BID DOCUMENTS COVER SHEET

CONTRACT DOCUMENTS
FOR
CONTRA COSTA COLLEGE

C-608 PE & Kinesiology Complex Renovation

AT
2600 Mission Bell Drive
San Pablo, California, 94806

CONTRA COSTA COMMUNITY COLLEGE DISTRICT

Consist of the following:

DSA File #7-C1
DSA Application # 01-117456

Architect: LIONAKIS
1919 19th Street
Sacramento, CA 95811

Volume 01 - Divisions 02-14

December 5, 2018
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END OF SECTION 00010
DIVISION 02
EXISTING CONDITIONS
PART 1 GENERAL

1.1 SECTION INCLUDES

A. Geotechnical Engineering Report:
   1. A Geotechnical Engineering Report has been prepared for the site of this Project by
      Kleinfeilder, 2882 Prospect Drive, Suite 200, Rancho Cordova, California, 95670; phone:
      (916) 366-1701.
   2. The report is titled as: Geologic and Seismic Hazards Assessment and Geotechnical
      Investigation Report, C-608 PE/Kinesiology Renovation Project, Contra Costa
      Community College, 2600 Mission Bell Drive, San Pablo, California.
      a. Also refer to Addendum Letter dated September 25, 2018.

B. Use of Data:
   1. This report was obtained for use in Project design and is referenced for Contractor’s
      information only.
   2. Contents of the report referenced in this Section do not constitute a warranty of
      subsurface conditions.
   3. Copies of this report can be obtained, upon request, at Architect’s office.
   4. Contractor shall visit the site to verify existing conditions.

1.2 QUALITY ASSURANCE

A. A Geotechnical Engineer/Testing Laboratory will be retained and paid by Owner to observe
   performance of work in connection with excavating, trenching, placing of compacted fill and
   backfilling operations and at the conclusion of the excavations to provide the following
   services:
   1. Determine if the soil at the bottom of the excavations is suitable as a base for the
      structure.
   2. Determine if compacted fill, backfill or any other required fill meets the requirements of
      the Specifications.
   3. Determine if imported fill materials comply with the specified requirements.
   4. Determine necessary adjustments in moisture content of soil, size of equipment,
      thickness of layers, and any tests as may be required to ensure a properly placed fill
      conforming to applicable requirements of Specifications.
   5. Observation and testing by Geotechnical Engineer/Testing Laboratory shall be provided
      during filling and compacting operations. Contractor shall give at least two working days’
      notice prior to beginning such operations, to allow proper scheduling of observation and
      testing work.
6. Field density tests shall be performed by Geotechnical Engineer/Testing Laboratory after compaction of each layer of fill. Where compaction equipment has disturbed the surface to a depth of several inches, density tests shall be taken in the compacted material below the disturbed surface. Additional layers of fill shall not be placed until the field density tests indicate that the specified density has been obtained.

B. If Contractor fails to meet technical or design requirements of the Contract Drawings and requirements/recommendations of Geologic and Seismic Hazards Assessment and Geotechnical Investigation Report, necessary readjustments shall be made until all work is deemed satisfactory by Geotechnical Engineer/Testing Laboratory, and Architect.

1. No deviation from Specifications shall be permitted without written acceptance from Architect.

C. Differing Site Conditions: Report differences observed between actual conditions at the site and the conditions indicated in Geologic and Seismic Hazards Assessment and Geotechnical Investigation Report immediately upon discovery. Report the nature and extent of differences to Owner and Architect orally to permit early verification of the conditions, and concurrently submit it in writing.

PART 2 PRODUCTS

Not Used

PART 3 EXECUTION

Not Used

END OF SECTION
SECTION 02 41 00

DEMOLITION

PART 1  GENERAL

1.1  SECTION INCLUDES

A.  Removal of designated construction.
B.  Identification of utilities.
C.  Demolition requirements.

1.2  RELATED SECTIONS

A.  Division 01 Sections, as applicable.

1.3  PROJECT RECORD DOCUMENTS

A.  Submit under provisions of Division 01.
B.  Accurately record actual locations of capped utilities and subsurface obstructions.

1.4  REGULATORY REQUIREMENTS

A.  Perform work of this Section under provisions of CBC Chapter 33, CFC Chapter 33, and NFPA 241 for demolition work, safety of structure, dust control and safety of occupants.
B.  Obtain required permits from authorities.
C.  Do not close or obstruct egress width to exits.
D.  Do not disable or disrupt building fire or life safety systems without three-day prior written notice to Owner.
E.  Conform to procedures applicable when discovering hazardous or contaminated materials.

1.5  SCHEDULING

A.  Schedule work under the provisions of Division 01.
B.  Describe demolition removal procedures and schedule.

PART 2  PRODUCTS

Not Used

PART 3  EXECUTION

3.1  PREPARATION

A.  Provide, erect and maintain temporary barriers as required.
B. Erect and maintain temporary partitions to prevent spread of dust, odors, and noise to adjoining facilities.

C. Protect existing materials and finishes that are not scheduled or otherwise required to be demolished.

D. Mark location of utilities.

3.2 DEMOLITION REQUIREMENTS

A. Conduct demolition to minimize interference with adjacent and occupied buildings.

B. Maintain protected egress and access to the Work.

3.3 DEMOLITION

A. Disconnect, remove, cap and identify designated utilities within demolition areas.

B. Demolish in an orderly and careful manner. Protect existing supporting structural members and materials.

C. Except where noted otherwise, remove demolished materials from site. Do not bury or burn materials on site.

D. Remove demolished materials from site as Work progresses. Upon completion of Work, leave areas in clean condition.

E. Remove temporary Work.

END OF SECTION
DIVISION 03
CONCRETE
PART 1   GENERAL

1.1 SECTION INCLUDES

A. Concrete formwork, shoring, bracing, and anchorage.

B. Concrete formwork accessories.

1.2 RELATED SECTIONS

A. Section 03 20 00 — Concrete Reinforcing.

B. Section 03 30 00 — Cast-In-Place Concrete.

1.3 REFERENCES

A. The publications listed below form a part of this Section to the extent referenced. The publications are referred to in the text by the basic designation only. Refer to Division 01 for definitions, acronyms, and abbreviations.

B. Standards, manuals, and codes refer to the latest edition of such standards, manuals, and codes in effect as of the date of issue of this Project Manual, unless indicated otherwise in CBC Chapter 35 and CFC Chapter 80.

C. Referenced Standards:

1. ACI 301 — Specifications for Structural Concrete.

2. ACI 347 — Guide to Formwork for Concrete.

3. AHA A135.4 — Basic Hardboard.

4. ASTM E1643 — Standard Practice for Selection, Design, Installation, and Inspection of Water Vapor Retarders Used in Contact with Earth or Granular Fill Under Concrete Slabs.

5. PS 1 — Construction and Industrial Plywood.

1.4 DESIGN REQUIREMENTS

A. Design, engineer, and construct concrete formwork, shoring, and bracing in accordance with design and code requirements, resulting in cast-in-place concrete conforming to required shape, line, and dimension.

1.5 SUBMITTALS

A. General: Submit in accordance with Division 01.

B. Product Data: Submit manufacturer’s descriptive literature and product specifications for the following:

1. Cylindrical forms.

2. Accessories:
   a. Chamfer strips.
b. Keyed construction joint.
c. Form ties.
d. Form release agent.

C. Shop Drawings: Indicate dimensions, materials, bracing, and location of joints and ties.

1.6 QUALITY ASSURANCE

A. Conform to ACI 347 for design, fabrication, erection, and removal of forms.

B. Field Samples: Provide only as requested by Architect.

C. Pre-Installation Meetings:
   1. Conduct pre-installation meeting in accordance with Division 01.
   2. Convene pre-installation meeting prior to commencing work of this Section.
   3. Coordinate work in this Section with work in related Sections.

PART 2 PRODUCTS

2.1 FORM MATERIALS

A. Architectural Cast Concrete Finish:
   1. Phenolic-faced plywood (minimum 167 g/m² on both faces); minimum 5/8 inch thickness; conforming to PS 1 APA HDO Plyform Class II or better; sound, undamaged sheets with clean, true edges, joints taped.
   2. Cylindrical Forms: Multi-layered fiber forms with coated lining for smooth, glass-like, no-spiral finish.

B. Smooth Concrete Concealed from View: Plywood; 5/8 inch minimum thickness; conforming to PS 1 APA B-B Plyform Class II or better.

C. Concrete Concealed from View:
   1. 2x lumber, plywood conforming to PS 1 APA Plyform Class II or better, tempered concrete form hardboard conforming to AHA A135.4, or other acceptable material.
   2. Cylindrical Forms: Multi-layered fiber forms made from high-quality fiber, spirally wound and laminated with waterproof adhesives.

2.2 ACCESSORIES

A. Chamfer Strips: Wood, metal, or rubber strips; size as shown on Drawings, minimum 3/4 inch by 3/4 inch.

B. Expansion Joint Filler: Refer to Section 03 30 00.
C. Foam Board Separation: Expanded polystyrene in size and thickness to suit application.

D. Keyed Construction Joint: Minimum 24 gauge galvanized steel, shaped with formed key (minimum 1-1/2 inch) for load transfer; and with knockouts for dowel placement.
   1. Basis-of-Design Product: G-33 Screed Key Joint by Dayton/Richmond Concrete Accessories, Miamisburg, OH; 800-745-3700; www.daytonrichmond.com. Provide the named product or accepted equal.

E. Form Ties: Provide as indicated and as required.
   1. Galvanized steel; adjustable length; cone type; snap-off type with 1 inch back break dimension; free of defects that could leave holes larger than 1 inch in concrete surface.
   2. Substitution: In lieu of galvanized steel ties, Contractor may use stainless steel form ties of equal or higher strength.
      a. Stainless Steel Form Tie System:
         3) Or accepted equal.

F. Plastic Stakes: At Contractor's option, solid plastic stakes may be used in lieu of wood and steel stakes. Provide solid plastic stakes for use in areas with continuous vapor retarder.
   2. Material: Non-corrosive, leak-resistant, solid PVC, with one pointed end and multiple pre-drilled holes for nailing; diameter and length as recommended by stake manufacturer, and as required by field conditions.

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

H. Spreaders: Metal; use of wood spreaders will not be permitted.

I. Form Release Agent: Commercially formulated form release agents that will not bond with, stain or adversely affect concrete surface, and will not impair subsequent treatment of concrete surfaces, nor impede the wetting of surfaces to be cured with water or curing compounds. Product shall meet the VOC requirements at the location of use.
   1. Product: Duogard as manufactured by W.R. Meadows or accepted equal.

PART 3 EXECUTION

3.1 EXAMINATION

A. Examine job site conditions and verify field dimensions.

B. Report unacceptable conditions to Architect. Begin installation only when unacceptable conditions have been corrected.
3.2 EARTH FORMS

A. Concrete may be placed against cut earth where feasible, conforming to the following criteria:
   1. Earth form trenches shall be able to stand without caving in.
   2. Sluffage will not be permitted.
   3. When, in the opinion of the Building Official and Architect, soil conditions do not require formwork per CBC Section 1808A.8.5.

B. Hand trim sides and bottoms of earth forms. Remove loose soil prior to placing concrete.

3.3 FORMWORK ERECTION

A. Erect formwork, shoring, and bracing in accordance with ACI 301.

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

C. Arrange and assemble formwork to permit ease of dismantling and stripping and prevent damage to concrete during stripping.

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

E. Obtain approval from Architect before framing openings not specifically indicated on Drawings.

F. Perform electrical and mechanical work requiring concrete formwork under provisions of this Section.

G. Stakes (wood and metal) used to support formwork or reinforcement, will not be permitted to occur within finished concrete work.
   1. Pulling of stakes and puddling concrete in after concrete placement will not be permitted.
   2. Locate non-plastic stakes appropriately to prevent embedment of stakes in the concrete after placement.
   3. Plastic stakes, when used in areas with vapor retarder, shall not be removed.
   4. Seal plastic stakes with vapor retarder manufacturer’s sealing mastic in accordance with ASTM E1643 and Section 03 30 00 requirements.
      a. Dip pointed side of plastic stake in mastic before driving through vapor retarder to seal the stake perimeter at penetration.

3.4 FORM RELEASE AGENT APPLICATION

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

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

C. Do not apply form release agent where concrete surfaces will receive special finishes or applied coverings that are affected by agent.

D. Soak inside surfaces of untreated forms with clean water. Keep surfaces coated prior to placement of concrete.
3.5 INSERTS, EMBEDDED PARTS AND OPENINGS
A. Locate and set in place items which will be cast directly into concrete.
B. Coordinate work of other Sections such as but not limited to openings, slots, reglets, recesses, chases, sleeves, bolts, anchors and other inserts.
C. Install accessories in accordance with manufacturer's instructions, straight, level and plumb. Ensure items are not disturbed during concrete placement.
D. Provide temporary ports or openings in formwork where required to facilitate cleaning and inspection. Locate openings at bottom of forms to allow flushing water to drain.

3.6 CONSTRUCTION JOINTS
A. Refer to Section 03 30 00.
B. Locate construction joints so as not to impair the strength of the structure and only at locations indicated on Drawings and as acceptable to Architect. Form keys in cold joints as shown or required.

3.7 UNDERSLAB VAPOR RETARDER
A. Protect underslab vapor retarder from damage at all times.

3.8 FORMWORK CLEANING AND INSPECTION
A. Inspect erected formwork, shoring and bracing to ensure that work is in accordance with formwork design and that supports, fastenings, wedges, ties, and embedded items are secure to prevent displacement and distortions.
B. Clean forms and adjacent surfaces as formwork is erected and prior to concrete placement. Remove wood chips, sawdust, dirt, and other debris.
C. Flush with water or use compressed air to remove remaining foreign matter. Ensure that water and debris drain through cleaning ports.
D. Close temporary openings with tight fitting panels, flush with inside face of forms and neatly fitted so joints will not be apparent in exposed concrete surfaces.

3.9 ADJUSTMENTS
A. When a concrete pour has been stopped for a sufficient length of time so that shrinkage or warp has separated the forms and the concrete, provide for form adjustment to draw the forms into firm contact with concrete before placing additional concrete. Take precautions to prevent any shoulder or ledge from being formed at a cold joint.

3.10 FORM REMOVAL
A. Refer to Section 03 30 00.
B. Do not remove forms or bracing until concrete has gained sufficient strength to carry its own weight and imposed loads.
C. Remove forms progressively and in accordance with ACI 347.
3.11 FORM REUSE

A. Forms in good condition may be reused.

B. Clean and inspect forms prior to reuse. Do not re-use split, warped, delaminated, or otherwise damaged forms that will impair surface condition and quality of cast concrete exposed to view.

C. Do not reuse wood formwork more than three times for concrete surfaces to be exposed to view. Do not patch formwork.

3.12 FORMWORK TOLERANCES

A. Construct formwork to maintain tolerances required by ACI 347.

B. Concrete work out of alignment, level or plumb will be cause for rejection of the whole work affected and, if so rejected, such work shall be removed and replaced, as directed by Architect, at no cost to Owner.

C. All concrete exposed to view, except as otherwise indicated and specified shall have a smooth finish of uniform texture, free from form marks or other visible irregularities and free from form coating, oils or other matter that will prevent bonding of patching work, painting or other finish materials.

END OF SECTION
SECTION 03 20 00

CONCRETE REINFORCING

PART 1 GENERAL

1.1 SECTION INCLUDES
A. Steel reinforcement and accessories for concrete.

1.2 RELATED SECTIONS
A. Division 01 – Sustainable Design Requirements; for additional LEED requirements.
B. Section 03 11 00 – Concrete Forming.
C. Section 03 30 00 – Cast-In-Place Concrete.

1.3 REFERENCES
A. The publications listed below form a part of this Section to the extent referenced. The publications are referred to in the text by the basic designation only. Refer to Division 01 for definitions, acronyms, and abbreviations.

B. Standards, manuals, and codes refer to the latest edition of such standards, manuals, and codes in effect as of the date of issue of this Project Manual, unless indicated otherwise in CBC Chapter 35 and CFC Chapter 80.

C. Referenced Standards:
2. ACI 301 – Specifications for Structural Concrete.
3. ACI 318/318R – Building Code Requirements for Structural Concrete and Commentary.
5. ASTM A82 – Standard Specification for Steel Wire, Plain, for Concrete Reinforcement.
7. ASTM A496/A496M – Standard Specification for Steel Wire, Deformed, for Concrete Reinforcement.

1.4 SUBMITTALS

A. General: Submit in accordance with Division 01.

B. Product Data: Submit manufacturer’s descriptive literature, installation instructions, and product specification for the following products:
   1. Mechanical splicing devices.
   2. Bar supports.

C. Placement Drawings:
   1. Prepare in accordance with ACI SP-66.
   2. Indicate bar sizes, spacing, locations, and quantities of steel reinforcement and wire fabric, bending and cutting schedules, and supporting and spacing devices.
   3. Identify placement drawings with reference to sheet and detail numbers from the Contract Documents.
   4. Do not use scaled dimensions from Drawings to determine lengths of steel reinforcement.
   5. Submit one copy of reproducible placement drawings in addition to those required by Division 01.
   6. Contractor shall be responsible for correctness and completeness of steel reinforcing requirements.
   7. Begin fabrication only when placement drawings have been accepted.

D. Samples:
   1. Bar supports: One for each type and grade.
   2. Mechanical splicing devices: One of each type.

E. Quality Assurance/Control Submittals:
   1. Submit reports of radiographic weld tests per ASTM E94, and testing per 2013 CBC Section 1913A “Concrete Testing,” Article 1913A.2 “Tests of Reinforcing Bars”.
   2. Submit certified copies of mill test reports of reinforcing materials analysis to Owner’s testing agency.

1.5 LEED COMPLIANCE DOCUMENTATION

A. Provide the following, and comply with applicable requirements and procedures of Division 01, LEED Online Letter Templates, and LEED Reference Guide for Green Building Design and Construction, 2013 Edition:
   1. Product Data for MR Credit 3: For products having recycled content, documentation indicating percentages by weight of post-consumer and pre-consumer recycled content. Include statement indicating costs for each product having recycled content.
   2. Certificates for MR Credit 3: Provide certification for percentage of materials (based on cost) extracted, processed, and manufactured regionally within 100 miles of the project site.
1.6 QUALITY ASSURANCE

A. Perform work in accordance with CRSI Manual of Standard Practice; ACI 301; and 2016 California Building Code (CBC) Chapter 17A “Special Inspections and Tests”, and Chapter 19A “Concrete”, and as follows:

3. Reinforcing Bar Welding: Per Section 1705A, Table 1705A.3 “Required Special Inspections and Tests of Concrete Construction” and Table 1705A.2.1 “Required Verification and Inspection of Steel Construction”, Item 5b.

B. Structural Testing for Seismic Resistance: Perform tests for seismic resistance as required by CBC Chapter 17A, Section 1705A.13 “Testing for Seismic Resistance” and Paragraph 1705A.13.1 “Structural Steel”.

C. Structural Tests and Inspections: Refer to DSA Statement of Structural Tests and Special Inspections (DSA Form DSA-103).

D. Pre-Installation Meetings:
   1. Conduct pre-installation meeting in accordance with Division 01.
   2. Convene pre-installation meeting prior to commencing Work of this Section.
   3. Coordinate Work in this Section with Work in related Sections.

1.7 DELIVERY, STORAGE, AND HANDLING

A. Comply with requirements of Division 01.

B. Deliver steel reinforcement in bundles marked with identification tags.

C. Handle and store materials to prevent damage and contamination, excessive rusting or coating with grease, oil, or other objectionable materials.

D. Store steel reinforcement, fabricated assemblies, and accessories off the ground on platforms, skids, or other supports.

E. Deliver and store welding electrodes in accordance with AWS D1.4.

PART 2 PRODUCTS

2.1 STEEL REINFORCEMENT

A. LEED Requirements, Recycled Content:
   1. Provide products with post-consumer and pre-consumer recycled content, calculated as percentages of total product weight.
      a. Post-consumer recycled content plus one-half of pre-consumer recycled content shall constitute a part of applicable LEED Credit requirement for recycled content.

B. Reinforcing Steel: ASTM A615/A615M, Grade 60, low-alloy deformed steel bars.
C. Reinforcing Steel Indicated to be Welded: ASTM A706/A706M, Grade 60, low-alloy deformed steel bars.

D. Plain Steel Wire (for Spiral Reinforcement): ASTM A82.

E. Deformed Steel Wire: ASTM A496/A496M.

F. Welded Wire Fabric: ASTM A185; 65 ksi minimum yield strength; fabricated from as-drawn steel wire into flat sheets (rolled fabric not permitted).
   1. Size: 6 x 6 – W1.4 x W1.4.

G. Tie Wire: ASTM A497/A497M; double annealed steel wire; No. 16 gauge.

2.2 ACCESSORIES

A. Bar Supports (Bolsters, chairs, spacers, and other devices for spacing, supporting, and fastening reinforcing bars and welded wire fabric in place): Provide in accordance with CRSI Manual of Standard Practice from steel wire, plastic, or precast concrete or fiber-reinforced concrete of equal to or greater compressive strength than surrounding concrete. Provide as follows:
   1. Footings: Precast concrete blocks with tie wires.
   2. Slab on ground: Precast concrete blocks, plastic coated steel fabricated with bearing plates, or specifically designed wire-fabric supports fabricated of plastic.
   3. Where legs of wire bar supports contact forms: CRSI Class 1 plastic-protected or CRSI Class 2 stainless steel bar supports.
   4. Where support is no closer to concrete surface than 1/2 inch: CRSI Class 3 wire supports.
   5. Supports placed against ground: Precast concrete blocks not less than 4 inch square with embedded wire.

B. Welding Materials For Reinforcing Steel:
   1. Weld Filler Material: AWS D1.4; low hydrogen, 80 ksi tensile strength.

C. Mechanical Splices: Splicing devices capable of developing 125 percent of the specified yield strength of the bar in compression and tension.
   1. Metal Sleeve with Cast Filler Metal:
   2. Mechanical Threaded Connections: Provide threaded mechanical connections using a metal coupling sleeve with internal threads.

PART 3 EXECUTION

3.1 EXAMINATION

A. Examine job site conditions and verify field dimensions.
B. Report unacceptable conditions to Architect. Begin installation only when unacceptable conditions have been corrected.

3.2 PREPARATION

A. Clean steel reinforcement of rust and mill scale, earth, moisture, and other foreign materials before fabrication or placement.

3.3 STEEL REINFORCEMENT FABRICATION

A. Fabricate to shapes, dimensions, and tolerances in accordance with accepted placement drawings conforming to CRSI Manual of Standard Practice, ACI SP-66, ACI 318/318R, ACI 117, and CBC Chapter 19A.

B. Standard Hooks and Bends: Conform to ACI 318/318R.

C. Bending: Cold bend steel reinforcement in the field or at the mill. Heating for bending is not permitted unless otherwise specifically allowed by Architect and DSA.

D. Reinforcement must not be straightened or re-bent without approval of Structural Engineer of Record (SEOR) and DSA.

E. Weld steel reinforcement in accordance with AWS D1.4.

F. Spirals: Provide 1-1/2 finishing turns at top and bottom with minimum 135 degree hook at each end. Lap splice at 48 bar diameters minimum with 135 degree hooks into the confined core at ends.

3.4 PLACEMENT

A. Place steel reinforcement in accordance with accepted placement drawings in conformance with tolerances specified in ACI 117.

B. Install steel reinforcement in largest practical lengths. Accurately position, support, and secure reinforcement against displacement. Locate support reinforcement with bar supports to maintain minimum concrete cover.

C. Secure reinforcement against displacement within tolerances permitted in ACI 318, Article 7.5.2. Point wire tie ends away from forms.

D. Concrete Cover: Refer to Drawings. Cover tolerances shall comply with ACI 117.

E. Laps: Refer to Drawings.
   1. Offset laps in adjacent bars.

F. Splices:
   1. Splice reinforcing as shown.
   2. Tie lap splices securely to prevent displacement during concrete placement.
   3. Install mechanical splice in accordance with manufacturer’s written instructions.
   4. Locate splices only where shown and accepted by Architect.
G. Welding:
1. Welding is not permitted unless specifically detailed on Drawings or accepted by Architect.
2. Employ shielded metal-arc method. Comply with AWS D1.4.
3. Welding is not permitted on bars where the carbon content is not known or is determined to exceed 0.75 percent.
4. Welding is not permitted within two bar diameters of any bent portion of a bar which has been bent cold.
5. Welding of crossing bars is not permitted.

H. Maintain minimum clear distance between parallel bars at not less than 1-1/2 times nominal bar diameter, 1-1/2 times maximum size of coarse aggregate, or 1-1/2 inch.

I. Dowels: Place where indicated on Drawings. Grease loose end to prevent concrete from bonding to dowel. Sleeves may be used when accepted by Architect.

J. Welded Wire Fabric: Install in longest practical lengths on bar supports to minimize sagging. Lap edges and ends of adjoining sheets at least one mesh spacing. Offset laps to avoid continuous laps in either direction. Tie lap joints at 12 inches on center.

K. Field Adjustments: Move steel reinforcement as necessary to avoid interference with other reinforcing steel or other embedded items within accepted tolerances.
1. Sleeves and embedded items: Do not cut bars to clear sleeves or slots through slabs or walls. Wrap bars around these openings.
2. Openings: Compensate for steel reinforcement terminated at openings in slabs by placing one half of steel reinforcement terminated on each side of openings for the full span length.
3. Steel reinforcement moved to avoid interference with other reinforcements, conduits, or embedded items, including additional steel reinforcement to meet structural requirements are subject to inspection and approval before concrete placement.

3.5 FIELD QUALITY CONTROL

A. General: Comply with requirements of Division 01.

B. Testing Service: Owner will select and pay for independent testing agency, which will perform the following:
1. Inspect shop and field welding per AWS D1.4, including checking materials, equipment, procedures, and welder qualifications.
2. Inspector shall employ non-destructive testing or any other aid to visual inspection deemed necessary to assure adequacy of weld.
3. Additional requirements for testing and inspection: Refer to Structural Drawings and to DSA Statement of Structural Tests and Special Inspections (DSA Form DSA-103).

C. Project Inspector shall inspect placement of steel reinforcement.

3.6 PROTECTION

A. Protect steel reinforcement from damage and displacement.
B. Protect for potential rust staining of adjacent surfaces. Wrap steel reinforcement with impervious tape or other methods as accepted by Architect. Remove protective cover and clean reinforcement before concrete placement.

C. Install safety caps on all exposed ends of vertical steel reinforcement that pose a danger to life safety.

END OF SECTION
SECTION 03 30 00
CAST-IN-PLACE CONCRETE

PART 1 GENERAL

1.1 SECTION INCLUDES

A. Cast-in-place concrete.
   1. Architectural concrete at exposed locations.

B. Concrete admixtures.

C. Curing and surface slab treatment.

D. Grouting, bonding, and patching materials.

E. Accessories:
   1. Underslab vapor retarder with pipe boots.
   2. Expansion joints.

F. Precast concrete wheel stops.

1.2 RELATED SECTIONS

A. Division 01 – Sustainable Design Requirements; for additional LEED requirements.

B. Section 03 11 00 – Concrete Forming.

C. Section 03 20 00 – Concrete Reinforcing.

D. Section 07 26 50 – Vapor Emission Control System.

E. Section 07 92 00 – Joint Sealants.

F. Section 09 65 00 – Resilient Flooring.

G. Section 09 68 13 – Tile Carpentry.

H. Divisions 21-23 – Mechanical Sections, as applicable to the Project.

I. Divisions 25-28 – Electrical Sections, as applicable to the Project.

J. Section 31 23 00 – Excavation and Fill.

K. Section 33 30 00 – Sanitary Sewerage Utilities.

L. Section 33 40 00 – Storm Drainage Utilities.

1.3 REFERENCES

A. The publications listed below form a part of this Section to the extent referenced. The publications are referred to in the text by the basic designation only. Refer to Division 01 for definitions, acronyms, and abbreviations.
B. Standards, manuals, and codes refer to the latest edition of such standards, manuals, and codes in effect as of the date of issue of this Project Manual, unless indicated otherwise in CBC Chapter 35 and CFC Chapter 80.

C. ACI publications 221R, 302.1R, 302.2R, 303R, 304R, 305R, 306R, and 309R contain recommended practices for concrete work. Submit any proposed deviations from these recommendations to Architect for review prior to commencing concrete work.

D. Referenced Standards:

2. ACI 221R – Guide for Use of Normal Weight and Heavyweight Aggregates in Concrete.
3. ACI 301 – Specifications for Structural Concrete.
4. ACI 302.1R – Guide for Concrete Floor and Slab Construction.
5. ACI 302.2R – Guide for Concrete Slabs that Receive Moisture-Sensitive Flooring Materials.
6. ACI 303R – Guide to Cast-In-Place Architectural Concrete Practice.
10. ACI 305.1 – Specification for Hot Weather Concreting.
14. ACI 318 – Building Code Requirements for Structural Concrete.


28. ASTM C231 – Standard Test Method for Air Content of Freshly Mixed Concrete by the Pressure Method.


34. ASTM C618 – Standard Specification for Coal Fly Ash and Raw or Calcined Natural Pozzolan for Use in Concrete.


40. ASTM C1028 – Standard Test Method for Determining the Static Coefficient of Friction of Ceramic Tile and Other Like Surfaces by the Horizontal Dynamometer Pull Meter Method.


42. ASTM C1077 – Standard Practice for Laboratories Testing Concrete and Concrete Aggregates for Use in Construction and Criteria for Laboratory Evaluation.


44. ASTM C1315 – Standard Specification for Liquid Membrane-Forming Compounds Having Special Properties for Curing and Sealing Concrete.

51. ASTM E154  – Standard Test Methods for Water Vapor Retarders Used in Contact with Earth Under Concrete Slabs, on Walls, or as Ground Cover.
54. ASTM E1643  – Standard Practice for Selection, Design, Installation, and Inspection of Water Vapor Retarders Used in Contact with Earth or Granular Fill Under Concrete Slabs.
55. ASTM E1745  – Standard Specification for Water Vapor Retarders Used in Contact with Soil or Granular Fill under Concrete Slabs.
58. NRMCA  – Quality Control Checklist – Section 2.
59. NRMCA  – Plant Certification Checklist – Section 3.

1.4 SUBMITTALS

A. General: Submit in accordance with Division 01.

B. LEED Submittals: Provide the following, and comply with applicable requirements and procedures of Division 01.
   1. Product Data for EQ Credit 2: For adhesives and sealants, including printed statement of VOC and chemical components.

C. Product Data: Submit manufacturer’s descriptive literature and product specification for each product. Include manufacturer’s written instructions and installation procedures.

D. Drawings: Submit concrete pouring plan showing proposed locations of construction and control joints for review by Architect prior to concrete placement.

E. Samples: Submit product samples when requested by Architect or testing laboratory.
F. Quality Assurance/Control Submittals:

1. Certificates:
   a. Manufacturer’s Certification of Compliance that materials (cementitious materials, aggregates, and admixtures) conform to specifications.
   b. Manufacturer’s certificate of compatibility stating that admixtures, slab curing materials, and surface treatments are compatible with subsequent floor finishes and adhesives.

2. Reference Documents: Maintain one copy of ACI SP-15 on site.

3. Concrete mixture proportions and characteristics for each class/type of concrete used.

4. Concrete mixture proportion data for each class/type of concrete used:
   a. Calculation of required average compressive strength and supporting test records.
   b. Documentation indicating proposed mixture proportions will produce an average compressive strength greater than the required average compressive strength, including field strength test records or trial mixtures.
   c. Provide documentation in accordance with Concrete Mix Design Submittal Checklist located at the end of this Section.

5. Test Reports.

6. Batch Ticket: Furnish accepted batch tickets at the time of delivery for each concrete load. Indicate on each ticket equipment used for measuring and quantities, by weight, of cement, sand, each class of aggregate, admixtures, and amount of water in the aggregate, water added at the batching plant, and any water withheld at the batch plant. In addition, include mix number, total yield in cubic yards, date and time of day (dispatch time, plant departure time, site arrival time, unloading start and end time).

7. Concrete Placement Record: Keep a record on site including time and date of concrete placing for each portion of the structure for the duration of the project. Record additional information not included in batch ticket such as admixtures added at the job site. Make records available to Architect and DSA for review. Submit record to Architect at project completion.

8. Protection of Slabs and Foundations: Submit plans for protection of slabs and foundations, including the following, if applicable:
   b. Hot Weather Concreting: Comply with submittal requirements of ACI 305.1.

G. Closeout Submittals:

1. Concrete placement record.

2. Show location of embedded utilities in record drawings.

1.5 LEED COMPLIANCE DOCUMENTATION

A. Provide the following, and comply with applicable requirements and procedures of Division 01, LEED Online Letter Templates, and LEED 2013 BD+C Reference Guide:

1. Product Data for MR Credit 3: For products having recycled content, documentation indicating percentages by weight of post-consumer and pre-consumer recycled content.
   a. Include statement indicating costs for each product having recycled content.
2. Certificates for MR Credit 3: Provide certification for percentages of materials (based on cost) extracted, processed, and manufactured regionally within 100 miles of the project site.

1.6 QUALITY ASSURANCE

A. Qualifications:
   1. Concrete Supplier: Firm specializing in products specified in this Section with a minimum five years documented experience; successfully supplying similar materials (design, content, and performance) as specified in this Section.
   2. Concrete Batch Plant: Complies with requirements of ASTM C94 and is currently certified per NRMCA Plant Certification Checklist - Section 3 or other certification acceptable to Architect and DSA.
   3. Contractor’s Design Laboratory: Under the direction of civil engineer licensed by the State of California; conforming to ASTM E329 and ASTM C1077.

B. Structural Tests and Inspections: Refer to DSA Structural Tests and Inspection Sheet (Form DSA-103).

C. Regulatory Requirements: Conform to requirements of 2016 California Building Code (CBC), Chapter 19A, “Concrete”, Chapter 17A “Special Inspections and Tests”, and as follows:
   1. Materials:
      b. Concrete Aggregates: CBC Chapter 19A, Section 1903A “Specifications for Tests and Materials”.
      c. Batch Plant Inspection: CBC Section 1705A, Paragraph 1705A.3.3 “Batch Plant Inspection”.
   2. Quality:
      b. Strength Tests of Concrete: CBC Chapter 19A, Section 1905A “Modifications to ACI 318” Paragraph 1905A.1.2.
   3. Inspection: CBC Chapter 17A, Section 1705A “Required Special Inspections and Tests” Article 1705A.3 “Concrete Construction”, as applicable.

D. Drying Shrinkage Test: Perform per ASTM C157/C157M modified as follows:
   1. Prepare 4 inch x 4 inch x 11 inch prisms with an effective gage length of 10 inches fabricated, cured, dried, and measured per ASTM C157/C157M except that specimens shall be removed from molds at an age of 23 hours +/- 1 hour after trial batching, and shall be placed immediately in water at 73 degrees F +/- 3 degrees for at least thirty minutes, and shall be measured within thirty minutes thereafter to determine original length and then submerged in saturated lime water at 73 degrees F +/- 3 degrees.
2. Measurement to determine expansion expressed as a percentage of original length shall be made at seven days. This length at seven days shall be the base length for drying shrinkage calculations. Specimens shall then be stored immediately in a humidity control room, maintained at 73 degrees F +/- three degrees F and fifty percent +/- four percent relative humidity for the remainder of the test.

3. Measurements to determine shrinkage expressed as a percentage of base length shall be made and reported separately for 7, 14, and 21 days of drying after 7 days of moist curing.

E. Quality Control: Comply with NRMCA Quality Control Checklist – Section 2.

F. Materials Quality Assurance: Obtain cement and aggregates from same source for the duration of the work unless specifically accepted by Architect.

G. Pre-Installation Meetings:
   1. Conduct pre-installation (pre-pour) meeting in accordance with Division 01.
   2. Convene pre-installation (pre-pour) meeting one week prior to commencing work of this Section attended by concrete supplier.
   3. Meeting minutes shall be taken and distributed to meeting attendees within three days of meeting.
   4. Coordinate work in this Section with work in related Sections.

1.7 DELIVERY, STORAGE, AND HANDLING

A. Comply with requirements of Division 01.

B. Deliver products in manufacturer’s original containers, dry and undamaged, with seals and labels intact.

C. Store cement and other cementitious materials in weathertight buildings, bins, or silos which exclude moisture and contaminants and keep building materials completely separated.

D. Arrange and use aggregate stockpiles in a manner to avoid excessive segregation and to prevent contamination with other materials or with other sizes of aggregates. Do not store aggregates directly on ground unless a sacrificial layer is left undisturbed.

E. Refer to manufacturers’ product data sheets for recommended shelf life and storage conditions for admixtures.

F. Clearly and accurately label materials after containers have been opened.

PART 2 PRODUCTS

2.1 LEED REQUIREMENTS

A. Recycled Content:
   1. Provide products with post-consumer and pre-consumer recycled content, calculated as percentages of total product weight.
      a. Post-consumer recycled content plus one-half of pre-consumer recycled content shall constitute a part of applicable LEED Credit requirement for recycled content.
B. Indoor Air Quality:

1. Credit EQ 2: For field applications that are inside the weatherproofing system, use adhesives and sealants that comply with the limits set forth in South Coast Air Quality Management District (SCAQMD) Rule 1168 for VOC content in g/L, less water, when calculated according to 40 CFR 59, Subpart D.
   a. Adhesives and adhesive primers:
      1) Multipurpose Construction Adhesives: 70 g/L.
      2) Contact Adhesive: 80 g/L.
      3) Special Purpose Contact Adhesive: 250 g/L.
   b. Sealants:
      1) Architectural Sealants: 250 g/L.
      2) Other Sealants: 420 g/L.
   c. Sealant Primers:
      1) Architectural Nonporous: 250 g/L.
      2) Architectural Porous: 775 g/L.
      3) Other Sealant Primers: 750 g/L.

2. EQ Credit 2: For field applications that are inside the weatherproofing system, use paints and coatings that comply with the following limits for VOC content when calculated according to 40 CFR 59, Subpart D:
   a. Concrete Curing Compounds: VOC not more than 100 g/L.
   b. Sealers: VOC content not more than 200 g/L.

