; set tight to rake boards; lap joints at least 2 inches (50 mm) and seal with plastic cement; secure with nails.

3.04 INSTALLATION OF SHINGLES

A. General:
   1. Install in accordance with GAFMC's instructions and local building codes. When local codes and application instructions are in conflict, the more stringent requirements shall take precedence.
   2. Minimize breakage of shingles by avoiding dropping bundles on edge, by separating shingles carefully (not by "breaking" over ridge or bundles), and by taking extra precautions in temperatures below 40 degrees F (4 degrees C)
   3. Handle carefully in hot weather to avoid scuffing the surfacing, or damaging the shingle edges.

B. Placement and Nailing:
1. Beginning with the starter strip, trim shingles so that they “nest” within the shingle located beneath it. This procedure will yield a first course that is typically 3” to 4” rather than a fully exposed shingle.

2. Laterally, offset the new shingles from the existing keyways, to avoid waves or depressions caused by excessive dips in the roofing materials.

3. Using the bottom of the tab on existing shingles, align subsequent courses.

4. Secure with 4, 5, or 6 nails per shingle per GAFMC’s instructions or local codes.

5. Placement of nails varies based on the type of shingle specified. Consult the application instructions for the specified shingle for details.

6. Nails must be driven flush with the shingle surface. Do not overdrive or underdrive the nails.

7. Shingle offset varies based on the type of shingle specified. Consult the application instructions for the specified shingle for details.

C. Valleys

1. Install valleys using the "open valley" method:
   a. Snap diverging chalk lines on the metal flashing, starting at 3 inches (75 mm) each side of top of valley, spreading at 1/8 inch per foot (9 mm per meter) to the eaves. Run shingles to chalk line.
   b. Trim last shingle in each course to match the chalk line; do not trim shingles to less than 12 inches (305 mm) wide.
   c. Apply a 2 inch (50 mm) wide strip of plastic cement under ends of shingles, sealing them to the metal flashing.

2. Install valleys using the "closed cut valley" method:
   a. Run the first course of shingles from the higher roof slope across the valley at least 12 inches (305 mm). Run succeeding courses of shingles from the lower roof slope across the valley at least 12 inches (305 mm) and nail not closer than 6 inches (150 mm) to center of valley.
   b. Run shingles from the upper roof slope into the valley and trim 2 inches (50 mm) from the center line.

D. Penetrations

1. All Penetrations are to be flashed according to SMACNA, GAFMC, ARMA and NRCA application instructions and construction details.

3.05 VENTILATION

A. General


3.06 PROTECTION

A. Protect installed products from foot traffic until completion of the project.
B. Any roof areas that are not completed by the end of the workday are to be protected from moisture and contaminants.

END OF SECTION
SECTION 07570
COATED FOAM ROOFING SYSTEM

PART 1 - GENERAL

1.01 SUMMARY

A. Documents affecting work of this Section include, but are not necessarily limited to, general Provisions, Special Provisions and Division 1 of these Specifications.

B. Section Includes:
   1. Coated foam roofing on combustible deck.
   2. Granule-surfaced roof coating.

1.02 RELATED WORK

A. Section 06100 – Rough Carpentry

B. Section 07620 – Sheet Metal Flashing and Trim

1.03 REFERENCES

A. American Society for Testing and Materials.
   2. ASTM E108 Class “B” Roof System over Combustible Deck.
   4. ASTM D6083 Acrylic Coating Criteria.

B. Underwriter’s Laboratory, Inc.
   2. UL 790.
   3. UL 1256 – Construction Method Numbers 136, 181, and 206.
   4. UL 1897 – Standard for Wind Uplift.
   5. UL 2218 – Standard for Impact Resistance.

C. California Code of Regulations- Title 24
   1. CBC - Chapter 2 Definitions and Abbreviations
   2. CBC - Chapter 15 Roofs and Roofs Structures

D. National Roofing Contractor’s Association.
   1. NRCA-Roofing Manual
1.04 SYSTEM DESCRIPTION

A. Built-up Roofing System: Coated foam roofing system with granule- surfaced finished coating.

1.05 SYSTEM PERFORMANCE

A. Roofing System: Arrest water migration from entering building through the roof membrane.

B. All work shall be completed as required to obtain specified warranty.

1.06 SUBMITTALS

A. Submit under provision of Section 03100.

B. Submit product data and samples indicating membrane and bitumen materials, base flashing materials and manufacturer’s roofing specifications.

C. Submit three samples, 6 by 6 inches in size illustrating all components including granule surface coating.

D. Submit manufacturer’s standard specification and installation instructions for the system specified herein.

E. Provide materials manufacturer’s written certification that this specification has been reviewed and the selected roofing and flashing specifications herein are proper, compatible and adequate for the project and that conditions and details indicated and specified do not conflict with the requirements and recommendations of the manufacturer.

F. Provide written certification that applicator is approved by the materials manufacturer to install roofing system as specified herein.


H. Provide specimen copy of the applicable warranty for this project, as specified herein.
I. Submit evidence that Coated Foam Insulated roof system is approved in accordance with UL-1256 Class A Testing.

J. Submit evidence that Coated Foam Insulated Roof Systems approved in accordance with UL 2218.

K. Submit evidence that Coated Foam Insulated roof System is approved in accordance with UL – Reports P- 7833, P-826, P-904 for Hourly Fire Resistance Design Ratings on specific decks where applicable.

L. Submit evidence that polyurethane foam with HFC 245fa blowing agent in Coated Foam Roofing System is approved in accordance with Montreal Protocol and U.S. EPA non-depleting ozone requirements.

M. Submit evidence that top coatings on Coated Foam Insulated Roof Systems are approved in accordance with “Energy Star” and CRRC Solar Reflectance and Thermal Emittance Testing.

N. Submit evidence of Applicator’s IPP (Injury and Illness Protection Plan) and Site Specified Fall Protection Plan.

1.07 QUALIFICATIONS

A. Manufacturer: Company specializing in manufacturing products, specified with minimum (5) years documented experience.

B. Applicator: Roofing applicator with 5 years experience in work of similar scope and nature to that specified and approved by manufacturer of roofing material and certified or licensed by the manufacturer.

C. Applicator: Must have documented Injury & Illness Prevention Program (IPP) as part of submittals prior to awarding contract and invitations to Pre-Installation Conference.

D. All materials shall be provided by a single manufacturer, except as specified herein.

E. All roofing materials shall bare UL Labels.

1.08 REGULATORY REQUIREMENTS AND INDUSTRY STANDARDS

A. Comply with UL Building Materials Directory for roof assembly fire hazard requirements.
B. Fire Hazard Classification: UL Class B in accordance with CBC Table 15-A

C. Work required in this Section shall comply with manufacturer’s product data and application instructions. Work shall also comply with recommended practices and details published by NRCA, where such practices and details are more stringent.

1.09 PRE-INSTALLATION CONFERENCE

A. Convene a pre-installation conference two weeks to commencing work of this Section

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

C. Review contract document requirements and submittals for roofing system, including roofing schedule, inspection and testing and environmental conditions. Identify governing regulations or insurance requirements incident to the Work of this Section.

D. Walk roof areas to review substrate preparation, including repair of unacceptable surfaces, roof drainage, penetrations, equipment curbs and work performed by other trades requiring coordination.

E. Review anticipated weather and procedures for responding to unacceptable weather, including using temporary roofing. Temporary roofing, if necessary, shall be included in the scope of work required under this Section without added time or cost to the contract sum.

F. Contract shall maintain sole responsibility for means, method, techniques and sequence of construction.

G. Required Attendance:
   1. Contractor
   2. Roofing subcontractor
   3. Architect
   4. Engineer
   5. City’s insurer, or other such entities as may be required by the City.

H. Optional Attendance: Installers of each component or related work, including deck or substrate construction rooftop equipment, penetrations of roof deck and other work integral with or adjacent to roofing. When required by the roofing manufacturer, attendance by these entities shall be mandatory.

I. Contractor shall verify requirements of authorities having jurisdiction and arrange for attendance accordingly.
1.10 DELIVERY, STORAGE AND HANDLING

A. Deliver products in manufacturer’s original containers, dry, undamaged, with manufacturer’s seals and labels intact and showing UL, CBC and CCRC listings.

B. Materials shall be delivered in cartons indicating the name of manufacturer and the type of product. Bulk shipments shall be accompanied with the same information issued in the form of a certification of on the bill of lading by the manufacturer.

C. Store products in a dry, weather protected environment, clear of ground and moisture. Do not leave unused felts on roof overnight or when roofing work is in progress.

D. Stand roll materials on end, on pallets or other raised surface.

E. Store materials so as not to overstress structure. Distribute weight of package roofing materials over roof decks areas to prevent substantial deflection of deck and overloading.

1.11 ENVIRONMENTAL REQUIREMENTS

A. Do not apply roofing polyurethane foam during inclement weather and when the following conditions exist:
   1. If surface temperature is above 160 degrees F or when the dew point is less than (5) degree F above the surface temperature.
   2. If surface moisture is present.
   3. If wind velocity is above (12) miles per hour, windscreens are required.
   4. If wind velocity is at/or above (25) miles per hour, work shall be suspended.

B. Do not apply roofing to damp deck surface.

1.12 COORDINATION

A. Coordinate work with the work of other Sections.

B. Coordinate the work of installing associated metal flashings as the work of the Section proceeds.
1.13 EXTENDED WARRANTY

A. Provide applicator’s two year warranty to maintain roofing flashings, and all other elements essential to watertightness of the roofing assembly in a watertight conditions form date of Substantial Completion.