2.2 MANUFACTURERS

A. Acceptable Manufacturers:

B. Substitutions: Manufacturers and products are listed in this Section to establish minimum requirements as to quality and performance. Comply with requirements of Division 01 for substitutions.

2.3 CONCRETE MATERIALS

A. Cementitious Materials:

1. Cement: ASTM C150, Type V, low alkali (equivalent alkalis (Na₂O + 0.658K₂O) no more than 0.6 percent per ASTM C114).

2. Supplementary Cementitious Materials (SCM):
   a. Fly Ash: ASTM C618, Class F or Class N. Class C is not permitted.
   b. Slag Cement: ASTM C989, Grade 100 or Grade 120.

3. LEED Requirements for Supplementary Cementitious Materials (SCM): Use fly ash or slag cement, as needed to reduce the total amount of Portland cement, which would otherwise be used, by not less than fifteen percent by weight.

B. Aggregates: Aggregates used in concrete shall have a combined aggregate distribution similar to the aggregates used in the concrete represented by field test data or used in trial mixtures. Fine and coarse aggregates: ASTM C33. Low-shrinkage producing coarse aggregates per ACI 221R; and uniformly graded as follows:

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1. Maximum Nominal Size of Coarse Aggregate: CBC Section 1903A "Specifications for Tests and Materials", and as follows:
   a. 1/5 the narrowest dimension between sides of forms,
   b. 1/3 depth of slab, or
   c. 3/4 the minimum clear spacing between individual reinforcing bars, wires, or bundles of bars.
2. Aggregate sources shall not contain any alkali-silica reactive material in accordance with ASTM C33, Appendix XI.

C. Water: Potable and complying with ASTM C1602/C1602M.

2.4 ADMIXTURES

A. General:
   1. Manufacturer certified to contain no more than 0.05 percent water-soluble chloride ions by mass of cementitious material. Admixtures containing calcium chloride or thiocyanates not allowed.
   2. Compatible with other admixtures and cementitious materials in the concrete mix.
   3. Obtain Architect’s and DSA’s written acceptance prior to use of admixtures. Use admixtures according to manufacturer’s written instructions.

   1. Acceptable Products:
      a. MasterAir-AE90, MasterAir AE 200, or MasterAir VR 20 by BASF Corporation – Admixture Systems.
      b. Darex AEA by Grace Construction Products.
      c. Eucon Air Mix or Eucon AEA Series by The Euclid Chemical Co.
      d. Or accepted equal.

C. Water Reducing:
   1. Normal Range: ASTM C494/C494M, Type A.
      a. Acceptable Products:
         1) MasterPozzolith Series by BASF Corporation – Admixture Systems.
         2) Eucon Series by The Euclid Chemical Co.
         3) WRDA 64 by Grace Construction Products.
         4) Plastocrete 161 by Sika Corp.
         5) Or accepted equal.
   2. Mid Range Water-Reducing: ASTM C494/C494M, Type A or Type F.
      a. Acceptable Products:
         1) MasterPolyheed Series BASF Corporation – Admixture Systems.
         2) Eucon Series by The Euclid Chemical Co.
         3) Duracem 55 by Grace Construction Products.
         4) Or accepted equal.
   3. High Range Water-Reducing: ASTM C494/C494M, Type F or G.
      a. Acceptable Products:
         1) MasterRheobuild 1000 or MasterGlenium Series by BASF Corporation – Admixture Systems.
         2) Eucon Series or Plastol Series by The Euclid Chemical Co.
         3) Duracem 100 by Grace Construction Products.
4) Sikament 10 ESL by Sika Corp.
5) Or accepted equal.

D. Shrinkage Reducing: Reduces dry shrinkage up to 80 percent at 28 days, and up to 50 percent at one year and beyond as tested per ASTM C157/C157M.
   1. Acceptable Products:
      b. Eclipse Floor and Eclipse Plus by Grace Construction Products.
      c. Eucon SRA Series or Conex by The Euclid Chemical Co.
      d. Or accepted equal.

E. Set Retarding: ASTM C494/C494M, Type B or Type D.
   1. Acceptable Products:
      a. Pozzolith Series or MasterSet DELVO Series by BASF Corporation – Admixture Systems.
      b. Eucon Retarder Series, Eucon DS, or Eucon Stasis by The Euclid Chemical Co.
      c. Or accepted equal.

F. Set Accelerating: ASTM C494/C494M, Type C or Type E.
   1. Acceptable Products:
      a. MasterSet AC 534 or MasterSet FP 20 by BASF Corporation – Admixture Systems.
      b. Accelguard Series by The Euclid Chemical Co.
      c. Or accepted equal.

G. Workability-Retaining: Shall retain concrete workability without affecting time of setting or early-age strength development. ASTMC494/C494M, Type S.
   1. Acceptable Products:
      b. Plastol AMP Series by The Euclid Chemical Co.
      c. Or accepted equal.

2.5 CURING MATERIALS AND SLAB TREATMENT

A. General:
   1. Comply with regulations of the California Air Resources Board and the local Air Pollution Control/Air Quality Management District.
      a. VOC Limit: 350 g/L.
   2. Verify compatibility with subsequent adhesives and coatings before application; furnish Manufacturer’s certificate of compatibility. Coordinate with related Sections.
B. Curing Compound: Select as appropriate for compatibility of subsequent adhesives and coatings.
   1. Water-emulsion, dissipating resin based; meets or exceed ASTM C309, Type 1, Class B.
      a. Acceptable Products:
         1) Kurez DR VOX by The Euclid Chemical Co.
         2) US SPEC Maxcure Resin Clear by US Mix Products Co.
         3) Or accepted equal.

C. Waterproof Sheet Materials for Curing: ASTM C171 and as follows:
   1. Curing paper consisting of two sheets of kraft paper adhered together with a bituminous material with embedded cords or strands of fiber running in both directions not more than 1-1/4 inches apart.
      a. Tensile strength in machine direction: Thirty foot-pounds per inch of width minimum.
      b. Tensile strength in cross direction: Fifteen foot-pounds per inch of width minimum.
   2. Polyethylene Film: ASTM D4397; minimum six mil thickness.
   3. White burlap-polyethylene sheeting: Consisting of burlap weighing not less than nine ounces per square yard extrusion coated on one side with at least four mil white opaque polyethylene sheet.

D. Evaporation Retarder: Water-based polymer concentrate, readily dilutable in water.
   1. Acceptable Products:
      a. MasterKure ER50 by BASF Corporation – Admixture Systems.
      b. Eucobar by The Euclid Chemical Co.
      c. US SPEC Monofilm ER by US Mix Products Co.
      d. Or accepted equal.

E. Surface Retarder: Water soluble liquid, formulated to retard wet surface of mortar in concrete.
   1. Acceptable Products:
      a. MBT EAC-S Regular or Deep by BASF Corporation – Admixture Systems.
      b. Sure Etch Series by The Euclid Chemical Co.
      c. Rugasol-S by Sika Corp.
      d. Or accepted equal.

F. Penetrating Sealer: Chemically reactive, waterborne solution of inorganic silicate or silicate materials; odorless, colorless; penetrates, densifies, and hardens concrete surfaces.
   1. Acceptable Products:
      a. Cementone Clear Concrete Sealer by L. M. Scofield Company.
      c. Eucosil by The Euclid Chemical Co.
      d. Aqua-Trete SG by Evonik.
e. US SPEC Industraseal by US Mix Products Co.

f. Or accepted equal.

G. Vapor Emission Control System: Refer to Section 07 26 50.

2.6 GROUTING, BONDING, AND PATCHING MATERIALS

A. Grout:

1. Non-shrink Grout: ASTM C1107, non-metallic aggregate grout; 7000 psi minimum 28-day compressive strength at fluid water ratio per ASTM C939.

   a. Acceptable Products:

      1) MasterFlow 928 by BASF Corporation – Building Systems.

      2) NS Grout, Hi-Flow Grout, or Euco Pre-Cast Grout by The Euclid Chemical Co.

      3) US SPEC MP Grout by US Mix Products Co.

      4) Or accepted equal.

2. Non-shrink Drypack Grout: Non-shrink, natural aggregates, 7000 psi minimum 28-day compressive strength.

   a. Acceptable Products:

      1) MasterFlow 100 by BASF Corporation – Building Systems.

      2) Dry Pack Grout by The Euclid Chemical Co.

      3) Sealight Pac-it by W.R. Meadows, Inc.

      4) US SPEC GP Grout by US Mix Products Co.

      5) Or accepted equal.

B. Bonding Materials:

1. Bonding Agent/Admixture:

   a. Interior or exterior applications: Acrylic or SBR, latex cement bonding agent/admixture; non-re-emulsifiable; meets or exceeds ASTM C1059, Type II.

      1) Acceptable Products:

         a) Akkro-7T, Flex-Con, or SBR Latex by The Euclid Chemical Co.

         b) US SPEC Acrycoate by US Mix Products Co.

         c) Sealight Acry-Lok by W. R. Meadows, Inc.

         d) Or accepted equal.

   b. Interior applications or exterior applications not subject to constant water immersions: Ethyl-vinyl acetate (EVA) copolymer liquid bonding agent and admixture; re-emulsifies once and will not re-wet; meets or exceeds ASTM C1059.

      1) Acceptable Products:

         a) Tammsweld by The Euclid Chemical Co.

         b) US SPEC Multicoat by US Mix Products Co.

         c) Or accepted equal.
2. Structural Bonding Epoxy Adhesive: Two component, 100 percent solids, 100 percent reactive; meets or exceeds ASTM C881/C881M, Type II, Grade 2, Class B or C as appropriate.
   a. Acceptable Products:
      1) MasterEmaco ADH 1090RS, MasterEmaco ADH 1420, or MasterEmaco ADH 327RS by BASF Corporation – Building Systems.
      2) Dural 452 MV by The Euclid Chemical Co.
      3) Sealight Rezi-Weld 1000 by W. R. Meadows, Inc.
      4) Or accepted equal.

C. Self-Leveling Underlayment: Portland cement based, self-leveling 1 inch thick to featheredge. Fast setting – minimum compressive strength 2200 psi after one day; minimum 4000 psi compressive strength at 28 days per ASTM C109.
   1. Acceptable Products:
      c. Flo-Top or EucoFloor SL 160 by The Euclid Chemical Co.
      d. US SPEC Self-Leveling Underlayment by US Mix Products Co.
      e. Or accepted equal.

D. Repair Mortar: Exceeds ASTM C928, R1 and R2; rapid setting – minimum 1300 psi at three hours; 5500 psi at seven days per ASTM C109.
   1. Acceptable Products:
      b. Euco-Speed, Versaspeed, or Speedcrete 2028 by The Euclid Chemical Co.
      c. US SPEC Transpatch by US Mix Products Co.
      d. Or accepted equal.

E. Repair Mortar (for patching over steel): Liquid polymer modified, containing an integral corrosion inhibitor, exceeds C928, R2; rapid setting – minimum compressive strength 1500 psi at one day; 3500 psi at seven days; 5000 psi at 28 days per ASTM C109.
   1. Acceptable Products:
      a. MasterEmaco N 350CI with Acrylic Additive or MasterEmaco T 310CI by BASF Corporation – Building Systems.
      b. Concrete-Top Supreme by The Euclid Chemical Co.
      c. US SPEC H2 by US Mix Products Co.
      d. Sikatop 122 Plus by Sika Corp.
      e. Or accepted equal.

F. Epoxy Joint Filler: Two component, 100 percent solids, semi-rigid epoxy; hardness: minimum 75 Shore A per ASTM D2240.
   1. Acceptable Products:
b. Euco 700 by The Euclid Chemical Co.
c. Sikadur 51 NS by Sika Corp.
d. Or accepted equal.

2.7 ACCESSORIES

A. Underslab Vapor Retarder, Plastic: Performance shall exceed ASTM E1745, Class A requirements, as modified below. Material properties shall match one of the acceptable products listed below.

1. Properties:
   a. Thickness: Minimum 15 mils (ACI 302.2R, as applicable).
   b. Water Vapor Permeance (as tested before and after ASTM E1745 mandatory conditioning): Maximum 0.01 Perms (based on Test Method ASTM E1745).
   c. Tensile Strength: Minimum 60 lbf/in (ASTM D882).
   d. Puncture Resistance: Minimum 3000 g (ASTM D1709, Method B).

2. Acceptable Products:
   a. Viper Vaporchek II 15 Mil by Insulation Solutions, Inc.
   b. VaporBlock VB15 by Raven Industries.
   c. Griffolyn® 15 Mil Green by Reef Industries, Inc.
   d. 15 Mil Vapor Barrier by Stego Industries, LLC.
   e. Perminator 15 Mil by W.R. Meadows, Inc.
   f. Substitutions: Under provisions of Division 01.

B. Vapor Retarder Accessories:

1. Seam Tape: Water vapor transmission rate 0.03 perms or lower, per ASTM E96. Provide seam tape as standard with vapor retarder manufacturer.

2. Vapor Proofing Mastic: Water vapor transmission rate 0.03 perms or lower per ASTM E96 as standard with vapor retarder manufacturer.

3. Boots for Pipe Penetrations: Provide prefabricated pipe boots as standard with vapor retarder manufacturer.

C. Cone Hole Plugs: Precast high strength cement compound plugs matching size and shape of form tie cone and matching color of poured-in-place concrete as provided by same manufacturer of form ties. Refer to Section 03 11 00.

D. Capillary Barrier: Clean crushed rock; 3/4 inch nominal maximum size with no material passing a No. 4 sieve.

E. Expansion Joints:

1. Joint-Filler Strips: ASTM D1751; bituminous type; preformed, resilient, flexible, and non-extruding.
   a. Acceptable Product:
      1) Sealtight Fiber Expansion Joint by W.R. Meadows, Inc.
      2) Or accepted equal.
2. Self-Leveling Polyurethane Sealant: ASTM C920; Type M; Grade P; Class 25; use T and M.
   a. Acceptable Products:
      1) THC 900/901 by Tremco Inc.,
      2) Urespan NR-200 by Pecora Corp.,
      3) MasterSeal SL2 by BASF Building Systems,
      4) Or accepted equal.

F. Anchors, Anchor Bolts, Nuts, and Washers: Refer to Section 05 12 00.

2.8 PRECAST CONCRETE WHEEL STOPS

A. Provide precast concrete wheel stops, size and shape as indicated on Drawings.

B. Concrete: Precast, air entrained concrete with a minimum compressive strength of 2,500 psi. Provide chamfered corners and drainage slots on underside and holes for anchoring to substrate.

C. Dowels: Galvanized steel, 3/4-inch diameter, 10-inch minimum length. Provide where indicated, or as required by design condition.

2.9 CONCRETE MIX

A. General:
   1. Proportion concrete design mixes per ACI 301 Section 3.9, ACI 318 Chapter 26, and CBC Section 1904A “Durability Requirements”.
   2. Proportion concrete design mixes per ACI, prepared and tested by an independent testing laboratory acceptable to Architect and DSA prior to design mix approval. For each mix design, prepare and perform tests as follows:
      a. Drying shrinkage test per modified ASTM C157/C157M as specified in this Section; provide at least three test specimens. Drying shrinkage test not required for below grade concrete.
      b. Compression test; provide at least six test specimens.
   3. Proportioning without field experience or trial mixtures may be permitted with written approval from Architect and DSA, where concrete manufacturer can establish the uniformity of its production for concrete of similar type and strength based on recent test data in accordance with ACI 318, Chapter 26, Article 26.4.4 “Documentation of Concrete Mixture Characteristics”.
   4. Proportion concrete design mix to attain compressive strength as specified below and as needed, with early strength to meet Contractor’s work program.

B. Mix Designs: Refer to Drawings.
   1. Maximum Water Content: 300 pounds per cubic yard.
   2. Maximum Drying Shrinkage: 0.048 percent as tested per modified ASTM C157/C157M as specified in this Section after 7 days moist curing plus 21 days drying. This requirement does not apply to below grade concrete.

C. Admixtures: Use specified admixtures as acceptable to Architect and DSA. Verify compatibility of concrete admixtures when using multiple admixtures.
2.10 CONCRETE MIXING
A. Concrete shall be mixed per ACI 304R.

2.11 SOURCE QUALITY CONTROL
A. Owner shall employ a testing laboratory accepted by Architect and DSAtos to perform the following:
   1. Review mix designs and certificates of compliance for materials Contractor proposes to use.
   2. Provide continuous batch plant inspections per CBC Chapter 17A, Paragraph 1705A.3.3 “Batch Plant Inspection”.

PART 3 EXECUTION
3.1 EXAMINATION
A. Examine and verify the following prior to concrete placement.
   1. Forms are erected, adequately braced, sealed, lubricated (if required), and bulkhead provided where placing is to stop.
   2. Thoroughly water soak wood forms other than plywood at least twelve hours before concrete placement.
   3. Steel reinforcement are accurately positioned, securely tied and braced. Verify concrete cover requirements.
   4. Coordination with related work is completed.
   5. Anchors and embedded items are in position, securely held and braced.
   6. Construction joints and previously placed concrete are prepared as specified.
   7. Compliance with cold-weather or hot-weather requirements.
   8. Compliance with cleaning and preparation requirements.
B. Report unacceptable conditions to Architect. Begin installation only when unacceptable conditions have been corrected.
C. Concrete formwork, reinforcement, inserts, and embedded items are subject to Architect’s acceptance. Notify Architect at least 48 hours prior to concrete placement.

3.2 PREPARATION
A. Capillary barrier below interior slabs shall be compacted using one pass of a smooth drum or vibratory roller. Compaction shall be verified by Geotechnical Engineer.
B. Underslab Vapor Retarder: Install in accordance with manufacturer’s written instructions, ASTM E1643, and as specified in this Section.
   1. Lay underslab vapor retarder at interior on-ground concrete work.
   2. Apply underslab vapor retarder directly on underlying subgrade, base course, or capillary water barrier, unless it consists of crushed material or large granular materials which could puncture the underslab vapor retarder. In this case, choke the surface with a bedding layer of approximately 1/2 inch fine-graded material rolled or compacted over the fill before placing the underslab vapor retarder.
3. Unroll vapor retarder with longest dimension parallel with direction of concrete placement.

4. Lay vapor retarder using the greatest widths and lengths practicable to eliminate joints wherever possible. Lap over footings and seal to foundation walls.

5. Overlap joints 6 inches and seal with compatible seal tape per manufacturer’s written recommendations.

6. Seal all penetrations per manufacturer’s written instructions using mastic and seal tape. No penetration of underslab vapor retarder is permitted except for reinforcing steel and permanent utilities.

7. Replace torn, punctured, and damaged underslab vapor retarder material prior to placing concrete.

8. Minor repairs may be made by patches of underslab vapor retarder overlapping edges 6 inches and sealing all four sides with tape.

9. Control concrete placement so as to prevent damage to underslab vapor retarder. Screed pins and similar implements that will puncture underslab vapor retarder are not permissible.

C. Cleaning: Clean forms and adjacent surfaces to receive concrete. Remove chips, wood, sawdust, dirt and other debris before placing concrete.

D. Refer to Section 03 11 00 for formwork preparation.

E. Refer to Section 03 20 00 for reinforcing steel preparation.

3.3 PLACING CONCRETE

A. Place concrete in accordance with ACI 301 and as specified in this Section.
   1. Place and finish Architectural Concrete in the locations indicated on Drawings in accordance with ACI 303.1 and 303R.

B. Add no water during delivery and at the project site unless specifically accepted by Architect. If water is withheld at batch plant, indicate in delivery ticket the design water for accepted mix, moisture content of aggregates, and free water added at batch plant. If total water added at plant is less than design water to attain slump of accepted mix design, water may be added to concrete at job site, not to exceed the design water content, subject to the limitations specified in ASTM C94/C94M. If additional slump is required, use water reducing admixture.

C. Discharge mixed concrete within 1-1/2 hours or before mixer has revolved 300 revolutions, whichever comes first, after the introduction of mixing water to the cement and aggregates. Reduce this time to 45 minutes when the concrete temperature exceeds 85 degrees F, unless appropriate measures as specified in ACI 305.1 are taken to maintain slump and temperature of concrete. Slump and concrete temperature can be maintained within limits longer with the use of retarding admixtures or hydration-control admixtures or ice.

D. Place concrete within fifteen minutes after it has been discharged from the mixer. Handle concrete from mixer to forms in a continuous manner.

E. Deposit concrete as close as possible to its final position in the forms, with no vertical drop greater than five feet except where suitable equipment is provided to prevent segregation and where specifically authorized.
F. Deposit concrete continuously or in layers of such thickness that no new concrete will be placed on concrete that has hardened enough to cause seams or planes of weakness. If concrete cannot be placed continuously, provide construction joints as specified. Deposit concrete to avoid segregation.

G. Deposit concrete in forms in horizontal layers no deeper than 24 inches and in a manner to avoid inclined construction joints. Place each layer while preceding layer is still plastic to avoid cold joints.

H. Pumping concrete, when specifically accepted, may be conveyed by positive displacement pump such as piston or squeeze pressure type; pneumatic placing equipment is not permitted. Use rigid steel pipe or heavy-duty flexible hose with an inside diameter at least three times the nominal maximum-size coarse aggregate, but not less than 4 inches. Aluminum pipe is not allowed.

I. Provide adequate scaffolding, ramps and walkways in a manner so that personnel and equipment are not supported by in-place reinforcement.

J. Consolidation: Consolidate placed concrete with mechanical vibrating equipment per ACI 309R.
   1. Consolidate each layer of concrete immediately after placing using internal vibrators, except for slabs 4 inches thick or less.
   2. Insert and withdraw vibrators vertically at uniformly spaced location no farther than the visible effectiveness of the vibrator. Hold vibrator stationary and slowly withdraw vertically while operating.
   3. Do not use vibrators to transport concrete inside forms.
   4. Place vibrator to rapidly penetrate placed layer and at least 6 inches into preceding layer. Do not insert vibrators into lower layers that have begun to lose plasticity. Limit vibration duration to time necessary to consolidate concrete and complete embedment of reinforcement and other embedded items without causing mix to segregate.

K. Concrete Floors and Slabs: Deposit and consolidate concrete for floors and slabs in a continuous operation within limits of construction joints until placement of a panel or section is complete.
   1. Consolidate concrete during placement so concrete is thoroughly worked around reinforcement and other embedded items and into corners.
   3. Screed slab surfaces with a straightedge and strike off to correct elevations.
   4. Slope exterior surfaces for drainage as directed, unless otherwise shown. Slope interior floors to drains uniformly, where provided.

L. Hot Weather Concreting: Place concrete according to ACI 305.1 and as follows:
   1. Cool components before mixing to maintain concrete temperature below 85 degrees F at time of placement. Chilled mixing water or chopped ice may be used to control temperature. Calculate and include water equivalent of ice in designed water cement ratio.
   2. Cover steel reinforcement with water-soaked burlap so steel temperature will not exceed ambient air temperature immediately before embedding in concrete.
3. Fog-spray forms, steel reinforcement, and subgrade just before placing concrete. Keep subgrade moisture uniform without standing water, soft spots, or dry areas.

4. Protect concrete from surface drying; moisture loss from concrete in plastic state shall be maintained below 0.1 pounds per square foot per hour. Methods may include, but are not limited to: evaporation retardant, sun shades, wind breaks, and fog misting.

M. Cold Weather Concreting: Place concrete according to ACI 306.1 and as follows:
1. Protect concrete work from physical damage or reduced strength as a result of frost, freezing, or low temperatures.
2. When ambient temperature is expected to fall below 40 degrees F, uniformly heat water and aggregates before mixing to obtain a concrete mixture temperature of not less than 50 degrees F and not more than 75 degrees F.
3. Do not use frozen materials or materials containing ice or snow. Do not place concrete on frozen subgrade.
4. Do not incorporate calcium chloride, salt or other materials containing antifreeze agents into the concrete mix.
5. Upon Architect’s written acceptance and subject to prior approval of mix design, accelerating admixtures, containing no calcium chloride, as specified in this Section may be used.

N. Do not allow concrete overpour from formwork where underground products and systems need to be installed at or adjacent to the concrete work. If overpour occurs, remove as necessary to accommodate the installation of such items.

3.4 JOINTS

A. General: Construct joints true to line with faces perpendicular to surface plane of concrete, unless otherwise indicated on Drawings.

B. Construction Joints: Locate and install joints as indicated on Drawings or as accepted by Architect, and in a manner that strength and appearance of concrete are not impaired.
1. Comply with ACI 318, Chapter 26, Articles 26.5.6.1 and 26.5.6.2.
2. Place joints perpendicular to main reinforcement. Continue reinforcement across construction joints unless otherwise indicated.
3. Expose concrete aggregates, a minimum of 1/4 inch depth, creating a rough surface using a surface retardant. Within 24 hours after placing concrete, remove retarded surface mortar using either high pressure water jetting or stiff brushing or a combination of both to expose coarse aggregate. A rough surface of exposed aggregate may also be produced by sandblasting followed by high pressure water jetting.
4. Where new concrete joins existing concrete (concrete more than sixty days old), clean and roughen existing concrete to expose coarse aggregate. Coat with epoxy bonding compound prior to placing new concrete.
5. Horizontal joints: Apply a 1 inch wood grade strip, level and straight, 1/2 inch below the placement lift elevation for a neat joint.
C. Slab-on-Ground Control Joints: Tool or saw-cut weakened plane joints at a depth of at least 1/4 slab thickness where shown on Drawings. Where not indicated in Drawings, provide at distances (in feet) every two times to three times of slab thickness (in inches).
   1. Tooled Joint: Form control joints after initial floating by grooving and finishing each joint edge to a 1/8-inch radius. Repeat grooving after applying surface finish.
   2. Sawed Joint: Saw cut 1/8-inch width as soon as the concrete has hardened sufficiently to prevent raveling (dislodging of the aggregates) of the edges of the saw cut and completed before shrinkage stresses become sufficient to produce cracking.
   3. Fill control joints with epoxy joint filler in accordance with manufacturer’s written instructions.

D. Slab-on-Ground Expansion Joints and Isolation Joints: Provide expansion joints and isolation joints where shown on Drawings, where slab abuts vertical surfaces such as curbs, gutters, and sidewalks.
   1. Extend joint-filler strips full width and extend to full depth of joint, terminating not less than 1/2 inch and not more than 1 inch from finish surface. Apply a removable capping flush to slab finish.
   2. Install strips in lengths as long as practicable. Where more than one length is required, lace or clip sections together.
   3. Remove capping when concrete has cured and apply joint sealant.

E. Dowel Joints: Install dowel sleeves and dowels or dowel bar and support assemblies at joints where shown on Drawings.

3.5 FORMED SURFACES FINISHING

A. Leave texture imparted on formed concrete surface, unless otherwise specified, except that defective surfaces shall be repaired. Repair defective concrete as specified in this Section.

B. Maintain uniform color of the concrete, unless painting of surfaces is required, by using only one mixture without changes in material or proportions for any structure or portion of structure exposed to public view.

C. Repair and patch tie holes. Apply cone hole plugs matching color of cured concrete; and unless otherwise indicated, flush to concrete surface, as provided by form tie manufacturer using waterproof adhesive.

3.6 CONCRETE FLOORS AND SLABS FINISHING

A. Comply with ACI 302.2R and as specified in this Section. Comply with flatness and levelness tolerance requirements of this Section.

B. Float Finish:
   1. Immediately following placing and consolidating concrete, begin initial floating using bull floats or darbies to form a uniform and open-textured surface plane, free of humps or hollows, before excess moisture or bleedwater appears on the surface.
   2. When concrete has sufficiently stiffened begin floating to a true and even plane free of ridges. Perform floating using power-driven equipment or hand floats if area is small or inaccessible to power-driven floats.
3. If bleedwater is present prior to finishing, carefully drag-off or remove by absorption with porous materials such as burlap. Dusting of surfaces with dry cement or other materials or the addition of any water during finishing is not permitted.

4. Check slab surfaces with a ten-foot straightedge at regular intervals while concrete is still plastic, to detect high or low areas.

5. Restraighten, cut down high spots, and fill low spots. Repeat float passes and restraighten until surface is left with a uniform, smooth, granular texture.

6. Take extreme care during finishing operations to prevent over finishing or to prevent working water into the surface; this can cause crazing (surface shrinkage cracks which appear after hardening) of the surface. Slabs with surfaces exhibiting significant crazing as determined by Architect shall be removed and replaced.

C. Trowel Finish:
   1. After floating is complete and after surface moisture has disappeared, apply trowel finish using a power-driven trowel or hand trowel if area is small or inaccessible to power-driven trowel.
   2. Steel trowel to a smooth, even, dense finish, free of blemishes including trowel marks.
   3. Apply final steel troweling by hand.
   4. Hard troweling (steel troweling) of air entrained concrete will not be permitted, unless otherwise indicated on Drawings or specified in other Sections.

D. Broom Finish:
   1. After floating, lightly trowel surface and then carefully score by pulling a broom across the surface. Use appropriate type of broom to achieve texture specified.
   2. Broom as indicated or as directed by Architect. Where not specifically indicated, broom transverse to traffic or at right angles to the slope of the slab.
   3. Adding water to facilitate brooming is not permitted.
   4. Exterior ramps, walks, and slabs: Apply a slip-resistant finish as follows:
      a. Where slope is six percent or greater: Heavy broom finish with at least 0.8 coefficient of friction per ASTM C1028.
      b. Where slope is less than six percent: Medium broom finish with a minimum 0.6 coefficient of friction per ASTM C1028.

E. Floor and Slab Flatness and Levelness Tolerance: Determine flatness and levelness of floor slabs using the F-Number System in accordance with ASTM E1155 using the inch-pound system of units. Calculate F-Numbers as follows:
   1. Definitions:
      a. Face Flatness Number (\(F_F\)): The maximum slab curvature allowed over 24 inches computed on the basis of successive 12 inch elevation differentials.
      b. Face Levelness Number (\(F_L\)): The relative conformity of the slab surface to a horizontal plane as measured over a ten foot distance.
   2. Sampling Requirements: As described in ACI 117.
3. Calculations:

\[ F_F = \frac{4.57}{\text{Maximum difference in elevation (in decimals of inches) between successive 12 inch elevation differences.}} \]

\[ F_L = \frac{12.5}{\text{Maximum difference in elevation (in decimals of inches) between two points 10 feet apart.}} \]

4. Tolerances:
   a. Trowel finish surfaces on ground: \( F_F \) 25; \( F_L \) 20 (overall tolerance values).
   b. Float finish surfaces on ground: \( F_F \) 20; \( F_L \) 17 (overall tolerance values).
   c. Minimum local tolerance (1/2 bay or as designated by Architect): 2/3 of specified tolerance values.

5. Refer to Article 3.9 of this Section for remedial work required for out-of-tolerance concrete.

F. Site Concrete Flatness Tolerance: 1/4 inch in 10 feet, non-cumulative; unless more restrictive tolerance is indicated or specified. This tolerance does not allow slopes to exceed the specified maximum slopes.

1. Surface cross slopes shall not exceed one unit vertical in fifty units horizontal (two percent).

3.7 CURING AND PROTECTION

A. Protect freshly placed concrete from premature drying, rapid temperature change, mechanical injury, and injury from flowing water for a curing period not less than seven days. Comply with ACI 306.1 for cold-weather protection and ACI 305R for hot-weather protection during curing.

B. Curing Methods:

1. Curing Compound: Apply uniformly in continuous operation by power spray or roller according to manufacturer’s written instructions. Recoat areas subjected to heavy rainfall within three hours after initial application. Maintain continuity of coating and repair damage during curing period.
   a. If curing compound is applied using a hand held, pump-up sprayer, it shall be back-rolled using a short nap roller.

2. Moist Curing: Keep surfaces in a moist condition for not less than seven days using water saturated absorptive cover (burlap-polyethylene sheeting) kept wet continuously. Cover concrete completely in widest practicable width, with sides and ends lapped at least 12 inches, and sealed with waterproof tape or adhesive. Immediately repair and maintain rips and tears and keep traffic away from surface during curing period.

3. Ponding or Immersion: Continuously immerse concrete throughout the curing period in water not more than twenty degrees below the temperature of the concrete.
C. Concrete in Forms: Keep forms and exposed concrete surfaces covered and continuously moist. Provide soaker hoses at top of walls or other accepted means of keeping concrete and forms wet while forms remain in place. If forms are removed before end of curing period, continue curing by methods described in this Section.

D. Floors and Slabs:
1. Evaporation Retarder: Apply evaporation retarder to floors and slabs if hot, dry, or windy conditions cause moisture loss of 0.1 pounds per square foot per hour before and during finishing operations. Apply according to manufacturer’s written instructions after placing, screeding, and bull floating or darbying concrete, but before float finishing.

2. Cure by application of curing and sealing compound or by moist curing. Use appropriate curing method compatible with subsequent floor adhesives and coatings. Moist cure concrete surfaces to receive penetrating liquid floor treatments.

3. Begin curing as soon as free water has disappeared from the concrete surface after placing and final finishing.

E. Protection:
1. Protect concrete surfaces from damage by tools, equipment, materials, and construction activity.

2. Traffic, shoring, or loading will not be permitted on concrete surface until it has sufficiently hardened to prevent injury to finish and strength.

3. Protect all flat work and other surfaces as required with full board of plywood coverings as necessary.

3.8 REMOVAL OF FORMS

A. Formwork for sides of curbs and similar parts of the Work that does not support weight of concrete may be removed after cumulatively curing at not less than 50 degrees F for 48 hours after placing concrete provided concrete is hard enough not to be damaged by form-removal operations and provided curing and protection operations are maintained.

3.9 CONCRETE REPAIRS

A. General: Comply with ACI 301, Article 1.7 as follows:

1. Completed concrete work shall conform to applicable requirements of this Section and Contract Documents.

2. Concrete work that fails to meet one or more requirements of the Contract Documents but subsequently is repaired to bring the concrete into compliance will be acceptable.

3. Concrete work that fails to meet one or more requirements of the Contract Documents and cannot be brought into compliance with the Contract Documents is subject to rejection.

4. Repair rejected concrete work by removing and replacing or by additional construction to strengthen or otherwise satisfy project requirements as directed by Architect. To bring rejected Work into compliance, use repair methods that meet applicable requirements for function, durability, dimensional tolerances, and appearance as determined by Architect.

5. Submit proposed repair methods, materials, and modifications needed to repair concrete work to meet the requirements of the Contract Documents.
6. Repair random cracks and single holes 1 inch or less in diameter with drypack grout. Groove top of cracks and cut out holes to sound concrete and clean off dust, dirt, and loose particles. Dampen cleaned concrete surfaces and apply bonding agent. Place drypack grout before bonding agent has dried. Compact and finish grouted areas to match adjacent concrete.

E. Moist cure patches and repairs for at least 72 hours.

F. Perform concrete structural repairs subject to Architect’s and DSA’s acceptance.

3.10 FIELD QUALITY CONTROL

A. General: Comply with requirements of Division 01.

B. Testing Service: Owner will select and pay for independent testing agency.

C. Strength Test Specimen Cylinders: Conduct sampling, curing, and testing per ASTM C172, ASTM C31/C31M, and ASTM C39/C39M. Contractor shall provide moulds required for strength test cylinders.

1. Frequency: Samples for strength tests of each class of concrete placed each day shall be taken not less than once a day, nor less than once for each 50 cubic yards of concrete, nor less than once for each 2000 square feet of surface area for slabs or walls. Additional samples for seven-day compressive strength tests shall be taken for each class of concrete at the beginning of the concrete work or whenever the mix or aggregate is changed.

2. A strength test shall be the average of the strengths of at least two 6 inch by 12 inch cylinders or at least three 4 inch by 8 inch cylinders made from the same sample of concrete and tested at the test age designated for the determination of concrete compressive strength.

3. Cylinder Label and Records: Mark and date each test cylinder. Maintain records of test specimen cylinders and send copies to Contractor, Architect, DSA, Project Inspector, and Owner. Record the following information:

   a. Cylinder identification mark.
   b. Date made.
   c. Concrete supplier.
   d. Slump/slump flow.
   e. Specified concrete design strength.
   f. Pour location and type of structural member.
   g. Compressive strength test date and age.
   h. Admixtures added to concrete mix.
   i. Air content.

4. Compressive Strength Tests: Test laboratory cured specimens at the following ages and report compressive strengths as follows:

   a. 7 days at the start of use of each class of concrete or change in mix or aggregates.
   b. 7 days where early compressive strength is required.
   c. 28 days.
   d. 56 days.
6. Contractor shall be responsible to bring concrete work into compliance with requirements of Contract Documents.

B. Defective Concrete: Repair and patch defective concrete work and concrete not conforming to required lines, details, and elevations. Use materials and methods specified in this Section as accepted by Architect. Serious defects, defects affecting structural strength, or unsatisfactory patching may be cause for complete removal and replacement of concrete.

C. Repairing Formed Surfaces: Surface defects include color and texture irregularities, cracks, spills, air bubbles, honeycombs, rock pockets, fins and other projections on the surface stains and other discolorations that cannot be removed by cleaning.

1. Immediately after form removal, cut out honeycomb, rock pockets, and voids more than 1/2 inch in any direction in solid concrete. Make edges of cuts perpendicular to concrete surface. Clean, dampen with water, and brush-coat holes and voids with bonding agent. Fill and compact with drypack grout before bonding agent has dried. Fill form-tie voids with patching mortar or core hole plugs secured in place with bonding agent.

2. Repair defects on surfaces exposed to view by blending white Portland cement and standard Portland cement so that, when dry, repair mortar will match surrounding color. Patch a test area at inconspicuous location to verify mixture and color match before proceeding with patching. Compact mortar in place and strike off slightly higher than surrounding surface.

3. Repair defects on concealed, formed surfaces that affect concrete’s durability and structural performance as determined by Architect and DSA.

D. Repairing Unformed Surfaces: Test unformed surfaces, such as floors and slabs, for finish and verify tolerances specified for each surface. Correct low and high areas. Test surfaces sloped to drain for trueness of slope and smoothness.

1. Repair defective finished surfaces including spills, popouts, honeycombs, rock pockets, crazing and cracks in excess of 0.01 inch wide or that penetrate to reinforcement or completely through unreinforced section regardless of width, and other objectionable conditions.

2. After concrete has cured fourteen days, correct high spots by grinding.

3. Correct localized low areas during or immediately after completing surface finishing operations by cutting out low areas and replacing with patching mortar. Finish areas to blend into adjacent concrete.

4. Correct other low areas scheduled to receive floor coverings with a repair underlayment. Prepare, mix, and apply mortar underlayment and primer according to manufacturer’s written instructions to produce a smooth, uniform, plane, and level surface. Feather edges to match adjacent floor elevations.

5. Repair defective areas, except random cracks and single holes 1 inch or less in diameter, by cutting out and replacing with fresh concrete. Remove defective areas with clean, square cuts and expose steel reinforcement with at least 3/4 inch clearance all around. Dampen concrete surface in contact with patching concrete and apply bonding agent. Mix patching concrete of same materials and mix as original concrete. Place, compact, and finish to blend with adjacent finished concrete.
e. Hold specimens for one strength test in reserve.

5. Test Reports: Furnish copies of test reports directly from testing agency to Contractor, Architect, DSA, Project Inspector, and Owner.

D. Slump Test: ASTM C143/C143M. Conduct slump testing when test cylinders are made and additionally for every 150 cubic yards of concrete. Perform additional tests when concrete consistency appears to change. Slump not meeting slump indicated in accepted mix design (± one inch) will be rejected. Contractor shall provide slump cones.

E. Air Content Tests: ASTM C231 for normal weight concrete and ASTM C173/C173M for lightweight concrete. Where air entrainment is specified, conduct air content tests from the first two batches of concrete mixed each day and when test cylinders are made. Concrete not meeting air entrainment requirements shall be rejected and removed.

F. In the event the cylinders tested do not meet the required concrete design strength, conduct core tests and additional tests or inspections as may be required by Architect to ascertain strength of placed concrete. Costs for additional tests and inspections shall be borne by Contractor.

END OF SECTION

Concrete Mixture Design Submittal Checklist

☐ Specify Use: All mix designs must clearly note the concrete type or use. (i.e. footings, slab on grade, site concrete)

☐ Mix Design: Provide concrete mixture designs with proportions and characteristics including all admixtures.

☐ Gradation: Provide combined aggregate gradation by weight for all course and fine aggregates.

☐ Weight: Provide dry unit weight of mix. Normal weight concrete shall be limited to 145 PCF.

☐ Material Certificates: Provide supplier’s certification that materials conform to specifications. This includes aggregates, admixtures, and cementitious materials such as cement and fly ash.

☐ Product Data: Provide product literature for each product and admixture used. Include manufacturer’s specification, written instructions, and installation procedures.

☐ Required SCM: Mix design must contain the percentage of supplementary cementitious materials noted in mix design table of the specifications.

☐ Admixtures: Where multiple admixtures are used, provide a letter from all manufacturers indicating there are no compatibility problems or adverse effects resulting from combination of products.

☐ Shrinkage: Provide shrinkage test per modified ASTM C157/C157M at 21 days. Shrinkage test must be for the same mix specified or a similar mix with the same water cement ratio and aggregate source. (Exception: shrinkage testing is not required for below grade concrete)

☐ Testing / Proportion Method: Concrete must be proportioned per the requirements of ACI 318-11, Section 5. Indicated method used and provide complete test data and
documentation for the chosen proportion method.
SECTION 03 93 00

FIBER-REINFORCED POLYMER (FRP) STRENGTHENING SYSTEM

PART 1 GENERAL

1.1 SECTION INCLUDES

A. Reinforced concrete strengthening using fiber reinforced polymer systems.

1.2 RELATED SECTIONS

A. Section 03 30 00 – Cast-In-Place Concrete.

1.3 REFERENCES

A. The publications listed below form a part of this Section to the extent referenced. The publications are referred to in the text by the basic designation only. Refer to Section 01070 for definitions, acronyms, and abbreviations.

B. Standards, manuals, and codes refer to the latest edition of such standards, manuals, and codes in effect as of the date of issue of this Project Manual, unless indicated otherwise in CBC Chapter 35 and CFC Chapter 80.

C. Referenced Standards:


2. ACI 562 – Code Requirements for Evaluation, Repair, and Rehabilitation of Concrete Buildings.

3. ASTM C78 – Standard Test Method for Flexural Strength of Concrete (Using Simple Beam with Third-Point Loading).


5. ASTM C882/C882M – Standard Test Method for Bond Strength of Epoxy-Resin Systems Used With Concrete By Slant Shear.


1.4 SUBMITTALS

A. Submit the following under provisions of Division 01:

1. The strengthening system’s design criteria, design calculations, and construction details in accordance with Project requirements and ACI 440.2R, stamped and signed by a civil engineer, registered in the State of California.

2. A material list of items proposed to be provided under this Section, including MSDS sheets, physical, mechanical, and chemical characteristics.

3. An approved ICC Evaluation Report number in the name of the proposed system and the system’s manufacturer. Evaluation report shall cover both the materials and the type of element to be strengthened with that material.

4. Manufacturer’s product data, specifications, recommended application procedures, and maintenance instructions for each material used showing compliance with the specified requirements. Specifications shall include procedures to properly mix the individual components of the proposed product as well as the proper mix ratios and epoxy resin allowable working time.

5. Certification of the system’s material properties by an independent laboratory testing in accordance with ASTM D3039. Clearly reference the exact polymer matrix and reinforcing fiber combination to be installed.

6. Independent test report showing system durability on the proposed composite to be used; including 10,000 hour resistance to fresh water, salt water, 140 degrees F, alkali soil, and 100 percent humidity.

7. Volatile Organic Compound (VOC) level test results of all components of the epoxy resin matrix, individually and mixed. Material shall possess less than three percent VOC per ASTM D2369.

8. Standard ultraviolet (UV) resistance test (ASTM G154). Material shall maintain design properties as specified in this Section.

9. Provide ASTM E84 test results for the unprotected polymer system to verify surface burn characteristics. Provide ASTM E84 test results for the protected system to verify a minimum Class 1 rating.

10. Complete shop drawings and calculations stamped and signed by a civil engineer, registered in the State of California, containing details of the number and thickness of layers, orientation of all FRP materials and coatings to be installed, anchorages, joint and end details and locations to satisfy project requirements.

   a. Design calculations shall conform to ACI 562 Equations 5.5.2a, 5.5.2b, and 5.5.3 that stipulate the strength of the unstrengthened structure must be at least equal to the load combinations specified in section 5.5.2.
11. Written certification from the composite system manufacturer showing the names of at least three trained installers with a minimum of three years experience and who will be on the jobsite during all phases of the installation.

1.5 PERFORMANCE REQUIREMENTS

A. The composite system is designed to the load and strain criteria as given on the structural drawings in accordance with ICC ES AC 125 as modified by the manufacturer’s design manual and design criteria accepted by Architect.


C. Design values shall be lower than the calculated mean determined from the test results received from the ASTM D3039 test specimens.

D. Work specified under this Section shall be performed by an applicator with at least three years experience in applying the accepted composite system, and having completed a minimum of twenty projects in the last two years, with over 800 elements strengthened; and two previous successfully completed California projects.

E. The composite system applicator shall submit a written description of the proposed epoxy, including VOC levels, and a complete written description of the application procedures for review by Architect. The applicator company shall be certified by the manufacturer/supplier in writing and provide a quality control procedure in accordance with ICC ES AC 125 and approved by means of an ICC ES Evaluation Report.

F. Supply and installation of the composite system shall meet the performance criteria of this Section. Calculations (for alternate composite systems to the one specified in this Section) to determine the installed composite thickness shall be submitted for Architect’s review and acceptance.

1.6 PRODUCT DELIVERY, STORAGE AND HANDLING

A. Deliver epoxy materials in factory-sealed containers with manufacturer’s labels intact and legible with verification of date of manufacture and shelf life.

B. Materials shall be stored in a protected area free of moisture and UV exposure, with temperatures between 45 degrees F and 95 degrees F.

C. Products shall be stored according to the manufacturer’s requirements and shall avoid contact with moisture.

PART 2 PRODUCTS

2.1 MANUFACTURERS

A. Basis-of Design Product: TYFO® Fibrwrap® System by Fyfe Co. LLC, San Diego, CA; 858-642-0694, www.fyfeco.com. Provide the named product or accepted equal by the following:


3. Or accepted equal.

B. Comparable composite system, when proposed by Contractor as accepted equal system, shall be submitted for Architect's review and acceptance. Submittal shall include associated design calculations, documentation that proposed system satisfies requirements of this Section, and the following:
   1. Proposed system manufacturer's QA/QC manual for FRP materials and installation.
   2. Design criteria for the type of strengthening being performed, including design equations used for calculations.

2.2 COMPOSITE STRENGTHENING SYSTEM MATERIALS

A. Composite fabric:
   1. Primary carbon fiber, uni-directional:
      a. SCH products as manufactured by Fyfe Co. LLC.
      b. CSS-CACF22 or CSS-CUCF44 by Simpson Strong-Tie, Inc.
      c. SikaWrap-103C by Sika Corporation.
      d. Or accepted equal.

B. Epoxy Saturant:
   1. System Compatible Epoxy Matrix:
      a. Tyfo® S epoxy combined with fiber to form TYFO® Fibrwrap® composite by Fyfe Co. LLC.
      b. CSS-ES epoxy combined with CSS carbon fiber by Simpson Strong-Tie, Inc.
      c. Sikadur 300 epoxy combined with SikaWrap fiber by Sika Corporation.
      d. Or accepted equal.

C. Primer/Filler:
   1. System compatible thickened epoxy for protective seal coat and filling voids and primer where needed:
      a. Tyfo® S, WS, WP or TC thickened epoxy by Fyfe Co. LLC.
      b. CSS-EP epoxy paste and filler or CSS-ES epoxy thickened with fumed silica by Simpson Strong-Tie, Inc.
      c. Sikadur 300, Sikadur 30, Sikadur 330 by Sika Corporation.
      d. Or accepted equal.

D. Anchorage: System compatible anchors shall be provided as detailed on shop drawings, and as required by system manufacturer.

E. Finish:
   1. System compatible protective coat; type and color to be selected by Architect.
      a. Tyfo® A or Tyfo® RR Type S by Fyfe Co. LLC.
      b. FX-505, Fx-207, or FX-70-9 by Simpson Strong-Tie, Inc.
      c. SikaGuard 550W or SikaGuard 670W by Sika Corporation.
      d. Or accepted equal.
e. Comparable finishes, when proposed by Contractor, shall be subject to system manufacturer's approval.

2.3 PATCHING MATERIALS

A. Field thickened epoxy matrix, compatible with composite system's resin matrix, shall be used to patch bugholes up to 1-1/2 inches deep and to fill large voids. Resin shall also be used to form column corners to required minimum radius.

PART 3 EXECUTION

3.1 SURFACE PREPARATION

A. Walls, Beams, and Columns: Concrete shall be abrasively prepared to achieve an ICRI CSP 3 profile by means of grinding, sand blasting, shot blasting, or pressure washing unless the FRP is being applied in a contact-critical application (i.e. horizontal wrapping of columns). All contact surfaces shall be cleaned by hand or compressed air. One prime coat of manufacturer's epoxy shall be applied and allowed to cure for a minimum of one hour. Prior to application of saturated composite fabric, fill any uneven surfaces with manufacturer's thickened epoxy. Provide anchorage as detailed on shop drawings, if required.

B. Round off sharp and chamfered corners (to be wrapped around) to a minimum radius of 3/4 inch by means of grinding or forming with the system's thickened epoxy. Variations in the radius along the edge shall not exceed 1/2 inch for each 12 inches of length.

C. Bond critical surface preparation techniques shall be verified by means of adhesion testing as per ASTM D4541.

3.2 PROCEDURES FOR APPLICATION

A. Preparation: Visit site to ensure that all patch work is complete and cured.

B. Verify ambient and concrete temperatures. No work shall proceed if the temperature of concrete surface being repaired is less than 45 degrees F or greater than 95 degrees F. The temperature of the epoxy components shall be between 45 degrees F and 95 degrees F at the time of mixing or as specified on the component labels. When air temperature is outside the prescribed range, other measures shall be employed to ensure components' temperature is maintained within this range.

C. Prepare epoxy matrix by combining components at a weight (or volume) ratio specified by the manufacturer. Components of epoxy resin shall be mixed with a mechanical mixer until uniformly mixed, typically five minutes at 400 rpm to 600 rpm. Components that have exceeded their shelf life (as designated on the material label) shall not be used.

D. Saturation of fabric shall be performed and monitored according to manufacturer's specified fiber-epoxy resin ratio. Fabric shall be completely saturated prior to application to contact surface in order to ensure complete impregnation. Saturation shall be supervised and checked by the certified installer. When manually saturating fabric, precut sheets to required length using heavy duty shears before saturating with hand rollers. If mechanically saturating fabric with rollers, cut sheets using heavy duty shears either before or after they go through the epoxy bath. In both cases, ensure full fabric saturation is achieved. When procured laminates are used, cut to required length using a metal cutting wheel, clean with solvent, and apply paste to laminate per manufacturer's recommendations.
E. Both epoxy resin and fabric shall be measured accurately, combined, and deposited uniformly at the rates shown on shop drawings and per manufacturer's printed instructions. Composite system shall be comprised of fibers completely saturated with epoxy resin per proper ratio. Any epoxy resin batch that exceeds the batch life working time shall not be used.

F. When using fabrics, apply additional layers as necessary to meet the project requirements, ensuring each layer is firmly adhered to the previous layer. When using laminates, do not apply more than one layer.

G. Feather all fabric seams/edges with epoxy paste.

H. Confirm that intimate contact between composite systems and substrate will be maintained throughout the curing process.

I. Quality Control Procedures: Record batch numbers for fabric and epoxy used each day, and note locations of installation. Measure square footage of fabric and volume of epoxy used each day. Complete report and submit to Architect and system manufacturer.

J. Fabric Sampling Procedure: From a standard epoxy mix of 100 parts “A” to 42 parts “B” by volume, run fabric through properly set saturator. On a smooth, flat, level surface covered with polyethylene sheeting, or 16-mil plastic film, prime with epoxy resin, then prepare sample by placing two layers of saturated fabric oriented in the same direction. Apply additional topping of epoxy. Cover with plastic film and squeegee out all bubbles. Samples shall be stored in a sample box and not moved for a minimum 48 hours after casting. The prepared, identified samples shall be given to a pre-approved testing laboratory. Laboratory shall precondition samples for 48 hours at 140 degrees F before testing.

K. Installation Procedures:
   1. Cutting of fabrics, mixing of epoxy and combination thereof shall take place in a protected area away from critical structure functions and electrical equipment.
   2. Prepare surface as required, including corners.
   3. Remove dust and debris by hand or with compressed air as specified.
   4. Clean up and protect area adjacent to element.
   5. Using a roller or trowel, apply one prime coat of thickened epoxy resin to concrete surface (two mils minimum). Allow primer to become tacky to touch.
   6. Fill any uneven surfaces or recesses with thickened epoxy.
   7. Saturate fabric with epoxy matrix through properly set saturator.
   8. Apply saturated fabric to concrete surface by hand, using methods that produce a uniform, constant tensile force that is distributed across the entire width of fabric. Under certain application conditions, the system shall be placed entirely by hand to ensure a uniform and even final appearance. Gaps between composite bands shall not exceed 1/2 inch width in the fabric’s transverse joint unless otherwise noted on shop drawings. A lap length of at least 6 inches is required at all necessary overlaps in the primary fiber direction of fabric.
   9. Apply subsequent layers, continuously or spliced, until designed number of layers is achieved, in accordance with Drawings.
10. Using a roller or hand pressure, ensure proper orientation of fibers, release or roll out entrapped air, and ensure that each individual layer is firmly bedded and adhered to the preceding layer or substrate.

11. Apply a final coat of thickened epoxy. Detail all fabric edges, including butt splice, termination points, and jacket edges, with thickened epoxy.

12. Finish: Commence finishing work between 24 and 72 hours after final application of epoxy. If after 72 hours the epoxy is cured, surface shall be roughened by hand sanding or brush blasting, prior to finishing. All interior finishes shall provide a minimum Class 1 flame spread and smoke developed rating per ASTM E84. Exterior applications shall be protected with a 10 mil to 15 mil coating of thickened epoxy or equivalent protective finish. All edges and seams shall be feathered.

13. System may incorporate structural fasteners, but limitations and detailing shall be verified with composite system manufacturer.

3.3 PROCEDURE MODIFICATIONS

A. Installation procedures may be modified to achieve maximum results, subject to Architect’s acceptance. Obtain Architect’s acceptance for procedure modifications prior to implementing the modifications.

3.4 FIELD QUALITY CONTROL

A. Field quality control procedures shall be in accordance with the following details, in addition to ICC AC 178, “Acceptance Criteria for Inspection and Verification of Concrete and Reinforced and Unreinforced Masonry Strengthening Using Fiber Reinforced Polymer Composite Systems.”

B. Work of this Section will be field monitored by the Owner’s Special Inspection Agency at the Owner’s expense. The surface preparation shall be checked immediately before application of the composite system materials. Periodic inspection shall be provided during the application process.

C. Installers:

1. Record batch numbers for fabric and epoxy used each day, and note locations of installation. Measure square footage of fabric and volume of epoxy used each day. Complete report and submit to Architect, Project Inspector, and system manufacturer.

D. Inspection:

1. Certified Special Inspector, accepted by Architect, shall periodically observe all aspects of preparation, mixing, and application of materials, and document the following:
   a. Date and time of installation.
   b. Ambient temperature, relative humidity, and weather conditions.
   c. Substrate surface temperature and dryness.
   d. Surface preparation method and ICRI concrete surface profile.
   e. Surface cleanliness description. Fabric/laminate/FRP anchor batch numbers.
   f. Epoxy batch numbers, mix ratios, and mixing times.
   g. Application locations.
   h. Conformance with installation procedures.
   i. Location and size of any delaminations/voids identified or repaired.
2. Composite casing shall be completely inspected by the Special Inspector during and immediately following application of the composite. Contractor shall monitor the mixing of all epoxy components for proper ratio and adherence to manufacturer’s recommendations.

3. Contractor shall provide a report signed by a civil engineer registered in the State of California certifying that the installation is acceptable, complete with testing reports, and photographs.

E. Visual Inspection and Sounding of the Installed Composite:
   1. Installed areas shall be visually inspected by the Special Inspector. Installed composite should appear to be completely adhered to the concrete substrate with no bubbles or voids. Any suspect areas should be sounded with a ball peen hammer. A light tapping will indicate the presence of any voids behind the installed composite. All defects shall be reported to Architect, and repaired as specified in this Section.

F. In-situ Testing
   1. ASTM D7522 and/or ASTM D4541 – Adhesion Tests.
   2. Direct tension adhesion testing of cored samples shall be conducted using the method described by ASTM D7522 and/or ASTM D4541. A minimum of three tests shall be performed for each day of production or for each 500 square feet of FRP application, whichever is less. Pull-off tests shall be performed on a representative adjacent area to the area being strengthened whenever possible. Tests shall be performed on each type of substrate or for each surface preparation technique used.
   3. The prepared surface of the bonded FRP system shall be allowed to cure a minimum of 72 hours before execution of the direct tension pull-off test. The locations of the pull-off tests shall be representative and on flat surfaces. If no adjacent areas exist, the tests shall be conducted on areas of the FRP system subjected to relatively low stress during service. The minimum acceptable value for any single tension test is 175 psi. The average of the tests at each location shall not be less than 200 psi. Additional tests may be performed to qualify the work.
   4. Test locations shall be filled with thickened epoxy after the values have been recorded and verified by the special instructor and the test dollies have been removed.

G. Laboratory Testing:
   1. The composite tensile properties used in the design calculations must be lower than the average of the test results unless calculations are performed with the reported average tensile properties show that the strengthening requirements are satisfied.
   2. For fabric systems, create a minimum of two material sample sets daily. Each set shall consist of two 12 inch x 12 inch panels made of two layers of saturated fabric and the sets shall be taken at different times during the working shift so that it is representative of maximum variances in material/site conditions. Prepare samples on a flat, level surface covered with heavy-duty vinyl (or similar). Prime vinyl with epoxy saturant, place saturated layers, and apply a top coat of epoxy saturant. Samples shall be cured at the site under the same environmental conditions as the production work they represent and shall be marked with sample date, time, epoxy/fabric batch numbers, and installation locations.
3. Tested samples shall be tested per ASTM D3039. The 12-inch by 12-inch panel shall have five coupons, 3/4-inch by 9-inch, removed and tested for their material properties in the longitudinal (primary fiber) direction. Tests shall conform to ASTM procedures and manufacturer’s published testing methods. Only qualified testing laboratories shall be used.

4. Testing results shall be made available within three weeks of sample submission. Testing shall provide average values of the following:
   a. Ultimate tensile strength.
   b. Tensile modulus.
   c. Percent elongation.

5. Fifteen percent of all sample batches shall be tested. If one 12-inch by 12-inch sample fails (on average), specimens from the same sample shall be tested. If these specimens also fail (on average), the other 12-inch by 12-inch from the same sample batch shall be tested. In the extreme case that this sample also fails, the remaining sample batch for that day shall be tested and appropriate remedial measures shall be taken to ensure integrity of the system from the failed sample batch. In addition, 25 percent of the remaining sample batches shall then be tested by the same criteria and in accordance with ICC AC 178.

H. Substrate Adhesion Testing:
   1. Direct tension adhesion testing of cored samples shall be conducted in accordance with ASTM D4541. A minimum of three tests shall be performed for each day of production or for each 500 square feet of FRP application, whichever is less. Pull-off tests shall be performed on a representative adjacent area to the area being strengthened. Tests shall be performed on each type of substrate or for each surface preparation technique used.

   2. The prepared surface with one-layer of the bonded FRP system shall be allowed to cure a minimum of 48 hours before execution of the direct tension pull-off test. The locations of the pull-off tests shall be representative and on flat surfaces. If no adjacent areas exist, the tests shall be conducted on areas of the FRP system subjected to relatively low stress during service. The minimum acceptable value for any single tension test is 175 psi. The average of the three tests at each location shall not be less than 200 psi. Additional tests may be performed to qualify the work. The tension adhesion tests shall exhibit failure of the substrate indicated by the presence of concrete or masonry on the underside of the test puck following the test.

I. Repairs:
   1. All defects, including bubbles, delaminations, and fabric tears, spanning more than five percent of the surface area, or as required by Architect, shall be repaired at Contractor’s expense. Three types of repairs shall be performed:
      a. Small delaminations less than 2 square inches are acceptable so long as the delaminated area is less than five percent of the total laminate area and there are no more than ten such delaminations per ten square feet.
      b. Large delaminations greater than 25 square inches shall be locally cut away and a new material shall be applied with an equivalent number of layers and sufficient development length overlaps.
      c. Delaminations between 2 square inches and 25 square inches shall be injected with epoxy or replaced, depending on the size, number of delaminations, and locations.
2. Small entrapped air pockets and voids naturally occur in mixed resin systems and do not require repair or treatment. Defect repair procedures shall be submitted to Architect for acceptance.

J. Remedial Measures:

1. In the event that material testing determines a sample batch to possess insufficient material properties, remedial measures shall be taken. If the tested composite system has material properties determined to be below the minimum specified values, additional layers shall be installed, at Contractor's expense, until the final composite thickness is increased by the same percentage as the deficiency of the material's elastic modulus.

END OF SECTION
PART 1 GENERAL

1.1 SECTION INCLUDES

A. Thin brick units.
B. Solid brick units.
C. Mortar.
D. Grout.

1.2 RELATED SECTIONS

A. Section 07 19 19 – Silicone Water Repellents.
B. Section 07 92 00 – Joint Sealants.
C. Section 09 24 00 – Portland Cement Plastering.

1.3 REFERENCES

A. The publications listed below form a part of this Section to the extent referenced. The publications are referred to in the text by the basic designation only. Refer to Division 01 for definitions, acronyms, and abbreviations.

B. Standards, manuals, and codes refer to the latest edition of such standards, manuals, and codes in effect as of the date of issue of this Project Manual, unless indicated otherwise in CBC Chapter 35 and CFC Chapter 80.

C. Referenced Standards and Manuals:


1.4 SUBMITTALS

A. Submit samples under provisions of Division 01.
B. Furnish five individual samples of thin brick showing variations in color and texture.
C. Furnish manufacturer's certification under Division 01 that all units and accessories furnished meet or exceed the requirements of these specifications.
1.5 DEFINITIONS

A. Units: Thin bricks specified in this Section are referred to as “unit” or “units” in this Section for brevity.

1.6 QUALITY ASSURANCE

A. Standards of Manufacture: Manufacturers designated herein indicate quality of materials to be used on this project. Products of other manufacturers equal to these standards in all respects may be provided for this project.

B. Requirements of Regulatory Agencies: The masonry work shall comply with the requirements of this Section and in addition shall conform to the applicable requirements of the California Building Code, Title 24, Part 2, Chapter 14, Section 1405.10.

C. Installer Qualifications: Installation shall be done only by an installation firm normally engaged in this business. All work shall be preformed by qualified mechanics working under an experienced supervisor.

D. Specifications for veneer work outlined herein are minimum requirements. It shall be Contractor’s responsibility to comply with the complete requirements of the material manufacturers.

1.7 MOCK-UPS

A. Provide mock-ups of thin brick assemblies under provisions of Division 01.

B. Erect one mock-up each of exterior thin brick wall assembly, minimum four feet long x four feet high. Panels shall include selected color and texture range, bonding, grout color, tooled joints, corners, quality of workmanship, and grouting of units.
   1. Accepted panel will be used as standard of quality for all work of same material.
   2. Do not destroy or remove panel until work is completed and accepted by Architect and Owner.

1.8 TESTS AND INSPECTIONS

A. Tests and Inspections required by CBC shall be made by a testing laboratory employed and paid for by Owner. Any work failing to meet requirements as specified hereinafter shall be removed, replaced and re-tested at no extra cost to Owner.
   1. Masonry Units: Per CBC Section 2105A and 2103A.1.
   2. Masonry Unit Testing: Per CBC Section 2103A.1 and 2105A.
   3. Mortar and Grout Testing: Per CBC Section 2105A.
   5. Bond Strength and Tests: Per CBC Section 1411.2.1.

1.9 DELIVERY, STORAGE AND HANDLING

A. Store units above ground on level platforms which allow air circulation under stacked units and will prevent contamination of mud, dust or materials likely to cause staining or other defects.

B. Cover and protect materials as necessary to protect from the elements.
C. Handle units on pallets or flat bed barrows.

D. Handle and store setting and grouting materials in strict compliance with the manufacturer’s instructions.

E. Take precautions to protect products specified in this Section from freezing or from excessive heat.

1.10 COLD WEATHER CONDITIONS

A. Do not place units when ambient air temperature is below 50 degrees F.

1.11 HOT WEATHER CONDITIONS

A. Protect construction from direct exposure to wind and sun when installation occurs at an ambient air temperature of 100 degrees F or higher, with relative humidity 50 percent or less.

PART 2 PRODUCTS

2.1 THIN BRICK VENEER MASONRY UNITS

A. Acceptable Manufacturers:
   1. H.C. Mudox.
   2. Pacific Clay Products, Inc.
   3. Robinson Brick.
   4. McNear Brick and Block.
   5. Endicott Brick, Inc.
   7. Substitutions: Under provisions of Division 01.

B. Veneer Brick: ASTM C1088, Grade SW, Type TBX, with the following characteristics:
   1. Sizes:
      a. Thin Brick: 3-5/8 inches x 7-5/8 inches x 1/2 inch.
      b. Solid Brick: 3-5/8 inches x 7-5/8 inches x 1 inch.
   2. Color: California Rose.
   3. Texture: Smooth.
   4. Provide special shapes as required including the following:
      a. Provide 90 degree L-shaped corner units as indicated and required. Corner unit returns shall be of sufficient length to maintain the bond pattern.

2.2 MORTAR AND GROUT

A. Acceptable Manufacturers and Products:
   1. Mortar (Adhesive):
         1) Laticrete 254 Platinum.
   1) TVIS Premium Thin Veneer Bonding Mortar.

   1) Ultraflex 3.

2. Grout, color as selected by Architect:
      1) Type S mortar.
      1) TVIS Veneer Pointing Mortar.
      1) Ultracolor Plus.


B. Standards:
   1. Adhesive shall conform to the requirements of ANSI A118.4 for latex-modified Portland cement mortar or ASTM C270 for Type N or S.
   2. Grout: Thin brick grout shall conform to the requirements of ASTM C270 and C387.

PART 3 EXECUTION

3.1 INSPECTION

   A. Surface Acceptance: Inspect all surfaces to which work is to be installed and report to Architect any corrective actions required or any unsatisfactory conditions such as excessive unevenness of surfaces. The start of the work on any surface shall constitute acceptance of such surface.

3.2 PREPARATION

   A. General: Before starting installation, surface to be covered shall be cleaned to remove materials deleterious to unit adhesion.

3.3 PROTECTION OF WORK

   A. Protect sills, ledges and offsets from mortar drippings or other damage during construction.
   B. Remove misplaced adhesive or grout immediately.
   C. Protect partially completed work against weather when work is not in progress by covering top of walls with a strong, waterproof, non-staining membrane. Extend membrane at least 2 feet down the sides of wall and anchor securely in place.
   D. Protect face materials against staining.
   E. Protect jambs and corners from damage during construction.
3.4 CONTROL JOINTS

A. Control joints shall be installed where units abut restraining surfaces such as perimeter walls, soffits, interior corners, etc., and at locations indicated on Drawings. Coordinate locations and construction of joints with the installation the cement plaster base coats, as specified in Section 09 24 00.

B. Control joints at units shall be maintained plumb, straight and true for the entire length of the joint, and shall be constructed in strict accordance with manufacturer's recommendations and details on Drawings. Fill control joint with sealant and backing as specified in Section 07 92 00. Do not install sealant until post-grouting cleaning procedures have been completed.

3.5 ADHESIVE MIXING

A. Mix powder and water in the proportions recommended by the manufacturer. Place clean, potable water into a clean mixing container and add mortar powder. Mix by hand or with a slow speed mixer to a smooth, trowelable consistency. Allow adhesive to slake for five to ten minutes. Remix without adding any additional water or powder. During installation, stir occasionally to keep mix fluffy. Do not temper mix with water.

3.6 INSTALLATION – THIN BRICK UNITS

A. Installation shall conform to CBC Section 2104A.1.

B. Bond: Running bond.

C. Joint Size: All horizontal and vertical joints shall be 3/8-inch wide.

D. Lay out walls in advance with snap string chalk lines for accurate spacing of surface bond patterns with uniform joint widths and to properly locate openings, movement joints, returns and offsets. “Rope” method of installation is not allowed.

1. Coordinate with work specified in Section 09 24 00 to insure that control/expansion joints at units align with control/expansion joints in plaster substrate.

E. Install full units without cutting wherever possible. Cut units as required to provide pattern indicated and to fit adjoining work neatly. Where cutting is required, cut units with motor-driven masonry/tile saw designed to cut units with clean, sharp, unchipped edges.

1. At thin brick installation:
   a. Install full-size L-shaped units at outside corners.
   b. No units shall be less than 4 inches long.

F. Before setting, units shall be cleaned; no free moisture shall remain on the back of the units. Trowel 3/16-inch thickness of adhesive on back of each unit. Install units by firmly pressing them into place, using a sliding and twisting motion to obtain 100 percent adhesive contact with setting substrate. Adjust unit final position while mortar is soft and plastic. Units shall be aligned and set plumb, true to line, with level courses accurately spaced to show uniform joints and then allowed to set until firm. Damaged or defective units shall be replaced.

G. Excess adhesive shall be cleaned from the surface of the units as the work progresses. Cleaning shall be done while adhesive is fresh and before it hardens on the surfaces.

H. If units are displaced after adhesive has stiffened, remove, clean joints and units of adhesive and reset with fresh adhesive.
3.7 GROUTING

A. Mixing: Mix mortar and water in the proportions recommended by the manufacturer. Place clean, potable water into a clean mixing container and add mortar powder. Mix to a plastic-like consistency. Maintain consistency between batches by controlling mixing time and ratio of water to mortar.

B. Allow units to set for a minimum of 24 hours after installation prior to grouting. Wet walls with clean, potable water just before beginning grouting.

C. Grout joints shall be installed with the specified grout product. Mechanically grout using only thin line pumps or squeeze bags; smear grouting is not allowed. Finished grout shall be uniform in color, smooth, without voids, pin holes or low spots.

D. Grout joints shall be struck concave and packed full with grout and free of all voids and pits.
   1. Concave joints shall be formed by striking the mortar flush, and after partial set tooled with an 8 inch long jointer to provide a uniform joint, free of waves. Tool shall be of a diameter to provide a joint that is as close to flush as possible. Clean off excess mortar with a short bristled brush; do not sack-rub joints with burlap or rags. Retool grout joints before mortar has set.

E. Excess grout shall be cleaned from the surface of the units as the work progresses. Cleaning shall be done while grout is fresh and before it hardens on the surfaces.

F. Hardened grout film or haze shall be removed using a VOC compliant cleaner recommended by the unit manufacturer. Saturate the surface with clean, potable water, then dampen the surface with the cleaner using a low pressure hand pump Hudson sprayer equipped with a wide fan tip. Allow cleaner to remain on surface for three to five minutes, then rinse with clean, potable water using a 3,000 psi minimum pressure washer.
   1. Cleaning with acids or by means of sandblasting is not allowed.

3.8 ALLOWABLE TOLERANCES

A. All masonry work shall be installed and maintained within the non-cumulative tolerances indicated below:
   1. Positioning of Elements: Maximum 1/4 inch from true position.
   2. Maximum Variation from Plane of Wall: 1/4 inch in 10 feet.
   4. Maximum Variation from Level Coursing: 1/8 inch in 3 feet; 1/4 inch in 10 feet; 1/2 inch maximum.
   5. Maximum Variation of Joint Thickness: 1/8 inch in 3 feet.

3.9 REPAIRS AND CLEANING

A. Repairs: Upon completion of unit installation, repair all holes. Defective joints shall be cut out and rejoointed. Green stain and efflorescence shall be removed.
B. Final Cleaning:
   1. Just prior to project substantial completion, and prior to the application of water repellent/anti-graffiti coating, clean masonry surfaces.
      a. Cleaning Product: PROSOCO Sure Klean line of cleaners, product appropriate to installed brick units, or accepted equal.
         1) Run-off from cleaning operations shall be contained, neutralized, and disposed of per State and local regulations. Obtain necessary permits for disposal of run-off.
      b. Sandblasting is an acceptable alternative means of cleaning, provided that no silica particulates are used.
         1) Sandblasting operations shall not generate large quantities of dust. Employ wet sandblasting methods to control dust.
   2. Final cleaning and water repellent/anti-graffiti coating application shall not be performed until walls have thoroughly dried out and sealants have been installed and cured.

C. Protection: Take precautions to protect the finished work from damage by other trades.

D. Defective Work: Work not installed per specification or damaged beyond satisfactory repair shall be replaced by Contractor at no cost to Owner.

3.10 CLEAN-UP

A. At the conclusion of the work of this Section, clean surfaces and remove all equipment used in work. Remove all surplus material, rubbish and debris from the premises.

END OF SECTION
DIVISION 05
METALS
SECTION 05 12 00
STRUCTURAL STEEL FRAMING

PART 1 GENERAL

1.1 SECTION INCLUDES
A. Structural steel framing and support members.
B. Base plates.
C. Grouting under base plates.

1.2 RELATED SECTIONS
A. Section 01 81 13 – Sustainable Design Requirements; for additional LEED requirements.
B. Section 03 20 00 – Concrete Reinforcing.
C. Section 03 30 00 – Cast-In-Place Concrete.
D. Section 05 31 00 – Steel Decking.
E. Section 05 40 00 – Cold-Formed Metal Framing.
F. Section 05 50 00 – Metal Fabrications.
G. Section 09 91 00 – Painting: Paint finish.

1.3 REFERENCES
A. The publications listed below form a part of this Section to the extent referenced. The publications are referred to in the text by the basic designation only. Refer to Division 01 for definitions, acronyms, and abbreviations.

B. Standards, manuals, and codes refer to the latest edition of such standards, manuals, and codes in effect as of the date of issue of this Project Manual, unless indicated otherwise in CBC Chapter 35 and CFC Chapter 80.

C. Referenced Standards:
1. AISC 303-05 – Code of Standard Practice for Steel Buildings and Bridges.
2. ANSI B18.22.1 – Plain Washers.
3. ANSI B18.23.1 – Beveled Washers.
12. ASTM A500 – Standard Specification for Cold-Formed Welded and Seamless Carbon Steel Structural Tubing in Rounds and Shapes.
18. ASTM F844 – Standard Specification for Washers, Steel, Plain (Flat), Unhardened for General Use.
22. AWS A2.4 – Standard Symbols for Welding, Brazing, and Nondestructive Examination.
25. AWS D1.8 – Structural Welding Code – Seismic Supplement.
26. AWS D2.0 – Specifications for Welded Highway and Railway Bridges.

1.4 SUBMITTALS

A. Submit under provisions of Division 01.

B. LEED Submittals:
   1. Product Data for MR Credit 3: For products having recycled content, documentation indicating percentages by weight of post-consumer and pre-consumer recycled content.
      a. Include statement indicating costs for each product having recycled content.
2. Certificates for MR Credit 3: Provide certification for percentages of materials (based on cost) extracted, processed, and manufactured regionally within 100 miles of the project site, respectively.

C. Shop Drawings:

1. Indicate profiles, sizes, spacing, and locations of structural members, attachments, fasteners, and required connections, including connections not detailed on Drawings.
2. Indicate welded connections with AWS A2.4 welding symbols. Indicate net weld lengths.
3. Clearly distinguish between shop and field bolts and welds.

D. Manufacturer’s Mill Certificate: Submit Manufacturer’s Certificates under provisions of Division 01, certifying that steel, fasteners and welding electrodes meet or exceed specified requirements.

E. Mill Test Reports: Submit Manufacturer’s Reports under provisions of Division 01, indicating structural strength, destructive and non-destructive test analysis and ladle analysis.