B. Provide manufacturer’s 10 year, NO DOLLAR LIMIT warranty covering all components of the roofing assembly, to include membranes, foam and coatings and all other elements essential to watertightness of the total membrane assembly, including workmanship.

1.14 TESTING AND INSPECTION

A. Services of an independent inspection and testing agency may be obtained by City, at City’s option. Cost of service will be paid by City. Contractor shall cooperate with independent agency.

PART 2 – PRODUCTS

2.01 MANUFACTURERS

A. US approved coated Foam Roof System shall be manufactured by the following accepted manufacturer;
   1. SWD Urethane Company, Mesa Arizona

2.02 MATERIALS

A. Primer/Sealer:
   1. Neoprene based primer formulated to be airless sprayed and designed expressly to enhance adhesion of SWD Urethane foam to various surfaces.
   2. SWD- 1000 Primer/Sealer is acceptable.
   3. SWD- 2000 Primer/Sealer is acceptable in California.

B. Polyurethane Foam Roofing/Insulation:
   1. Two components rigid foam, designed to be applied with foam dispensing equipment meeting the following Minimum Physical Properties:
      a. Primer/Sealer is not usually needed on new wood deck
      b. Primer/Sealer is almost always needed on metal deck on metal roof penetrations.
PHYSICAL PROPERTIES

<table>
<thead>
<tr>
<th>Property</th>
<th>ASTM Procedure</th>
<th>Values</th>
</tr>
</thead>
<tbody>
<tr>
<td>Core Density, pcf nominal*</td>
<td>D-1622</td>
<td>2.5 –3.0</td>
</tr>
<tr>
<td>Compressive Strength, psi</td>
<td>D-2621</td>
<td>40.1</td>
</tr>
<tr>
<td>Tensile Strength, psi</td>
<td>D-1623</td>
<td>85.5</td>
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<tr>
<td>Open Cell Content %</td>
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<td>17.7</td>
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<tr>
<td>Closed Cell Content%</td>
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<tr>
<td>Water vapor transmission, per inch</td>
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<tr>
<td>R Value</td>
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<td>6.8</td>
</tr>
<tr>
<td>k-Factor( initial)</td>
<td>C-177</td>
<td>0.148</td>
</tr>
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</table>

2. SWD 125 “Quik-Shiled” polyurethane foam is acceptable.
   a. Polyurethane foam Density and Compressive Strength shall be uniform and constant with specifications. Minimum Physical Properties shall not allow for multiple foam densities of compressive strengths to be sprayed-applied within multiple inches of specified foam.
   c. SWD Urethane Company, SWD 125 Polyurtheane Foam with HFC 245 fa “Enovate” blowing agent is acceptable.

C. Protective Coating:

1. 100% acrylic elastomeric, UL 723 Class I rated. White coating meets EPA “Energy Star” and CRRC requirements for Solar Reflectance and Thermal Emittance and can be applied by brush, roller or convention airless spray equipment with the following Minimum Physical Properties.

PHYSICAL PROPERTIES

<table>
<thead>
<tr>
<th>Property</th>
<th>ASTM Procedure</th>
<th>Values</th>
</tr>
</thead>
<tbody>
<tr>
<td>Fire Resistance</td>
<td>E-84</td>
<td></td>
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<tr>
<td>Flame Spread</td>
<td>E-84</td>
<td>15</td>
</tr>
<tr>
<td>Smoke Developement</td>
<td>E-84</td>
<td>10</td>
</tr>
<tr>
<td>Solid Content By Weight</td>
<td>D-1353</td>
<td>70%</td>
</tr>
</tbody>
</table>

COATED FOAM ROOFING SYSTEM-07570-7
<table>
<thead>
<tr>
<th>Property</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>By Volume Solar Reflectance</td>
<td>D-2697 60%</td>
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<tr>
<td>E-903 82%</td>
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<tr>
<td>Thermal Emittance</td>
<td>E-408 91%</td>
</tr>
<tr>
<td>Solar Reflectance Index, SRI</td>
<td>E-1980 103%</td>
</tr>
<tr>
<td>Tensile Strength: psi</td>
<td>D-412 280</td>
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<tr>
<td>Elongation: psi</td>
<td>D-412 355</td>
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<tr>
<td>Water Vapor Transmission, ppi</td>
<td>E-96 1</td>
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<tr>
<td>(Perms @ 20 mils) Hardness</td>
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</tr>
<tr>
<td>Hardness: Shore A Durometer</td>
<td>D-2240 60</td>
</tr>
<tr>
<td>Colors: Grey, Buff White as selected by Architect</td>
<td></td>
</tr>
</tbody>
</table>

 Alla FOLLOWING TESTS PAST

Liquid requirements/Film Properties:  

Note: SWD Urethane Company is an original “Energy Star” partner and approved by CRRC.  
a. Dry film thickness shall be (25) mils application with #9 limestone granules or #11 ceramic granules embedded at 3.0 lbs per 100 square feet.  
b. Base coat and top coat should be contrasting colors to ensure adequate thickness and coverage.  
c. SWD Urethane Company “Kool-Kote”™ 1929F Acrylic Elastomeric Coatings are acceptable.

2.03 CRICKETS, SADDLES AND TAPERED AREAS

A. Material: ASTM C728; rigid perlite

B. Tapered Edge Strips: 1 inch by 12 inches minimum, double slope of roof slope required.

PART 3 - EXECUTION

3.01 EXAMINATION

A. Verify that surfaces and site conditions are ready to receive work.

B. Verify that deck is supported and secured.
C. Verify that deck is clean and smooth, free of depressions, waves, or projections, properly sloped to drains, valleys or eaves.

D. Verify that deck surfaces are dry.

E. Verify that roof openings, curbs, pipes, sleeves, ducts and vents through roof are solidly set, and cant strips and reglets are in place.

F. Other construction adjoining or affecting the work of this Section shall be examined before any work is started.

G. Beginning of Installation means installer accepts existing substrate.

H. Verification of Conditions:

1. Roofing contractor shall examine the roof deck, flashing and other surfaces that are to receive roofing materials, prior to the application, to ensure that surfaces are dry, clean and in proper condition to receive the roofing system.

2. All penetrations through roofing including drains, scuppers, miscellaneous pipe and vent penetrations and electrical conduits shall be completed prior to starting of work. Post installation of penetrations after roofing section is completed requiring repairs shall constitute cost added above contracted scope of work.

I. Application of roofing materials shall constitute the roofing contractor’s acceptance of surface and flashings to receive the materials.

J. Coordinate roof applications with other work and trades which affect connects with or will be concealed by this work.

3.02 PROTECTION

A. Protect building surfaces against damage from roofing work.

B. Maintain maximum fire safety.

3.03 PREPARATION – WOOD DECK
A. Verify flatness and tight joints of wood decking. Fill knot holes with latex filler acceptable to the manufacturer. Apply sheet metal cover firmly nailed to all joints exceeding ½ inch in width.

B. Correct substrate surfaces which are unacceptable to the applicator and contrary to the manufacturer's installation instructions and recommendations.

C. Install cants where roof meets vertical surfaces. Mechanically fasten at 12 inches oc.

D. Install crickets, saddles, and tapered areas to fully support roofing membrane and to provide proper transitions at changes in roof plane. Utilize mechanical fastening.

E. Install tapered edges strips at roof edges where scuppers and sumps may be located.

F. Install inverted cap ply over seismic straps and over wood cricket valley lines.

G. General Area:
   1. Notify the owner’s representative and visitors to the job-site of potential fugitive over spray.
   2. Car’s etc., should be moved or covered to prevent inadvertent spraying. Contractor shall coordinate traffic with subcontractor during roof operations.
   3. Use appropriate barricading methods to shelter walking traffic from the work area's equipment and over spray.
   4. Mask work area as necessary to protect buildings walls, adjacent structures and vegetation, etc. from possible over spray.

3.04 MEMBRANE APPLICATION

B. Summary of Materials per 100 square feet:

<table>
<thead>
<tr>
<th>Material</th>
<th>1 ply</th>
<th>25 to 28 lbs</th>
</tr>
</thead>
<tbody>
<tr>
<td>Baseply</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Glass Plies</td>
<td>2 ply at 7 to 11 lbs</td>
<td>14 to 22 lbs</td>
</tr>
<tr>
<td>Asphalt</td>
<td>2 Moppings at 25 to 30 lbs</td>
<td>50 to 60 lbs</td>
</tr>
<tr>
<td>Cap Sheet</td>
<td>1 ply</td>
<td>72 to 79 lbs</td>
</tr>
<tr>
<td>Asphalt</td>
<td>1 Mopping at 25 to 30 lbs</td>
<td>25 to 30 lbs</td>
</tr>
<tr>
<td>Approximate Total Weight</td>
<td></td>
<td>186 to 219 lbs</td>
</tr>
</tbody>
</table>
C. When manufacturer's standard printed specifications stipulate differing weights of materials, the manufacturer's specifications may be followed, but with no more than a 10% reduction in total weight permitted.

D. Sheathing paper:
   1. Over wood deck consisting of materials other than plywood or OSB: Apply one ply sheathing paper, nailed down temporarily, lapped 2 inches on all sides.

E. Starting at low point of wood deck, nail one full width base ply, lapping each sheet 2 inches and 6 inches at ends. Base ply over rigid insulation at crickets shall be mopped solid.

F. Base sheet shall be fastened to wood deck in the field with a total of four rows of fasteners (one in each lap and two equally spaced in the middle of the sheet) fastened at 9 inches on center. Tape and staple application shall comply with required fastening pattern. Base ply over rigid insulation at crickets shall be mopped solid.

G. Nailing pattern for perimeters and corners shall comply with the following:
   1. Lineal distance from parapet to perimeter line (extent of increased nailing) shall not be less than 40 percent of the parapet height.
   2. Nailing pattern for areas within the perimeters shall be increased by 70 percent.

H. Wood Deck:
   1. Deck must meet building code requirements for resistance to wind uplift.
   2. Plywood shall contain no more than 18% water, as measured in accordance with ASTM standards. Plywood shall be exterior grade not less that ½” thick, nailed firmly in place.
   3. Plywood joints in excess of ¼ inch shall be taped or filled by others with suitable sealant material, prior to application of polyurethane foam.
   4. Deck shall be free of loose dirt or debris by use of compressed air, vacuum or broom. No washing shall be permitted.

3.05 INSTALLATION

A. Install all materials in strict compliance with all published safety, weather or applicable instructions from the manufacturer and/or regulations of local state and/or federal agencies.

B. No work shall be commenced over defective area until advised in writing by architect of the action to be taken in such areas.
C. Spray polyurethane foam for new construction projects, shall be installed when the deck parapet wall, rough openings and curbs are complete. The type of skylight used will determine when skylights should be installed. Plumbing vents (no lead), drains and electrical penetrations shall be in place prior to foam installation. No trades-people shall be allowed to work on roof when the spray polyurethane foam and coatings are being installed - HVAC units shall not be installed until after the foam and coating roof system is in place.

D. Substrate shall have sufficient structural strength and integrity without substrate deformation, and sufficient slope-to drain-per code requirements of ¼ inch/foot to eliminate excessive ponding water. Excessive ponding is defined as “an area of 100 square feet or more which holds in excess of ½” of water, as measured 48 hours after a rainfall” per The NRCA Roofing and Waterproofing Manual – Fourth Edition. Note: j-Bar and other metal counter-flashings are no longer required at the top of foam edge on parapet walls.

E. Metal: install metal foam – stop at all roof edges, as required. J-Bar and other counter-flashings are no longer required at the top horizontal foam edge across the parapet walls.

F. Crickets and Cants:
1. Require drainage slope gradients are required to meet the various drainage sources.
2. Crickets may be constructed as follows:
   a. Using CDX plywood and structural lumber adhered mechanically to the substrate and vertical walls installed by others.
   b. Using spray polyurethane foam (within certain sloping requirements).
   c. Using tapered insulation board which shall be secured to the substrate with an adhesive recommended by the tapered board manufacturer or with mechanical fasteners.
3. Cants formed with spray polyurethane foam shall transition from deck surface up the parapet walls.

G. Parapets:
1. Polyurethane foam shall extend a minimum of (4) inches up to (12) inches up the vertical parapet wall at a thickness of ¾” to 1½” at the cant.
2. If it is required that polyurethane foam extend all the way up the parapet wall then foam termination shall be detailed via straight line and tapered foam or optional sheet metal flashing that is acceptable to architectural standards.

3.06 INSTALLATION-PRIMER/SEALER
A. All surfaces should be clean and free from moisture, oil, grease, loose particles, dust, debris, and any other material that shall prevent maximum adhesion.

B. Spray prime/sealer to decking at a rate of ½ gallon per square feet.

3.07 INSTALLATION- POLYURETHANE FOAM

A. SWD 125 “Quick-Shield”® foam shall be applied in an minimum of ½ to 1 inch thick to achieve the specified thickness ± ¼ inch per thickness.

B. Spray only the area each day that can be completed to the specified thickness that same day. Before resuming spraying operations on subsequent days, inspect the exposed leading edge of the foam for possible surface moisture that could cause blistering. The foam edge shall be considered dry when there is no indication of moisture when blotted with an absorptive material.

C. “Surface texture and quality-cured foam shall range from a smooth to heavy orange peel” finish. Texture describes as ‘popcorn or tree bark” surfaces, which exhibit crevices, voids and widespread defects, are not acceptable.

3.08 INSTALLATION- PROTECTIVE ELASTOMERIC COATING

A. Preparation:
   1. Foam surface and adjacent surfaces to be coated, shall be dry and completely free of degraded foam, foam over-spray, grease, oil, dirt or other contaminants which interfere with proper coating adhesion, dry and free of contaminants.
   2. Do not apply coating materials when surface temperature is less that 50 degree F.
   3. Any physical damage to the polyurethane foam shall be repaired before coating.
   4. Operator should wear soft-soled shoes to avoid damaging the shin of the foam.
   5. An additional application of base coat shall be applied where foam surface has been sanded, planed or trimmed.

B. Application:
   1. Base Coat:
      a. Shall be contrasting color for the topcoat to insure adequate coverage.
      b. Shall be applied on the same day, as the polyurethane foam application, when possible.
c. Polyurethane foam shall be inspected for UV oxidation if more than (72) hours has elapsed prior to application of base coat.

d. Spray-apply elastomeric base coat over insulation at the rate of (1) gallon per 100 square feet in one application.

2. Top Coat:
   a. Shall be contrasting color from the topcoat to insure adequate coverage.
   b. Do not apply top coat until base coat has cured properly. Normally, 24 hours is sufficient time for the base coat to properly cure.
   c. Spray-apply acrylic elastomeric top coat over the base coat at the rate of two gallons per 100 square feet in one application.
   d. Coating passes shall be applied in cross-hatch pattern at right angles to base coat passes to ensure more uniform coverage.
   e. Coating shall extend up and over all polyurethane foam on vent pipes, parapets and other penetration and shall terminate a minimum of (4) inches above the foam. All top coat terminations points shall be straight-lined on parapet walls, vent pipes and other penetrations for effective use and uniform appearance.

3. Granules:
   a. Granules when specified, shall be broadcast into or on top of the wet top coating while it is being applied at the rate of 30 pounds per 100 square feet.
   b. Shall consist of #11 ceramic granules of 39 limestone granules.

3.09 CLEANING

A. Remove and dispose of excess materials, equipment and debris from premises during work and/or upon completion of work,

B. Leave work in clean condition in accordance with company policy and pride in job well done.
SECTION 07620

SHEET METAL FLASHING AND TRIM

PART 1 - GENERAL

1.01 SUMMARY

A. Documents affecting work of this Section include, but are not necessarily limited to, General Conditions, Special Provisions and Division 1.

B. Section Includes:
   1. Flashing and sheet metal components for building construction.
   2. Counterflashings over roofing base flashings.
   3. Counterflashings at roof-mounted mechanical equipment and vent stacks.
   4. Counterflashings for plumbing, mechanical, electrical and other roof penetrations.
   5. Sheet metal as shown on the Drawings and specified herein.
   6. Weather-sealing and sealant applications in connection with this work.

1.02 REFERENCES

A. American Society for Testing and Materials.
   1. ASTM A924 - Steel, Sheet, Metallic-Coated by the Hot-Dip Process.
   2. ASTM B32 - Solder Metal.
   3. ASTM B69 - Rolled Zinc.
   4. ASTM B749 - Lead and Lead Alloy Strip, Sheet and Plate Products.
   5. ASTM D2822 - Asphalt Roof Cement.
   8. ASTM E154 - Water Vapor Retarders Used in Contact with Earth Under Concrete Slabs, on Walls, or as Ground Cover.

B. Federal Specifications.
   1. FS O-F-506 - Flux, Soldering, Paste and Liquid.

C. National Roofing Contractor’s Association.
   1. NRCA - Roofing and Waterproofing Manual.

D. Sheet Metal and Air Conditioning Contractors National Association.

E. Steel Structures Painting Council.
1. SSPC 12 - Asphalitic Roof Cement.

1.03 SUBMITTALS

A. Submit under provisions of Section 01300.

B. Shop Drawings: Indicate material profile, jointing pattern, jointing details, fastening methods, flashings, terminations, and installation details.

C. Include major counterflashings, trim, fascia units and expansion joint systems, downspouts and scuppers.

D. Describe material profile, jointing pattern, jointing details, fastening methods and installation details.

E. Scaled manufacturer’s catalog data acceptable.

1.04 QUALITY ASSURANCE

A. Perform work in accordance with NRCA and SMACNA standard details and requirements.

1.05 QUALIFICATIONS

A. Fabricator and Installer: Company specializing in sheet metal flashing work with five years experience in commercial and institutional type construction.

1.06 DELIVERY, STORAGE, AND HANDLING

A. Stack prefomed and prefinished material to prevent twisting, bending, or abrasion, and to provide ventilation. Slope metal sheets to ensure drainage.

B. Package and protect materials during shipment to avoid dampness and staining. Uncrate and inspect materials for damage, dampness and staining upon delivery to the jobsite. Remove from the site and replace damaged materials that cannot be restored to like-new condition.

C. Store materials in dry, weather-tight, ventilated areas until immediately before installation. Stack performed and prefinished material to prevent twisting, bending or abrasion and to provide ventilation. Prevent contact with materials during storage which may cause discoloration, staining or damage.

D. Handle sheet metal items to avoid damage to surfaces, edges and ends.
1.07 COORDINATION

A. Coordinate with the work of Section 07410.

PART 2 - PRODUCTS

2.01 SHEET MATERIALS

A. Galvanized Steel: ASTM A924; grade A, commercial quality, G90 zinc coating; minimum 24 gage core steel or thicknesses as indicated on the Drawings.