F. Submit product data for type of metal primer proposed for use.

G. Welders’ Certificates: Submit certificates under provisions of Division 01, certifying welders employed on the Work, verifying AWS qualifications within the previous twelve months.
   1. Welders who have not performed welding for period of three or more months shall be requalified.
   2. Welders whose work fails to pass inspection shall be requalified before performing further welding.
   3. Contractor shall pay costs of certifying qualifications.

H. Qualification Data: For qualified Fabricator and Installer.

1.5 DEFINITIONS

A. Structural Steel: Elements of structural-steel frame, as classified by AISC 303-05, Code of Standard Practice for Steel Buildings and Bridges.

B. Seismic-Force-Resisting System: Elements of structural-steel frame designated as "SFRS" or along grid lines designated as "SFRS" on Drawings, including columns, beams, and braces and their connection.

C. Demand Critical Welds: Those welds, the failure of which would result in significant degradation of the strength and stiffness of the Seismic-Force-Resisting System and which are indicated as "Demand Critical" on Drawings.

1.6 QUALITY ASSURANCE

A. Fabricate structural steel members in accordance with the AISC Specification for Structural Steel Buildings, Code of Standard Practice for Steel Buildings and Bridges and Quality Criteria and Inspection Standards.

B. Fabricator Qualifications: Company specializing in performing the work of this Section with sufficient documented experience.
C. Installer (Erector) Qualifications: Company specializing in performing the work of this Section.

1.7 REGULATORY REQUIREMENTS

A. Conform to 2016 California Building Code (CBC), Chapter 16A “Structural Design”, Chapter 22A “Steel”, and Chapter 17A “Special Inspections and Tests”.

B. Structural Tests and Inspections: Refer to DSA Structural Tests and Inspection Sheet (DSA Form DSA-103).

C. Materials:
   1. Material identification per CBC Chapter 22A, Section 2203A, Paragraph 2203A.1 “Identification”.
   2. Protection of structural steel per CBC Chapter 22A, Section 2203A, Paragraph 2203A.2 “Protection”.

1.8 FIELD MEASUREMENTS

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

B. Coordinate fabrication and delivery of structural steel items with concrete work and with all other trades to permit such items to be built into the structure without delay.

1.9 DELIVERY, STORAGE AND HANDLING

A. Delivery of Materials to be Installed Under Other Sections: Anchor bolts and other anchorage devices which are embedded in cast-in-place concrete construction shall be delivered to the project site in time to be installed before start of cast-in-place concrete operations.

B. Storage of Materials:
   1. Structural steel members to be stored at the Project site shall be placed above ground, on platforms, skids or other supports.
   2. Steel shall be protected from corrosion.
   3. Other materials shall be stored in a watertight, dry place until ready for installation in the Work.
   4. Packaged materials shall be stored in their original package or container.
   5. Do not store materials on the structure in a manner that might cause distortion or damage to members of supporting structures. Repair or replace damaged materials or structure as directed by Architect.

PART 2 PRODUCTS

2.1 MATERIALS

A. LEED Requirements, Recycled Content:
   1. Recycled Content: Provide steel products with recycled content such that post-consumer recycled content plus one-half of pre-consumer recycled content, calculated as percentages of total product weight, shall contribute to the LEED Credit requirement for recycled content.
2. Recycled Content of Steel Products: Provide products with an average recycled content of steel products so that the sum of post-consumer recycled content and one half of pre-consumer recycled content is not less than the following:
   a. W-Shapes: 60 percent.
   b. Channels, Angles, M-, and S-Shapes: 60 percent.
   c. Plate and Bar: 25 percent.
   d. Cold-Formed Hollow Structural Sections: 25 percent.
   e. Steel Pipe: 25 percent.
   f. All Other Steel Materials: 25 percent.

B. Structural Steel Members:
   1. ASTM A992 Grade 50 for wide flange and WT shapes.
   2. ASTM A36/A36M or A572 Grade 50 for plates, as noted on Drawings.
   3. ASTM A36/A36M for channels, angles and all other shapes.

C. HSS:
   1. Tubing: ASTM A500, Grade B.
   2. Round: ASTM A500, Grade B.

D. Pipe: ASTM A53/A53M, Type E or S, Grade B.

E. Bolts and Nuts: ASTM A307, Grade A, with ASTM A563, Grade A, hex nuts, ASTM A325N, Type 1, with ASTM A563, Grade C, heavy hex nuts; anchor bolts, ASTM F1554, grade as indicated on Drawings.

F. High-Strength Bolts, Nuts, and Washers: ASTM A325, Type 1, heavy hex steel structural bolts; ASTM A563 heavy hex carbon-steel nuts.

G. High-Strength Bolts, Nuts, and Washers: ASTM A490, Type 1, heavy hex steel structural bolts or tension-control, bolt-nut-washer assemblies with splined ends; ASTM A563 heavy hex carbon-steel nuts; and ASTM F436 hardened carbon-steel washers, plain.

H. Tension-Control, High-Strength Bolt-Nut-Washer Assemblies: ASTM F1852, Type 1, heavy hex head steel structural bolts with splined ends; ASTM A563 heavy hex carbon-steel nuts; and ASTM F436 hardened carbon-steel washers.

I. Welding Materials:
   1. Typical Weld Locations: AWS D1.1; type required for materials being welded.
   2. SFRS and Demand Critical Welds: AWS D1.8; filler metal shall be classified as low hydrogen and shall have a minimum Charpy V-notch toughness of twenty foot-pounds at 0 degrees F for SFRS welds and forty foot-pounds at 70 degrees F for Demand Critical Welds as determined by AWS classification or manufacturer certification. Demand critical weld material shall also meet heat input testing requirements of AWS D1.8, Clause 6.3.


K. Beveled washers for common bolts: ANSI B18.23.1.
L. Washers for high strength bolts: Direct tension indicator. ASTM F959 hardened circular, beveled and clipped, ASTM F436.

M. Post-Installed Concrete Anchors: I.C.C. approved, as indicated and manufactured by Hilti or accepted equal.

N. Eye Bolts and Nuts: ASTM A108, Grade 1030, cold-finished carbon steel.


P. Welded Headed Stud Anchors: ASTM A108. Welding, testing and inspection shall be in accordance with AWS D1.1.

Q. Steel Shop and Touch-Up Primer: TNEMEC Series 115 Uni-Bond DF or accepted equal.

R. Shop and Touch-Up Zinc Rich Primer for Galvanized Surfaces: ZRC Galvilité Galvanizing Repair Compound as manufactured by ZRC Worldwide Company, Phone: (800) 831-3275, or accepted equal.

S. Weld filler material: All weld filler material shall have a minimum tensile strength of 70 KSI per AWS D1.1, latest edition approved by code enforcement agency.

T. Drypack: Refer to Section 03 30 00.

U. Grout: Non-shrink type, pre-mixed compound consisting of non-metallic aggregate, cement, water reducing and plasticizing additives, capable of developing a minimum compressive strength of 7,000 psi at 28 days.

V. Reinforcing Steel: Refer to Section 03 20 00.

2.2 FABRICATION

A. General: Fabricate items of structural steel in accordance with AISC specifications and as indicated on Drawings. Properly mark and match-mark all materials for field assembly. Fabricate for delivery sequence which will expedite erection and minimize field handling.

   1. Welded splicing of structural members may be done only upon written acceptance by Architect, unless otherwise indicated on Drawings. Splicing shall be thoroughly examined by a nondestructive means at Contractor's expense. Inspection shall be made by a recognized and approved testing laboratory; procedure, technique and standards of acceptance shall conform to Appendix E of AWS Standard D2.0-69. Correct faulty welds and re-examine in a manner specified for original welds.

B. Welded Construction:

   1. Weld in accordance with AISC using manual shielded arc method or flux cored arc method in accordance with AWS D1.1 and AWS D1.8. Groove welds shall be complete joint penetration welds, unless specifically designated otherwise on Drawings.

   2. Remove back-up plates for complete joint penetration welds when specifically requested by testing laboratory to perform non-destructive testing. Remove at no cost to Owner.

   3. Weld reinforcing steel in accordance with AWS D1.4 and using prequalified procedures.

C. Connections:

   1. Weld or bolt shop connections as indicated.
2. Bolt field connections except where welded or other connections are indicated. Provide unfinished threaded fasteners only where noted on Drawings and for temporary bracing to facilitate erections.

D. Holes for Other Work: Provide holes required for securing other work to structural steel framing, and for the passage of work through steel framing members as indicated. Provide threaded nuts welded to framing, and other specialty items as shown to receive other work. Cut, drill or punch holes perpendicular to metal surfaces. Do not flame cut holes or enlarge holes by burning. Drill holes in bearing plates.

2.3 FINISHES

A. Prepare structural component surfaces in accordance with SSPC SP-2 at concealed locations and SSPC SP-6 at exposed locations. Provide Class “A” (clean mill scale) contact surfaces per RCSC 2009 at high-strength bolted connections.

B. Do not prime surfaces in direct contact with concrete, where field welding is required, or contact surfaces of steel-to-steel connections. Provide Class “A” or better contact surfaces at steel connections per RCSC Specification for Structural Joints Using High Strength Bolts, latest edition.

C. All exposed interior steel shall be primed with shop primer unless otherwise noted.
   1. Primer shall be applied in one coat, to meet or exceed the minimum mil thickness required by the primer manufacturer.

D. All un-exposed, concealed or enclosed interior or exterior steel requires no finish.

E. All exposed exterior steel shall be galvanized unless otherwise noted.
   1. Galvanize in accordance with ASTM A123/A123M, designated steel items. Provide minimum 1.25 ounce per square foot galvanized coating.
   2. At galvanized members, touch-up all welds with zinc-rich primer.

2.4 TESTING AND INSPECTION

A. General: Owner will engage and pay a testing agency to perform the following services:
   1. Review manufacturer's certificates and check heat numbers and that the steel is properly identified in accordance with CBC Section 2203A "Identification and Protection of Steel for Structural Purposes”.
   2. Testing of unidentified materials or as directed by Owner.
   3. Provide inspection per CBC Sections 1705A.2 and 1705A.12.
   4. Provide testing per CBC Sections 1705A.13 and 2213A.
   5. In the event an examination discloses faulty welds and additional tests are required to fully examine the welds, the cost of the additional tests shall be paid for by Owner and back-charged to Contractor.
   6. All defective welds shall be repaired and tested at no expense to Owner.
   7. Perform any physical tests of structural steel as required by Architect. Perform ultrasonic tests on members as determined by Architect to determine if delamination defects in steel members are evident.
8. High-strength bolting testing and inspection shall conform to the following requirements:
   a. Perform pre-installation verification of pretensioned bolts per RCSC Section 7.1 for the selected pretensioning method.
   b. Inspect bolted joints per RCSC Section 9 and CBC Sections 1705A.2.1 and 2212.6.
   c. All fasteners failing to meet the specified tension shall be examined to determine the cause of failure and re-tested.

PART 3 EXECUTION

3.1 EXAMINATION

A. Verify that field conditions are acceptable and are ready to receive work.
B. Beginning of installation means erector accepts existing conditions.
C. Bolts shall be clean and free of grease, oil and all other deleterious substances.

3.2 ERECTION

A. Allow for erection loads and for sufficient temporary bracing to maintain structure safe, plumb and in true alignment until completion of erection and installation of permanent bracing.
B. Field weld components indicated on shop drawings.
C. Do not field cut or alter structural members without acceptance of Architect and DSA.
D. After erection, prime welds, abrasions and surfaces not shop primed, except surfaces to be in contact with concrete.
E. Setting Base Plates:
   1. Clean concrete bearing surfaces and roughen to improve bond. Clean the bottom surface of base plates.
   2. Set loose and attached base plates for structural members on adjusting nuts at anchor bolts. All anchor bolts shall have double nuts for adjusting.
   3. Tighten anchor bolts after the supported members have been positioned and plumbed. Do not remove adjusting nuts.
   4. Place non-shrink grout solidly between surfaces as shown to ensure that no voids remain. Finish exposed surfaces, protect installed materials and allow non-shrink grout to cure.
F. Structural steel work shall be set accurately at established lines and levels. Steel shall be plumb and level before final bolting or welding is commenced and after complete erection. All cutting, notching, coping, etc., required for proper assembly and fitting of parts and members, shall be done by the steel fabricator. Such workmanship shall be equal in quality to shop work.
   1. Coordinate the erection of structural steel with other trades and locate temporary guys, braces, falsework and cribbing as may be necessary for erection so as not to interfere with the progress of other work.
2. At bearing plates 2 inches and thicker, compression joints which depend on contact bearings shall have bearing surfaces milled and truly faced.

3. Rolled sections, except for minor details, shall not be heated except for welding operations.

4. Upon acceptance by Architect, gas cutting may be permitted if the metal being cut is not highly stressed during the operation. Stresses shall not be transmitted through a flame cut surface unless such surfaces are cut by a mechanically guided torch. The radius of re-entrant flame cut fillets shall be as large as possible, but not less than 1 inch. To determine the net area of members so cut, 1/8 inch shall be deducted from the flame cut edges not made by a mechanically guided torch. Gas cuts shall be smooth and regular. Holes for bolts shall not be cut with a torch.

5. All contact surfaces shall be cleaned before assembly.

6. Provide setting diagrams and templates as required. Placement of beam connectors shall be the responsibility of structural steel fabricator.

7. Splice members only where indicated.

G. Connections shall be as specified hereinbefore under "Fabrication." In addition, bolted connections shall conform to the following requirements:

1. Beveled washers shall be used under all bolt heads and nuts where they rest on beveled surfaces.

2. Connectors shall have hexagon heads and nuts.

3. Nuts shall be drawn up tight. Check threads of unfinished bolts with chisel or approved self-locking nuts.

4. Bolts that have been completely tightened shall be marked with identifying symbol.

5. High-strength bolted construction: Install high-strength threaded fasteners in accordance with RCSC Specification for Structural Joints Using High-Strength Bolts. All high strength bolts shall be pretensioned, unless specifically noted otherwise. Pretensioning shall be by one of the methods permitted in RCSC Section 8.2.

H. Framing shall be carried up true and plumb. Temporary bracing shall be introduced wherever necessary to take care of all loads to which structure may be subjected, including erection equipment and its operation. Such bracing shall be left in place as long as may be required for safety. It shall finally be removed by Contractor as part of his equipment. As erection progresses, the work shall be securely connected to take care of all dead load, lateral loads and erection stresses. No final bolting or welding shall be done until the structure has been properly aligned.

3.3 ERECTION TOLERANCES

A. Level and plumb steel within the tolerances defined in the AISC Code of Standard Practice, latest edition.

3.4 REPAIRS AND PROTECTION

A. Repair damaged galvanized coatings on galvanized items with galvanized repair paint as specified or according to ASTM A780, and manufacturer's written instructions.
B. Touchup Painting: After installation, promptly clean, prepare, and prime or re-prime field connections, rust spots, abraded surfaces of prime-painted joists and accessories, and abutting structural steel.

1. Clean and prepare surfaces by SSPC-SP 2 hand-tool cleaning or SSPC-SP 3 power-tool cleaning.

2. Apply a compatible primer of same type as shop primer used on adjacent surfaces.

3.5 CLEAN-UP

A. Upon completion of the work of this Section, remove all surplus materials, rubbish and debris from premises.

END OF SECTION
SECTION 05 31 00
STEEL DECKING

PART 1 GENERAL

1.1 SECTION INCLUDES

A. Steel decking and accessories:
B. Framing for openings up to and including 24 inches.

1.2 RELATED SECTIONS

A. Section 01 81 13 – Sustainable Design Requirements; for additional LEED requirements.
B. Section 05 12 00 – Structural Steel Framing.
C. Section 09 91 00 – Painting: Paint finish.

1.3 REFERENCES

A. The publications listed below form a part of this Section to the extent referenced. The publications are referred to in the text by the basic designation only. Refer to Division 01 for definitions, acronyms, and abbreviations.

B. Standards, manuals, and codes refer to the latest edition of such standards, manuals, and codes as of the date of issue of this Project Manual, unless indicated otherwise in CBC Chapter 35 and CFC Chapter 80.

C. Referenced Standards:

1. AISI S100 – North American Specification for the Design of Cold-Formed Steel Structural Steel Members.

1.4 SUBMITTALS

A. Submit under provisions of Division 01.

B. LEED Submittal:

1. Product Data for MR Credit 3: For products having recycled content, documentation indicating percentages by weight of post-consumer and pre-consumer recycled content.
2. Include statement indicating costs for each product having recycled content.

C. Shop Drawings: Indicate decking plan, dimensions, sizes, support locations, projections, openings and reinforcement, pertinent anchoring details and accessories. Coordinate with other trades in accurately locating and detailing openings and penetrations.
D. Product Data: Provide deck profile characteristics and dimensions, structural properties, finishes and accessories. Provide product data for acoustic insulation.

E. Manufacturer’s Installation Instructions: Indicate specific installation sequence and special instructions.

F. Certificates:
   1. The manufacturer’s certification and fire test reports to document that deck assemblies comply with requirements of this Section.
   2. Furnish certification by approved testing agency for each welder employed.

1.5 PERFORMANCE REQUIREMENTS

A. Steel decking and section properties shall comply with AISI S100.

B. Profile and design of deck units and accessories shall conform to the details shown on Drawings. Units shall be one piece, unless indicated otherwise.

C. Steel decking and its installation shall meet the requirements of 2016 California Building Code (CBC).

1.6 FIELD MEASUREMENTS

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

1.7 TESTS AND INSPECTIONS

A. Furnish test specimens of materials when they are requested. Welded decking in place is subject to inspection and testing per CBC Chapter 17A “Special Inspections and Tests”, Section 1705A “Required Special Inspections and Tests”.

   1. Expense of removing and replacing any portion of decking for testing purposes will be borne by Owner if installation is found to be satisfactory. All portions of the work found to be defective and not in conformity with contract requirements shall be removed and replaced at no cost to Owner.

1.8 QUALITY ASSURANCE

A. Testing Agency Qualifications: An independent agency qualified according to ASTM E329 for testing indicated.

B. Welding: Qualify procedures and personnel according to AWS D1.3.

C. Installer: Company specializing in performing work of this Section.

1.9 DELIVERY, STORAGE AND HANDLING

A. Deliver products to site under provisions of Division 01.

B. Store and protect products under provisions of Division 01.

C. Store decking on dry wood sleepers; slope for positive drainage. Work showing creases, burrs in cells, deformation, weathering, or other defects affecting its use or appearance in exposed locations will not be accepted.
PART 2 PRODUCTS

2.1 MANUFACTURERS

A. Acceptable Manufacturer:
   1. Basis-of-Design: ASC Steel Deck, West Sacramento, CA; 916-372-6851, www.ascsd.com; per evaluation agency reports as follows:
      a. IAPMO Evaluation Report No. ER-0161 for bare steel deck.

   1. Substitution requests for steel decking shall consider the vertical and lateral load capacities of final system, including attachments. Provide a comparison summary of proposed and specified deck systems showing that the proposed system has equal or greater vertical and lateral load capacities for all conditions shown on Drawings. Systems with lower load capacities will not be acceptable.
   2. Substitution requests will require review by the Structural Engineer of Record and DSA. Cost for such reviews shall be borne by Contractor.
   3. Do not submit shop drawings with substituted decking manufacturer until decking manufacturer has been accepted via substitution request process.

2.2 MATERIALS

A. Recycled Content of Steel Products: Provide products with an average recycled content of steel products so post-consumer recycled content plus one-half of pre-consumer recycled content is not less than 25 percent.

B. Sheet Steel for Bare Deck: ASTM A653/A653M, SS designation, Grade 40 (minimum yield 38 KSI); zinc coated conforming to ASTM A653/A653M, G60, unless noted otherwise. Refer to Drawings for types and sizes of steel decking.

C. Welding Materials: Conform to AWS D1.1 and D1.3, with a minimum 60 KSI filler metal yield strength.


E. Steel Decking and Design: Steel decking shall be metallic coated with interlocking side lap. Deck types and minimum structural properties shall be as indicated on Drawings. Submit Evaluation Agency Reports that demonstrate compliance with design requirements.
   1. Decking shall be non-vented.

2.3 FABRICATION

A. Fabrication: All steel decking units shall be roll-formed to assure uniformity and strength.

B. Allowable Tolerances: Maximum variation in unit alignment 1/4 inch in 40 feet (1/1920).
C. Workmanship: All work shall be neat, trim, true to line and upon completion shall present a true finished surface of specified deck profile, free of dents, deformations, creases, weld spatter or other noticeable defects. Steel deck permanently exposed to view shall be manufactured, handled, and transported for “exposed” installation.

D. Reinforcement: Provide reinforcement for openings, cutouts and free edges of decking as required for strength and stiffness. Provide reinforcement where a cell is cut parallel to rib as necessary to make a tight fit along the cut cell. Such reinforcement shall be in addition to structural supports shown on Drawings and specified in Section 05 12 00.

E. Miscellaneous Work: Provide all other transition pieces, reinforcement and miscellaneous decking items as detailed and required to provide a complete installation.

F. Where steel decking is scheduled to receive a paint finish, it shall be provided free of lubricants, oils, passivators, and other substances which would impair the adhesion of the paint.

PART 3 EXECUTION

3.1 EXAMINATION

A. Verify that field conditions are acceptable and are ready to receive work. Check supporting members for correct layout and alignment. Should layout and alignment be such as to prevent proper bearing of the deck units on supporting members, the deck installer shall bring it to the attention of structural steel installer in writing, with a copy to Architect, for corrective measures and action. Steel decking units shall not be placed until necessary corrections are made.

B. Beginning of installation means installer accepts existing conditions.

3.2 INSTALLATION

A. Erect steel decking in accordance with Evaluation Agency Report, manufacturer’s instructions and final shop drawings.

B. Placing and Fastening Deck Units: Place decking in a permanent position with all panels aligned end-to-end so that the fluted portions of the panels align accurately. Panels shall be placed on supporting framework and adjusted in final position before being permanently fastened. Ends shall be over structural supports with positive, complete bearing over full width of panels. Installation shall be accomplished without deformation of units. Decking layout shall be as indicated on Drawings.

1. Carefully check control points, as indicated, for layout of deck flutes. Where required, deck module shall be adjusted to conform to layout indicated.

2. Fasten deck units to structure and to each other as indicated.

3. At galvanized steel decks, deslag, clean, and touch-up all welds with zinc-rich primer, including those at the underside of deck.

4. Complete installation shall conform to manufacturer’s specifications and as detailed.

C. Openings Through Decking: Steel decking fabricator shall cut and reinforce all openings in the metal deck, including framed openings indicated on Drawings. Small miscellaneous openings shall be field-cut by the trade requiring the opening.

1. All cutting of exposed edges shall be square, trim and equal to factory cutting.
2. Steel deck panels and accessories shall be cut and neatly fit around openings and other work projecting through the deck.

3. Openings shall be reinforced as indicated or required to provide a rigid installation.

D. Steel decking installation shall proceed in accordance with current Cal/OSHA and OSHA regulations including guidelines with respect to fall protection.

E. Steel decking shall be spread for safety and working platforms.

F. All steel decking sheets shall be wind tacked and loose bundles of deck shall be wired at the end of each shift.

G. Provide a membrane barrier between steel deck and preservative treated or fire retardant treated wood.

3.3 FIELD QUALITY CONTROL

A. Testing Agency: Owner will engage a qualified independent testing and inspecting agency to perform field tests and inspections and prepare test reports.

B. Field welds will be subject to inspection.

C. Remove and replace work that does not comply with specified requirements.

1. Additional inspection, at Contractor's expense, will be performed to determine compliance of corrected work with specified requirements.

3.4 PROTECTION

A. Do not use steel decking for storage or working platforms until it has been permanently fastened. Storage loads must be supported on wood blocking in the flutes of the deck.

1. Any damaged deck unit shall be repaired or replaced as directed by Architect and at no cost to Owner.

B. Assure that construction loads do not exceed the carrying capacity of the deck.

3.5 CLEAN-UP

A. Upon completion of the work of this Section, remove all surplus materials, rubbish and debris from premises.

END OF SECTION
SECTION 05 40 00
COLD-FORMED METAL FRAMING

PART 1   GENERAL

1.1   SECTION INCLUDES

A. Steel stud exterior wall framing.
B. Exterior soffit joist framing.

1.2   RELATED SECTIONS

A. Section 01 81 13 – Sustainable Design Requirements; for additional LEED requirements.
B. Section 05 12 00 – Structural Steel Framing.
C. Section 05 31 00 – Steel Decking.
D. Section 05 50 00 – Metal Fabrications.
E. Section 07 21 00 – Thermal Insulation.
F. Section 07 92 00 – Joint Sealants.
G. Section 09 22 16 – Non-Structural Metal Framing.
H. Section 09 29 00 – Gypsum Board.

1.3   REFERENCES

A. The publications listed below form a part of this Section to the extent referenced. The publications are referred to in the text by the basic designation only. Refer to Division 01 for definitions, acronyms, and abbreviations.

B. Standards, manuals, and codes refer to the latest edition of such standards, manuals, and codes in effect as of the date of issue of this Project Manual, unless indicated otherwise in CBC Chapter 35 and CFC Chapter 80.

C. Referenced Standards:

1. AISI S100 – North American Specification for the Design of Cold-Formed Steel Structural Steel Members.
2. AISI S200 – North American Standard for Cold-Formed Steel Framing – General Provisions.
5. ASTM A1003/ A1003M – Standard Specification for Steel Sheet, Carbon, Metallic and Nonmetallic-Coated for Cold-Formed Framing Members.
9. ASTM C1513 – Standard Specification for Steel Tapping Screws for Cold-Formed Steel Framing Connections.

1.4 SUBMITTALS

A. Submit under provisions of Division 01.

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

C. Shop Drawings:
1. Provide shop drawings prepared by cold-formed metal framing manufacturer.
2. Indicate component details, framed openings, bearing, anchorage, loading, welds, type and location of fasteners and accessories or items required of related work.
3. Indicate stud layout.
4. Describe method for securing studs to tracks and for welded framing connections.

D. Manufacturer’s Installation Instructions: Indicate special procedures and perimeter conditions requiring special attention.

E. LEED Submittals:
1. Product Data for MR Credit 3: For products having recycled content, documentation indicating percentages by weight of postconsumer and preconsumer recycled content. Include statement indicating cost for each product having recycled content.
2. Product Data for MR Credit 5: For products diverted from disposal in landfills and incinerators, and where recycled resources are directed back to the manufacturing process. Include a statement indicating percentage of materials diverted and recycled, and the costs associated with each.
3. Product Data for MR Credit 3: For products where product manufacturing is within a 100 mile radius of the jobsite and the point of extraction of the raw materials. Include a statement indicating the location and distances for the manufacturing plant and the point of extraction of raw materials in relation to the jobsite location.

F. Evaluation Reports: For products not covered in SSMA or SFIA standards, submit current evaluation reports reviewed per the applicable building code.
1.5 QUALITY ASSURANCE

A. All products shall be manufactured by a current member of the SSMA or SFIA.

B. Calculate structural properties of framing members in accordance with American Iron and Steel Institute Cold-Formed Steel Design Manual AISI S100.

1.6 REGULATORY REQUIREMENTS

A. Conform to 2016 California Building Code (CBC), Chapter 16A “Structural Design”, Chapter 17A “Special Inspections and Tests”, and Chapter 22A “Steel”, as applicable.

B. Materials:
   1. Structural Steel per CBC Chapter 22A, Section 2202A “Definitions”, and Section 2203A “Identification and Protection of Steel for Structural Purposes”.
   2. Material Identification per CBC Chapter 22A, Section 2203A.1 “Identification”.

C. Inspection: CBC Chapter 17A.
   1. Welding Inspection per Chapter 17A, Section 1705A, Paragraph 1705A.2 “Steel Construction”.

1.7 QUALIFICATIONS

A. Manufacturer: Company specializing in manufacturing the products specified in this Section.

B. Installer: Company specializing in performing the work of this Section.

1.8 FIELD MEASUREMENTS

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

1.9 COORDINATION

A. Coordinate work under provisions of Division 01.

B. Coordinate with the placement of components within the stud framing system, specified in Divisions 21-23 and 25-28.

PART 2 PRODUCTS

2.1 LEED REQUIREMENTS

A. Recycled Content: Provide products with recycled content such that post-consumer recycled content plus one-half of pre-consumer recycled content, calculated as percentages of total product weight, shall contribute to the LEED Credit requirement for recycled content.

2.2 METAL FRAMING SYSTEM

A. Acceptable Manufacturers:

B. Substitutions: Under provisions of Division 01.

2.3 FRAMING MATERIALS

A. Steel Sheet: ASTM A1003/A1003M, Structural Grade, Type H, metallic coated, grade as follows:
   1. Grade: ST33H for 18 gauge and lighter, ST50H for 16 gauge and heavier.

B. Sheet Steel for Vertical Deflection and Drift Clips: ASTM A1003/A1003M and ASTM A653/A653M, structural steel, zinc coated, of grade and coating as follows:
   1. Grade: 50 (340).
   2. Coating: G90 (Z275).

C. Studs, Zees, Angles and Plates: ASTM A1003/A1003M Steel sheet formed to channel shape, solid web; sizes and gauges, as indicated on Drawings.

D. Deflection Track Slotted: Single, deep-leg, U-shaped steel track: punched with vertical slots in both legs. Steel Sheet top runner manufactured to prevent cracking of finishes applied to framing resulting from deflection of structure above; in thickness not less than indicated for studs and in width to accommodate depth of studs.

E. Vertical Deflection Clips: Manufacturer's standard bypass and head clips, capable of accommodating upward and downward vertical displacement of primary structure through positive mechanical attachment to stud web and capable of resisting forces imposed by the wall system.

F. Joists: ASTM A1003/ A1003M Grade 50, Class 1 or 2 sheet steel, formed to channel shape, punched web.

G. Headers and Jambs: Shapes used to form header beams and jambs, columns or posts, of web depths indicated, un-punched, with stiffened flanges.

H. Channel Bridging or Bracing: U-Channel Assembly: ASTM C645; Base metal thickness of 0.0538 inch, and minimum 1/2 inch wide flanges.

I. Framing members shall be provided by a member of the Steel Stud Manufacturer's Association (SSMA) or Steel Framing Industry Association (SFIA) and have minimum structural properties indicated on Structural Drawings.

2.4 ACCESSORIES

A. Bracing, Furring, Bridging: Formed sheet steel, thickness determined for conditions encountered.

B. Plates, Gussets, Clips: Formed sheet steel, thickness as shown on Drawings.

C. Shop and Touch-Up Primer: TNEMEC Series 115 Uni-Bond DF or accepted equal, unless otherwise required to match shop primer.

2.5 FASTENERS


B. Welding: In conformance with AWS D1.1 and AWS D1.3.

C. Power Actuated Fasteners: Refer to Drawings. All fasteners shall have Evaluation Agency approval.

2.6 FINISHES

A. Studs and Joists: Provide galvanized finish as follows:

B. Tracks and Headers: Provide galvanized finish as follows:

C. Bracing, Furring, Bridging: ASTM A1003/A1003M, hot dip galvanized to Coating Class G-90 per ASTM A653.

D. Plates, Gussets, Clips: ASTM A1003/A1003M, hot dip galvanized to Coating Class G-90 per ASTM A653.

E. No equivalent coatings allowed.

PART 3 EXECUTION

3.1 EXAMINATION

A. Verify site conditions under provisions of Division 01.

B. Verify that building framing components are ready to receive work.

3.2 ERECTION OF FRAMING

A. Install components in accordance with ASTM C754, ASTM C1007, AISI S200, manufacturer's instructions, and as shown on Drawings.

B. Align floor and top tracks; locate to wall layout. Secure in place by method shown on Drawings. Coordinate installation of sealant with floor tracks and studs attached to masonry or concrete walls.

C. Place studs as shown on Drawings. Connect studs to tracks using method shown on Drawings.

D. Construct corners using minimum three studs. Install double studs at wall openings and door and window jambs unless otherwise shown on Drawings.

E. Erect studs one piece full length. Splicing of studs is not permitted.

F. Erect studs; brace and reinforce to develop full strength to achieve design requirements.

G. Install intermediate studs above and below openings to align with wall stud spacing.
H. Provide deflection allowance in stud track, directly below horizontal building framing at non-load bearing framing.

I. Attach furring channels to studs for attachment of fixtures anchored to walls.

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

K. Touch-up field welds and damaged galvanized surfaces with primer.

L. Complete framing ready to receive exterior finish system.

1. Backing/Blocking: Shall be provided for all interior finishes and exterior finish systems, and for the supporting and anchorage of products, fixtures and equipment for all trades. Coordinate size, type, and location of backing and supports with manufacturer or supplier of items requiring backing/blocking.

3.3 ERECTION OF JOISTS

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

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

C. Place joists as shown on Drawings. Connect joists to supports as indicated on Drawings.

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

E. Provide joist bridging at mid-point of spans or not to exceed 8 feet on center.

F. Touch-up field welds and damaged galvanized surfaces with primer.

G. Complete framing ready to receive finish.

3.4 REPAIRS AND PROTECTION

A. Repair damaged galvanized coatings on galvanized items with galvanized repair paint as specified or according to ASTM A780, and manufacturer’s written instructions.

B. Touchup Painting: After installation, promptly clean, prepare, and prime or re-prime field connections, rust spots, and abraded surfaces of prime-painted joists and accessories and abutting steel.

1. Clean and prepare surfaces by SSPC-SP 2 hand-tool cleaning or SSPC-SP 3 power-tool cleaning.

2. Apply a compatible primer of same type as shop primer used on adjacent surfaces.

3.5 ERECTION TOLERANCES

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

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

END OF SECTION
SECTION 05 50 00
METAL FABRICATIONS

PART 1  GENERAL

1.1  SECTION INCLUDES

A. Metal fabrications as follows:
   1. Metal trellis.
   2. Railing assemblies.
   3. Roof access ladders.
   4. Stair renovation treads.
   5. Stair safety nosings.
   6. Decorative safety gates.
   7. Miscellaneous metal fabrications.

1.2  RELATED SECTIONS

A. Section 03 30 00 – Cast-In-Place Concrete.
B. Section 05 12 00 – Structural Steel Framing.
C. Section 08 71 00 – Door Hardware: Gates.
D. Section 09 91 00 – Painting.

1.3  REFERENCES

A. The publications listed below form a part of this Section to the extent referenced. The publications are referred to in the text by the basic designation only. Refer to Division 01 for definitions, acronyms, and abbreviations. Standards, manuals, and codes refer to the latest edition of such standards, manuals, and codes in effect as of the date of issue of this Project Manual, unless indicated otherwise in CBC Chapter 35 and CFC Chapter 80.

B. Referenced Standards:
7. ASTM A500 – Standard Specification for Cold-Formed Welded and Seamless Carbon Steel Structural Tubing in Rounds and Shapes.


11. AWS A2.4 – Standard Symbols for Welding, Brazing, Nondestructive Examination.


14. SSPC SP-2 – Hand Tool Cleaning.

15. SSPC SP-6 – Commercial Blast Cleaning.

1.4 SUBMITTALS

A. Submit under provisions of Division 01.

B. Shop Drawings: For each item specified, indicate profiles, sizes, connection attachments, reinforcing, anchorage, size and type of fasteners and accessories. Include erection drawings, elevations and details where applicable.

C. Indicate welded connections using standard AWS A2.4 welding symbols. Indicate net weld lengths.

D. Submit product data for type of metal primer proposed for use.

1.5 QUALITY ASSURANCE

A. Welding: Qualify procedures and personnel according to the following:
   1. AWS D1.1, "Structural Welding Code – Steel."

B. Conform to 2016 California Building Code (CBC) Chapter 17A “Special Inspections and Tests” and Chapter 22A “Steel”.
   1. Materials:
      a. Material Identification per CBC Chapter 22A, Section 2203A, Paragraph 2203A.1 “Identification”.

   2. Inspection and Tests:
      a. Welding Inspection per CBC Chapter 17A, Section 1705A, Paragraph 1705A.2 “Steel Construction”.
      b. High Strength Bolt Inspection per CBC Chapter 17A, Section 1705A, Paragraph 1705A.2.1 “Structural Steel” and Table 1705A.2.1 “Required Verification and Inspection of Steel Construction”.
      c. Non-Destructive Weld Testing per CBC Chapter 17A, Section 1705A, Paragraph 1705A.12.1 “Structural Steel”.

C. Painting: Refer to Section 09 91 00 for field painting.
   1. Do not paint galvanized surfaces that are indicated to remain galvanized.

1.6 QUALIFICATIONS

   A. Welders' Certificates: Submit certificates under provisions of Division 01, certifying welders employed on the Work, verifying AWS qualification within the previous twelve months.

1.7 FIELD MEASUREMENTS

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

PART 2 PRODUCTS

2.1 MATERIALS

   A. Steel: Unless otherwise noted, provide steel materials as follows:
      1. Steel Plates, Shapes, and Bars: ASTM A36/A36M.
      2. Plates: ASTM A283/A283M.
      4. Pipe: ASTM A53/A53M, Type E or S, Grade B.
      5. HSS:
         a. Tubing: ASTM A500, Grade B.
         b. Round: ASTM A500, Grade B.

   B. Anchorage:
      1. Cast-in-Place Anchors in Concrete: Anchors capable of sustaining, without failure, a load equal to four times the load imposed, as determined by testing according to ASTM E488, conducted by a qualified independent testing agency.
      2. Expansion Anchors: Anchor bolt and sleeve assembly with capability to sustain, without failure, a load equal to six times the load imposed when installed in unit masonry and four times the load imposed when installed in concrete, as determined by testing according to ASTM E488, conducted by a qualified independent testing agency.

   C. Welding Materials:
      1. Steel: AWS D1.1; type as required for materials being welded.
      2. Sheet Steel: AWS D1.3; type as required for materials being welded.

   D. Weld filler material: All weld filler material shall have a minimum tensile strength of 70 ksi per AWS D1.1, latest edition approved by code enforcement agency.

   E. Steel Shop and Touch-Up Primer: TNEMEC Series 115 Uni-Bond DF or accepted equal.

   F. Shop and Touch-Up Zinc Rich Primer for Galvanized Surfaces: ZRC Galvilitie Galvanizing Repair Compound as manufactured by ZRC Worldwide Company, Phone: (800) 831-3275, or accepted equal.
G. Bituminous Paint: Cold-applied asphalt emulsion complying with ASTM D1187.