B. Lead: ASTM B749; minimum 4 lbs/sf for split-lead (field soldered) jacks and drains, 2-1/2 lbs/sf for roof jacks.

2.02 ACCESSORIES

A. Provide accessory materials and other items essential to complete the sheet metal and trim installation, including sheet metal clips, straps, anchoring devices and similar accessory units as required for installation of the work, matching or compatible with material being installed, non-corrosive, size and gage required for performance minimums.

B. Fasteners: Rivets, nails, sheet metal screws, machine screws, self-tapping screws and stove bolts, of the types and size best adapted to the conditions of use.
   1. Provide fasteners of the type specified or indicated.
   2. Unless otherwise noted, fasteners shall be galvanized steel or stainless steel, with soft neoprene washers.
   3. Open-end type rivets may be used for all applications except where watertight connections are required, in which case use closed-end type only.
   4. Fasteners to Wood Substrate: Full threaded screws, galvanized when applied on the exterior, minimum No. 12 size, round head or flat head with neoprene washers as appropriate to surface applied.
   5. Fasteners to Concrete, Masonry and Metal Substrates: Galvanized when applied on the exterior, expansion or wedge type as appropriate to surface applied, neoprene washers.
   6. Comply with details on Drawings and Section 07500.

C. Underlayment:
   1. ASTM D4601; asphalt-coated fiberglass, inorganic, minimum 25 lb per square.
   2. ASTM E154; reinforced polyethylene sheet, minimum 6 mills thickness, resistant to decay.
D. Primer: Coordinate primer with finish paint and coating, as applicable, to provide sound foundation for field-applied topcoats despite prolonged exposure during construction.
   2. Shop primer for Ferrous Metal at Concealed Exterior Locations and for Interior Locations: 90E-92, ETHYL SILICATE ZINC-RICH PRIMER, by Tnemec.

E. Field Primer and Finish Paints: As specified in Section 09900.

F. Protective Backing Paint: Bituminous, high-build mineral-filled coal tar pitch coating or cold-applied asphalt mastic complying with SSPC-12, containing no asbestos fibers, No. 46-450 by Tnemec.

G. Sealant: One-component polyurethane, type 1, specified in Section 07900.

H. Bedding Compound: Rubber-asphalt type.

I. Plastic Cement: ASTM D4586; type I or II, asphaltic type.

J. Roofing Cement: ASTM D2822; asphaltic base cement, free of asbestos

K. Reglets: Surface mounted, extruded aluminum, profiled to receive sealant bead at upper edge, by Fry Reglet.

L. Solder: ASTM B32; 50/50 lead-tin type alloy. Name of manufacturer and grade designation shall be cast or die-marked on each bar.

M. Flux: FS O-F-506; acidic.

2.03 FABRICATION

A. Form sections true to shape, accurate in size, square, and free from distortion or defects.

B. Fabricate materials in accordance with the best trade practices and with all joints and corners accurately machined, filled and fitted and rigidly framed together and connected.

C. Carefully match components to produce perfect continuity of line and design.
D. Make joints and connections in exterior face metal watertight, using approved sealing materials and methods of assembly.

E. Fit faces of metal in contact with hairline joints, except as otherwise indicate or require for expansion or fitting.

F. Conceal fastenings, unless otherwise indicated. Conceal required reinforcements within the finished assembly.

G. Provide for expansion and contraction by providing expansion and contraction and building movement capability in the completed work, without over-stressing the materials, breaking connections, or producing wrinkles and distortion in finished surfaces.
1. Sealant Joints: Where movable, non-expansion type joints are indicated or required for proper performance of sheet metal work, form metal to provide for proper installation of one-component sealant as specified in Section 07900.
2. Expansion Provisions: Where lapped or bayonet-type expansion provisions in sheet metal work cannot be used or would not be sufficiently waterproof and weatherproof form expansion joints of intermeshing hooked flanges, not less than 1 inch deep, filled with one-component polyurethane sealant as specified in Section 07900.

H. Finish sheet metal work water and weather-tight throughout.

I. Form pieces in longest possible lengths, true to shape, accurate in size, square and free from distortion or defects. Typically, provide sheet metal items in 8 to 10 ft lengths. Single pieces less than 8 ft long may be used to connect to factory-fabricated inside and outside corners and at ends of runs.

J. Miter and seam corners. Form exposed sheet metal work without excessive oil-canning, buckling or tool marks, true to line and levels indicated and with exposed edges folded back to form hems on underside 1/2 inch.

K. Form material with flat-lock seams. Sweat full of solder, except where installed to permit expansion and contraction. Lap flat-lock seams and lap seams where soldered, according to pitch, but in no case less than 3 inches. Make seams in direction of flow. Fill expansion joints with sealant.
1. Soldered flat lap seams not permitted.

L. Fabricate corners from one piece with minimum 18 inch long legs; solder for rigidity, seal with sealant.
M. Fabricate vertical faces with bottom edge formed outward 1/4 inch and hemmed to form drip.

PART 3 - EXECUTION

3.01 EXAMINATION

A. Verify roof openings, curbs, pipes, sleeves, ducts, or vents through roof are solidly set, reglets in place, and nailing strips located.

B. Verify roofing termination and base flashings are in place, sealed, and secure.

3.02 PREPARATION

A. Install starter and edge strips, and cleats before starting installation.

B. Install surface mounted reglets true to lines and levels. Seal top of reglets with one-component polyurethane sealant, as specified in Section 07900.

3.03 INSTALLATION

A. Comply with details as indicated on the Drawings and included in the NRCA manual. When details or conditions are not indicated, comply with standard details and recommended practices in SMACNA and referenced industry standards. For proprietary products, comply with manufacturer’s installation instructions and recommendations.

B. Produce lines, profiles, arrises and angles accurate, sharp and true. Make corners square, surfaces true and straight in planes.

C. Exposed surfaces shall be free from visible wave, warp, buckle or tool marks. Fold back exposed edges neatly to form a 1/2 inch hem on the concealed side. Make sheet metal exposed to the weather watertight with provisions for expansion and contraction.

D. Secure flashings in place using concealed fasteners. Provide compatible washers to protect surface of sheet metal and to provide a watertight connection.
   1. restrict screw and nail applications to sheet metal having a maximum width of 18 inches.
   2. Space fasteners evenly not over 3 inches oc and approximately 1/2 inch from edges.
   3. Exposed fasteners in locations open to public view not permitted.
E. Install sheet metal flashing and trim with laps, joints and seams that will be permanently watertight and weatherproof. Provide lapped and sealed joints only where indicated and where approved by the Architect.

F. Apply plastic cement compound between metal flashings and felt flashings.

G. Fit flashings tight in place. Make corners square, surfaces true and straight in planes, and lines accurate to profiles.

H. Seal metal joints watertight.

I. Solder metal joints for full metal surface contact.
   1. Clean and flux metals in seams before soldering.
   2. Pre-tin edges of sheet metal before soldering.
   3. Solder immediately after application of flux. Slowly solder with well heated soldering irons so as to thoroughly heat the seams and completely sweat the solder through the full width of the seam.
   4. After soldering, wash metal clean with neutralizing solution and rinse with water.

J. Secure all sheet metal components in place using concealed fasteners.

K. Seal metal joints watertight. Apply plastic cement compound between metal flashings and felt flashings.

L. Cleats and Starter Strips:
   1. Provide cleats for sheet metal where indicated and also where sheet metal is 18 inches and over in width.
   2. Unless continuous cleat is indicated, space cleats evenly not over 12 inches oc, unless otherwise indicated.
   3. Unless otherwise indicated, cleats shall be not less than 2 inches wide by 3 inches long and of the same material and thickness as the sheet metal being installed.
   4. Secure one end of cleat with two fasteners, with cleat folded back over the fastener head. Lock other end into seam.
   5. Pre-tin cleats for soldered seams.


N. Seams:
   1. Provide seams with uniform width and height, with no solder showing on the face.
   2. Flat-lock seams. Finish not less than 3/4 inch wide.
3. Lap seams. Overlap seams, not soldered, shall be not less than 3 inches wide.
4. Loose-lock expansion seams shall be not less than 3 inches wide. Provide minimum 1 inch movement within the joint. Completely fill the joints with one-component polyurethane sealant applied in a not less than 1/8 inch bed.
5. Standing seams shall be not less than 1 inch high, double locked without solder.
6. Flat seams shall be fabricated in the direction of the flow.

3.04 EXPANSION CONTROL

A. Provide for expansion and contraction of sheet metal as recommended in SMACNA.

B. Sheet metal shall accommodate thermal expansion and contraction resulting from an ambient temperature differential of 120 degrees F, which may result in a metal surface temperature range of 180 degrees F, without causing buckling excessive stresses on structural elements or fasteners, stresses on glazing, failure of seals, reduction of performance or other detrimental effects on appearance and performance.

C. Provide expansion and contraction control joints at not more than 40 ft intervals typically. Provide joints at 10 ft oc for copings, gravel stops and other roof edge terminations. Space joints evenly.

D. Where the distance between the last expansion joint and the end of the continuous run is more than half the required interval, provide an additional joint.

E. Attach expansion joint units to curb nailers with appropriate fasteners, at maximum spacing of 6 inches oc. Fabricate seams at joints between units with minimum 3 inch overlap, to form a continuous, waterproof system.

3.05 DISSIMILAR MATERIALS

A. Coat surfaces in contact with mortar, concrete or other cementitious materials with alkali-resistant bituminous coating.

B. Apply 7.5 mil minimum dry film thick coating of bituminous paint to each contacting face of dissimilar metals, for net 15 mil minimum thickness of coating.