2.2 METAL TRELLIS

A. Components:
   1. Steel Plates, Shapes, and Sections: ASTM A36/A36M; sizes, thicknesses, and configuration as shown on Drawings.
   2. Hot-dip galvanize all components in accordance with ASTM A123/A123M, minimum 1.25 ounces per square foot.
   3. Paint finish under provisions of Section 09 91 00.

2.3 RAILING ASSEMBLIES

A. Steel Railing Assemblies: Fabricated from steel pipe, steel plates and sections; sizes as shown on Drawings. At exterior locations, hot-dip galvanize all components in accordance with ASTM A123/A123M, minimum 1.25 ounces per square foot.
   2. Galvanize exterior handrail and guardrail assemblies after fabrication. After assembly has been galvanized, fill vent and drain holes that will be exposed in the finished Work, unless indicated to remain as weep holes, by plugging with zinc solder and filing off smooth.
   3. Finish: Field painted in accordance with Section 09 91 00; color as selected by Architect.

B. Fabrication:
   1. Handrail gripping surfaces and any surfaces adjacent to them shall be free of sharp or abrasive elements and shall have rounded edges.
   2. Handrails shall not rotate in their fittings.

2.4 ROOF ACCESS LADDERS

A. Roof Access Ladders:
   1. Regulatory Requirements: Conform to ANSI A14.3, OSHA, and UL requirements, as applicable.
   2. Access Ladder, General:
      a. Space side rails 18 inches apart, unless otherwise indicated.
      b. Support each ladder at top and bottom, and not more than 48 inches on center, with brackets made from same metal as ladder.
      c. Provide brackets and anchorage as indicated on Drawings.
   3. Steel Ladders:
      a. Side Rails: Continuous, 3/8-by-3-1/2-inch steel flat bars, with eased edges, unless otherwise indicated.
      b. Rungs: 3/4-inch-diameter steel bars.
      c. Fit rungs in centerline of side rails; plug-weld and grind smooth on outer rail faces.
d. Provide non-slip surfaces on top of each rung by coating with abrasive material metalically bonded to rung by a proprietary process. Provide one of the following products:
   1) W. S. Molnar Company; SlipNOT.
   2) IKG Industries, a Harsco company; Mebac.

e. Prime interior ladders including brackets and fasteners, with zinc-rich primer.

2.5 STAIR RENOVATION TREADS

A. Safety Treads: Provide safety treads with integral nosing and anti-slip finish.
   2. Tread:
      a. Extruded aluminum (Type 6063-T5) base with anti-slip filler containing approximately 65 percent virgin grain aluminum oxide/silicon carbide abrasive.
      b. Unless otherwise indicated on Drawings, provide square or beveled ends as required to match existing condition.
   3. Width: 11 inches.

B. Colors: Two-tone, as selected by Architect.

2.6 STAIR SAFETY NOSINGS

A. Safety Nosing: Provide aluminum safety nosing with anti-slip abrasive finish.
   2. Nosing Materials:
      a. Type 6063-T5 extruded aluminum, with anti-slip abrasive filler containing approximately 65 percent virgin grain aluminum oxide (Al₂O₃) and silicon carbide abrasive.
      b. Width: 3 inches.
      c. Thickness: 1/4 inch.
      d. Length: Provide nosing for full width of treads less 1/8 inch on either side for clearance.
      e. The radius of curvature at the leading edge of the nosing shall be no greater than 1/2 inch.
   3. Anchorage: Provide integral anchorage in nosing, as standard with manufacturer and acceptable to Architect.
   4. Abrasive Filler Color: As selected by Architect from manufacturer's full range of standard colors.
2.7 DECORATIVE FENCING AND GATES

A. Components:
   1. HSS Tubing:
      a. ASTM A500, Grade B, hot-dip galvanized in accordance with ASTM A123/A123M,
         minimum 1.25 ounces per square foot.
      b. Sizes and configuration as indicated on Drawings.
      c. Paint finish under provisions of Section 09 91 00.
   2. Horizontal Slats: Composite wood siding; refer to Section 06 73 00.
   3. Swinging and Sliding Gates: Refer to Drawings.
      a. Gate Hardware: Refer to Section 08 71 00.

2.8 MISCELLANEOUS METAL FABRICATIONS

A. Provide miscellaneous metal fabrications as required to complete work under other
   Sections, but not specified in those Sections.

B. Miscellaneous metal work, including, but not limited to, the following items:
   1. Steel Framing and Supports For:
      a. Countertops.
      b. Operable partitions.
      c. Overhead doors.
      d. Mechanical and electrical equipment.
   2. Loose bearing and leveling plates.
   3. Steel weld plates and angles for casting into concrete not specified in other Sections.

2.9 SHOP FABRICATION

A. Fit and shop assemble in largest practical sections, for delivery to site.
   1. Disassemble units only as necessary for shipping and handling limitations. Use
      connections that maintain structural value of joined pieces. Clearly mark units for
      reassembly and coordinated installation.

B. Fabricate items with joints tightly fitted and secured.

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

D. Cut, drill, and punch metals cleanly and accurately. De-burr rough edges and holes.

E. Form exposed work true to line and level with accurate angles and surfaces and straight
   edges.

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

G. Supply components required for anchorage of fabrications. Fabricate anchors and related
   components of same material and finish as fabrication except where specifically noted otherwise.
H. Miter and weld members, welds ground smooth.

I. Provide for anchorage of type indicated; coordinate with supporting structure. Space anchoring devices to secure metal fabrications rigidly in place and to support indicated loads.

2.10 FINISHES

A. Prepare structural component surfaces in accordance with SSPC SP-2 at concealed locations and SSPC SP-6 at exposed locations.

B. Do not prime surfaces in direct contact with concrete, where field welding is required, or contact surfaces of steel-to-steel connections.

C. Shop prime all exposed interior steel with shop primer unless otherwise noted. Apply primer in one coat, to meet or exceed the minimum mil thickness required by the primer manufacturer.

D. All unexposed, concealed, or enclosed interior or exterior steel requires no finish.

E. All exposed exterior steel shall be galvanized after fabrication unless otherwise noted.

1. Galvanizing shall be in accordance with ASTM A123/A123M, on designated steel items. Provide minimum 1.25 ounces per square foot galvanized coating.

2. At galvanized members, touch-up all welds with zinc-rich primer.

F. Painting shall conform to applicable requirements of Section 09 91 00.

PART 3 EXECUTION

3.1 EXAMINATION

A. Examine job site conditions and verify field dimensions.

B. Verify structure or substrate is plumb, level, and ready to receive work.

C. Verify that appropriate backing, blocking, or structural reinforcing is provided at walls.

D. Report unacceptable conditions to Architect. Begin installation only when unacceptable conditions have been corrected.

3.2 PREPARATION

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

B. Supply items required to be cast into concrete with setting templates, to appropriate Sections.

3.3 INSTALLATION

A. Install items plumb and level, accurately fitted, free from distortion or defects.

B. Install manufactured items in accordance with manufacturer's printed instructions.

C. Allow for erection loads and for sufficient temporary bracing to maintain true alignment until completion of erection and installation of permanent attachments.
D. Field weld components indicated on shop drawings.

E. Perform field welding in accordance with AWS D1.1 for structural steel and AWS D1.3 for sheet steel.

F. Obtain Architect's acceptance prior to site cutting or making adjustments not scheduled.

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

H. Install stair renovation treads in accordance with manufacturer's printed instructions and as indicated on Drawings.

I. Install stair safety nosings on treads in accordance with manufacturer's printed instructions and as indicated on Drawings. Accurately position and hold securely during placement of concrete. Terminate safety nosing as recommended by manufacturer.

J. Post Setting in Concrete: Install support posts as indicated on Drawings.
   1. Cast-In Posts: Set cast-in support posts in concrete footing with smooth top, shaped to shed water. Protect portion of posts above footing from concrete splatter. Verify that posts are set plumb or at correct angle and are aligned and at correct height and spacing. Hold posts in position during placement and finishing operations until concrete is sufficiently cured.
   2. Posts Set into Voids in Concrete: Form or core-drill holes for installing posts in concrete to depth recommended in writing by manufacturer of site furnishings and 3/4 inch larger than outside diameter of post. Clean holes of loose material, insert posts, and fill annular space between post and concrete with non-shrink, nonmetallic grout or anchoring cement, mixed and placed to comply with anchoring material manufacturer's written instructions. In exterior locations top shall be smoothed and shaped to shed water.
   3. Pipe Sleeves: Use steel pipe sleeves preset and anchored into concrete for installing posts. After posts have been inserted into sleeves, fill annular space between post and sleeve with non-shrink, nonmetallic grout or anchoring cement, mixed and placed to comply with anchoring material manufacturer's written instructions. In exterior locations, top shall be smoothed and shaped to shed water.

3.4 CLEANING

A. Inspect components after completing installation. Remove dirt and debris. Repair damaged finishes to match original finish or replace component.

END OF SECTION
DIVISION 06
WOOD, PLASTICS AND COMPOSITES
SECTION 06 10 00
ROUGH CARPENTRY

PART 1 GENERAL

1.1 SECTION INCLUDES

A. Description of requirements for materials, fabrications and installation of rough carpentry and associated items (except that which is specified elsewhere) indicated on Drawings and necessary to complete the work. Items include, but are not necessarily limited to, the following:

1. Wood framing.
2. Plywood, general use.
4. Rough hardware.

1.2 RELATED SECTIONS

A. Section 03 11 00 – Concrete Forming.
B. Section 03 30 00 – Cast-In-Place Concrete.
C. Section 06 18 00 – Manufactured Lumber.
D. Section 06 41 00 – Architectural Wood Casework.
E. Section 07 21 00 – Thermal Insulation.
F. Section 07 92 00 – Joint Sealants.
G. Section 09 29 00 – Gypsum Board.
H. Section 09 81 00 – Acoustic Insulation.

1.3 REFERENCES

A. The publications listed below form a part of this Section to the extent referenced. The publications are referred to in the text by the basic designation only. Refer to Division 01 for definitions, acronyms, and abbreviations.

B. Standards, manuals, and codes refer to the latest edition of such standards, manuals, and codes in effect as of the date of issue of this Project Manual, unless indicated otherwise in CBC Chapter 35 and CFC Chapter 80.

C. Referenced Standards:

1. ALSC – American Lumber Standard Committee: Softwood Lumber Standards.
2. ANSI/ASME B18.2.1. – Square and Hex Bolts and Screws Inch Series.
6. The Engineered Wood Association (APA); Plywood Specifications and Grades.

1.4 SUBMITTALS

A. Submit all products and materials proposed for use under provisions of Division 01.

B. Preservative Treatment Certification, Pressure Treated Wood:
   1. Submit certification by treating plant stating the chemicals and process used, net amount of preservative treatment product retained, and conformance with applicable standards.

1.5 QUALITY ASSURANCE

A. Coordinate work with other trades to ensure proper placement of materials, anchors, etc., as well as providing for openings and anchors for the installation of surface mounted items and equipment.

B. Qualifications of Workmen: Provide skilled workmen and supervisors who shall be present at all times during execution of this portion of the work and who shall be thoroughly familiar with the type of construction involved and the materials and techniques specified.

C. Rejection: In the acceptance or rejection of rough carpentry, no allowance will be made for lack of skill on the part of the workmen.

D. Requirements of Regulatory Agencies:
   1. State of California, California Code of Regulations, Title 24, Part 2, Chapter 23 requirements apply.
      a. Grading and preservative treatment of lumber and plywood shall conform to CBC Section 2303, Minimum Standards and Quality.

1.6 DELIVERY, STORAGE AND HANDLING

A. Protection:
   1. After delivery, store all materials in such a manner as to ensure proper ventilation and drainage and to protect against damage and the weather.
   2. Keep all material clearly identified with all grade marks legible; keep all damaged material clearly identified as damaged, and separately store to prevent its inadvertent use. Do not allow installation of damaged or otherwise non-complying material.
   3. Use all means necessary to protect the installed work and materials of all other trades.

B. Replacements: In the event of damage, immediately make necessary repairs and replacements as acceptable to Architect and at no cost to Owner.
1.7 JOB AND ENVIRONMENTAL CONDITIONS

A. Environmental Requirements: Maintain uniform moisture content of lumber at 19 percent or less at time of installation.

B. Sequencing: Coordinate details with other work supporting, adjoining, or fastening to rough carpentry work.

PART 2 PRODUCTS

2.1 MATERIALS

A. Wood:

1. Lumber shall be identified by the grade mark of an approved lumber grading or inspection agency in conformance with NIST Doc PS-20.

2. Lumber species and grades shall be as noted on Drawings.

B. Plywood:

1. General Use: DOC PS 1, Exposure 1. Thickness and type shall be as indicated on Drawings.

2. Plywood back boards for electrical, telephone, and similar types of wall mounted equipment shall be provided as indicated and as required by design conditions. Unless otherwise specified, plywood shall be 3/4 inch thick, fire-retardant treated, exterior A-C plywood with “A” face exposed.

3. Plywood for Structural Sheathing: Refer to Drawings.

C. Plates, Blocking, Cast-in-Nailers at Concrete Curbs, or Sills on Concrete: Douglas Fir No. 1 pressure-treated.

D. Preservative Treatment:

1. Furnish pressure treated wood in accordance with AWPA Standard U1.

2. All preservative treatment products shall be waterborne, alkali-based type, acceptable for use in California.

a. Acceptable products and retention rates for Douglas Fir sawn lumber:

   1) Alkaline Copper Quat (ACQ) with retention rates of 0.25 pounds per cubic foot for wood installed above grade and 0.40 pounds per cubic foot for wood in contact with the ground.

   2) Ammoniacal Copper Zinc Arsenate (ACZA) with retention rates of 0.25 pounds per cubic foot for wood installed above grade and 0.40 pounds per cubic foot for wood in contact with the ground.

   3) Copper Azole Type C (CA-C) with retention rates of 0.06 pounds per cubic foot for wood installed above grade and 0.15 pounds per cubic foot for wood in contact with the ground.

3. Cut, bored or notched surfaces shall be retreated per AWPA Standard M4 by brushing on a minimum of three coats of Copper Naphthenate (CuN-W) containing a minimum of 1.0 percent copper metal.
4. Each piece of preservative treated lumber shall be labeled per CBC Section 2303.1.9.1 shall bear AWPA quality stamp by an ALSC approved treating inspection agency indicating compliance with the AWPA standards.

5. Type of fasteners used with pressure treated wood shall be in accordance with CBC Section 2304.10.5.1.

E. Rough Hardware Fastenings and Connections: All types including bolts, lag screws, nails, spikes, screws, washers, framing devices and other rough hardware, or kinds that may be purchased and that require no further fabrication, shall be furnished and installed for all finish and rough carpentry. All exterior hardware shall be hot-dipped galvanized per ASTM A123/123M Standards.

1. Nails: Common wire nails or spikes; box nails and “sinkers” are not permitted.

2. Bolts: ASTM A307, Grade A, hexagonal heads, unless noted otherwise. Upset threads are not permitted.

3. Washers: Washers for bearing against wood shall be provided under all bolt heads and nuts. Washers shall be as indicated on Drawings.

4. Power Actuated Fasteners: Tempered steel pins with special corrosive-resistant plating or coating. Pins shall have guide washers to accurately control penetration, minimum 1-1/8 inch. Fastening shall be accomplished by low-velocity pistol-driven powder activated tool. Pins and tool shall be as manufactured by Hilti Fastening Systems; ITW Ramset/Redhead; Impex Tool Corporation; or accepted equal. All fasteners shall have ICC approval.

5. Post-Installed Anchors: ICC approved, Hilti, ITW Ramset/Redhead Fastening Systems, or accepted equal. Substitutions under provisions of Division 01.

6. Fabricated Sheet Metal Timber Framing Connectors: ICC approved; fabricate from hot-dipped galvanized steel. Connector material shall be 18 gauge minimum (1/8 inch plate materials where welded, unless otherwise noted), and punched for nailing. Nails and nailing shall conform to manufacturer's printed instructions with a nail provided for each punched hole. Connector types shall be as indicated on Drawings. Provide timber framing connectors by Simpson Co. or accepted equal. Framing connectors shall be stamped with manufacturer's logo, and model designation.
   a. Inspection of Timber Connectors shall conform to CBC Section 1705A.5.6.

7. Nailing Schedule: Except as otherwise indicated on Drawings or specified, nailing shall conform to 2016 CBC, Table 2304.10.1, Fastening Schedule.


2.2 FABRICATION

A. Lumber:

1. Air- or kiln-dry to maximum 19 percent moisture content, at the time of installation.

2. Furnish S4S unless otherwise noted.

3. Size to conform to rules of governing standard. Sizes shown are nominal unless otherwise noted.
2.3 SOURCE QUALITY CONTROL

A. Grade Mark each piece of lumber. Marking must be done by recognized agency.

B. Plywood: Each panel shall be legibly identified as to type, grade and specie by APA grade. If plies are spliced, the slope of the scarf shall not be steeper than 1:8. White pockets will not be permitted in face plies.

C. Each piece of preservative treated lumber shall bear AWPA quality stamp by an ALSC approved inspection agency indicating compliance with the AWPA standards.

PART 3 EXECUTION

3.1 SURFACE CONDITIONS

A. Inspection:
   1. Prior to execution of work under this Section, carefully inspect the installed work of other trades and verify that such work is complete to the point where work of this Section may properly proceed.
   2. Verify that rough carpentry may be performed in strict accordance with the original design and all pertinent codes and regulations.

B. Selection of Lumber Pieces: Carefully select all members. Select individual pieces so that knot and obvious defects will not interfere with placing bolts or proper nailing or making proper connections. Cut out and discard all defects which will render a piece unable to serve its intended function.

C. Lumber may be rejected by Architect, whether or not it has been installed, for excessive warp, twist, bow, crook, mildew, fungus or mold, as well as for improper cutting and fitting. No load carrying member shall fall below grade.

D. Shimming: Do not shim any framing component.

3.2 FASTENING

A. Nailing: Except as otherwise specified, all nailing shall be as scheduled on Drawings:
   1. Nails or Spikes shall be common wire unless noted otherwise. Penetration of nails or spikes shall be one-half the length of the nail or spike into the piece receiving the point. However, to connect pieces 2 inches in thickness, 16d nails shall be used unless noted otherwise.
      a. Bore holes for nails wherever necessary to prevent splitting. Hole size shall not exceed 75 percent of nail diameter.
      b. Use finish or casing nails for finish work.
      c. Use of nailing guns is limited by CBC requirements and subject to approval by Architect and DSA. Submit nailing gun and nail data for review.

B. Bolts: Bolts shall be of sizes indicated. Drive fit with washers under head and nuts. Lag screws shall be screwed (not driven) into place with holes bored the same depth and diameter as shank. For threaded portion, holes shall be no larger than root diameter. Retighten all bolts and screws before closing in.
C. Framing Devices: As specified under Products, sizes as indicated. Use half-length nails where required.

3.3 FRAMING AND ROUGH CARPENTRY

A. Sills: Shall be in long lengths of sizes shown, fastened with anchor bolts at exterior walls and with fasteners at non-structural interior walls as indicated, a minimum of two fasteners per piece and a bolt within 9 inches but not nearer than 6 inches from end of piece. Place malleable iron or steel plate washers (but not cut washers) under nuts bearing on wood. Set sills level and true and bed exterior wall sills and interior bearing wall sills on 1/2 inch dry-pack or non-shrink grout.

B. Studs, Posts and Columns: Shall be full length. Corners shall be as detailed. Partitions or walls containing plumbing, heating or other piping shall be so formed as to give proper clearance for materials. Cut members as required to provide full bearing at ends. Connect to structure as indicated.

C. Plates: Shall be in long lengths and spliced as shown.

D. Fire Blocking: Shall be same thickness and width of studs or joists unless shown otherwise. Blocking shall not be spaced over 8 feet – 0 inches on center. Install fire blocking in accordance with CBC, Title 24, Part 2, Section 718, Concealed Spaces.

E. Joists and Beams: Shall be in long lengths and spliced over bearings unless shown otherwise. Install with crown side up. Beams or headers indicated to be built up of two or more joists shall be fabricated on the job using full length members. For two piece members, stitch nail pieces together with 16d common nails spaced not over 12 inches on center and staggered. Clinch nails protruding through members.
   1. Provide double joists and headers at all openings through floors and roofs unless otherwise shown on Drawings.
   2. Provide typical headers at all openings through walls where one or more studs are required to be cut. For penetration through walls narrower than stud spacing, provide solid backing on all sides for fastening finish materials.

F. Plywood, General Use: Install to pattern indicated and provide blocking at joints where noted on Drawings. Center all joints over bearing supports. Nail to framing as indicated.

G. Wood Furring, Stripping and Grounds: Install as shown or required to provide nailing of materials or passage of pipes, conduits, etc., not otherwise accommodated.

H. Bridging: Space not over 8 feet-0 inches on center for spans over 16 feet-0 inches. Spans over 8 feet-0 inches and under 16 feet-0 inches shall have bridging placed at midspan. Bridging shall be two 2 x 3s or solid blocking as indicated. Joists 8 inches or less in depth shall not require bridging unless specifically indicated.

I. Backing/Blocking: Shall be provided for all wall and ceiling finishes and for the supporting and anchorage of products, fixtures and equipment for all trades, including, but not limited to, toilet partitions, toilet room accessories, casework, mirrors, trim, applied wall finishes, artwork, wall bumpers, downspout straps, plumbing and electrical fixtures, etc. Coordinate size, type, and location of backing and supports with manufacturer or supplier of items requiring backing/blocking.
   1. Install blocking for fastening surface applied items.
   2. Install blocking at plywood joints unless otherwise noted on Drawings.
J. Framing members shall not be notched or bored unless specifically detailed on Drawings.

3.4 ROUGH HARDWARE

A. Rough hardware indicated or required but not specified elsewhere, shall be furnished and installed hereunder, including metal fittings, screws, bolts, and other fastening devices; size and configuration as applicable.

3.5 MISCELLANEOUS CARPENTRY WORK

A. Miscellaneous Carpentry Work not included under other Sections shall be furnished and installed hereunder as indicated. Carefully locate and securely anchor such items to structure.

B. Drypack: Drypack shall consist of one part high early strength Portland cement to not more than three parts of sand by volume. Add only a minimum amount of water to hold the mixture in shape while packing and to provide hydration. Solidly ram drypack into place to provide uniform bearing and cure with moist sacks or cloths for a period of at least three days.

C. Plywood back boards for electrical, telephone, and similar types of wall mounted equipment shall be provided as indicated and as required by design conditions. Plywood back boards may be installed either horizontally or vertically.

D. Draft Stops: Construct draft stops in attic spaces where indicated and required. Construct of not less than 5/8 inch Type X gypsum wallboard or 3/8 inch plywood, adequately supported. All materials and installation work shall conform to CBC requirements, Section 718, Concealed Spaces.

E. Shoring and Bracing: Shore or brace for temporary support of all work as required during the construction period except any shoring and bracing specified and included under other Sections of these specifications.

F. Temporary Enclosures: Provide and maintain all barricades and enclosures required to protect the work in progress.

G. Protect all work in progress and all work installed, as well as the work of all other trades. Any work damaged as a result of the work under this Section shall be corrected to its original condition or replaced if directed by Architect and at no cost to Owner.

H. Protection Devices: Pedestrian walkways, barricades, lights, shoring, and other protective structures and devices necessary for protection of pedestrians shall conform to requirements of 2016 CBC, Title 24, Section 3306, Protection of Pedestrians, and to the requirements of the Department of Public Works, County of Contra Costa.

3.6 FRAMING TOLERANCES

A. Maximum variation from true flatness: 1/4 inch in 10 feet in any direction.

3.7 CLEAN-UP

A. Upon completion of the work of this Section, remove all surplus materials, rubbish and debris from the premises.

END OF SECTION
SECTION 06 18 00
MANUFACTURED LUMBER

PART 1  GENERAL

1.1  SECTION INCLUDES

A.  Glued-laminated structural timber members for the following:
   1.  Beams.

B.  Laminated Veneer Lumber (LVL).

1.2  RELATED SECTIONS

A.  Section 06 10 00 – Rough Carpentry.

1.3  REFERENCES

A.  The publications listed below form a part of this Section to the extent referenced. The
    publications are referred to in the text by the basic designation only. Refer to Division 01 for
    definitions, acronyms, and abbreviations.

B.  Standards, manuals, and codes refer to the latest edition of such standards, manuals, and
    codes in effect as of the date of issue of this Project Manual, unless indicated otherwise in
    CBC Chapter 35 and CFC Chapter 80.

C.  Referenced Standards:

   2.  AITC 111  – Recommended Practice for Protection of Structural Glued Laminated Timber During Transit, Storage and Erection.
   4.  ANSI/AITC/A190.1  – Structural Glued Laminated Timber.

1.4 SUBMITTALS

A. Submit under provisions of Division 01.

B. Shop Drawings: Shop drawings shall clearly show all pieces with all pertinent dimensions, sizes, connections and installation requirements; areas of 6 inch spacing of end joints; species of wood, stress grade of lumber, type of glue and other pertinent data relating to fabrication of glued laminated beams and laminated veneer lumber.

C. Certificate of Compliance shall be furnished to Architect attesting that the materials and methods used in the fabrication of the glued-laminated timber conform in all respects to the requirements of this Section. The Certificate of Compliance shall include pertinent data such as the grade and species of lumber, the type of glue and the moisture content of the lumber at the time of gluing. Each glued laminated member shall be stamped with an identifying mark “Quality Inspected” mark and such marks shall be included in the Certificate of Compliance.

1. Stamp: APA stamp may be used in lieu of AITC stamp, provided manufactured products conform to specified AITC requirements and manufacturer provides certification of conformance to AITC standards.

D. Certificate of compliance shall be furnished to Architect attesting that the materials and methods used in the fabrication of the laminated veneer lumber conform in all aspects to the requirements of this Section. The Certificate of Compliance shall include pertinent data such as the product type and grade, NER report number, manufacturer’s name, plant number and the independent inspection agency’s name. Each laminated veneer member shall be identified by a stamp indicating the product type and grade, NER report number, manufacturer’s name, plant number and the independent inspection agency’s logo.

1.5 QUALITY ASSURANCE

A. Glued-Laminated Timber:

1. Reference Standards: Except as otherwise specified hereinafter, design, fabrication and construction of structural glued-laminated timber shall conform to the requirements of ANSI/AITC A190.1.

   a. Inspection of glued-laminated timber fabrication per CBC Section 1705A.5 and Section 1705A.5.4.

2. Defective Members: Glued-laminated timber not meeting design requirements, finish, and workmanship as specified, or showing any evidence of separation of glue line or laminations, shall be deemed defective and shall be cause for rejection of entire member.

3. Manufacturer Qualifications: Factory glued-laminated timber members shall be produced by an AITC licensed fabricator qualified to issue the AITC “Quality Inspected” mark.

   a. Factory mark each piece of glued-laminated timber with the "Quality Mark" placed on the timber at a location concealed from view in the completed work.
B. Laminate Veneer Lumber (LVL):
   1. Reference Standards: Design, fabrication and construction of structural Laminate Veneer Lumber shall conform to the requirements as set forth in an evaluation report compliant with 2016 CBC, such as an ICC ES report.
   2. Products shall be proven by testing and evaluation in accordance with the provisions of ASTM D5456.
   3. Defective Members: Laminated veneer lumber not meeting design requirements, finish and workmanship as specified, or showing any evidence of separation of glue line or laminations, shall be deemed defective and shall be cause for rejection of entire member.

1.6 DELIVERY, STORAGE AND HANDLING

A. All laminated members shall be protected from the weather if stored prior to erection.

B. Wrap each member with plastic-coated paper with water-resistant seams for protection during transit, storage and erection.

PART 2 PRODUCTS

2.1 MANUFACTURERS

A. Acceptable Manufacturers:

B. Substitutions: Under provisions of Division 01.

2.2 GLUED-LAMINATED TIMBER

A. Material: Douglas fir-larch, fabricated in accordance with ANSI/AITC A190.1 and AITC 117, except moisture content not to exceed 12 percent.
   1. Species and Combination Symbols: As indicated on Drawings.
      a. Use 24F-V4 (DF/DF) for blocking, purlins, and simple span girders.
      b. Use 24F-V8 (DF/DF) for cantilever girders and all truss members.

B. Camber: Provide camber to members as indicated on Drawings.

C. Adhesive: Wet condition of use complying with ANSI/AITC A190.1.

D. Workmanship: Fabrication shall be in accordance with the best practices with adequate plant and equipment and under supervision of properly qualified personnel. End joints shall be spaced 6 inches minimum in any lamination and between adjacent laminations for one-eighth of the depth of the beam plus one lamination as follows:
   1. Simple beams – 100 percent of the span at the tension face.
   2. Continuous or cantilever beams – continuous both faces.
E. Appearance: Finished appearance grades shall conform to the requirements of the AITC 110 as follows:
2. Fully or Partially Exposed Glue-Laminated Members: Architectural Appearance Grade.

F. Shop Sealing: Immediately after end-cutting each member to final length, apply a saturation coat of end sealer to ends and other cross-cut surfaces, keeping surfaces flood-coated for not less than ten minutes. All surfaces shall receive one heavy saturation coat of clear penetrating sealer after fabricating and end-sealing.
1. End Sealer: Manufacturer's standard, transparent, colorless wood sealer that is effective in retarding the transmission of moisture at cross-grain cuts and is compatible with indicated finish.
2. Penetrating Sealer: Manufacturer's standard, transparent, penetrating wood sealer that is compatible with indicated finish.

G. Details: Carefully check all details and provide all daps, rabbets, cutouts, holes and plugs as shown.

H. Fabrication of glued-laminated members shall be continuously inspected by a qualified inspector employed by fabricator and acceptable to Architect and DSA. The inspector shall furnish Architect and DSA a report that the lumber species, grades and moisture content, type of glue, temperature and gluing procedure, and workmanship conform to the accepted shop drawings and specifications. Inspector shall stamp each glued-laminated member with an identifying mark. Glued-laminated trusses shall be fabricated and completely assembled in the shop by the fabricator. Fabricator shall be responsible for preparation of shop drawings and fabrication of truss gusset plates.
1. Moisture Content: Maximum twelve percent and minimum seven percent, at the time of gluing.

I. Timber Connectors:
1. General: Unless otherwise indicated, fabricate from the following materials:
   a. Structural-steel shapes, plates, and flat bars complying with ASTM A36/A36M.
   b. Round steel bars complying with ASTM A575, Grade M 1020.
   c. Hot-rolled steel sheet complying with ASTM A1011/A1011M, Structural Steel, Type SS, Grade 33.
2. Hot-dip galvanize steel assemblies and fasteners after fabrication to comply with ASTM A123/A123M or ASTM A153/A153M.

2.3 LAMINATED VENEER LUMBER (LVL)

A. Manufacturer: Microllam LVL by i-Level; or accepted equal.

B. Veneer: Wood veneers ultrasonically graded or graded by other advanced grading system.

C. Adhesives: Adhesives shall be of waterproof type conforming to the requirements of ASTM D2559.

D. Fabrication: Laminated veneer lumber shall be manufactured in a continuous process with all grain parallel with the length of the members. All members shall be free of finger or scarf joints or mechanical connections in full-length members.
E. Tolerances:
   1. Finished Length (As Indicated): ± 1/8 inch.
   2. Depth: ± 1/16 inch.
   3. Width: ± 1/16 inch.

PART 3 EXECUTION

3.1 INSPECTION

A. Visually inspect in field all glued-laminated members, laminated veneer lumber and laminated strand lumber for defects prior to erection. Notify Architect of defects found and method of repair proposed prior to start of erection.

B. DSA Requirement: Fabrication inspection is required by DSA in accordance with CBC Section 1705A.5.4.

3.2 ERECTION

A. Glued-Laminated Timber:
   1. Erect glued-laminated framing members as indicated. Comply with AITC 111 and manufacturer's instructions. Make all daps, cutouts and drill all holes for anchors using templates. Carefully align templates to provide for accurate and positive anchorage.
      a. Handling of erection tools, equipment and methods shall be such as to avoid scarring the corners and faces or otherwise injuring members. Sharp instruments or unprotected wire rope, or chain slings shall not be permitted.
   2. Apply an approved end sealer to any member requiring cutting and trimming in the field.

B. Laminated Veneer Lumber:
   1. Erection:
      a. Erect LVL members as indicated and as recommended by the manufacturer.
      b. Temporary construction loads that cause stresses beyond design limits will not be permitted.
      c. Holes, cuts or notches not previously approved by the manufacturers and Architect will not be permitted.
      d. The final erection of LVL members shall be under the direction of a qualified construction supervisor.

3.3 REPAIRS

A. Upon completion of erection of members, repair any defects or damage to members as a result of the erection process.
   1. Glued-Laminated Timber: Repairs shall be made to restore the glued-laminated member to the finished appearance as specified in this Section.
      a. Replace damaged structural glued-laminated timber if repairs are not accepted by Architect.
   2. Laminated Veneer Lumber: Damaged lumber shall be removed and replaced. Do not repair laminated veneer lumber, laminated strand lumber, and parallel strand lumber.
3.4 PROTECTION

A. Do not remove wrappings on individually wrapped members until they no longer need protection from weather, sunlight, soiling, and damage from work of other trades.

3.5 CLEAN-UP

A. Upon completion of the work of this Section, remove all surplus materials, rubbish and debris from the premises.

END OF SECTION
SECTION 06 41 00
ARCHITECTURAL WOOD CASEWORK

PART 1 GENERAL

1.1 SECTION INCLUDES
A. Custom fabricated casework.
B. Countertops.
C. Cabinet hardware.

1.2 RELATED SECTIONS
A. Section 01 81 13 – Sustainable Design Requirements; for additional LEED requirements.
B. Section 03 30 00 – Cast-In-Place Concrete.
C. Section 06 10 00 – Rough Carpentry.
D. Section 07 92 00 – Joint Sealants.
E. Section 09 22 16 – Non-Structural Metal Framing.
F. Section 09 29 00 – Gypsum Board.
G. Divisions 21-23 – Mechanical.
H. Divisions 25-28 – Electrical.

1.3 REFERENCES
A. The publications listed below form a part of this Section to the extent referenced. The publications are referred to in the text by the basic designation only. Refer to Division 01 for definitions, acronyms, and abbreviations.

B. Standards, manuals, and codes refer to the latest edition of such standards, manuals, and codes in effect as of the date of issue of this Project Manual, unless indicated otherwise in CBC Chapter 35 and CFC Chapter 80.

C. Referenced Standards:
1. ANSI 135.4 – Basic Hardboard.
2. ANSI A118.4 – Modified Dry Set Cement Mortar.
3. ANSI A208.1 – Particleboard.
4. ANSI A208.2 – Medium Density Fiberboard (MDF) for Interior Applications.
5. ANSI Z124.6 – American National Standard for Plastic Sinks.
6. ANSI/BHMA 156.9 – Cabinet Hardware.
7. ANSI/HPVA HP-1 – Hardwood and Decorative Plywood.
16. NEMA LD3 — High-Pressure Decorative Laminates.
18. PS 1 — Construction and Industrial Plywood.

1.4 SUBMITTALS

A. General: Submit in accordance with Division 01. Begin fabrication only after required approvals have been obtained.

B. LEED Submittals: Provide the following, and comply with applicable requirements and procedures of Division 01.

1. Product Data for EQ Credit 2: For adhesives and sealants, including printed statement of VOC content and chemical components.

2. EQ Credit 2:
   a. Manufacturer's product data for each composite wood or agrifiber product used indicating that the product contains no added urea formaldehyde resins.
   b. Laminate adhesive manufacturer's product data for each adhesive used indicating that the adhesive contains no added urea formaldehyde resins.

3. Certificates for MR Credit 3: Chain-of-custody certificates certifying that products specified to be made from certified wood comply with forest certification requirements. Include evidence that mill is certified for chain of custody by an FSC-accredited certification body.
   a. Include statement indicating costs for each certified wood product.
C. Shop Drawings: Comply with Section 1 of WI/AWMAC North American Architectural Woodwork Standards – Basic Requirements for Architectural Millwork Shop Drawings. Submit as follows:

1. Submit two copies of shop drawings, 11 inch by 17 inch minimum size.
2. Architect furnished Drawings indicate form and profile concept only. Submit shop drawings to illustrate Fabricator’s understanding of Architect’s Drawings and to show intended fabrication details. Photocopies, traced copies, or other reproduction of Architectural Drawings will not be acceptable.
3. Prepare shop drawings using field verified dimensions. Report any major discrepancies between Architect’s Drawings and field dimensions before work fabrication.
4. Indicate casework conditions, identified with location, grade, type of finish, and wood species.
5. Show casework in relation to adjacent construction with sectional drawings at full size or at 3 inch to 1 foot scale.
6. Coordinate dimensions of built-in equipment and fixtures. Show casework hardware indicating brand name and model used.
7. Show special accessory components not included in manufacturer’s product data.
8. Show anchoring and attachment method. Show seismic restraint in accordance with CBC. Show method of scribing.
9. Furnish a WI Certified Compliance Label on shop drawings as specified in this Section.

D. Samples: Submit finish samples as follows:

1. Two 6 inch by 12 inch samples of each cut and species of lumber and plywood.
2. Two 6 inch by 12 inch samples of each type of countertop finish.
3. Two samples of each high pressure plastic laminate type and color specified.
4. One sample of each type of cabinet hardware.

E. Quality Assurance/Control Submittals: Submit the following in accordance with appropriate provisions of this Section:

1. Manufacturer qualifications.
2. Installer qualifications.
3. WI Compliance Certification.

1.5 SYSTEM DESCRIPTION

A. Casework design and construction shall be in accordance with WI/AWMAC North American Architectural Woodwork Standards as follows:

1. Grade: Custom.
3. Construction Type: Type I – Multiple Self Supporting Units.
4. Door and Drawer Front Style: Flush overlay.
5. Shelves: Conform to WI requirements subject to a fifty pounds per square foot uniformly spaced load not to exceed 200 pounds per shelf.
6. Provide seismic anchorage in accordance with CBC.
7. Non-housing casework will not be permitted.


1.6 QUALITY ASSURANCE

A. Qualifications:
   1. Fabricator/Installer Qualifications: Firm specializing in fabricating and installing products specified in this Section with a minimum five years’ experience. Fabricator/Installer shall be a WI Accredited Millwork Company.

B. Certification Requirements:
   1. WI Compliance Certification: Submit a certification stating that millwork products furnished and installed meet all the requirements of the WI Grade or Grades specified.
   2. WI Certified Compliance Label: Show WI Certified Compliance Label on the first page of each set of shop drawings.
   3. WI Certified Seismic Installation Program: Submit a certification stating that millwork products meet the seismic installation requirements in the State of California including, but not limited to, wall backing/blocking and fastener size, frequency, and location.
      a. Provide photographic evidence of the installation of backing/blocking for all casework prior to applying finishes to stud framing.

C. Pre-Installation Meetings:
   1. Conduct pre-installation meeting in accordance with Division 01.
   2. Convene pre-installation meeting prior to commencing work of this Section.
   3. Coordinate work in this Section with work in related Sections. Coordinate work with plumbing and electrical rough-in. Ensure orderly and efficient sequencing of installation of interdependent trades, construction elements, and include provisions for future work.

1.7 DELIVERY, STORAGE, AND HANDLING

A. Comply with requirements of Division 01.

B. Deliver materials and manufactured products only when the area is ready for installation, broom clean, totally enclosed, and the relative humidity is fifty percent or less at 70 degrees F. Allow casework to acclimate to above conditions for 72 hours minimum prior to installation.

C. Storage and Protection: Store materials in a dry secure place. Protect from weather, surface contaminants, construction traffic, and other potential damage.

1.8 MAINTENANCE DATA

A. Submit in accordance with Division 01.

B. Provide cleaning and maintenance information. Include hardware adjustment information.
PART 2 PRODUCTS

2.1 SPECIAL ENVIRONMENTAL REQUIREMENTS

A. Comply with provisions of Division 01.

B. Provide FSC certified wood products whose value amounts to at least 50 percent of total value of wood products in this Section.

C. Provide a minimum of [XX] percent recycled content composite wood products in this Section.

D. Provide composite wood products whose bonding agents contain no urea-formaldehyde.

2.2 LEED REQUIREMENTS

A. VOC Content of Adhesives and Sealants: For field applications that are inside the weatherproofing system, use adhesives and sealants that comply with the limits set forth in South Coast Air Quality Management District (SCAQMD) Rule 1168 for VOC content in g/L, less water, when calculated according to 40 CFR 59, Subpart D. Refer to LEED 2013 BD+C Reference Guide for list of sealant and adhesive types that must comply with VOC limits.

B. Composite wood and agrifiber products used on the interior of the building shall contain no added urea-formaldehyde resins.

C. Laminating adhesives used to fabricate on-site and shop-applied composite wood and agrifiber assemblies shall contain no added urea-formaldehyde resins.

D. Provide FSC-certified new wood products for this Section as required for achievement of the Project’s minimum required total of fifty percent FSC-certified new wood products.

2.3 LUMBER

A. Lumber: Conform to PS 20; Premium Grade in accordance with WI/AWMAC North American Architectural Woodwork Standards, Section 3. Dimensions as shown on Drawings. Properties as follows:
   1. Moisture Content: Kiln dried; moisture content six percent to twelve percent.
   2. Wood Species:

<table>
<thead>
<tr>
<th>Use</th>
<th>Species</th>
</tr>
</thead>
<tbody>
<tr>
<td>Framing, internal construction.</td>
<td>Douglas Fir</td>
</tr>
</tbody>
</table>

2.4 WOOD BASED PANELS

A. Formaldehyde emissions of wood-based panels shall not exceed limits established by the Department of Housing and Urban Development (HUD) and 24 CFR, Section 3208.308. Products containing urea-formaldehyde resins shall not be allowed.

B. Softwood Plywood: Veneer-core plywood; conforming to PS 1, Exposure 1, Grade A-A, Group 1. Nominal thickness shall be as indicated in this Section and as shown on Drawings.

C. Particleboard: Meets or exceeds ANSI A208.1, Class M2, NAF resin, minimum 45 pounds per cubic foot density. At wet areas, meet moisture resistant specifications for ANSI MR30 per ASTM D1037 for 24 hour water absorption.
1. Products:
   a. Encore as manufactured by SierraPine or accepted equal.
   b. FreeForm as manufactured by Collins Pine or accepted equal.

D. Medium Density Fiberboard (MDF): Meets or exceeds ANSI A208.2, Class SDF, NAF resin, minimum 45 pounds per cubic foot density. At wet areas, meet moisture resistant specifications for ANSI Grade 155 MR50 per ASTM D1037 for 24 hour water absorption.

1. Products:
   a. Standard MDF: Medite II as manufactured by SierraPine or accepted equal.
   b. Moisture-Resistant MDF: Medex as manufactured by SierraPine or accepted equal.

E. Hardboard: ANSI 135.4, Class 1 – Tempered; smooth-one-side (S1S), minimum sixty pounds per cubic foot density.

F. Thermally Fused Melamine: Thermoset decorative overlays pre-laminated to substrate (hardboard, particleboard, or MDF as specified in this Section) by thermal fusion; performance characteristics equal to a general purpose grade or liner grade high pressure laminate as per NEMA LD3.

2.5 PLASTIC LAMINATE

A. Manufacturers:

1. Acceptable Manufacturers:

2. Substitutions: Under provisions of Division 01.

B. High-Pressure Decorative Laminates: NEMA LD3; grades and thickness as follows:

<table>
<thead>
<tr>
<th>Use/Application</th>
<th>NEMA LD3 Grade</th>
<th>Min. Thickness</th>
</tr>
</thead>
<tbody>
<tr>
<td>Horizontal surface where postforming is not required.</td>
<td>HGS or HGL</td>
<td>0.048 inch ± 0.005 inch</td>
</tr>
<tr>
<td>Exposed vertical surfaces of casework components where postforming is not required.</td>
<td>VGS</td>
<td>0.028 inch ± 0.004 inch</td>
</tr>
<tr>
<td>Exposed vertical surfaces of casework components where postforming is required for curved surfaces.</td>
<td>VGP</td>
<td>0.028 inch ± 0.004 inch</td>
</tr>
<tr>
<td>Horizontal fire rated surfaces as part of fire rated assembly, CBC Class A (NFPA Class A) per ASTM E84.</td>
<td>HGF</td>
<td>0.048 inch ± 0.005 inch</td>
</tr>
</tbody>
</table>
Vertical fire rated surfaces as part of fire rated assembly. CBC Class A (NFPA Class A) per ASTM E84.

<table>
<thead>
<tr>
<th></th>
<th>VGF</th>
<th>0.028 inch ± 0.004 inch</th>
</tr>
</thead>
<tbody>
<tr>
<td>Cabinet liner</td>
<td>CLS</td>
<td>0.020 inch</td>
</tr>
<tr>
<td>Backing sheet. Provide at backside of plastic laminated panel substrates to enhance dimensional stability where laminate finish is applied to only one surface.</td>
<td>BK</td>
<td>0.020 inch</td>
</tr>
</tbody>
</table>

C. Colors: As indicated on Drawings.

2.6 QUARTZ SOLID SURFACING MATERIAL

A. Products and Manufacturers:
   1. Acceptable Products and Manufacturers:
   2. Substitutions: Under provisions of Division 01.

B. Solid Surfacing Material (SSM): Homogeneous quartz surface composed of approximately 93 percent crystalline silica bound in polymer creating a solid surfacing material. Color and pattern shall extend throughout the material.
   1. Thickness: 3/4 inch, unless otherwise indicated on Drawings.
   2. Color: As indicated on Drawings.

C. Properties:
   1. Flexural Strength: >5,300 psi, per ASTM D790.
   2. Flexural Modulus: 5.3–5.7E6 psi, per ASTM D790.
   3. Compressive Strength (Dry, Wet): ~27,000 psi, ~24,000 psi, per ASTM C170.
   6. Freeze-Thaw Cycling: Unaffected, per ASTM C1026.
   7. Point Impact: Passes ANSI Z 124.6.4.2
   8. Ball Impact: 164 inches, per NEMA LD 3.3.8, based on NEMA LD 3-2000.
10. Density: \( \approx 2400 \text{ kg/m}^3 \).
11. Flammability: ASTM E84, UL 723 (Class I and Class A) and NFPA 255
13. Smoke Developed Index: <100 for 3/4-inch.

D. Solid Surfacing Accessories:
   1. Joint Adhesive: Manufacturer’s standard two-part adhesive kit to create inconspicuous
      non-porous joints, with a chemical bond.
   2. Panel Adhesive: Manufacturer’s standard neoprene-based panel adhesive.
   3. Sealant: Manufacturer’s standard mildew resistant, FDA and UL recognized silicone
      sealant in color matching or clear formulations.

2.7 ACCESSORIES

A. Edge Banding: PVC vinyl; 0.125 inch (3 mm) thick by 15/16 inch wide. Color and pattern
   shall closely match exposed door and drawer front laminate color and pattern as accepted
   by Architect.

B. Vinyl Countertop Edge: PVC vinyl; 0.125 inch (3 mm) thick. Color and pattern shall closely
   match countertop laminate color and pattern as accepted by Architect.

C. Fasteners: Nails, screws, and other fasteners of size and type best suitable for the purpose.
   Staples, screws or T-nails not permitted at exposed surfaces. Staples and nails not
   permitted in casework joinery.

D. Adhesives, Caulks, and Sealants:
   1. Comply with provisions of Division 01. Adhesives shall meet VOC requirements of South
      Coast Air Quality Management District (SCAQMD) Rule No. 1168. Sealants and fillers
      shall meet or VOC requirements of Bay Area Air Quality Management District
      (BAAQMD) Regulation 8, Rule 51.
   2. Adhesives shall be selected for their ability to provide a durable, permanent bond and
      shall take into consideration such factors as materials to be bonded, expansion and
      contraction, bond strength, fire rating, and moisture resistance.
   3. Wood Joinery: CS 35-61 Type II (water-resistant). Shall withstand cold-soak tests
      specified in ANSI/HPVA HP-1.
   4. Laminate Adhesive: Water-based contact adhesive, type recommended by plastic
      laminate manufacturer.
   5. Caulk: Clear, 100 percent silicone – use to fill voids and joints between laminated
      components and adjacent surfaces.
   6. Sealant: Mold and mildew resistant; type and composition recommended by substrate
      manufacturer to provide a moisture barrier at sink cutouts and other locations where
      unfinished substrate edges may be subjected to moisture.

2.8 CABINET HARDWARE

A. Hardware shall be furnished and installed as required to provide for a complete and
   operable casework installation. All hardware shall conform to ANSI/BHMA 156.9 Grade 2,
   except where a higher grade is specified.
B. Manufacturers:
   1. Acceptable Manufacturers:
   2. Substitutions: Under provisions of Division 01.

C. Overlay Institutional Hinges: ANSI/BHMA 156.9 Grade 1.
   1. Five-knuckle type; US26D satin chrome finish. Products: RPC Part No. 456, Häfele Cat. No. 354.65.400, or accepted equal.

D. Wire Pulls: 4 inch x 1-3/8 inch x 5/16 inch diameter steel handle; nickel matt finish. Product: Häfele Cat. No. 116.09.617, Epco Cat. No. MC401-4-DC, or accepted equal.

E. Drawer Slides:
   1. Pencil drawers: Full extension; steel ball bearings; hold-in detent; silenced in and out; low profile; 1/2 inch side space; minimum 50 pounds rated load. Product: Accuride Model No. 2632, Knape & Vogt Model No. 8400, or accepted equal.
   2. Box drawers: Full extension; steel ball bearings; hold-in detent; progressive movement; 1/2 inch side space; 100 pounds rated load. Product: Accuride Model No. 3832, Knape & Vogt Model No. 8405, or accepted equal.
   3. File drawers (up to 24 inches wide): Minimum 1 inch over travel; steel ball bearings; hold-in detent; progressive movement; 1/2 inch side space; 150 pounds rated load. Product: Accuride Model No. 4034, Knape & Vogt Model No. 8505, or accepted equal.

F. Adjustable Shelf Supports: ANSI/BHMA 156.9 Grade 1; nickel plated zinc die-cast shelf supports, 5 mm pin diameter with additional pin for shelf. Product: Hettich Sekura 6 Cat. No. 079707, Häfele Cat. No. 282.24.720, or accepted equal.

G. Elbow Catch: Heavy duty solid brass. Product: Epco Part No. 1018-N, or accepted equal.
H. Cabinet Locks:

1. Single: Deadbolt locks with 90 degree turn; key removable in both locked and unlocked positions. Provide two keys per lock. Provide strike bars at doors and angle strikes at drawers. Cylinder lengths: 7/8 inch at doors and 1-3/8 inch at drawers. Finish: US26D, satin chrome. Products:
   a. Doors: CompX National C8173, Olympus 100DR, or accepted equal.
   b. Drawers: CompX National C8179, Olympus 200DW, or accepted equal.

2. All casework locks and keying shall match facility’s casework needs and keying system. Locks shall be keyed in groups per functional operations.

I. Cable Grommets: 2-1/2 inch diameter plastic grommet; black color. Product: Doug Mockett & Company, Inc. Model EDP (flip-top tab), Häfele Cat. No. 429.99.324 (spring-loaded rotating segment in cover), or accepted equal.

2.9 FABRICATION

A. Fabricate and assemble casework components at the shop site to the maximum extent possible. Construction and fabrication of cabinets and their components shall meet or exceed WI grade requirements as indicated in this Section.

B. Closely fit casework at site. Provide filler inserts and trim where necessary, scribe for a tight fit.

C. Provide cutouts for inserts, grommets, and fittings. Install grommets where indicated on the drawings after site verification of locations and dimensions. Seal surfaces of cut edges.

D. Operable parts for all accessible casework shall comply with CBC Section 11B-309.

E. Plastic Laminates:

1. Apply plastic laminate in full uninterrupted sheets, consistent with manufactured sizes.
2. Fit corners and joints hairline. Slightly bevel arises.
3. Secure plastic laminated panels with concealed fasteners.
4. Apply laminate backing sheets to reverse side of panels with high-pressure decorative laminates on one face.

F. Sheet Materials Application:

<table>
<thead>
<tr>
<th>Use/Application</th>
<th>Thickness</th>
<th>Wood-Based Panel</th>
</tr>
</thead>
<tbody>
<tr>
<td>Casework carcass.</td>
<td>Min. 3/4 inch</td>
<td>Plywood, Particleboard, or MDF</td>
</tr>
<tr>
<td>Doors and drawer false fronts.</td>
<td>3/4 inch</td>
<td>Particleboard or MDF</td>
</tr>
<tr>
<td>Drawer box.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Sides, backs, and subfronts.</td>
<td>Min. 1/2 inch, Max. 5/8 inch</td>
<td>Plywood, Particleboard, or MDF</td>
</tr>
<tr>
<td>Bottom.</td>
<td>Min. 1/4 inch</td>
<td>Hardboard or MDF</td>
</tr>
<tr>
<td>Cabinet backs.</td>
<td>Min. 1/4 inch</td>
<td>Hardboard or MDF</td>
</tr>
<tr>
<td>Laminate clad countertops.</td>
<td>Min. 3/4 inch</td>
<td>Plywood, Particleboard, or MDF</td>
</tr>
<tr>
<td>Shelves: up to 32 inch span.</td>
<td>Min. 3/4 inch</td>
<td>Plywood, Particleboard, or MDF</td>
</tr>
<tr>
<td>Shelves: 32 inch up to 49 inch span.</td>
<td>Min. 1 inch</td>
<td>Plywood</td>
</tr>
</tbody>
</table>
G. Casework Carcass:
   1. Glue frame components together. Brace top corners, bottom corners and cabinet
      bottoms with hardwood blocks, or metal or plastic braces.
   2. Joinery Method: Acceptable joinery methods shall be as follows:
      a. Tops, exposed ends, and bottoms:
         1) Steel European assembly fasteners 1-1/2 inch from end, 5 inches on center.
            Fasteners shall not be visible on exposed parts.
         2) Doweled and glued under pressure – approximately four dowels per 12 inches of
            joint.
         3) Stop dado, glued under pressure, and either nailed or screwed. Fasteners shall
            not be visible on exposed parts.
         4) Spline or biscuit and glued under pressure.
      b. Cabinet backs (wall hung cabinets):
         1) Wall hung cabinet backs must not be relied upon to support the full weight of the
            cabinet and its anticipated load for hanging/mounting purposes. Method of back
            joinery and hanging/mounting mechanism should transfer the load to case body
            members.
         2) Fabrication method: Full bound, capture in grooves on cabinet sides, top, and
            bottom. Cabinet backs for floor standing cabinets shall be side bound, captured
            in grooves, glued and fastened to top and bottom.

H. Drawer Assembly:
   1. Drawer box with drawer false front.
   2. Acceptable joinery methods:
      a. Multiple dovetail (all corners) or French dovetail front/dadoed back, glued under
         pressure.
      b. Doweled, glued under pressure.
      c. Lock shoulder, glued and pin nailed.
      d. Bottoms shall be set into sides, front, and back, 1/4 inch deep groove, with a
         minimum 3/8 inch standing shoulder.
   3. File Drawers: Unless otherwise indicated, direction of file folders shall be parallel to
      drawer door. Provide adequate, clear inside dimensions for hanging file folders. Minimum
      clear inside drawer dimensions shall be as follows:
      b. Legal size file folders: Minimum 16-1/4 inch wide by 10-1/2 inch high.

I. Shelving:
   1. Fixed shelves: Dadoed or doweled into cabinet sides.
   2. Adjustable shelves: 0.197 inch bore holes at 1-1/4 inch on center.

J. Laminate Countertops and Backsplash:
   1. Edge Style: As indicated on Drawings.
   2. Mechanically fasten back splash to countertops at minimum 16 inches on center.
3. Substrate shall be moisture-resistant where countertops receive sinks, lavatories, or are subject to liquids.

2.10 FINISH

A. Finish – Laminated Casework:
   1. Drawer box: Thermally fused melamine.
   2. Semi-exposed surfaces, as defined in WI/AWMAC North American Architectural Woodwork Standards Section 10:
      a. Cabinet with doors: Thermally fused melamine.
      b. Cabinets with open shelves: High-pressure decorative laminate.
   3. Exposed surfaces, as defined in WI/AWMAC North American Architectural Woodwork Standards Section 10: High-pressure decorative laminate with PVC edge banding.
   4. Doors and drawer false fronts: High-pressure decorative laminate with PVC edge banding.

PART 3 EXECUTION

3.1 EXAMINATION

A. Verify field measurements, dimensions, location and layout.

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

C. Verify adequacy of backing and support framing.

D. Report unacceptable conditions to Architect. Begin installation only when unacceptable conditions have been corrected.

3.2 INSTALLATION

A. Install in accordance with accepted shop drawings and with applicable WI grade requirements as indicated in this Section.

B. Install fabricated assemblies, level, plumb, square, and true to line, in locations as shown on Drawings.

C. Anchorage:
   1. Attach and anchor casework securely to floors and walls with mechanical fasteners appropriate for the substrate.
   2. Use concealed fasteners to attach and secure casework components, countertops, and plumbing fixtures.

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

E. Install solid surfacing per manufacturer's written instructions.

F. Install cable grommets in countertops at all casework knee-spaces and where shown on Drawings.
3.3 ADJUSTING

A. Adjust moving or operating parts for smooth, uniform operation.

B. Drawer slides shall be adjusted such that the drawer does not act as the stop.

3.4 CLEANING

A. Clean as recommended by manufacturer. Do not use materials or methods which may damage finish surface or surrounding construction.

END OF SECTION
PART 1  GENERAL

1.1  SECTION INCLUDES
A.  Interior and exterior polyester-based resin paneling.
B.  Attachment accessories including support system.

1.2  RELATED SECTIONS
A.  Division 01 – Sustainable Design Requirements; for additional LEED requirements.
B.  Section 05 12 00 – Structural Steel Framing.
C.  Section 09 22 16 – Non-Structural Metal Framing.
D.  Section 09 29 00 – Gypsum Board.

1.3  REFERENCES
A.  The publications listed below form a part of this Section to the extent referenced. The publications are referred to in the text by the basic designation only. Refer to Division 01 for definitions, acronyms, and abbreviations.
B.  Standards, manuals, and codes refer to the latest edition of such standards, manuals, and codes in effect as of the date of issue of this Project Manual, unless indicated otherwise in CBC Chapter 35 and CFC Chapter 80.
C.  Referenced Standards:

1.4  SUBMITTALS
A.  Submit under provisions of Division 01.
B. LEED Submittals: Provide the following, and comply with applicable requirements and procedures of Division 01.
   1. Product Data for EQ Credit 2: For adhesives and sealants, including printed statement of VOC content and chemical components.

C. Provide product data on panels, trim and adhesive.

D. Submit manufacturer's installation instructions under provisions of Division 01.

E. Shop Drawings: Shop drawings shall include details and erection data associated with the work of other trades; location; materials, profiles, fastenings and accessories.

F. Samples: Submit samples of all interior and exterior trim materials. Samples shall be finished as specified and submitted for color and material approval prior to delivery and installation.
   1. Submit two samples 6 inches by 6 inches in size illustrating panel material, color, and finish.
   2. Submit two samples 6 inches long in size illustrating trim material, color and finish.

1.5 LEED COMPLIANCE DOCUMENTATION

A. Provide the following, and comply with applicable requirements and procedures of Division 01, LEED Online Letter Templates, and LEED 2013 BD+C Reference Guide:
   1. Product Data for MR Credit 3: For products having recycled content, documentation indicating percentages by weight of post-consumer and pre-consumer recycled content.
      a. Include statement indicating costs for each product having recycled content.
   2. Certificates for MR Credit 3: Provide certification for percentages of materials (based on cost) extracted, processed, and manufactured regionally within 100 miles of the project site.

1.6 QUALITY ASSURANCE

A. Source Limitations: Obtain plastic paneling and trim from a single manufacturer.

B. Regulatory Requirements: Comply with 2016 California Building Code, Chapter 8, "Interior Finishes", Section 803, "Wall and Ceiling Finishes".

C. Surface-Burning Characteristics: Class C, as determined by testing identical products according to ASTM E84 by a qualified testing agency. Identify products with appropriate markings of applicable testing agency.
   1. Flame-Spread Index: 200 or less.
   2. Smoke-Developed Index: 450 or less.

D. Installation Acceptance: All rejected work shall be removed and replaced at no cost to Owner.

1.7 DELIVERY, STORAGE AND HANDLING

A. Delivery: Do not deliver to the job site until suitable storage space is available.
B. Storage, Handling and Protection: Provide all work or materials necessary to store, cover and protect materials specified and installed under this Section. Store materials under cover in a well-ventilated enclosure and protect against extreme changes in temperature and humidity. Prevent marring of finished surfaces and keep materials clean during handling and installation operations. Protect exposed finish work and materials from damage after installation. Replace damaged items at no cost to Owner.

1.8 PROJECT CONDITIONS

A. Environmental Limitations: Do not install plastic paneling until spaces are enclosed and weathertight and temporary HVAC system is operating and maintaining ambient temperature and humidity conditions at occupancy levels during remainder construction period.

PART 2 PRODUCTS

2.1 LEED REQUIREMENTS

A. Recycled Content:
   1. Provide products with post-consumer and pre-consumer recycled content, calculated as percentages of total product weight.
      a. Post-consumer recycled content plus one-half of pre-consumer recycled content shall constitute a part of applicable LEED Credit requirement for recycled content.

2.2 MANUFACTURERS


C. Substitutions: Under provisions of Division 01.

2.3 MATERIALS

A. Polyester-Based Resin Paneling Systems:
   1. Chroma Panels:
      a. Panel Sizes: As indicated on Drawings.
      b. Configurations: As indicated on Drawings.
      c. Thickness: 1/2 inch.
      d. Pattern and Color: As indicated on Drawings.
      e. Diffusion: 45 percent.
      g. Style: Powder DO3
      h. UV Protection: Required.
      i. Edge Sealing: Required.
j. Performance Properties:
   1) Rate of Burning: Attain CC2 Rating for a nominal thickness of 0.060 inch and
greater per ASTM D635.
   2) Self-Ignition Temperature: Greater than 850 degrees F per ASTM D1929.
   3) Density of Smoke: Less than ten percent per ASTM D2843.
   4) Dynamic Environmental Testing: Panels shall not have detectable VOC off-
gassing agents and shall be Greenguard Indoor Air Quality Children and Schools
certified.
   5) Product shall be fused using heat and pressure, not laminated with adhesives.
   6) Colors shall be PVC-free and be an acrylic resin made with pigments, not dyes.
Colors shall be UV stable.
   7) Vellum surface shall be completely renewable on-site.

2.4 FABRICATION

A. Comply with manufacturer’s printed instructions for fabrication.

B. General: Fabricate panels to designs, sizes, thicknesses, profiles, and other characteristics
   as indicated on Drawings.

C. Machining: Acceptable means of machining are listed below. Ensure that material is not
   chipped or warped by machining operations.
   1. Sawing: Select equipment and blades suitable for type of cut required.
   2. Drilling: Drills specifically designed for use with plastic products.
   4. Laser cutting.
   5. Laser etching.

D. Forming: Comply with manufacturer’s printed instructions. Form products to shapes
   indicated on Drawings, using the appropriate method as listed below.
   1. Cold bending.
   2. Hot bending.
   3. Thermoforming: Acceptable only on uncoated material.
   4. Drape forming.
   5. Matched mold forming.
   6. Mechanical forming.

E. Laminating: Laminate to substrates indicated on Drawings, using adhesives and techniques
   recommended by panel manufacturer.

F. Bonding: Manufacturer shall have an in-field seaming process and fabrication kit including
   necessary adhesives and tools.
2.5 ACCESSORIES

A. Point Support System:
   1. 25 mm x 20 mm cap.
   2. 25 mm x 25 mm barrel.
   3. 50 mm flange.
   4. Threaded anchor for attachment to metal framing.
   6. Installation: Grid pattern.

B. Cleaner: Type recommended by manufacturer.

PART 3 EXECUTION

3.1 EXAMINATION

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

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

3.2 PREPARATION

A. Sand substrate high spots and fill low spots as required to provide flat and even surface for panel installation.

B. Clean substrates of substances that could impair bond of adhesive, including oil, grease, dirt, and dust.

C. Surfaces to receive polyester-based resin paneling shall be prepared in strict accordance with manufacturer’s printed instructions and as specified herein. Fill pinholes, cracks and other surface imperfections with spackle and scrape off surface splatters and imperfections to leave substrate smooth and free of damage. Condition panels by unpacking and placing in installation space before installation according to manufacturer’s written recommendations.

D. Lay out paneling before installing. Locate panel joints as indicated on Drawings.

E. Other trade work that penetrates the substrate shall be completed before beginning polyester-based resin paneling application.

F. Verify Drawings for panel location, layout, and treatment of perimeter conditions.

3.3 INSTALLATION

A. Install plastic paneling in accordance with manufacturer’s printed instructions and as indicated on Drawings.
   1. Installation with Fasteners: Install panels with fasteners. Layout fastener locations and mark on face of panels so that fasteners are accurately aligned.

B. Install panel systems level, plumb, and true.

C. Provide a smooth, straight, solid and clean wall surface.
D. Maintain uniform space between adjacent panels and between panels and floors, ceilings, and fixtures.

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

F. Install trim as shown and as required for a complete, finished system.

3.4 CLEAN-UP

A. General: Keep the premises in a neat, safe and orderly condition during execution of this portion of the work.

B. Clean-up: Upon completion of the work of this Section, remove all surplus materials, rubbish and debris from the premises and leave it "broom clean."

END OF SECTION
SECTION 06 73 00
COMPOSITE WOOD SIDING

PART 1  GENERAL

1.1  SECTION INCLUDES

A.  Composite wood siding.

1.2  RELATED SECTIONS

A.  Section 05 50 00 – Metal Fabrications: Decorative fencing.

1.3  REFERENCES

A.  The publications listed below form a part of this Section to the extent referenced. The publications are referred to in the text by the basic designation only. Refer to Division 01 for definitions, acronyms, and abbreviations.

B.  Standards, manuals, and codes refer to the latest edition of such standards, manuals, and codes in effect as of the date of issue of this Project Manual, unless indicated otherwise in CBC Chapter 35 and CFC Chapter 80.

C.  Referenced Standards:


8.  ASTM D2047  – Standard Test Method for Static Coefficient of Friction of Polish-Coated Flooring Surfaces as Measured by the James Machine


1.4 SUBMITTALS
A. Submit under provisions of Division 01.
B. Product Data: Indicate sizes, profiles, surface finishes, and performance characteristics.
C. Samples: Submit three-12 inch long siding samples illustrating size, profile, color, and surface finish.
D. Closeout Submittals:
   1. Maintenance Data: Manufacturer's instructions on care and cleaning of composite wood products

1.5 DELIVERY, STORAGE AND HANDLING
A. Deliver, store, and handle composite wood in accordance with manufacturer’s instructions.
B. Store composite wood level and flat, off ground or floor, with supports at each end and maximum 24 inches on center.
C. Do not stack composite wood over 12 feet high.
D. Cover composite wood with waterproof covering, vented to prevent moisture buildup.

1.6 WARRANTIES
A. Furnish manufacturer’s 25 year warranty providing coverage against checking, splitting, splintering, rotting, structural damage from termites, and fungal decay of composite wood.

PART 2 PRODUCTS

2.1 MANUFACTURERS
B. TimberTech.
C. Substitutions: Under provisions of Division 01.

2.2 MATERIALS
A. Composite Wood:
   1. Composition: Reclaimed wood and plastic with integral coloring; free from toxic chemicals and preservatives.
   2. Profiles:
      a. Siding Size: Nominally 1 inch x 7-1/4 inches x maximum practical length.
   3. Edges: Square.
   4. Surface Texture: Deeply grained.
   5. Colors: Colors as selected by Architect from full range of manufacturer’s standard colors.
6. Characteristics:
   a. Abrasion resistance: 0.01 inch wear per 1000 revolutions, tested to ASTM D2394.
   b. Hardness: 1124 pounds, tested to ASTM D143.
   c. Self ignition temperature: 743 degrees F, tested to ASTM D1929.
   d. Flash ignition temperature: 698 degrees F, tested to ASTM D1929.
   e. Flame spread rating: 80, tested to ASTM E84.
   f. Water absorption, 24 hour immersion, tested to ASTM D1037:
      1) Sanded surface: 4.3 percent.
      2) Unsanded surface: 1.7 percent.
   g. Thermal expansion coefficient, 36 inch long samples:
      1) Width: 35.2 x 10^-6 to 42.7 x 10^-6.
      2) Length: 16.1 x 10^-6 to 19.2 x 10^-6.
   h. Fastener withdrawal, tested to ASTM D1761:
      1) Nail: 163 pounds per inch.
      2) Screw: 558 pounds per inch.
   i. Static coefficient of friction:
      1) Dry: 0.53 to 0.55, tested to ASTM D2047.
      2) Dry: 0.59 to 0.70, tested to ASTM F1679.
      3) Wet: 0.70 to 0.75, tested to ASTM F1679.
   j. Fungus resistance, white and brown rot: No decay, tested to ASTM D1413.
   k. Termite resistance: 9.6 rating, tested to AWPA E-1.
   l. Specific gravity: 0.91 to 0.95, tested to ASTM D2395.
   m. Compression:
      1) Parallel: 1806 PSI ultimate, 550 PSI design, tested to ASTM D198.
      2) Perpendicular: 1944 PSI ultimate, 625 PSI design, tested to ASTM D143.
   n. Tensile strength: 854 PSI ultimate, 250 PSI design, tested to ASTM D198.
   o. Shear strength: 561 PSI ultimate, 200 PSI design, tested to ASTM D143.
   p. Modulus of rupture: 1423 PSI ultimate, 250 PSI design, tested to ASTM D4761.
   q. Modulus of elasticity: 175,000 PSI ultimate, 100,000 PSI design, tested to ASTM D4761.
   r. Thermal conductivity: 1.57 BTU per inch per hour per square foot at 85 degrees F, tested to ASTM C177.

2.3 ACCESSORIES

A. Fasteners: Stainless steel wood screws of length and shank diameter recommended by composite wood manufacturer for profile being fastened.
PART 3  EXECUTION

3.1  EXAMINATION

A. Examine job site conditions and verify field dimensions.
B. Verify structure or substrate is plumb, level, and ready to receive work.
C. Report unacceptable conditions to Architect. Begin installation only when unacceptable conditions have been corrected.

3.2  INSTALLATION

A. Install composite wood in accordance with manufacturer's instructions.
B. Cut, drill, and rout composite wood using carbide tipped blades.
C. Pre-drill fastener holes located closer than 1 inch from edges.
D. Cut ends square and true.
E. Do not exceed maximum spans recommended by manufacturer.
F. Place boards perpendicular to supports.
G. Stagger end joints in adjacent rows at least one support.
H. Leave expansion spaces between abutting boards and between boards and adjacent construction:
   1. End gaps between boards: 1/8 inch at ambient temperatures of 60 degrees F and above and 3/16 inch at ambient temperatures below 60 degrees F.
   2. Side gaps between boards: 1/4 inch at ambient temperatures of 60 degrees F and above and 3/8 inch at ambient temperatures below 60 degrees F.
   3. Gaps between boards and adjacent construction: 1/4 inch at ambient temperatures of 60 degrees F and above and 1/2 inch at ambient temperatures below 60 degrees F.
I. Place boards to span three or more supports.
J. Fasten each board to each support with two fasteners.

3.3  CLEANING

A. Clean composite wood to remove stains:
   1. Mold, mildew, and berry and leaf stains: Clean surfaces with conventional wash containing detergent or sodium hypochlorite.
   2. Rust and ground-in dirt: Clean surfaces with cleaner containing oxalic or phosphoric acid.
   3. Oil and grease: Clean surfaces with detergent containing degreasing agent.

END OF SECTION
DIVISION 07
THERMAL AND MOISTURE PROTECTION
SECTION 07 19 19

SILICONE WATER REPELLENTS

PART 1  GENERAL

1.1  SECTION INCLUDES

A. Water-based silicone water repellent and anti-graffiti coating.

1.2  RELATED SECTIONS

A. Section 04 21 13.23 – Surface Bonded Brick Masonry.

1.3  REFERENCES

A. The publications listed below form a part of this Section to the extent referenced. The publications are referred to in the text by the basic designation only. Refer to Division 01 for definitions, acronyms, and abbreviations.

B. Standards, manuals, and codes refer to the latest edition of such standards, manuals, and codes in effect as of the date of issue of this Project Manual, unless indicated otherwise in CBC Chapter 35 and CFC Chapter 80.

C. Referenced Standards:


1.4  SUBMITTALS

A. General: Submit in accordance with Division 01.

B. Product Data: Submit the following:

1. Manufacturer’s descriptive literature and product data sheets.

2. MSDS.

C. Quality Assurance/Control Submittals:

1. Submit manufacturer qualifications information.

2. Submit applicator qualifications information.

3. VOC content limits certification.

4. Provide narrative description of protection of surrounding areas and non-masonry surfaces, surface preparation, application, and final cleaning.

5. Manufacturer’s application instructions

6. Manufacturer’s field reports.

D. Closeout Submittals:

1. Manufacturer’s warranty certificate.

2. Cleaning and maintenance data.
1.5 QUALITY ASSURANCE

A. Qualifications:
   1. Manufacturer Qualifications: Firm specializing in manufacturing products specified in this Section with a minimum ten years experience.
   2. Applicator Qualifications: Firm specializing in installing work specified in this Section acceptable to manufacturer with experience on at least five projects of similar nature in the past three years of similar nature. Provide a complete list of completed projects, including project name and location, names of Owner and Architect including contact information, and description of products, substrates, and method of application.

B. Regulatory Requirements:
   1. Comply with the local Air Quality Management District’s (AQMD) rules and regulations.
   2. Provide products that meet requirements of local AQMDs for volatile organic compounds (VOC).

C. Certifications:
   1. VOC Content Limits Certification: Submit certification that coating product complies with local air quality management district’s regulations and prescribed requirements for volatile organic compounds (VOC).

D. Field Sample (Test Panel):
   1. Before full-scale application, review manufacturer’s product data sheets to determine the suitability of each product for the specific surfaces. Apply coating to test panels to determine appropriate strength, coverage rates, compatibility, effectiveness, surface preparation, application procedures and desired results.
   2. Apply coating to test panels as directed by Architect, minimum 48 inches wide by 48 inches high for each type of substrate, in accordance with manufacturer’s written instructions. Allow 24 hours or until panels are thoroughly cured before evaluating final appearance and results. Do not begin full-scale application until test panels are reviewed and accepted by the Architect.
   3. Allow coating to cure at least seven days prior to testing using low-pressure tube test (RILEM) or masonry absorption test (MAT) methods.

E. Tests:
   1. Perform tests in accordance with Division 01.
   2. Test Panel: Owner appointed testing laboratory shall perform tests on test panels using low-pressure tube test (RILEM) or masonry absorption test (MAT) methods.
   3. Executed Work: Owner appointed testing laboratory shall perform two tests for each type of substrate on executed work at randomly selected areas designated by Architect.
   4. Owner shall pay for these tests; however, retesting required because of non-conformance shall be paid for by the Contractor.

F. Pre-Installation Meetings:
   1. Conduct pre-installation meeting in accordance with Division 01.
2. Convene pre-installation meeting prior to commencing work of this Section. Require attendance of parties directly affecting work of this Section including Contractor, Architect, applicator, and manufacturer’s representative. Review environmental requirements, test panel procedures, protection of surrounding areas and non-masonry surfaces, surface preparation, application, field quality control, final cleaning, coordination with other work, and extended warranty requirements.

3. Coordinate work in this Section with work in related Sections.

1.6 DELIVERY, STORAGE, AND HANDLING

A. Comply with requirements of Division 01.

B. Deliver products in manufacturer's original containers, dry and undamaged, with seals and labels intact.

C. Storage and Protection: Store containers in a cool, dry place. Keep away from sparks and open flame. Store and handle materials in accordance with manufacturer's written instructions.