C. Paint surfaces of wood or other absorptive materials that may become repeatedly wet and in contact with metal with heavy application of bituminous coating.
3.06 FLASHINGS AND COUNTERFLASHINGS

A. Fit flashings tight in place. Secure flashings in place using concealed fasteners only.

B. Install reglets true to lines and levels, located minimum 8 inches above cant at high point of roof decks. Install reglets to receive counterflashings in manner and by methods indicated. Seal top of surface-applied reglets with one-component polyurethane sealant as specified in Section 07900.

C. Install counterflashings in reglets to form tight fit, either by snap-in seal arrangement or by securing in place with lead wedges spaced 18 inches oc maximum. Pack remaining spaces with lead wool.

D. Insert counterflashings in reglets, extending down vertical surfaces over upturned vertical leg of base flashings not less than 3 inches.

E. Form counterflashings to required shapes before installation.

F. Lengths of metal counterflashings shall not exceed 10 ft. Where stepped counterflashings are required, counterflashings may be installed in short lengths of may be of preformed, one-piece type.

G. Provide factory or shop formed corners not less than 12 inches from the angle.

H. Provide endlaps in counterflashings not less than 3 inches and make laps weathertight with sealant.

I. Install edge of counterflashings built into masonry or concrete walls not less than 2 inches into wall.

J. Fold exposed edges of counterflashings 1/2 inch. Install material to provide a spring action against base flashing.

3.07 ROOF PENETRATIONS

A. Provide metal flashing for all pipes, ducts and conduits projecting through the roof surface and for equipment supports, guy wire anchors and similar items supported by or attached to the roof deck. Goose-necks, rainhoods, power roof ventilators and other plumbing, HVAC and electrical products are specified in Divisions 15 and 16.

B. Vent Pipe Flashing:
1. Construct vent pipe flashing sleeve of 2-1/2 lb lead with minimum 4 inch wide flange.
2. Prior to pipe flashing installation, install roofing plies up to the pipe penetration and cut neatly around the opening.
3. Prime pipe flashing flange on both sides with specified primer.
4. Flanged metal shall be primed, allowed to dry, installed on top of finished plies, in a bed of mastic and nailed 4 inches oc staggered and stripped-in with two reinforcing felts (the first 4 inches beyond flange, the second 4 inches beyond first) prior to application of surfacing.
5. Mop over to ensure embedment of top surfacing.
6. Crimp top of lead at least one inch into pipe.
7. Provide draw band and sealant at condensate lines, electrical, gas and similar penetrations.
8. Comply with details on Drawings and Section 07500.

3.08 CLEANING AND PREPARATION FOR FIELD PAINTING

A. Neutralize excess flux with 5 to 10 percent soda solution and rinse.
B. Repair or replace damaged and deformed sheet metal.
C. Wash down exposed surfaces and remove stains, scrap and debris such that sheet metal is ready to receive field painting and related work.
D. Remove soiling, dust, contamination from steel wool and drilling residue and other scrap and debris.
E. Scrub surfaces with detergent solution as necessary to remove grease and oil films, handling marks and stains.

3.09 FIELD PAINTING

A. Field-paint exposed sheet metal for corrosion resistance and decorative purposes.
B. Paint all exposed sheet metal under provisions of Section 09900, Special Coatings.

3.10 SCHEDULE

A. Comply with details on Drawings.
B. Downspouts (where occurs):
1. Exposed Type: Rectangular shape and size as indicated on Drawings, gage as indicated on the Drawings, or if not indicated, minimum 20 gage galvanized sheet steel with brackets, reinforcing and internal diverters.

2. Fabricate downspouts in approximately 10 ft lengths.

3. Provide end joints telescoped not less than 1/2 inch and with flat lock seams.

4. Provide downspout terminations at grade. Coordinate installation to ensure that water is directed onto concrete paving or concrete splashblock. Provide connection to underground storm drain system where indicated on Drawings.

C. Reglets and Flashings:
1. Provide formed metal spring-lock type reglets with snap-in metal counterflashing, factory-fabricated, with a minimum opening of 1/4 inch and a depth of 1-1/4 inches. Reglets shall be surface-mounted, unless shown otherwise on Drawings.


3. End Laps: Factory-formed, 1 inch at reglets and 3 inches at flashings.

4. Corners: Provide built-up mitered corner pieces for internal and external angles.

5. Wind Clips: Provide sheet metal clips to be secured to wall prior to installing flashing in reglet and to be bent up over bottom edge of flashing.

6. Provide slotted mounting holes spaced 16 inches oc for fastening reglet to vertical substrate.


D. Copings and Cap Flashings
1. Fabricate from minimum 20 gage galvanized steel. Provide all coping and caps of the types and shapes indicated on Drawings.

2. Build-in integral expansion joints, allowing for movement of the metal without resulting in distortion of coping or leaks of any kind. Work shall be watertight.

E. Gutters (where occurs):
1. Fabricate from minimum 24 gage galvanized sheet metal.

2. Install an expansion joint every 30 linear feet of gutter. Install cover plates over expansion joints.

3. Fabricate gutter without longitudinal seams.

4. Install cradles of 1/4 inch by 1-1/2 inch galvanized steel at 36 inches oc.

5. Gutters shall rest in cradles but shall not be mechanically fastened, to allow for expansion and contraction.
F. Scuppers:
   1. Fabricate from 20 gage galvanized sheet steel.
   2. Apply Type 1 sealant, as specified in Section 07900, in all crevices.

G. Downspouts and Strainers:
   1. Fabricate from 24 gage galvanized steel.
   2. Strainers shall be 10 gage galvanized steel wire basket type.
   3. Provide all anchor clips and straps as required for installation.
   4. Install wire basket strainer in all downspouts at gutter level.

H. Drips:
   1. Fabricate from 20 gage galvanized sheet steel at heads of all doors in exterior walls where no roof or overhead protection occurs.
   2. Extend drips minimum 2 inches beyond jambs.

I. Pitch Pans:
   1. Construct pitch pans of minimum 24 gage galvanized sheet metal, 4 inches high, with minimum 4 inch continuous flange.
   2. Prime all surfaces with specified primer, including surfaces of pipe or structural element penetrating the roof system.
   3. Flanged metal shall be primed, allowed to dry, installed on top of finished plies, in a bed of mastic and nailed 4 inches oc staggered and stripped-in with two reinforcing felts (the first 4 inches beyond flange, the second 4 inches beyond first) prior to application of surfacing.
   4. Apply membrane system.
   5. Fill pitch pan 2/3 depth with non-shrink grout. Fill top 1/3 depth with specified plastic cement, sloped to drain.

J. Miscellaneous:
   1. Provide miscellaneous flashings as shown on the Drawings and required to complete sheet metal flashing and trim work under this Section.
   2. Provide shop drawings indicating details for approval.
   3. Materials: Not less than 24 gage thickness, and as required to produce firm, solid, structurally sound elements, capable of withstanding wear and external forces normally associated with component or assembly.

END OF SECTION
SECTION 07900

JOINT SEALERS

PART 1 - GENERAL

1.01 SUMMARY

A. Documents affecting work of this Section include, but are not necessarily limited to, General Conditions, Special Provisions and Division 1.

B. Section Includes:
   1. Sealant and joint backing.

1.02 REFERENCES

A. American Society for Testing and Materials
   1. ASTM C834 - Latex Sealing Compounds.
   2. ASTM C919 - Use of Sealants in Acoustical Applications.
   5. ASTM D1056 - Flexible Cellular Materials - Sponge or Expanded Rubber.

B. Sealant, Waterproofing and Restoration Institute.

C. Federal Specifications.
   1. FS TT-S-227 - Sealing Compound: Elastomeric Type, Multi-Component.
   2. FS TT-S-230 - Sealing Compound: Elastomeric Type, Single Component.
   3. FS TT-S-1543 - Sealing Compound: Silicone Type.

1.03 SUBMITTALS

A. Submit under provisions of Section 01300.

B. Product Data: Provide manufacturer’s specifications and other data indicating sealant chemical characteristics, performance criteria, substrate preparation, limitations, color availability and Shore hardness.

C. Submit three cured samples, of each type sealant specified, in sizes to demonstrate colors for selection, minimum 6 inches long, applied to substrates similar in appearance to actual substrates.
D. Submit written evidence that Manufacturer and/or applicator has reviewed the use of sealant proposed for each substrate application.

1.04 SYSTEM DESCRIPTION

A. Joint Sealer Work for Weathertightness: Sealant work of this Section includes all interior and exterior caulking and sealing required to make building weather tight and includes caulking and sealing wherever expansion and contraction occurs and between materials and products which could lead to infiltration of moisture, water, light or air-blown particles into building.

B. Joint Sealer Work for Acoustical Control: Work includes interior caulking and sealing required to arrest airborne sound transmission through building assemblies.

C. Joint Sealer Work for Moisture Control: Work includes interior caulking and sealing to fill openings and seams to prevent moisture penetration to the interior or into building assemblies of any kind.

D. Joint Sealer Work for Appearance: Work includes interior caulking and sealing to neatly trim and fill openings prior to painting.

1.05 QUALITY ASSURANCE

A. Perform work in accordance with sealant manufacturer’s requirements for preparation of surfaces and material installation instructions.

B. Perform joint sealant work in accordance with ASTM C1193.

C. Perform acoustical sealant application work in accordance with ASTM C919.

D. Perform work in accordance with SWRI requirements for materials.

1.06 QUALIFICATIONS

A. Manufacturer: Company specializing in manufacturing the Products specified in this section with minimum five years experience.

B. Applicator: Company, or applicator within any individual Section of the Specifications, specializing in performing the work of this section with minimum one year experience.