1.7 ENVIRONMENTAL REQUIREMENTS

A. Temperature: Water repellent product may be applied at any temperature, providing that there is no frozen moisture present in the substrate. When applied at temperatures below 40 degrees F, the product may cure at a slower rate. Optimal ambient temperature for applying product is 40 degrees F to 95 degrees F.

B. Do not apply material if the substrate is wet or contains frozen moisture. Allow substrate to dry for a minimum of 48 hours after rain or power washing.

C. Do not apply material during inclement weather or if precipitation is expected within 12 hours.

D. Do not use spray methods of application under windy conditions.

1.8 WARRANTY

A. Comply with provisions of Division 01.

B. Provide manufacturer's ten year warranty.

C. Prior to applying coating, review and comply with manufacturer's warranty processing requirements – do not proceed until warranty processing requirements have been met.

1.9 OPERATIONS AND MAINTENANCE DATA

A. Submit under provisions of Division 01.

B. Provide cleaning and maintenance data.
PART 2  PRODUCTS

2.1  MANUFACTURERS AND PRODUCTS

A. Acceptable Manufacturers and Products:
   2. or accepted equal.

B. Substitutions: Under provisions of Division 01.

2.2  WATER REPELLENT/ANTI-GRAFFITI COATING

A. Penetrating sealer formulated using water-based silicone emulsion. Penetrates without altering the natural appearance of the substrate. Inorganic; not affected by ultraviolet rays, ozone, salt spray, and acid rain. Breathable; allows moisture-vapor to escape while preventing liquid penetration.

B. Properties:
   1. Form: Milky white liquid.
   2. Specific Gravity: 1.00
   3. Weight: 8.32 pounds per gallon.
   4. Active Content: 6 percent.
   5. Total Solids: 6 percent per ASTM D5095.
   6. VOC Content: Less than 20 g/L.
   7. Flash Point: Greater than 212 degrees F.
   8. Freeze Point: 32 degrees F.
   9. Shelf Life: One year in tightly sealed, unopened container.

PART 3  EXECUTION

3.1  EXAMINATION

A. Examine substrate conditions to determine that conditions are acceptable to receive coating. Verify the following:
   1. The required joint sealants have been installed.
   2. Masonry and mortar has cured a minimum of 28 days.
   3. Surface to be treated is clean, dry, absorbent, and contains no frozen moisture.
   4. Environmental conditions are appropriate for application.

B. Report unacceptable conditions to the Architect. Begin installation only when unacceptable conditions have been corrected.
3.2 PREPARATION

A. Protection

1. Protect surrounding areas such as but not limited to glass, landscaping, building occupants, pedestrians, vehicles, and non-masonry surfaces during the work from contact with coatings.

2. Take special precautions to prohibit fumes from entering the building being treated. Cover and turn-off ventilation systems and fresh air intakes.

B. Surface Preparation

1. Clean all dirt, oil, grease, mold, mildew, efflorescence, or any other coating or material from surfaces that could interfere with penetration, performance, adhesion, or aesthetics of coatings per coating manufacturer’s recommendations. Allow surfaces to dry completely before application of coatings.

2. Repair, patch, and fill all cracks, voids, defects, and damaged areas in surface as accepted by Architect. Allow repair materials to cure completely before application of coatings.

3. Seal all open joints.

4. Allow masonry surfaces to cure for a minimum of 28 days before application of coatings.

3.3 APPLICATION

A. Apply coating to substrates in accordance with manufacturer’s written instructions, environmental requirements, and application procedures determined from test panel results accepted by Architect.

B. Apply to clean, dry, cured, and properly prepared surfaces.

C. Apply coating after sealants have fully cured. Coordinate with Section 07 92 00.

D. Apply material as shipped by manufacturer – do not dilute.

E. Apply material using a high-volume, low pressure, pump-up sprayer (less than 50 psi), with fan tip. Avoid atomization of material. Apply two coats of product allowing first coat to dry to the touch, or within one hour, before applying second coat.

1. Apply from the bottom up.

2. Saturate surface wet-on-wet, spraying from the bottom up. Apply enough material to create a 6 inch to 8 inch rundown below the contact point.

3. Let the first application penetrate surface for 2 minutes to 3 minutes. Reapply in same saturating manner to ensure complete coverage of surfaces.

4. Immediately brush out runs and drips to prevent build-up.

F. Material dries to the touch in approximately one hour and gains water repellency properties in 24 hours. Drying takes longer at lower temperatures. Protect treated surfaces from precipitation for at least 6 hours after application.

3.4 FIELD QUALITY CONTROL

A. General: Comply with requirements of Division 01.
B. Coating work shall be inspected by Owner’s representative, Architect, Project Inspector, and manufacturer’s representative; and compared with accepted test panel.

C. Manufacturer’s Field Services: Provide services of manufacturer’s authorized field representative to verify specified products are used; protection, surface preparation, and application of water repellents are in accordance with manufacturer’s written instructions; and the test panel is accepted by Architect.

3.5 CLEANING

A. Clean as recommended by manufacturer. Do not use materials or methods which may damage finish surface or surrounding construction.

B. Upon completion of coating application, remove all equipment, materials and debris, leaving the area in an undamaged and acceptable condition. Dispose of coating containers according to state and local environmental regulations.

C. Clean, repair, restore, or replace to the satisfaction of the Architect, all materials, landscaping, and all non-masonry surfaces damaged by exposure to coatings at no additional cost to Owner.

END OF SECTION
SECTION 07 21 00
THERMAL INSULATION

PART 1 GENERAL

1.1 SECTION INCLUDES

A. Thermal insulation in exterior wall construction.
B. Exterior wall rigid sheathing/insulation.

1.2 RELATED SECTIONS

A. Division 01 – Sustainable Design Requirements; for additional LEED requirements.
B. Section 05 40 00 – Cold-Formed Metal Framing.
C. Section 09 29 00 – Gypsum Board.
D. Section 09 81 00 – Acoustic Insulation.

1.3 REFERENCES

A. The publications listed below form a part of this Section to the extent referenced. The publications are referred to in the text by the basic designation only. Refer to Division 01 for definitions, acronyms, and abbreviations.

B. Standards, manuals, and codes refer to the latest edition of such standards, manuals, and codes in effect as of the date of issue of this Project Manual, unless indicated otherwise in CBC Chapter 35 and CFC Chapter 80.

C. Referenced Standards:


1.4 SUBMITTALS

A. Submit under provisions of Division 01.
B. Product Data: Provide data on product characteristics, performance criteria, and limitations.
C. Manufacturer's Certificate: Certify that products meet or exceed California Quality Standards.

1.5 SYSTEM DESCRIPTION

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

1.6 COORDINATION

A. Coordinate work with other trades under provisions of Division 01.

PART 2 PRODUCTS

2.1 GLASS FIBER INSULATION

A. Acceptable Manufacturers:
   6. Substitutions: Comply with requirements of Division 01. Basis of Design product is critical to achievement of LEED credits. Proposed substitutions not meeting LEED criteria will not be considered.

B. Batt Insulation: Preformed glass fiber batt in accordance with 2016 CBC Section 720, ASTM E84, and UL 723, conforming to the following:
   1. Facings:
      a. Faced on one side with foil reinforced kraft (FSK) face at exposed locations (facing not covered by finish materials); Type III, Class A per ASTM C665; flame spread 25 and smoke developed 50 per ASTM E84.
      b. Kraft facing at locations where insulation will be covered by finish materials; Type II, Class C per ASTM C665. In concealed locations, facings shall be installed behind and in substantial contact with the unexposed surface of the wall finish.
   2. Provide formaldehyde-free thermal insulation products.

C. Accessories:
   1. Tape: Polyester self-adhering type, mesh reinforced, 2 inches wide.

2.2 RIGID SHEATHING/INSULATION

A. Acceptable Manufacturers:
B. Rigid Sheathing Insulation: ASTM C1289, Type I, Class 1 or Class 2, Grade 3; polisocyanurate foam core bonded to 1.0 mil thick smooth reflective aluminum foil facers on both faces.
   1. Thickness: 1-1/2 inch.
   2. Compressive Strength: 25 psi minimum per ASTM D1621.
   4. Thermal Resistance Value: Minimum 6.5 per inch of thickness per ASTM C518.

C. Accessories:
   1. Fasteners: Insulated sheathing manufacturer’s recommended polymer or other corrosion protective coated steel screw fasteners and washers for anchoring sheathing to metal wall framing. Fastener length and size based on wall sheathing thickness.
   2. Liquid Spray Flashing: Insulation manufacturer’s recommended board joint commercial liquid spray flashing and sealant for sealing joints, seams, window openings, door openings, counter-flashing, and penetrations through the insulation layer.
   3. Flashing Tape: Insulation manufacturer’s recommended tape for counter-flashing and penetrations through the insulation layer. Tape shall meet ASTM C711 for self adhering flashing.
   5. Gap Air Infiltration Filler: Insulated sheathing manufacturer’s recommended two component, quick cure polyurethane foam, meeting ASTM E84 standard test method for surface burning characteristics of building materials.

PART 3  EXECUTION

3.1 EXAMINATION

A. Verify existing site conditions.

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

3.2 INSTALLATION – BATT INSULATION

A. Install insulation in accordance with insulation manufacturer’s instructions and with the flame spread rating and smoke density requirements of CBC Section 720, ASTM E84, and UL 723.

B. Install in exterior walls full width, depth, and height of cavity, without gaps or voids. Do not compress insulation.

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

D. Fit insulation tight in spaces and tight to exterior side of mechanical and electrical services within the plane of insulation.
E. Install with factory applied vapor retarder membrane facing interior side of building spaces. Lap ends and side flanges of membrane over framing members.

F. Securely fasten and anchor insulation in place to prevent displacement or sagging of material in all areas.
   1. At metal stud walls, the insulation shall be wired in place with two #14 spring steel wires, one within 12 inches of the top and one at the mid-point of each stud bay.

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

3.3 INSTALLATION – RIGID SHEATHING/INSULATION

A. Install insulation in accordance with insulation manufacturer's instructions and with the flame spread rating and smoke density requirements of CBC Section 2603.

B. Place insulation over and fasten to exterior metal stud wall framing using insulation manufacturer's recommended type and length screw fasteners with washers. Abut panels tightly together and around openings and penetrations.
   1. Install insulation panels horizontally with correct surface, per the manufacturer, to the exterior. Use maximum lengths to minimize number of joints. Locate edge joints parallel to and on framing. Center end joints over supports and stagger in each course. Provide additional framing wherever panel joints do not bear against framing plate or sill members.

2. Fasten panels to each support with fasteners spaced 12 inches on center at perimeter of the panel and 16 inches on center in panel field. Set back perimeter fasteners 3/8 inch from edges and ends of panel units. Drive fasteners to bear tight and flush with surface of insulation. Do not overdrive fastener causing damage to the insulation board facer. Perimeter fasteners can be detailed to bridge the gap of abutting board joints due to the 2 inch diameter of the washer used to fasten the board to the studs. Maximum of two board joints may be bridged per fastener.

3. Install flashing at end and edge joints in accordance with insulation manufacturer's joint sealing recommendations.

4. Install flashing behind wall tie and mechanical fastening assemblies for rain screen claddings according to manufacturer's recommendations.

5. Seal sheathing joints and penetrations of sheathing in accordance with insulation manufacturer's joint and penetration sealing recommendations.

END OF SECTION
SECTION 07 25 00
WEATHER BARRIERS

PART 1 GENERAL

1.1 SECTION INCLUDES

A. Weather barrier membrane.
B. Seam tape.
C. Flexible flashings.
D. Fasteners.
E. Accessories.

1.2 RELATED SECTIONS

A. Section 05 40 00 – Cold-Formed Metal Framing.
B. Section 06 10 00 – Rough Carpentry.
C. Section 07 62 00 – Sheet Metal Flashing and Trim.
D. Section 08 11 13 – Hollow Metal Doors and Frames.
E. Section 08 41 13 – Aluminum-Framed Entrances and Storefronts.
F. Section 09 24 00 – Portland Cement Plastering.

1.3 REFERENCES

A. The publications listed below form a part of this specification to the extent referenced. The publications are referred to in the text by the basic designation only. Refer to Division 01 for definitions, acronyms, and abbreviations.

B. Standards, manuals, and codes refer to the latest edition of such standards, manuals, and codes in effect as of the date of issue of this Project Manual, unless indicated otherwise in CBC Chapter 35 and CFC Chapter 80.

C. Referenced Standards:

11. TAPPI Test Method T-410 – Grams of Paper and Paperboard (Weight per Unit Area).

1.4 SUBMITTALS

A. Submit under provisions of Division 01.

B. Product Data: Submit manufacturer current technical literature for each component specified in this Section.

C. Samples: Two samples each of weather barrier membrane and flashings, minimum 8-1/2 inches by 11 inch.

D. Quality Assurance Submittals:
   1. Design Data, Test Reports: Provide manufacturer test reports indicating product compliance with indicated requirements.
   2. Manufacturer Instructions: Provide manufacturer’s written installation instructions and details.
   3. Manufacturer’s Field Service Reports: Provide site reports from authorized field service representative, indicating observation of weather barrier assembly installation.

E. Closeout Submittals:
   1. Submit under provisions of Division 01.
   2. Weather Barrier Warranty: Manufacturer’s executed warranty form with authorized signatures and endorsements indicating date of Substantial Completion.

1.5 QUALITY ASSURANCE

A. Qualifications:
   1. Installer shall have experience with installation of specified weather barrier and flexible flashing assemblies under similar conditions.
   2. Installation shall be in accordance with weather barrier manufacturer’s installation guidelines and recommendations.

B. Single Source Responsibility: Provide building wrap, flashings, and accessory materials from a single manufacturer to ensure system compatibility and quality, and to comply with manufacturer’s warranty requirements.

C. Pre-installation Meeting:
   1. Conduct pre-installation meeting in accordance with provisions of Division 01.
   2. Hold a pre-installation conference, two weeks prior to start of weather barrier installation. Attendees shall include Contractor, Architect, installer, Owner’s Representative, and weather barrier manufacturer’s designated representative.
   3. Review all related project requirements and submittals, status of substrate work and preparation, areas of potential conflict and interface, availability of weather barrier assembly materials and components, installer’s training requirements, equipment, facilities and scaffolding, and coordinate methods, procedures and sequencing requirements for full and proper installation, integration and protection.
1.6 DELIVERY, STORAGE AND HANDLING

A. Deliver, store, and handle products and materials under provisions of Division 01.

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

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

1.7 SCHEDULING

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

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

1.8 WARRANTY

A. Product and Labor Warranty: Weather barrier manufacturer shall warranty weather barrier assemblies for a period of ten years from date of Project Completion.
   1. Weather barrier manufacturer’s approval for warranty is required prior to assembly installation.

PART 2 PRODUCTS

2.1 MANUFACTURER


B. Substitutions: Under provisions of Division 01.

2.2 MATERIALS

A. Building Wrap: High-performance, flash spun-bonded olefin, non-woven, non-perforated, secondary weather barrier is based upon DuPont™ Tyvek® CommercialWrap D® and related assembly components or accepted equal.

B. Performance Characteristics:
   1. Air Penetration Resistance: <0.04 cfm/ft² at 1.57 psf, when tested in accordance with ASTM E2357. Type 1 per ASTM E1677.
   2. Water Vapor Transmission: 30 perms, when tested in accordance with ASTM E96, Method B.
   3. Water Penetration Resistance: Minimum 235 cm when tested in accordance with AATCC Test Method 127.
   4. Basis Weight: Minimum 2.4 ounces per square yard, when tested in accordance with TAPPI Test Method T-410.
   5. Air Penetration Resistance: >750 seconds/100cc, when tested in accordance with TAPPI Test Method T-460.
7. Tear Resistance: 6/9 pounds, when tested in accordance with ASTM D1117.

2.3 FLEXIBLE FLASHINGS

A. DuPont™ FlexWrap™, as manufactured by DuPont™ Building Innovations™.
   1. Flexible membrane flashing materials for openings and penetrations.

B. DuPont™ StraightFlash™, as manufactured by DuPont™ Building Innovations™.
   1. Straight flashing membrane materials for flashing window and door openings and sealing penetrations.

2.4 ACCESSORIES

A. Seam Tape: DuPont™ Tyvek® Tape, three inches wide, as manufactured by DuPont™ Building Innovations™.

B. Fasteners: Tyvek® Wrap Cap Screws, as manufactured by DuPont™ Building Innovations™.
   1. 1-5/8 inch rust resistant screw with 2-inch diameter plastic cap fasteners.

C. Sealants:
   1. Provide sealants that comply with ASTM C920, elastomeric polymer sealant to maintain watertight conditions. All sealants shall be California VOC compliant.

2. Acceptable Products:
   a. DuPont Commercial Sealant.
   b. Dow Corning® 756.
   c. Tremco 830.
   d. Tremco Butyl.
   e. Other sealants recommended by the weather barrier manufacturer.

D. Adhesives:
   1. Provide adhesive recommended by weather barrier manufacturer. All adhesives shall be California VOC compliant.

2. Acceptable Products:
   a. SIA 655.
   b. Other adhesives recommended by the weather barrier manufacturer.

E. Primers:
   1. Provide flashing manufacturer recommended primer to assist in adhesion between substrate and flashing. All primers shall be California VOC compliant.

2. Acceptable Products:
   a. SIA 655.
   b. Other primers recommended by the flashing manufacturer.
PART 3 EXECUTION

3.1 EXAMINATION

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

3.2 INSTALLATION - WEATHER BARRIER

A. Install weather barrier over exterior face of exterior wall substrate in accordance with manufacturer recommendations

B. Install weather barrier prior to installation of windows, doors, and exterior cladding materials.

C. Start weather barrier installation at a building corner, leaving 6 inches to 12 inches of weather barrier extended beyond corner to overlap.

D. Install weather barrier in a horizontal manner starting at the lower portion of the wall surface with subsequent layers installed in a shingling manner to overlap lower layers. Maintain weather barrier plumb and level.

E. Sill Plate Interface: Extend lower edge of weather barrier over sill plate interface 6 inches. Secure to foundation with elastomeric sealant as recommended by weather barrier manufacturer.

F. Window and Door Openings: Extend weather barrier completely over openings.

G. Overlap weather barrier:
   1. Exterior Corners: Minimum 12 inches.
   2. Seams: Minimum 6 inches.

H. Weather Barrier Attachment:
   1. Attach weather barrier to steel or wood studs through exterior sheathing. Secure using weather barrier manufacturer recommend fasteners, space 6 inches to 18 inches vertically on center along stud line, and 24 inches on center, maximum horizontally.

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

3.3 SEAMING

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

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

3.4 OPENING PREPARATION

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

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

A. Cut wide DuPont™ FlexWrap™ a minimum of 4 inches wider than stud depth and 12 inches longer than length of sill rough opening.

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

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

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

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

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

G. Coordinate flashing with window and door installation.

H. On exterior, install backer-rod in joint between window and door frames and flashed rough framing. Apply sealant at jambs and head, leaving sill unsealed. Apply sealants in accordance with sealant manufacturer’s instructions and ASTM C1193.

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

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

K. On interior, install backer rod in joint between frame of window, door, and flashed rough framing. Apply sealant around entire opening to create air seal. Apply sealant in accordance with sealant manufacturer’s instructions and ASTM C1193.

3.6 FIELD QUALITY CONTROL

A. Notify manufacturer’s designated representative to obtain required periodic observations of weather barrier assembly installation.

3.7 PROTECTION

A. Protect installed weather barrier from damage.

END OF SECTION
SECTION 07 26 50

VAPOR EMISSION CONTROL SYSTEM

PART 1  GENERAL

1.1  SECTION INCLUDES

A. Vapor emission control system for application over new concrete slabs indicated to receive finished floor coverings.

1.2  RELATED SECTIONS

A. Division 01 – Sustainable Design Requirements; for additional LEED requirements.

B. Section 03 30 00 – Cast-In-Place Concrete.

C. Section 09 65 00 – Resilient Flooring.

1.3  REFERENCES

A. The publications listed below form a part of this Section to the extent referenced. The publications are referred to in the text by the basic designation only. Refer to Division 01 for definitions, acronyms, and abbreviations.

B. Standards, manuals, and codes refer to the latest edition of such standards, manuals, and codes in effect as of the date of issue of this Project Manual, unless indicated otherwise in CBC Chapter 35 and CFC Chapter 80.

C. Referenced Standards:


3. ASTM F710 – Standard Practice for Preparing Concrete Floors to Receive Resilient Flooring.


1.4  SUBMITTALS

A. General: Submit under provisions of Division 01.

B. LEED Submittals: Provide the following, and comply with applicable requirements and procedures of Division 01.

1. Product Data for EQ Credit 2: For paints and coatings, including printed statement of VOC content and chemical components.
C. Submittal Requirements: Submit product data, test reports, certificates, and manufacturer’s standard warranty.

D. Submit concrete slab relative humidity and pH test results, performed and certified by a qualified independent testing agency.

E. Submit manufacturer’s Certificate of Conformance stating that, per independent third party verification, the System installed on this project meets or exceeds all aspects of the standards set forth in ASTM F3010. Certificate shall be on manufacturer’s letterhead and shall be signed by manufacturer.

1.5 DEFINITIONS

A. The System: Vapor emission control system specified in this Section referred to as “System” or “the System” in this Section for brevity.

1.6 QUALITY ASSURANCE

A. Qualifications:
   1. Installer Qualifications:
      a. Installer shall be either manufacturer’s trained personnel; or manufacturer’s factory-trained and certified installer.
      b. Installer shall have a minimum of five years experience in the installation of specified vapor emission control system and shall have worked on a minimum of five installations using the same system.
   2. Manufacturer Qualifications:
      a. Minimum ten years experience in manufacturing water vapor emission control systems, specifically formulated and used for reducing water vapor emissions, and alkalinity control in concrete slabs, without change of system formulation for a minimum period of five years at the time of application.
      b. Experience in product application in similar projects requiring vapor emission control at new and existing concrete slabs.
         1) Similar projects shall have documented success of system being installed at in-situ relative humidity of 98 percent or greater, when tested according to ASTM F2170.
      c. Manufacturer shall provide independent laboratory test reports documenting performance of the System as follows:
         1) Water Vapor Transmission (Water Method), ASTM E96: Performance of the System shall be documented by an independent testing laboratory. Test net perm rate results shall not exceed 0.11 grains h-1 ft-2 in Hg-1.
         2) Alkalinity Test, ASTM D1308: Insensitivity to alkaline environment up to pH 14 in a 14-day test with no effect or degradation of sample.
   3. Testing Agency Qualifications: Qualified and experienced independent testing agency or International Concrete Repair Institute (ICRI) accredited individual to perform relative humidity (RH) and pH tests, as specified in this Section.
   4. System Qualifications: The System shall meet or exceed all aspects of the standards set forth in ASTM F3010.

B. Environmental Requirements: The System shall meet applicable VOC requirements of authorities having jurisdiction at Project site.
1.7 DELIVERY, STORAGE AND HANDLING

A. Deliver products to the job site in manufacturer’s original unopened containers, clearly labeled with the manufacturer’s name and brand designation.

B. Store products in a ventilated dry area, protected from dampness, freezing, and direct sunlight. Products shall not be stored in areas with temperatures in excess of 90 degrees F or below 50 degrees F, or with humidity in excess of 80 percent.

1.8 SITE CONDITIONS

A. Concrete Curing: The System shall be capable of being successfully installed on new concrete with a minimum curing period of seven days.

B. Enclosures and Environmental Limitations:
   1. Prior to testing concrete slabs for vapor emission rates, building shall be fully enclosed, and weather-tight. Interior wet work shall be completed and nominally dry, and work above ceilings completed. Test sites shall be maintained at the same temperature and humidity expected during normal building use.
   2. Concrete slabs shall be fully protected, with no water accumulation on the surface.
   3. Do not apply the System when ambient temperature is lower than 50 degrees F or higher than 90 degrees F, or expected to fall below 50 degrees F or rise above 90 degrees F within 24 hours of the System application, or when ambient humidity level is above 80 percent. In addition, the surface temperature of the concrete shall be a minimum of 5 degrees F removed from dewpoint and rising.

1.9 WARRANTY

A. Provide manufacturer’s written warranty for the System, covering system materials, testing, surface preparation, and installation. Additionally, warranty shall cover the cost of cementitious underlayment and floor covering repair or replacement, as acceptable to Owner and Architect, including, but not limited to, removal work, surface preparation, underlayment, floor covering materials, primers, adhesives, and associated installation work.
   1. Warranty Period: Fifteen years, minimum, or the life of finished floor covering, whichever comes first.
   2. Replacement Cost: In the event of failure of the System during warranty period, manufacturer’s warranty shall cover all costs for removal and replacement work including the System and floor covering, up to $5,000,000 per occurrence.

B. Manufacturer’s warranty exclusion shall be limited to the following:
   1. System failure due to topical intrusion of water due to plumbing failure, or other substances entering from the surface.
   2. Seismic damage occurring after installation.
   3. Water intrusion including, but not limited to, plumbing or flooding leaks below the slab.
   4. Damage due to removal and demolition work necessitated by replacement of installed floor covering during warranty period.

C. Warranty shall not exclude cracks visible at the time of installation or improper System installation.
PART 2 PRODUCTS

2.1 MANUFACTURERS AND PRODUCTS

A. LEED Requirements:
   1. VOC Content for floor coatings: 50 g/L or less when calculated according to 40 CFR 59, Subpart D (EPA Method 24).

B. Vapor Emission Control System:
   1. Acceptable Manufacturers and Products:
         1) Vap l® 2000 Zero VOC.
         2) SL Premium Self Leveling Underlayment.
         3) SC skim coat finish.
         4) Vap 06 Primer.
         1) MC Rapid.
         2) Ardex cementitious underlayment products.
      c. Substitutions: Under provisions of Division 01.

C. Relative Humidity and pH Testing Supplies:
   1. Provide digital RH meter by one of the following or accepted equal:

   2. Provide digital pH meter by one of the following or accepted equal:
      c. AMT Concrete Digital Alkalinity-pH Meter by American Moisture Test, Tustin, CA; 866-670-9700, americanmoisturetest.com.


2.2 SYSTEM DESCRIPTION

A. General: Vapor emission control system shall be warranted to control concrete slab relative humidity up to 100 percent as determined by:
1. Site conditions.
2. Concrete mix design.
3. Age of concrete substrate.
4. Relative humidity in the concrete slab.
5. pH test results.
6. Compatibility with finished floor covering products.

B. System Performance: Installed system shall bring pH levels within the range of 8-9, as determined by pH testing, in one or two coats at all areas indicated to receive a finished floor covering or finish coating.

1. Water Vapor Transmission: ASTM E96 (Water Method); performance of the System shall be documented by an independent testing laboratory. Net perm rate results shall not exceed 0.11 grains h-1 ft-2 in Hg-1.
2. Relative Humidity Testing: ASTM F2170; the System shall perform as specified with relative humidity test results of 100 percent or less.
3. Alkaline Exposure Testing: ASTM D1308; insensitivity to alkaline environment up to pH 14 in a 14-day test.
4. Certified acceptance of exposure to continuous topical water exposure after final curing of the System.
5. Vapor emission control system shall be applied in one or two coats as required for full performance of System, and shall include a cementitious underlayment over the System for subsequent adhesion of floor covering.

C. System Materials: Two-component epoxy resin system, 100 percent solids, zero VOCs, containing specifically formulated chemicals and resins to provide the characteristics and properties specified in this Section. Epoxy systems containing water are not allowed.

D. Accessories: Concrete repair materials, underlayment, and primers used in conjunction with vapor emission control system shall be as recommended by or acceptable to the System manufacturer. Underlayment used over the System shall be acceptable to vapor emission control system, flooring adhesive, and floor covering manufacturers. Underlayment shall attain minimum 5,000 psi compressive strength at 28 days.

2.3 MIXING

A. Use clean containers and mix System components thoroughly, in accordance with manufacturer's printed instructions, to obtain a homogeneous mixture.

PART 3 EXECUTION

3.1 EXAMINATION

A. Examine substrates, with Installer present, for compliance with requirements and for other conditions affecting performance of the System.

B. For the record, prepare written report, endorsed by Installer, listing conditions detrimental to performance.
C. Do not begin installation of the System until minimum seven day concrete curing and drying period has passed, after unsatisfactory conditions have been corrected, and after surfaces are dry.

3.2 CONCRETE SLAB TESTING

A. Testing Schedule: Testing shall be performed prior to application of the System.
   1. Conduct tests at the same temperature and humidity expected during normal facility use. If this is not possible, the test conditions shall be 75 degrees F ±10 degrees F and 50 percent ±10 percent relative humidity. Maintain these conditions 48 hours prior to and during tests.
   2. All relative humidity and pH test results shall be distributed to Contractor, Architect, and Owner.

B. Pre-Installation Testing: Perform pre-installation testing of concrete slab using relative humidity and pH tests prior to surface preparation for application of the System. Testing shall be performed by ICRI certified independent testing personnel and testing agency.

C. Installation contractor shall submit pre-installation checklist to the System manufacturer and written confirmation that the warranty will be enforced prior to beginning installation.
   1. Concrete Testing: At new concrete slabs, confirm that proposed concrete curing methods are acceptable to System manufacturer prior to beginning curing procedures. Silicate based curing compounds are not allowed.
   2. Relative Humidity Testing: Perform tests for relative humidity in the concrete slab per ASTM F2170. Perform three tests for the first 1,000 square feet and one test for each 1,000 square feet thereafter.
   3. pH Testing: Perform three pH tests for the first 1,000 square feet and one test for each 1,000 square feet thereafter.

D. Post-Installation Testing:
   1. After the System is installed, Owner may engage a testing agency to perform additional testing at Owner's cost before installation of floor covering. Coordinate and schedule testing work with Owner's testing agency. Number of tests shall be determined by the testing agency. Provide testing surfaces as required by Owner's testing agency using ASTM E96 wet method test for net perms (grains h-1 ft-2 in Hg-1).
      a. Test floors for moisture by using the test method described in ASTM E96. Results shall be submitted to Architect for evaluation. When test results are above the allowable moisture emission specified for the intended floor covering materials, resolve the condition prior to installation of floor covering. Environment of all tests shall be the same during testing.
   2. Adhesion Test: Perform adhesion compatibility test for flooring adhesives, coatings, and leveling compounds over completed vapor emission control system, as acceptable to Architect and Owner. Document and submit all adhesion test results to Architect and Owner.

3.3 PREPARATION

A. Prior to installation of System, all walls shall be masked or otherwise protected from the effects of scarification and System application.
B. Clean and prepare substrates according to the System manufacturer's written recommendations to produce clean, dust-free, dry substrate for the System application.

C. Remove silicate based floor hardeners or curing compounds from concrete slabs as recommended by the System manufacturer.

D. Remove defective materials, and foreign matter, such as, dust, adhesives, paint, dirt, floor hardeners, bond breakers, oil, grease, curing agents, form release agents, efflorescence, and laitance.

E. Cracks, control joints, and cold joints shall be prepared and treated in accordance with the System manufacturer's recommendations.

F. Clean and fill chips, voids and other surface irregularities with water resistant repair materials as recommended by System manufacturer.

G. Acid etching is not permitted.

H. Shot blast concrete surface to profile recommended by System manufacturer to ensure bonding of the System to concrete.

I. Concrete slabs to receive finished floor coverings shall conform to applicable requirements of ASTM F710.

J. Before application of the System, prepared surfaces shall be inspected by and acceptable to the System manufacturer's technical representative.

3.4 INSTALLATION

A. Install vapor emission control system in strict accordance with manufacturer's written instructions.

B. A leveling or trowel grade cementitious underlayment is required over completed vapor emission control system. Apply appropriate primer to the cured vapor emission control system, as recommended by the System manufacturer. Underlayment shall have adequate thickness to absorb any residual water from the flooring adhesive; thickness as recommended by the flooring/adhesive manufacturer.

3.5 FIELD QUALITY CONTROL

A. Any product testing to verify conformance to manufacturer's specifications shall be performed by taking unopened containers of product to an independent laboratory, with testing performed in accordance with the methods provided in manufacturer's technical literature.

3.6 CLEANING

A. Remove all debris resulting from the System installation from Project site.

3.7 PROTECTION

A. Protect installed vapor emission control system during curing period and prior to finished flooring installation from traffic, topical water, and surface contaminants.

END OF SECTION
SECTION 07 42 43.16
ALUMINUM COMPOSITE WALL PANELS

PART 1  GENERAL

1.1  SECTION INCLUDES

A.  Aluminum composite panel system.

1.2  RELATED SECTIONS

A.  Section 05 12 00  — Structural Steel Framing.
B.  Section 05 40 00  — Cold-Formed Metal Framing.
C.  Section 07 21 00  — Thermal Insulation.
D.  Section 07 62 00  — Sheet Metal Flashing and Trim.
E.  Section 07 92 00  — Joint Sealants.
F.  Section 08 41 13  — Aluminum-Framed Entrances and Storefronts.

1.3  REFERENCES

A.  The publications listed below form a part of this Section to the extent referenced. The
publications are referred to in the text by the basic designation only. Refer to Division 01 for
definitions, acronyms, and abbreviations.

B.  Standards, manuals, and codes refer to the latest edition of such standards, manuals, and
codes in effect as of the date of issue of this Project Manual, unless indicated otherwise in
CBC Chapter 35 and CFC Chapter 80.

C.  Referenced Standards:
   1.  AAMA 611  — Voluntary Standards for Anodized Architectural Aluminum.
   2.  ASTM C297  — Standard Test Method for Flatwise Tensile Strength of Sandwich
      Constructions.
      Materials and Envelope Assemblies by Means of a Hot Box Apparatus.
   5.  ASTM E72  — Standard Test Methods for Conducting Strength Tests of Panels
      for Building Construction.
   6.  ASTM E84  — Standard Test Method for Surface Burning Characteristics of
      Building Materials.
   7.  ASTM E283  — Standard Test Method for Determining Rate of Air Leakage
      Through Exterior Window, Curtain Walls, and Doors Under Specified Pressure Differences Across the Specimen.

1.4 SUBMITTALS

A. General: Submit in accordance with Division 01.

B. Product Data: Submit manufacturer’s descriptive literature and product specification for each product. Include installation instructions.

C. Shop Drawings:
   1. Indicate panel layout including dimensions.
   2. Show anchorage details, integration with adjacent surfaces and materials.
   3. Submit drawings showing field measured dimensions.

D. Samples:
   1. Submit two 6 inch by 6 inch panel samples for each color.
   2. Submit one sample of each anchoring assembly and accessories.

E. Closeout Submittals: Operation and maintenance data.

1.5 PERFORMANCE REQUIREMENTS

A. Provide composite metal panels which have been manufactured, fabricated, and installed to withstand loads from deflection and thermal movement and to maintain performance criteria in accordance with building structural design criteria per CBC and as specified in this Section.

B. Secondary supports for the wall panel system shall be designed in accordance with AISC or AA design procedures. Through-tube support systems shall be designed and installed only by the manufacturer and certified wall systems contractor.

   1. Secondary supports shall not vary from the theoretical plane by more than the specified tolerances.
      a.  1/4 inch in any twenty foot length vertically or horizontally.
      b.  1/2 inch in any building elevation.
      c.  1/8 inch within five feet of any change in plane such as corners or soffits.

C. The wall panel system and secondary supports shall be designed to allow differential movement of the buildings roof and floor structures.

D. Wall panel system shall be based on design temperature of 70 degrees F. The wall panel system shall accommodate expansion and contraction movement due to surface temperature differentials of 180 degrees F without causing buckling, stress on panels, failure of joint seals, excessive stress on structural elements, reduction of performance, and other detrimental effects.
E. Performance of the wall panel system shall be verifiable with tests witnessed or conducted by independent third-party agencies acceptable to Architect.

1. Structural performance of the wall panels shall be derived from ASTM E72 Chamber Method with a deflection limit of 1/175 applied to positive load. Ultimate structural values shall be achieved without the use of backside mechanical attachments to the structure.

2. There shall be no evidence of delamination of the wall panels after two million cycles of positive and negative L/175 deflection.

3. Thermal performance of the wall panels shall be based on tests in accordance with ASTM C1363 corrected to fifteen miles per hour outside and still air inside. Tests shall include side-joint, standard fastening and integral reveals or profiling.

4. Air infiltration of the wall panels shall not exceed 0.06 cubic feet per minute per square foot at a static pressure of 1.57 pounds per square foot when testing in accordance with ASTM E283.

5. There shall be no uncontrolled water penetration under static pressure when tested in accordance with ASTM E331 at a differential of 18 percent inward acting design load, 6.24 pounds per square foot minimum after 15 minutes.
   a. Water penetration is defined as the appearance of uncontrolled water in the wall.
   b. Wall design shall feature provisions to drain the exterior face of the wall any leakage of water at joints and any condensation that may occur within the construction.

1.6 QUALITY ASSURANCE

A. Qualifications:
   1. Manufacturer/Fabricator Qualifications: Firm specializing in manufacturing products specified in this Section with a minimum five years experience.
   2. Installer Qualifications: Firm specializing in installing work specified in this Section acceptable to manufacturer with experience on at least five projects of similar nature in past three years.

B. Single Source Responsibility: Obtain composite panel system including component panels and anchorage system from a single manufacturer.

C. Pre-Installation Meetings:
   1. Conduct pre-installation meeting in accordance with Division 01. Verify substrate conditions, installation instructions, and warranty requirements.
   2. Convene pre-installation meeting one week prior to commencing work of this Section.
   3. Coordinate work in this Section with work in related Sections.

1.7 DELIVERY, STORAGE, AND HANDLING

A. Comply with requirements of Division 01.

B. Deliver products in manufacturer's original containers, dry and undamaged, with seals and labels intact.

C. Package composite metal wall panels for protection against transportation damage. Provide markings to identify components consistent with drawings.
D. Exercise care in handling, storing, and installing panels to prevent bending, warping, twisting, and surface damage.