1.07 FIELD SAMPLES
A. Provide a minimum of one field sample, demonstrating sealant type, color, tooled surfacing, in each differing sealant application.

B. Locate where approved by the Architect. Do not proceed with remainder of sealant application until approved by the Architect.
   1. Field Installation Tests: Before installation of any section of sealant application, test the adhesion of sealant to actual substrate.
   2. Seal at least a 5 ft length of joint and cure properly. Attempt pullout of material by hand, or by method recommended by sealant manufacturer.
   3. Select test joints representative of joints to be sealed by the product to be tested.
   4. Perform tests for each type of sealer used on exterior of building.
   5. Perform tests in presence of Architect and the product manufacturer.
   6. Report results to Architect in written format, when tests prove negative.

C. Field sample, if approved, may remain as part of the Work. Field samples not approved shall be removed from the Work, and corrections made at no added time or cost to the Contract.

1.08 ENVIRONMENTAL REQUIREMENTS

A. Maintain temperature and humidity recommended by the sealant manufacturer during and after installation. Do not permit conditions unacceptable to the manufacturer.

B. Do not install solvent curing sealants in enclosed building spaces.

1.09 DELIVERY, STORAGE AND HANDLING

A. Deliver materials in original unopened containers with labels intact and legible at time of use. Store in a covered area under conditions of temperature and humidity recommended by the manufacturer.

B. Do not retain at the job site any materials which have exceeded the manufacturer’s recommended shelf-life.

C. Use all means necessary to protect the materials of this Section before, during and after installation and to protect work and materials of other trades.

1.10 EXTENDED WARRANTY

A. Provide five year manufacturer’s warranty, to include coverage for installed sealants and accessories which fail to achieve air-tight, or water-tight capability,
or exhibit loss of adhesion or cohesion, or do not properly cure within the warranty period.

B. Correction is required for all failed application, as a part of scope of work under this Section.

PART 2 - PRODUCTS

2.01 MATERIALS

A. Provide only products which are recommended and approved by the manufacturer for the specific use to which they are applied and which comply with all requirements of the work under this Section.

B. For each generic product, use only materials from one manufacturer.

C. Provide only materials which are compatible with each other and with the joint substrate.

2.02 SEALANT TYPES

A. Type 1: FS TT-S-230; one-part polyurethane, non-sag. Approved Products:
   1. Pecora DYNATROL I.

B. Type 2: FS TT-S-227; multi-part polyurethane, non-sag. Approved Products:
   1. Pecora DYNATROL II.
   2. Vulkem 922.
   3. Sika SIKAFLLEX 2-c NS.

C. Type 3: FS TT-S-230; one-part polyurethane, self-leveling. Approved Products:
   1. Pecora UREXPAN NR-201.
   2. Vulkem 45.

D. Type 4: FS TT-S-227; multi-part polyurethane, self-leveling. Approved Products:
   1. Pecora UREXPAN NR-200.
   2. Vulkem 245/255.
   3. Sika SIKAFLLEX 2-c SL.
E. Type 5: FS TT-S-1543; one-part silicone, non-sag, mildew-resistant, with movement capability of more than 25 percent but less than 50 percent in both extension and compression. Approved Products:
1. Dow Corning 795.
2. Pecora 895 SILICONE.
3. Tremco SPECTRUM 2.

F. Type 6: ASTM C834; one-part acrylic, acoustical, non-sag, paintable, nonstaining. Approved Products:
1. Pecora BA-98.
2. Tremco ACOUSTICAL SEALANT.
3. Sonneborn SONOLAC.

G. Type 7: ASTM C1085; one-part, butyl rubber, non-sag, solvent-release curing, polymerized, non-staining, paintable, with tack-free time of 24 hours or less. Approved Products:
1. Pecora BC-158.
2. TREMCO BUTYL SEALANT.

2.03 SEALANT COLORS

A. Colors for each sealant will be selected by the Architect, from standard colors normally available from the manufacturer. Should such standard color not be available from the approved manufacturer except at additional charge, provide all such colors at no additional cost or time to the Contract.

B. In concealed installations and in partially or fully exposed installations, where so approved by the Architect, use standard gray or black color.

2.04 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: ASTM D1056; round, closed cell or open cell, polyethylene foam rod; oversized 25 to 50 percent larger than joint width, as recommended and approved by the manufacturer.

D. Masking Tape: Non-staining, non-absorbing, compatible with sealants and surfaces adjacent to joints.
E. Bond Breaker: Pressure sensitive tape recommended by sealant manufacturer to suit application. Apply to bottom of joints which are too shallow to receive foam backer rod.

F. Tooling Agents: Approved by the sealant manufacturer, nonstaining to sealant and substrate.

G. All other materials not specifically described but required for complete and proper installation of sealants, shall be first quality or their respective kinds as selected by the Contractor, subject to approval of the Architect.

PART 3 - EXECUTION

3.01 EXAMINATION

A. Verify that substrate surfaces and joint openings are ready to receive work and field measurements are as shown on the Drawings and as recommended by the manufacturer.

B. Examine joints indicated to receive joint sealers, for compliance with requirements for joint configuration, installation tolerances and other conditions affecting joint sealer performance.

C. Verify that joint backing and release tapes are compatible with sealant.

D. Do not install sealers if joint dimensions are less than or greater than that recommended by sealant manufacturer. Notify the Architect and obtain sealant manufacturer’s recommendations for alternate procedures.

E. Beginning of installation means installer accepts existing surfaces.

3.02 PREPARATION

A. Remove loose materials and foreign matter which might impair adhesion of sealant. Including old joint sealers, oil, grease, paint, waterproofing, water repellents, water, surface dirt and frost.

B. Remove laitance and form-release agents from concrete.

C. Clean metal, glass, porcelain enamel or glazed surfaces of ceramic tile or other non-porous surfaces by chemical cleaners or other means which are not harmful to substrates or leave residues capable of interfering with adhesion of joint sealers.
1. Steel: Steel surfaces in contact with sealant shall be sandblasted, manually scraped or wire-brushed to remove mill scale, paint or other foreign substances detrimental to proper adherence of the sealant materials. Use solvent to remove oil and grease, wiping the surfaces with clean rags. Remove protective coatings and all residue.

2. Aluminum: Aluminum surfaces in contact with sealant shall be cleaned of temporary protective coatings, dirt, oil and grease. Remove masking tape protective cover just prior to application of sealant. Use only such solvents as recommended by the aluminum manufacturer, and which are non-staining.

3. Concrete and Ceramic Tile Surfaces: All contact surfaces shall be dry, sound, well brushed and wiped free from dust. Use solvent to remove oil and grease, wiping the surfaces with clean rags. Treated surfaces shall have the surface treatment removed by sandblasting or wire brushing. Remove laittance and mortar from joint cavities.

D. Prime joints in accordance with manufacturer’s instructions or where indicated or where applicator’s past experience or tests give indication special preparation.

E. Confine primers to areas of joint sealer bond. Do not allow spillage or migration onto adjoining surfaces.

F. Perform preparation in accordance with manufacturer’s instructions.

G. Protect elements surrounding the work of this section from damage or disfiguration.

3.03 INSTALLATION

A. Equipment: Apply sealants under pressure with hand or power actuated gun or other appropriate means. Guns shall have nozzle of proper size and shall provide sufficient pressure to completely fill joints as designed.

B. Install sealant in accordance with manufacturer’s instructions, and applications indicated, except where more stringent requirements apply.

C. Measure joint dimensions and size materials to achieve optimum sealant movement capability.

D. Install joint backing to achieve a neck dimension as recommended by the SWRI, or as required to achieve optimum sealant movement capability. Do not leave gaps between ends of joint fillers. Do not stretch, twist, puncture, or tear joint fillers. Remove absorbent joint fillers which have become wet prior to sealant application and replace with dry material.
E. Install bond breaker tape between sealants and joint fillers, compression seals, or back of joints where adhesion of sealant to surfaces at back of joints would result in sealant failure.

F. Install bond breaker tape where joint backing is not used.

G. Install sealant free of air pockets, foreign embedded matter, ridges, and sags.

H. Apply sealant within recommended application temperature ranges. Consult manufacturer when sealant cannot be applied within these temperature ranges.

I. Install sealants by proven techniques that result in sealants directly contacting and fully wetting joint substrates, completely filling recesses provided for each joint configuration, and providing uniform, cross-sectional shapes and depths relative to joint widths which allow optimum sealant movement capability.

J. Immediately after sealant application and prior to time skinning or curing begins, tool sealants to form smooth, uniform concave beads or configuration indicated, to eliminate air pockets, and to ensure contact and adhesion of sealant with sides of joint. Do not use tooling agents which discolor sealants or adjacent surfaces or are not approved by the manufacturer.

K. Use masking tape to protect adjacent surfaces of recessed tooled joints.

3.04 CLEANING AND REPAIRING

A. Clean off excess sealants or sealant smears adjacent to joints as work progresses by methods and with solvent or cleaning agents approved by the manufacturer.

B. Remove masking tape immediately after joints have been tooled.

C. Repair or replace defaced or disfigured finishes caused by the work of this Section.

D. Promptly remove from the job site all debris, empty containers and surplus material derived from the work under this section.

3.05 DEFECTIVE WORK

A. Work will be adjudged defective by the Architect if leakage results from failure of sealant to cure or bond to adjacent work, or if it hardens, cracks, shrinks or runs or stains adjacent surfaces.
B. Defective work shall be removed and re-applied. Clean joints and install new sealant materials as approved by the Architect.

3.06 PROTECTION OF FINISHED WORK

A. Protect sealants until cured.

3.07 SCHEDULE

A. Exterior Joints:
1. Joints between metal frames and concrete, masonry or plaster: Type 2.
2. Joints between concrete, masonry, and exterior impervious materials: Type 2.
5. Perimeters of metal or wood window frames, door frames, louvers and similar openings, and where metal, wood or other materials abut or join masonry, concrete or each other: Type 1 or 2.
6. Horizontal expansion, control and abutment joints in sidewalks or concrete floors: Type 4. Similar joints where a self-leveling sealant cannot be used because of slope: Type 2.
7. Cap beads on glass adjacent to metal or other silica substance surfaces: Type 5.

B. Interior Joints:
1. Vertical expansion and control joints: Type 1.
2. Joints between concrete, masonry and interior impervious materials: Type 1.
3. Horizontal expansion, control, isolation and abutment joints: Type 3 or 4.
4. Perimeters of metal or wood window frames, door frames, and where metal, wood or other materials abut or join masonry, concrete or each other: Type 1.
5. Joints in gypsum board: Type 1.
6. Perimeters of sinks and other fixtures in countertops: Type 5.
7. Intersection of wall surface and cap strip at resilient flooring integral cove: Type 1.
8. Intersection of metal or wood thresholds and floor substrate, where building components are mechanically attached and require sealing: Type 7.
9. Perimeter of sound-rated walls, at intersection of gypsum board and abutting surfaces, both sides of wall: Type 6.

END OF SECTION
SECTION 08110

STEEL DOOR FRAMES

PART 1 - GENERAL

1.01 SUMMARY

A. Documents affecting work of this Section include, but are not necessarily limited
to, General Conditions, Special Provisions and Division 1.

B. Section Includes:
   1. Welded steel door and window frames

1.02 RELATED WORK

A. Section 06210 Door, Frame, and Hardware Installation
B. Section 08115 Steel Doors
C. Section 08710 Door Hardware
D. Section 09900 Painting

1.03 REFERENCES

A. Steel Door Institute.
   1. SDI 100 - Standard Steel Doors and Frames.
   2. SDI 105 - Recommended Erection Instructions for Steel Frames.
   3. SDI 111 - Recommended Standard Details Steel Doors and Frames.
   5. SDI 118 - Basic Fire Door Requirements.

B. Hollow Metal Manufacturer's Association.
   1. HMMA - 820 - Hollow Metal Frames.
   2. HMMA - 840 - Installation and Storage of Hollow Metal Doors and Frames.
   3. HHMA - 850 - Fire-Rated Hollow Metal Doors and Frames.

C. American Society for Testing and Materials.
   1. ASTM A1008 - Steel Sheet, Cold-Rolled, Carbon, Structural High
      Strength Low-Alloy and High-Strength Low-Alloy with Improved
      Formability.
   2. ASTM A1011 – Steel Sheet, Hot-Rolled, Carbon, Structural High Strength
      Low-Alloy and High-Strength Low-Alloy with Improved Formability.
3. ASTM A591 - Steel Sheet, Electrolytic Zinc-Coated, for Light Coating Mass Applications.
4. ASTM A653 – Hot-Rolled Heavy-Thickness Sheet & Strip Steel.
5. ASTM E152 – Methods of Fire Tests for Door Assemblies

   1. NFPA 80 - Fire Doors and Windows.

E. American National Standards Institute.

F. International Conference of Building Officials.
   1. UBC Standard 7-2 – Fire Tests of Door Assemblies.

G. Underwriters laboratories, Inc.
   1. UL 10B – Fire Tests of Door Assemblies.
   2. UL 10C - Positive Pressure Fire Tests of Door Assemblies.

H. Warnock Hersey Inc.
   1. WHI – Listings.

1.04 SUBMITTALS

A. Submit under provisions of Section 01300.

B. Shop Drawings: Indicate frame elevations, reinforcement, and finish. Include details of each frame type, elevations of door frame types, conditions at opening, details of construction, location and installation requirements of finish hardware and reinforcements, and details of joints and connections. Show anchorage and accessory items.

C. Product Data: Indicate frame configuration, anchor types and spacings, location of cut-outs for hardware, reinforcement.

D. Samples: Submit three samples of frame, illustrating typical factory manufacturing technique.

E. Manufacturer’s Installation Instructions: Indicate special installation instructions.
1.05 QUALITY ASSURANCE

A. Comply with requirements of SDI 100 and HMMA 820 standards except where exceeded by this specification.

B. Manufacturing tolerances shall meet or exceed requirements of SDI 117.

1.06 QUALIFICATIONS

A. Manufacturer shall demonstrate current membership in SDI or HMMA.

1.07 REGULATORY REQUIREMENTS

A. Installed Frame Assembly: Comply with NFPA 80 for fire rated class same as fire door.

1.08 DELIVERY, STORAGE, AND HANDLING

A. Deliver rolled steel products cartoned or crated to provide protection during transit and job site storage. Provide additional sealed plastic wrapping to protect factory finishes.

B. Accept frames on site in manufacturer’s packaging. Inspect for damage. Minor damages may be repaired provided refinished items are equal in all respects to new work and approved by the Architect. Non-approved products shall be removed from the job site.

C. Store frames at job site under cover. Store frames in compliance with SDI 840.

D. Place units on wood blocking. Avoid use of non-vented plastic or canvas shelters which could create humidity chamber. If cartons become wet, remove immediately. Allow sufficient space between stacked units to permit air circulation.

E. Attach spreader bars on welded frames to preclude warping or bending during delivery and storage. Comply with SDI 105 for erection procedures.

1.09 FIELD MEASUREMENTS

A. Verify that field measurements are as indicated on shop drawings.

1.10 COORDINATION
A. Coordinate the work with frame opening construction, door and hardware installation.

PART 2 - PRODUCTS

2.01 MANUFACTURERS

A. Approved manufacturers:
   1. Ceco Door Products, Benchwood TN.
   2. The Kewanee Corporation, Kewanee IL.
   3. Republic Builders Products, McKenzie TN.
   4. Steelcraft, Cincinnati OH.

B. Approved Manufacturers: Any manufacturer providing certification of compliance with the standards of fabrication, installation, finish and testing required in the current issues of SDI or HMMA specification guides.

2.02 WELDED FRAMES

A. Frames shall suit SDI 100 Grade and Model of door specified in other Sections.

B. Exterior Frames: Minimum 16 gage thick material base metal thickness.

C. Interior Frames: Minimum 16 gage thick material base metal thickness.

D. Anchors:
   1. In concrete construction, provide two anchors at head for openings up to 48 inches, three if wider, maximum 30 inches on centers. Provide three at jamb for doors up to 84 inches in height, additional anchors at maximum 30 inches on centers for higher openings.
   2. In Steel stud or wood stud construction provide two anchors at head for openings up to 48 inches, three if wider, maximum 30 inches on centers.
   3. Provide anchors on hinge jamb immediately above each hinge reinforcing plate and below the top hinge reinforcement (minimum 4 per jamb) and locate anchors directly opposite on the strike jamb.

E. Provide appropriate type of anchors consistent with type of wall construction for each installation and in conformance with HMMA 820 and SDI 111.

F. Floor Attachment: Provide metal anchor with provision for expansion anchor attachment to concrete floor, adjustable for height, welded in place. Minimum Thickness: 14 gage.
G. Hardware Attachment: Mortise, reinforce, drill and tap at factory to receive specified hardware. Install minimum 10 gage reinforcing welded to frame for surface mounted hardware, except install 7 gage reinforcing for hinges in accordance with HMMA 820. Tap to templates.
   1. Install reinforcing for closers, both sides of frames, on all frames, single and pairs, labeled and non-labeled.

2.03 ACCESSORIES

A. Silencers: Resilient type, fitted into drilled hole. Make provision for minimum three silencers at strike jamb of all frames and one at head of each leaf of double doors, except fire-rated frames.

B. Primer: Zinc chromate type. Provide etching coat for galvanized surfaces.

2.04 FABRICATION

A. Fabricate frames as welded unit, combination buck frame and integral stop and flat trim, double rabbet, profiles as indicated on the Drawings, cold rolled steel ASTM A1008 or hot-rolled steel ASTM A1011.
   1. Drywall: Provide backbend.
   2. Plaster: Provide plaster key.

B. Exterior steel door frames shall be fabricated as saw-mitered and full (continuously) inside welded unit type or machine-mitered and full welded unit type, in accordance with HMMA 820. Weld and grind smooth. No intermittent welds or plate splices permitted at intersections.

C. Fabricate interior steel door frames as machine-mitered face-welded unit type in accordance with HMMA 820. Weld and grind smooth.

D. Where cross mullions or T intersections occur, frames shall be fabricated as butted and face-welded assembly joints, in accordance with HMMA 820. At mullion-to-base intersections extend mullion to floor and face weld. Where butted joints are exposed to weather, seal intersection with paintable two-component polyurethane sealant as specified in Section 07900.

E. Machine mitered faces and butt-joined integral stops permitted with continuous welds.

F. Transom Bars for Glazed Lights: Fixed type, of same profiles as jamb and head.

G. Fabricate frames with hardware reinforcement plates welded in place. Provide mortar guard boxes where appropriate.
1. Mortise, reinforce, drill and tap at factory to receive specified hardware. Install minimum 10 gage reinforcing welded to frame for surface mounted hardware, except install seven gage reinforcing for hinges in accordance with HMMA 820. Tap to templates.

2. Install reinforcing for closers, both sides of frames, on all frames, single and pairs, labeled and non-labeled.

H. Configure exterior frames with special profile to receive recessed weatherstripping, when required by Section 08710.

I. Fabricate frames to suit masonry wall coursing, when indicated on the Drawings.

2.05 PROTECTIVE COATINGS

A. Interior Frames: Galvanizing not required.

B. Shop prime interior units with modified alkyd, air dried, meeting requirements of ANSI A224.1. Approved Primer: Series 10-1009, gray, by Themec.

C. Exterior Frames: Galvanizing required. Two types permitted:
   1. ASTM A653; hot-dipped, 0.60 oz psf, (G60).
   2. ASTM A591; electrolytic, 0.60 oz psf, (A60).

D. Exterior Frames: Special High Performance Polyurethane finish. Etching coat, primer and paint finish shall comply with provisions of Section 09900.

E. Interior Frames: Primer and paint finish shall comply with paint finish schedule specified in Section 09900.

F. On surfaces where zinc coating has been removed during fabrication, doors shall receive a factory-applied touch-up primer.

PART 3 - EXECUTION

3.01 INSTALLATION

A. Install frames under provisions of Section 06210.

END OF SECTION
SECTION 08115

STEEL DOORS

PART 1 - GENERAL

1.01 SUMMARY

A. Documents affecting work of this Section include, but are not necessarily limited to, General Conditions, Supplemental General Conditions, and Division 1.

B. Section Includes:
   1. Rolled steel doors.
   2. Louvers

1.02 RELATED WORK

A. Section 06210 – Door, Frame, and Hardware Installation.
B. Section 08110 – Steel Door Frames.
C. Section 08710 – Door Hardware.
D. Section 09900 – Painting.

1.03 REFERENCES

A. American Society for Testing and Materials.
   1. ASTM A1008 - Steel Sheet, Cold-Rolled, Carbon, Structural High Strength Low-Alloy and High-Strength Low-Alloy with Improved Formability.
   2. ASTM A1011 – Steel Sheet, Hot-Rolled, Carbon, Structural High Strength Low-Alloy and High-Strength Low-Alloy with Improved Formability.
   3. ASTM A591 - Steel Sheet, Electrolytic Zinc-Coated, for light Coating Mass applications.
   4. ASTM A653 – Steel Sheet, Zinc-Coated (Galvanized) or Zinc-Iron Alloy-Coated (Galvannealed) by the Hot-Dip Process.
   5. ASTM E84 - Surface Burning Characteristics of Building Materials.

B. Steel Door Institute.
   1. SDI 100 - Standard Steel Doors and Frames.
   2. SDI 105 – Erection Instructions for Steel Frames.
   3. SDI 118 – Basic Fire Door Requirements.

C. Hollow Metal Manufacturer’s Association.
1. HMMA 810 - Hollow Metal Doors.
2. HMMA 840 – Installation and Storage of Hollow Metal Doors and Frames.
3. HMMA 850 – Fire-Rated Hollow Metal Doors and Frames.

D. American National Standards Institute.

   1. NFPA 80 - Fire Doors and Windows.

F. Underwriters Laboratories, Inc.
   1. UL 10B - Fire Tests of Door Assemblies.
   2. UL 10C – Positive Pressure Testing for Fire Door Assemblies.

G. Warnock Hersey.
   1. WH - Certification Listings.

H. Factory Mutual Research Corporation.
   1. FM - Approval Guide.

1.04 SUBMITTALS

A. Submit under provisions of Section 01300.

B. Shop Drawings: Indicate door elevations, internal reinforcement and finish. Include details of each door type, elevations of door types, details of construction, location and installation requirements of finish hardware and reinforcements, and details of corners, joints, closure method and cut-outs for louvers or glazing, where required.

C. Product Data: Indicate core construction, door configurations, and location of cut-outs for hardware reinforcement.

D. Samples: Submit three samples of door face metal, illustrating galvanized surface texture.

E. Manufacturer’s Installation Instructions: Indicate special installation instructions.

1.05 QUALITY ASSURANCE

A. Comply with requirements of SDI-100, HMMA 810 and HMMA 840 standards except where exceeded by this specification.
B. Provide all products from a single manufacturer.

1.06 QUALIFICATIONS

A. Manufacturer: Company specializing in manufacturing the products specified in this Section with minimum five years experience.

B. Manufacturer shall demonstrate current membership in SDI or HMMA.

1.07 REGULATORY REQUIREMENTS

A. Where fire-rated door assemblies are indicated on the drawings or required, provide fire-rated door assemblies which comply with NFPA 80 and have been tested, listed and labeled by a nationally recognized independent testing and inspection agency acceptable to fire authority having jurisdiction.

B. Labels required in accordance with UL 10B shall indicate approval for positive pressure testing as required by CBC Standard 7-2 and UL 10C.

1.08 DELIVERY, STORAGE, AND HANDLING

A. Deliver, rolled steel products cartoned or crated to provide protection during transit and job storage. Provide additional sealed plastic wrapping to protect factory finishes.

B. Accept doors on site in manufacturer’s packaging. Inspect for damage. Minor damages may be repaired provided refinished items are equal in all respects to new work and approved by the Architect. Non-approved products shall be removed from the job site.

C. Store doors at job site under cover. Place units on wood blocking. Avoid use of non-vented plastic or canvas shelters, which could create humidity chamber. If cartons become wet, remove immediately. Allow sufficient space between stacked units to permit air circulation.

1.09 FIELD MEASUREMENTS

A. Verify that field measurements are as indicated on shop drawings.

1.10 COORDINATION

A. Coordinate the work with door opening construction, door frame and door hardware installation.
PART 2 - PRODUCTS

2.01 MANUFACTURERS

A. Approved manufacturers:
   1. Ceco Door Products, Benchwood TN.
   2. The Kewanee Corporation, Kewanee IL.
   3. Republic Builders Products, McKenzie TN.
   4. Steelfract, Cincinnati OH.

B. Approved Manufacturers: Any manufacturer providing certification of compliance with the standards of fabrication, installation, finish and testing required in the current issues of SDI or HMMA specification guides.

2.02 DOORS

A. Exterior Doors: SDI-100 or HMMA 810, Level 3, Model 2, extra heavy-duty, 1-3/4 inches thick, minimum 16 gage face sheets, seamless hollow steel construction, sizes as scheduled on the Drawings. Close top with flush channel. Inverted channel permitted at bottom only.

B. Interior Doors: SDI-100 or HMMA 810, Level 3, Model 2, extra heavy-duty, 1-3/4 inches thick, minimum 16 gage face sheets, seamless hollow steel construction, sizes as scheduled on the Drawings. Close top with flush channel. Inverted channel permitted at bottom only.
   1. Fire Rated Doors: SDI 118 or HMMA 850.

2.03 DOOR CONSTRUCTION

A. Steel Sheet for Doors, Anchors and Accessories:
   3. Hot-Dipped Zinc Coated Steel: ASTM A653, Class A40 for alloyed coatings.

B. Core, Non-Rated Doors: Honeycomb or polystyrene, or steel channel grid with insulation to provide metallic ring-free acoustic value.

2.04 LOUVERS
A. Approved Manufacturers: Anemostat Products Division, Carson, CA.
   1. Product: Model FDL at non-rated doors and Model FDL-UL with fusible link at rated doors.

B. Equivalent products by the following manufacturers may be submitted for approval:
   2. K.N. Crowder Manufacturing Company, Lewiston, NY.
   3. AJ Manufacturing Company, Kansas City, MO.

C. Materials:
   1. Material and Finish – Interior Louvers: Roll-formed steel, factory-primed and field-painted finish to color as selected by the architect per Specifications Section 09900 – Painting.
   2. Material and Finish – Exterior Louvers: Roll-formed steel, factory-hot-dipped galvanized. Field-primed and field-painted finish to color as selected by the architect per Specifications Section 09900 – Painting.
   4. Frame: Minimum 18 gage, with one-way vandal-proof through bolts and 18 / 14 galvanized steel insect screen.

2.05 FABRICATION

A. Astragals for Double Doors: Steel, T shaped, specifically fabricated for double doors.

B. Fabricate doors with hardware reinforcement welded in place.

C. Prepare doors to receive mortised and concealed finish hardware.

D. Fabricate units to be rigid, neat in appearance and free from defects, warp or buckle.

E. Seal joints watertight.

F. Configure exterior doors with profile to accommodate weather-stripping. Refer to Specifications Section 08710 – Door Hardware for additional requirements.

G. Fabricate doors with 5/8 inch high by ½ inch wide steel stops, where required for vision panels. Height of stops in fire-rated doors shall be ¾ inch.

2.06 FINISH

A. Interior Doors: Galvanizing not required.
B. Factory shop prime interior units with modified alkyd, air dried or baked-on, meeting requirements of ANSI A224.1.
   1. Approved Primer: Series 10-1009, gray, by Tnemec Co., Kansas City MO.

C. Exterior Doors: Galvanizing required. Two Types Permitted:
   1. ASTM A653; hot-dipped, 0.60 oz psf, (G60).
   2. ASTM A591; electrolytic, 0.60 oz psf, (A60).

D. Exterior Doors: Field-applied high performance polyurethane coating. Etching coat, primer, and paint finish shall be compatible with finish coat and per the requirements of Specification Section 09900 - Painting.

E. Interior Doors: Primer and paint finish shall comply with paint finish schedule and as specified in Section 09900 - Painting.

F. On surfaces where zinc coating has been removed during fabrication, doors shall receive a factory-applied touch-up primer.

PART 3 - EXECUTION

3.01 INSTALLATION

A. Install doors under provisions of Section 06210.

END OF SECTION