E. Storage and Protection
1. Store materials in a dry secure place, well ventilated, and out of direct sunlight. Protect from weather, surface contaminants, corrosion, construction traffic, and other potential damage.
2. Slope panels to ensure positive drainage of any accumulation of water.
3. Do not store panels in any enclosed space where ambient temperature can exceed 120 degrees F.
4. Avoid contact with any other materials that might cause staining, denting, or other surface damage.

1.8 MAINTENANCE

A. Operations and Maintenance Data:
1. Submit in accordance with Division 01.
2. Furnish cleaning and maintenance information.

PART 2 PRODUCTS

2.1 PRODUCTS AND MANUFACTURERS

A. Acceptable Products and Manufacturers:

B. Substitutions: Under provisions of Division 01.

2.2 COMPOSITE METAL PANELS

A. Materials:
1. Two sheets of aluminum face sheets sandwiching a solid core of thermoplastic material formed in a continuous process with no glues or adhesives between dissimilar materials.
2. Face Sheets: Aluminum 3105-H14 alloy; minimum 0.0197 inch thick.
3. Core: Thermoplastic material, free of voids or air spaces and shall not contain foamed insulation material.

B. Properties:
1. System:
a. Rout and return wet seal; reveal joint as shown on drawings, sealant as specified in Section 07 92 00 and with foam type backer rod.
b. System shall not have any visible fasteners, telegraphing or fastening on the panel faces or any other compromise of a neat and flat appearance.
c. System shall be designed so that no restraints can be placed on the panel which might result in compressive skin stresses. The installation detailing shall be such that the panels remain flat regardless of temperature change and at all times remain air and water tight in accordance with performance requirements as specified in this Section.

d. Outside corners shall be back-routed and shop bent.

e. Panels shall be radiused where indicated on Drawings.

2. Panel Thickness and Weight: 0.157 inch (4 mm), 1.12 pounds per square foot.

3. Fire Resistance: CBC Class A.
   a. Flame spread: 0 per ASTM E84.
   b. Smoke developed: 10 maximum per ASTM E84.

4. Bond Integrity:
   a. Bond strength: 1,500 psi minimum per ASTM C297.
   b. Peel strength: 33.6 in-lb/in minimum per ASTM D1781.
   c. No change in bond performance after 8 hours of submersion in boiling water and after 21 days of immersion in water at 70 degrees F.

2.3 ACCESSORIES

A. Provide manufacturer’s standard accessories including fasteners, clips, anchorage devices and attachments.

B. Sealant: Refer to Section 07 92 00.

2.4 FABRICATION

A. Fabricate panels to sizes and joint configurations indicated on approved shop drawings. Where final dimensions cannot be established by field measurements, provide allowance for field adjustment as recommended by manufacturer.

B. Form panel lines, breaks, and angles sharp and true, with surfaces free from warp or buckle.

C. Fabricate with sharp edges, with no displacement of aluminum sheet or protrusion of core.

D. Fabricate panels with removable protective film.

E. Fabrication Tolerances:
   1. Width: Plus 0.08 inch.
   2. Length: Plus 0.22 inch.
   3. Thickness: Plus 0.008 inch.
   4. Bow: Maximum 0.5 percent of length or width.
   5. Squareness: 0.2 inch.
   6. Edges of sheets shall be square and trimmed with no displacement of aluminum sheets or protrusion of core material.
2.5 FINISH

A. Finish: Aluminum shall have Architectural Class I finish per Aluminum Association Standard AA-M12 C22 A41, clear anodized, complying with AAMA 611, 0.7 mil minimum thickness.

PART 3 EXECUTION

3.1 EXAMINATION

A. Examine job site conditions and verify field dimensions. Verify substrate is plumb, level, and parallel.

B. Report unacceptable conditions to Architect. Begin installation only when unacceptable conditions have been corrected.

3.2 INSTALLATION

A. Protection: Protect adjacent work and finish surface from damage during installation.

B. Install in accordance with manufacturer’s printed instructions and approved shop drawings.

C. Install units plumb, level, and square, and free from warp or twist while maintaining dimensional tolerances and alignment with adjacent surfaces.

D. Anchor panels securely in place. Comply with manufacturer’s instructions for concealed fasteners.

E. Do not cut, trim, weld or braze component parts during erection in a manner which would damage the finish, decrease strength, or result in visual imperfection or failure in performance. Return component parts which require alteration to shop for re-fabrication, replace with new parts if re-fabrication will result in unacceptable conditions as specified in this Section.

F. Separate dissimilar metals and use gasketed fasteners where needed to eliminate the possibility of corrosive or electrolytic action between metals.

G. Repair panels with minor damage so that repairs are not discernible at a distance of ten feet.

H. Remove and replace panels damaged beyond repair.

I. Remove protective film immediately after installation of joint sealants and immediately prior to completion of composite metal panel work.

J. Remove from project site damaged panels, protective film, and other debris attributable to work of this Section.

3.3 FIELD QUALITY CONTROL

A. General: Comply with requirements of Division 01.

B. Installation Tolerances: Maximum deviation from horizontal and vertical alignment of installed panels: 0.25 inch in 20 feet, non-cumulative.
C. Manufacturer's Field Services: Upon Owner's request, provide manufacturer's field service consisting of product use recommendations and periodic site visit for inspection of product installation in accordance with manufacturer's instructions.

3.4 CLEANING

A. Clean as recommended by manufacturer. Do not use materials or methods which may damage finish surface or surrounding construction.

B. Protect installed product's finish surfaces from damage during construction. Provide protective covering as required to ensure installed panels will not be damaged by work of other trades.

END OF SECTION
SECTION 07 54 23
THERMOPLASTIC-POLYOLEFIN ROOFING

PART 1 GENERAL

1.1 SECTION INCLUDES

A. Mechanically fastened thermoplastic polyolefin (TPO) roofing membrane system.
B. Gypsum roof cover board.
C. Roof insulation.
D. Walkway membrane (Traffic Pads).
E. Roofing accessories.
F. Existing roofing demolition.

1.2 RELATED SECTIONS

A. Section 02 41 00 – Demolition: Roofing Demolition.
B. Section 05 31 00 – Steel Decking.
C. Section 06 10 00 – Rough Carpentry.
D. Section 07 62 00 – Sheet Metal Flashing and Trim.
E. Section 07 72 33 – Roof Hatches.
F. Section 07 95 00 – Expansion Control.
G. Section 08 62 23 – Tubular Skylights.
H. Divisions 21-23 – Mechanical.
I. Divisions 25-28 – Electrical.

1.3 REFERENCES

A. The publications listed below form a part of this Section to the extent referenced. The publications are referred to in the text by the basic designation only. Refer to Division 01 for definitions, acronyms, and abbreviations.

B. Standards, manuals, and codes refer to the latest edition of such standards, manuals, and codes in effect as of the date of issue of this Project Manual, unless indicated otherwise in CBC Chapter 35 and CFC Chapter 80.

C. Referenced Standards and Manuals:


9. ASTM D1204 – Standard Test Method for Linear Dimensional Changes of Non-Rigid Thermoplastic Sheathing or Film at Elevated Temperature.


1.4 SUBMITTALS

A. General: Submit in accordance with Division 01.

B. Product Data:

1. Submit manufacturer's descriptive literature, product specification, and installation instructions for each product.

2. Material Safety and Data Sheet (MSDS) for each product.
C. Shop Drawings:
   1. Insulation Setting Plan.
      a. Include layout of regular and tapered rigid insulation system showing identification of each insulation board, sequence of laying boards, all roof slopes, and thickness of insulation.
      b. For mechanically fastened single-ply membrane system – fastener type, size, and spacing to meet wind uplift requirements.
   3. Detail Drawings: Include joint or termination detail conditions, such as junction at deck and wall, curb flashing, roof drain, pre-molded pipe flashing, field fabricated pipe flashing, field fabricated hot pipe flashing, parapet flashing, inside corner and outside corner flashing, and sealant pockets.

D. Samples:
   1. 24 inch by 24 inch roofing assembly illustrating roofing membrane, cover board, rigid insulation, roof deck substrate, and fastening system.
   2. Expansion joints.
   3. Walkway pads.

E. Quality Assurance Submittals:
   1. ICC ES Report.
   2. ANSI/SPRI Pullout Test Reports A & B.
   3. Manufacturer's Field Reports: Submit under provisions of Division 01.
   4. Manufacturer Certifications.
   5. Installer Certifications.

F. Closeout Submittals:
   1. Warranty certificate.

1.5 QUALITY ASSURANCE

A. Single Source Responsibility: Provide insulation, cover board, membrane, and accessory materials from a single manufacturer to ensure system compatibility and quality, and to comply with manufacturer’s warranty requirements.

B. Qualifications:
   1. Manufacturer Qualifications:
      a. Firm specializing in roofing systems specified in this Section with a minimum ten years documented experience.
      b. Furnish qualification documentation including a complete list of all projects (minimum of ten) within a 100-mile radius from project site, with the same climate zone, using the same roofing system, and single-ply membrane formulation/ingredients. Include information on project location, size (square feet), date of installation, and contact information.
      c. Private-labeled single-ply membrane products are not acceptable.
2. Installer Qualifications:
   a. Firm specializing and certified by roofing system manufacturer. Submit manufacturer’s certification at time of bid.
   b. Minimum of three years experience in single-ply roofing installation.
   c. State Contractor’s License: Class C-39.

C. Regulatory Requirements:
   1. Conform to the 2016 CBC, Section 1505 for roof assembly fire classification requirements.
   2. Roof Assembly Fire Hazard Classification: UL Class A per ASTM E108 or UL 790.
   3. All roof surfaces shall have positive roof drainage per definition in CBC Section 1502 and shall meet or exceed the minimum slope of 1/4 inch per foot as described in CBC Section 1507.13.1. Refer to Drawings for roof slopes and drainage patterns.

D. Certifications:
   1. Manufacturer Certification: Certify that the specified or proposed roofing system including type of deck, insulation, gypsum roof cover board, membrane type, attachment or adherence of components, perimeter attachment details, and all system component details are acceptable to meet warranty requirements and, when installed as per FMG Approval Guide, it will meet or exceed Factory Mutual System Approval and UL Classification Requirements as per UL RMSD. Include in the certification that the manufacturer has reviewed the ANSI/SPRI FX-1 Roof Deck Pull Test Results and approved the fastening patterns for the proposed roof system.
   2. Manufacturer’s Acceptance of Roofing Installer: Certify that the roofing installer’s qualifications have been reviewed, meet requirements of this Section, and is accepted by the roofing manufacturer.

E. Pre-Installation Meetings:
   1. Conduct pre-installation meeting in accordance with Division 01.
   2. Convene pre-installation meeting at the site at least one week prior to commencing work on this Section.
      a. Attendees:
         1) Owner’s representative, preferably including Owner’s Facilities Manager and Maintenance Foreman.
         2) Architect.
         3) Contractor.
         4) Roofing installer.
         5) Related trades sub-contractors.
         6) Manufacturer Technical Representative/Inspector.
      b. Agenda:
         1) Review roof design (roof substrate, roofing system, flashings, etc.), shop drawings, and submittals.
         2) Review manufacturer’s installation and technical information and provisions of this Section.
         3) Review substrate requirements including substrate preparation and procedures for inspection and handover to roofing installer.
4) Review substrate pull tests (procedures and results).
5) Review and coordinate schedule and site conditions related to project and work of this Section.
6) Conduct a roofing substrate walk-through.

3. Contractor shall give a minimum one-week notice to pre-installation meeting participants.

F. Coordination: Coordinate the work in this Section with work in related Sections particularly roof substrate work. Convene a coordination meeting at least one week before roof substrate work with roof system manufacturer’s representative attending and in accordance with Division 01.

1.6 SUSTAINABLE BUILDING DESIGN REQUIREMENTS

A. Provide highly reflective Energy Star® compliant roofing system with emissivity of at least 0.9 when tested in accordance with ASTM E408 for a minimum of 75 percent of the roof surface.
1. Thermal Emissivity shall be measured in accordance with ASTM C1371.
2. Solar Reflectivity shall be measured in accordance with ASTM C1549.
3. Solar Reflectance Index shall be measured in accordance with ASTM E1980.

B. Provide insulation products manufactured free from environment-harmful blowing agents chlorofluorocarbon (CFC) and hydrochlorofluorocarbon (HCFC).

1.7 DELIVERY, STORAGE, AND HANDLING

A. Comply with requirements of Division 01.

B. Deliver products in manufacturer’s original containers, dry and undamaged, with seals and labels intact.

C. Store products in weather protected environment, clear of ground and moisture.

D. Store insulation and cover board dry and protected from the elements. Store insulation on pallets and completely cover with a breathable material such as tarp or canvas. Remove or slit temporary factory-applied packaging to prevent accumulation of condensation. Do not use wet or damaged insulation.

E. Store roofing membrane in the original undisturbed plastic wrap.

F. Store adhesives, sealants, and other curable materials in cool and dry location with temperatures between 60 degrees F and 90 degrees F. Do not store adhesive containers with opened lids due to the loss of solvent which occur from flash off.

1.8 PROJECT/SITE CONDITIONS

A. Do not apply roofing system during inclement weather.

B. Do not apply roofing system to damp or frozen substrate.

C. Take precautions to prevent wind blow-off or wind damage during the course of the roofing application.
D. Substrates to receive roofing system shall be thoroughly dry. Provide drying equipment should moisture occur.

1.9 WARRANTY

A. Comply with provisions of Division 01.

B. Warranty installed membrane roofing system including labor and materials for loss of watertightness caused by defective materials (including accessories) or workmanship, with no dollar limit, for twenty years. Effective warranty start date shall be at the time of final acceptance by Owner.

C. Warranty shall provide for the removal, replacement, repair, and making good without cost to Owner, of defects due to defective materials or workmanship.

D. Repairs under warranty shall be made within three days after receiving notice of need for repairs from Owner, weather permitting.

PART 2 PRODUCTS

2.1 MANUFACTURERS AND PRODUCTS

A. Acceptable Manufacturers and Products:
   1. TPO Roofing Membrane System:
      a. Carlisle Syntec Inc.: Sure-Weld 60 with SecurEdge 2000 extended fascia.
      b. Firestone Building Products Co.: UltraPly TPO 60.
      c. GAF Materials Corp.: EverGuard TPO 60.
   2. Gypsum Cover Board: Provided by roof system manufacturer.
   3. Roof Insulation: Provided by roof system manufacturer.

B. Substitutions: Under provisions of Division 01.

2.2 TPO ROOFING MEMBRANE

A. Ultraviolet resistant thermoplastic polyolefin membrane reinforced with polyester fabric.

B. Properties:
   2. Thickness over scrim: 15 mils nominal.
   3. Tolerance on nominal thickness: ± 10 percent.
   a. Initial Solar Reflectance: 0.79.
   b. Initial Thermal Emittance: 0.90.

2.3 GYPSUM ROOF COVER BOARD

A. Glass mat-faced, noncombustible, moisture-resistant treated gypsum core panel specifically designed for roofing applications, 1/4 inch thick, square edges, conforming to ASTM C1177.
   1. Where membrane is attached to gypsum roof cover board with adhesive (such as at vertical surfaces), cover board shall be factory primed and 5/8 inch thick. Do not use products intended for use as exterior wall sheathing.

2.4 ROOF INSULATION

A. Rigid, closed-cell polyisocyanurate foam core integrally laminated to heavy black (non-asphaltic), fiber-reinforced felt facers; square edges. Comply with ASTM C1289, Type II, Class 1, Grade 2; ICC ES Listed; UL Listed.
   1. Properties:
      b. Product density (ASTM D1621): 2.0 pounds per cubic foot minimum.
      d. Surface burning characteristics (ASTM E84):
         1) Flame spread: Less than 75.
         2) Smoke developed: Less than 450.
      e. Long-term thermal resistance (LTTR) value (CAN/ULC-S770): Minimum 6.0 F·hr·SqFt / Btu / inch at 75 degrees F.
      g. Dimensional stability (ASTM D2126): 2.0 percent linear change maximum.
      h. Thickness: Refer to Drawings.

B. Place insulation over entire area scheduled to receive single ply roofing.
   1. Crickets shall be fabricated from polyisocyanurate insulation; tapered.

C. Insulation shall be tapered where indicated on Drawings.

2.5 ACCESSORIES

A. Non-Reinforced or Reinforced TPO Flashing, Pipe Boot and Flashings, Clamping Rings: Use roofing membrane provided and recommended by manufacturer.

B. Flashing Metal: 0.023 inch thick galvanized steel laminated to 0.020 inch thick roofing membrane in white color used for flashing and edge metal detailing as furnished by the membrane manufacturer.
   1. Provided extended fascia in locations and sizes as indicated on Drawings. Extended fascias shall be provided in a custom color as selected by Architect.
C. Membrane Fasteners and Disks: Use mechanical fasteners and disks approved by roofing system manufacturer and cover board and insulation manufacturers.

D. Membrane Bonding Adhesive at Vertical Surfaces: Manufacturer approved two-component, low-rise, low VOC bonding adhesive to meet California Air Resources Board or local Air Pollution Control/Air Quality Management District regulations.

E. Termination Bar: Extruded Aluminum bar 0.08 inch thick by 1 inch wide.

F. Membrane Cleaning Solution: Manufacturer approved or recommended.

G. Air and Vapor Barrier: Roofing manufacturer’s 40 mil composite air and vapor barrier consisting of 35 mils of self-adhering rubberized asphalt laminated to a 5 mil polyolefin film with a siliconized one piece release liner. Permeability: 0.05 perms per ASTM D1970.
   1. Primer: Type as manufactured and recommended by roofing manufacturer, appropriate to substrate.

H. Sealants: Refer to Section 07 92 00. Solvent-based ethylene propylene seam caulk approved by roofing system manufacturer.

I. All-Purpose Sealant: Single component, high-solids content, and gun grade, approved by membrane manufacturer.

J. Walkway Rolls: 34 inches wide, 180 mils thick heat-weldable TPO material as supplied by membrane manufacturer, color: white. Verify manufacturer’s standards for walkway pad design and slip-resistance with Architect prior to procurement of pads and prior to submittal of shop drawings.

K. Safety Zone Markings: Roofing manufacturer’s 12 inch wide yellow coverstrip consisting of 30 mil thick non-reinforced TPO flashing laminated to a nominal 30 mil thick, fully cured synthetic rubber pressure sensitive adhesive.

L. Wood Nailers: Pressure treated.

M. Expansion Joints: Refer to Section 07 95 00.

PART 3 EXECUTION

3.1 EXAMINATION

A. Report unacceptable conditions to Architect. Begin installation only when unacceptable conditions have been corrected and only when substrate is inspected and accepted by roofing installer and roofing system manufacturer.

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

C. Verify that deck is structurally sound to secure mechanical fastened single ply roofing system. Inspect roof deck for corrosion, rotting, warping, concrete spalling, etc. Repair or replace defective roof deck prior to installing the roofing system.

D. Verify that deck surfaces are dry to the touch and free of snow or ice.

E. Verify that deck is clean and smooth, free of noticeable high spots or depressions, and has a positive slope to drains or valleys.
F. At existing wood roof decks, perform pullout tests as per ANSI/SPRI FX-1 at a minimum of ten pullout tests for areas up to 500 squares, thereafter, add one test for every two percent of the field areas.

G. Verify that roof openings, curbs, pipes, sleeves, ducts, vents, etc. through roof are solidly set. Verify and ensure that all roof drain lines are clear.

3.2 PREPARATION - GENERAL

A. Protection: Protect roofing surface and adjacent work against damage to roofing work.

B. Review Material Safety Data Sheet and safety regulations recommended by OSHA.

C. Wood Nailers:
   1. Install pressure treated wood nailers in appropriate size and location when required by the membrane manufacturer for a warrantable system.
   2. Anchor to the roof deck at two feet on center maximum to resist a pullout force of 175 pounds per foot in any direction. Install fasteners within 6 inch of each end. Spacing and fastener embedment shall conform to Factory Mutual Loss Prevention Data Sheet 1-49.
   3. Top of nailers shall be flush top of roof insulation.

D. Preparation Of Substrate:
   1. General: To prevent delays or interruptions, coordinate with other work to ensure that components to be incorporated into the roofing system are available as the work progresses. Examine substrates to which the roofing materials are to be applied to ensure that their condition is satisfactory for the roofing systems application. Do not permit voids greater than 1/4 inch width in the substrate. Substrates for roofing materials shall be dry and free of oil, dirt, grease, sharp edges and debris. Inspect substrates and correct defects before application of roofing membrane.
   2. Remove existing roofing down to structural substrate.
   3. Determine the condition of the structural substrate. Areas with deteriorated or damaged decking or other materials shall have those affected materials removed and replaced.
   4. Provide temporary water cut-offs at the end of each day. Maintain watertight condition of roof to prevent water intrusion. Remove and install only that amount of roofing and flashing that can be made watertight with new materials in a one-day period or prior to the onset of inclement weather. Remove cut-off before resuming roofing.
   5. Cover decking with rigid insulation and cover board, applied in accordance with manufacturer’s instructions and as required resulting in a UL Class A roof system.

3.3 INSULATION INSTALLATION

A. Place insulation over clean roof deck where indicated on Drawings in accordance with manufacturer’s instructions.

B. Install insulation in thickness to meet specified minimum total R-value. Install additional thickness as required to meet requirements indicated on Drawings.

C. Lay boards with edges in moderate contact without forcing. Cut insulation to fit neatly to perimeter blocking and around penetrations through roof.

D. Apply no more insulation than can be covered with cover board and membrane in same day.
E. Tape joints of insulation in accordance with insulation manufacturer’s instructions.

F. Stagger all joints when multiple layers of insulation are being installed.

G. Fasten with disk-type fasteners as recommended by insulation manufacturer.

3.4 GYPSUM ROOF COVER BOARD INSTALLATION

A. Place cover board over clean insulation.

B. Stagger all joints a minimum of 6 inches from underlying insulation joints.

C. Fasten with disk-type fasteners as recommended by cover board manufacturer.

3.5 AIR AND VAPOR BARRIER INSTALLATION

A. Prepare surfaces and install primer and air and vapor barrier per manufacturer’s recommendations.
   1. Surfaces shall be clean, dry, smooth, and free of voids, spalled areas, sharp protrusions, loose aggregate, laitance, and curing and form release compounds.

B. Install air and vapor barrier at all roof penetrations and deck to wall intersections.

3.6 ROOFING MEMBRANE PLACEMENT, ATTACHMENT, AND HOT AIR WELDING

A. General: Install membrane in accordance with manufacturer’s instructions.

B. Sweep substrate of all loose debris before laying membrane.

C. Mechanically-Fastened Single-Ply Roofing System:
   1. Roll out membrane free from wrinkles or tears. Place sheet into place without stretching. Allow the membrane to relax at least fifteen minutes when the temperature is above 60 degrees F or 40 minutes when the temperature is below 60 degrees F prior to installation. Inspect for damage. Remove sections of membrane that are creased or damaged. Lap sheets as recommended by manufacturer.

   2. Perimeter: When installing roofing, where walls do not exceed or equal 24 inches in height, install a minimum of one sheet parallel with the perimeter and fasten with fastening system at the predetermined spacing in the lap area in a line centered approximately 1-1/2 inches from the edge of the sheet leaving 1/2 inch of membrane outside the disc. Weld lap area to metal base flashing continuously a minimum of 1-1/2 inches weld width.

   3. Field Areas: Run membrane perpendicular to roof slope. Install membrane overlaps to facilitate the flow of water. Overlap membrane sheets as recommended by manufacturer to provide space for fastener and disc placement for a continuous 1-1/2 inch width weld.

   4. Seal membrane continuous around all roof penetrations.

D. Adhered Single-Ply Roofing System at Vertical Surfaces and Horizontal Concrete Surfaces:
   1. Position membrane over the substrate.

   2. Fold membrane sheet back so half the underside is exposed.

   3. Stir bonding adhesive thoroughly scraping the sides and the bottom of the can (5 minutes minimum). Bonding surfaces must be dry and clean.
4. Apply bonding adhesive to the exposed underside of the membrane and the corresponding substrate area. Do not apply adhesive along the splice edge of the membrane to be hot air welded over adjoining sheet.

5. Apply adhesive evenly, without puddles using a plastic core medium nap roller to achieve continuous coating of both surfaces at a coverage rate recommended by adhesive manufacturer.

6. Due to solvent flash-off, condensation may form on freshly applied bonding adhesive when the ambient temperature is near the dew point. If condensation develops, possible surface contamination may occur and the application of bonding adhesive must be discontinued. Allow the surface to dry and apply a thin freshener coat to the previously coated surface when conditions allow for continuing.

7. Allow adhesive to dry until it is tacky but will not string or stick to a dry finger touch.

8. Roll the coated membrane into the coated substrate while avoiding wrinkles.

9. Brush down the bonded section of the membrane sheet immediately after rolling the membrane into the adhesive with a soft bristle push broom to achieve maximum contact.

10. Fold back the unbounded half of the sheet in the same manner, overlapping edges a minimum of 2 inches to provide for a minimum of 1-1/2 inch hot air weld.

11. Install adjoining membrane sheets in the same manner, overlapping a minimum of 2 inches to provide a minimum of 1-1/2 inch hot air weld.

12. Protect completed sections of the roof so bonding adhesive will not discolor the membrane surface. Do not place bonding adhesive containers or their lids directly on the surface of the membrane.

13. Install additional membrane securement at the perimeter of each roof level, roof section, curb, skylight, interior wall, penthouse, etc. at any inside angle change where slope exceeds 2 inches in one horizontal foot. Use manufacturer approved fasteners and standard seam fastening plates installed horizontally or vertically at the base of the walls, curbs, etc., spaced a minimum of 12 inches on center and flashed as recommended by roofing system manufacturer.

E. Welding of Laps:

1. General:
   a. Roofing membrane connection shall be hot air welded only.
   b. Surfaces to be welded shall be clean and dry.

2. Hot Air Welding:
   a. Hot air weld the membrane sheets with an automatic hot air welding machine. Follow hot air welding machine manufacturer’s instructions for use.
   b. Where use of automatic hot air welding machines is not practical, use a hand-held hot air welding machine. Preheat the nozzle tip and apply over the overlap area until the material reaches required temperature, immediately follow with a hand roller to press the heated membrane surfaces together with slow, even movements. Keep the roller within one inch of the nozzle tip. Seam strength may be tested when cool. For best results, test seams 8 hours after hot air welding.

3. Quality Control of Seams: After seaming, check welded seams for continuity and integrity. Repair openings or “fishmouths” with a hand-held hot air tool fitted with a narrow nozzle tip and with a roller.
4. Membrane lap edges that have been exposed to the elements for approximately seven
days or longer must be prepared with manufacturer-approved membrane cleaner.
Prepare the surface where the cleaner has been applied as per manufacturer’s
instructions prior to hot air welding.

3.7 MEMBRANE FLASHING

A. Flash all vertical surfaces with reinforced membrane. Use non-reinforced membrane only at
inside and outside corners, field fabricated pipe seals, scuppers, and sealant pockets where
the use of premolded accessories are not practical. Terminate the flashing in accordance
with manufacturer-approved detail.

B. Use bonding adhesive on vertical surfaces more than 12 inches high such as walls, curbs,
and pipes. Bonding adhesive is not required for vertical surfaces terminated under a metal
counter flashing less than 12 inches high. Bonding adhesive may be eliminated for flashing
heights 18 inches or less when a coping or termination bar is used for vertical terminations.

3.8 OTHER RELATED WORK

A. Walkways: Install walkway pads per manufacturer’s recommendations in the locations
indicated on Drawings. Position the walkway material. Cut the walkway rolls into maximum
10-foot lengths and position with a minimum 1-inch gap between adjacent pieces to allow for
water drainage. Cut the walkway so a 4-inch minimum gap is created over any field
membrane seams/splices.

B. Safety Zone Markings: Install safety zone markings as recommended by the manufacturer in
the locations indicated on Drawings.
1. Clean roofing membrane with manufacturer’s membrane cleaner.
2. Roller apply manufacturer’s low-VOC TPO primer. Install coverstrip immediately after
primer flashes off.
3. Peel off a length of protective release liner from coverstrip. Position coverstrip and press
down using firm, even hand pressure across the entire area.
4. Immediately roll coverstrip with silicone or steel roller using positive pressure. Roll
across coverstrip edge, not parallel to the length.

C. Copings, Counterflashing, and Other Metal Work: Refer to Section 07 62 00. Fasten flashing
to prevent metal from pulling free or buckling. Seal to prevent moisture from entering the
roofing system or building.

D. Expansion Joints: Refer to Section 07 95 00.

3.9 FIELD QUALITY CONTROL

A. General: Comply with requirements of Division 01.

B. The manufacturer’s representative shall observe, conduct tests, and prepare test reports in
accordance with the provisions of this Section at predetermined periods before, during, and
after installation of the work – specifically at critical periods identified by roofing system
manufacturer to ensure a completely warranted system.

C. The manufacturer’s representative and the testing agency shall conduct final roof inspection
on completion of the work in this Section and submit report to Architect and Owner. Notify
Architect and Owner 48 hours in advance of date and time of inspection.
3.10 CLEANING

A. Clean roof surfaces as recommended by manufacturer. Do not use materials or methods which may damage surface or surrounding construction.

B. Where traffic must continue over finished roof membrane, protect surfaces.

END OF SECTION
PART 1  GENERAL

1.1  SECTION INCLUDES

A. Exterior wall flashings.
B. Roof flashings.
C. Gutters.
D. Downspouts.
E. Pre-manufactured copings.
F. Pre-manufactured roof penetration flashings.
G. Reglets.

1.2  RELATED SECTIONS

A. Section 07 54 23 – Thermoplastic-Polyolefin Roofing.
B. Section 07 92 00 – Joint Sealants.
C. Section 09 91 00 – Painting.

1.3  REFERENCES

A. The publications listed below form a part of this Section to the extent referenced. The publications are referred to in the text by the basic designation only. Refer to Division 01 for definitions, acronyms, and abbreviations.

B. Standards, manuals, and codes refer to the latest edition of such standards, manuals, and codes in effect as of the date of issue of this Project Manual, unless indicated otherwise in CBC Chapter 35 and CFC Chapter 80.

C. Referenced Standards:


1.4 **SUBMITTALS**

A. Submit shop drawings and product data under provisions of Division 01.

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

C. Samples: Provide three-12 inch long samples of premanufactured reglets and coping in selected color.

1.5 **QUALITY ASSURANCE**

A. Applicator: Company specializing in sheet metal flashing work with sufficient documented experience.

1.6 **SYSTEM DESCRIPTION**

A. Work of this Section is to physically protect roofing and exterior from damage that would permit water leakage to building interior.

1.7 **DELIVERY, STORAGE AND HANDLING**

A. Store products under provisions of Division 01.

B. Stack preformed material to prevent twisting, bending or abrasion, and to provide ventilation.

C. Prevent contact with materials during storage that may cause discoloration, staining or damage.

**PART 2  PRODUCTS**

2.1 **SHEET MATERIALS**

A. Galvanized Steel: ASTM A653/A653M, G90; 24 gauge core steel, unless noted otherwise on Drawings.

2.2 **ACCESSORIES**

A. Fasteners: Galvanized steel or stainless steel with soft neoprene washers. Finish exposed fasteners same as flashing metal.

B. Bituminous Coating: Cold-applied asphalt emulsion complying with ASTM D1187.

C. Touch-up Paint: "Galvalloy" or "Galweldalloy."

D. Sealant: Type specified in Section 07 92 00.

E. Bedding Compound: Rubber-asphalt type.

F. Asphalt Roofing Cement: ASTM D4586, asbestos free, of consistency required for application.

G. Solder:
   1. Galvanized Steel: ASTM B32; 95-5 Tin Antimony type.

H. Flux: Type as recommended by sheet metal manufacturer.
I. Strainers: Provide and install strainers at downspout openings in gutters per SMACNA manual.

2.3 PREMANUFACTURED COPINGS

A. Manufacturers:
   1. W.P. Hickman Company.
   2. Tremco.
   3. Metal Era.
   4. Permatite.
   5. Substitutions: Under provisions of Division 01.

B. Copings: Modular Coping System.
   1. Coping shall be 0.050 inch thick aluminum with smooth surface.
   2. Sizes as required to accommodate varying wall thicknesses.
   3. Splice joints shall have 6 inch long concealed splice plates at 12 feet on center. Allow 1/4 inch at all butt joints per 12 foot length.
   4. Prefabricated corners shall be shop mitered and shop welded.
   5. All fasteners shall be concealed.
   6. Finish: Pre-finished with Kynar 500 three coat paint system in conformance with AAMA 2605, color as selected by Architect.

2.4 PREMANUFACTURED ROOF PENETRATION FLASHINGS

A. At single ply membrane roofing:
   1. Pipe Portal System as manufactured by Portals Plus or accepted equal. Products:
      a. Pipe Boots: Compression molded EPDM rubber caps mechanically sealed to curb cover using two beads formed into the collar of the cover mated with double grooves molded into the inside of the cap. Provide manufacturer's standard adapter rings as required for a watertight installation. Size and type: As required for size and number of pipes to be flashed.
         1) Provide stainless steel clamps for final securement of pipe boots around penetrations.

2.5 REGLETS

A. Manufacturers:
   1. Fry. Products:
      a. Plaster Flashing System: Fry Reglet Model “STX” Springlok Stucco Reglet and Counter Flashing. Material shall be 0.025 inch thick aluminum with mill finish.
   2. MM Systems.
   3. Superior.

2.6 FABRICATION

A. Form sections true to shape, accurate in size, square, and free from distortion or defects.
B. Fabricate cleats and starter strips of same material as sheet, interlockable with sheet.

C. Form pieces in longest practical lengths.

D. Hem exposed edges on underside 1/2 inch; miter and seam corners.

E. Form material with flat lock seam.

F. Solder and seal metal joints watertight. After soldering, remove flux. Wipe and wash solder joints clean.

G. Fabricate one piece corners with minimum 18 inch long legs; seam for rigidity, solder joint watertight.

H. Fabricate vertical faces with bottom edge formed outward 1/4 inch and hemmed to form drip.

I. Expansion-contraction of sheet metal runs: Provide flat, loose locking slip joint at maximum of 10 foot intervals.

2.7 FINISHES

A. Back-paint concealed metal surfaces with bituminous paint to a minimum dry film thickness of 15 mils.

B. Site paint finish under provisions of Section 09 91 00.

PART 3 EXECUTION

3.1 INSPECTION

A. Verify shapes and dimensions of surfaces to be covered.

B. Verify substrates are clean, dry, smooth and free of defects to the extent needed for sheet metal work.

C. Beginning of installation means acceptance of existing conditions.

3.2 PREPARATION

A. Field measure site conditions prior to fabricating work.

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

C. Install reglets true to lines and levels. Seal top of reglets with sealant.

D. Insert flashings into reglets to form tight fit. Secure in place with plastic wedges at maximum 12 inches on center. Seal flashings into reglets with sealant.

E. Secure flashings in place using concealed fasteners. Use exposed fasteners only in locations acceptable to Architect.

F. Lock and seal all joints.

G. Apply plastic cement compound between metal flashings and felt flashings.
H. Fit flashings tight in place. Make corners square, surfaces true and straight in planes, and lines accurate to profiles.

I. Solder metal joints watertight for full metal surface contact. After soldering, wash metal clean with neutralizing solution and rinse with water.

J. Seal metal joints watertight.

K. Single-Ply Roofing:
   1. Do not use petroleum-based products in conjunction with single-ply roofing.
   2. All sealants used in conjunction with single-ply roofing shall be approved by roof membrane manufacturer.

3.3 INSTALLATION

A. Fabricate and install items in conformance with drawing details and SMACNA and NRCA manuals.
   1. Install premanufactured items in accordance with manufacturer’s recommendations.

B. Ensure that items are installed in true and accurate alignment with other items and related work; that joints are accurately fitted; that exposed surfaces are free from dents; that corners are reinforced; that seams are watertight.

C. All work shall be left free of passivators, oil, grease, or acid residue, ready to receive paint finish.

D. Wherever possible, all fasteners shall be concealed. All exposed fasteners shall have neoprene gaskets and be capped with a bead of sealant.

E. Install counter-flashings in reglets with continuous bead of sealant.

3.4 TOUCH-UP

A. Where galvanized finish is damaged by fabrication or installation, repair with specified touch-up material, applying in accordance with manufacturer’s printed instructions.

END OF SECTION
SECTION 07 72 33
ROOF HATCHES

PART 1 GENERAL

1.1 SECTION INCLUDES

A. Prefabricated roof hatches, with integral support curbs, operable hardware and counter-flashings.
B. Roof hatch guards.
C. Ladder safety posts.

1.2 RELATED SECTIONS

A. Section 05 31 00 – Steel Decking.
B. Section 05 50 00 – Metal Fabrications: Roof access ladders.
C. Section 07 54 23 – Thermoplastic-Polyolefin Roofing.
D. Section 07 62 00 – Sheet Metal Flashing and Trim: Flashing to roof system.

1.3 SUBMITTALS

A. Submit under provisions of Division 01.
B. Product Data: Provide data on unit construction, sizes, configuration, jointing methods and locations, and attachment method.
C. Manufacturer's Installation Instructions: Indicate special installation criteria, interface with adjacent components.

PART 2 PRODUCTS

2.1 MANUFACTURERS

A. Bilco, Products:
   1. Roof Hatch: Type S-50 single leaf.
   2. Roof Hatch Guard: Model RL-S.
   3. Ladder Safety Posts: Model LU-1, Ladder up.
B. Babcock – Davis.
C. Milcor.
D. Lane-Aire Manufacturing Corporation.
E. Substitutions: Under provisions of Division 01.
2.2 ROOF HATCHES

A. Unit: 30 inches by 36 inches size, single leaf type.
   1. Performance Characteristics:
      a. Cover shall be reinforced to support a minimum live load of 40 pounds per square foot with a maximum deflection of 1/150th of the span and 140 pounds per square foot wind uplift.
      b. Operation of the cover shall be smooth and easy with controlled operation throughout the entire arc of opening and closing.
      c. Operation of the cover shall not be affected by temperature.
      d. Entire hatch shall be weathertight with fully welded corner joints on cover and curb.
   2. Cover: 11 gauge aluminum with a 3 inch beaded flange with formed reinforcing members. Cover shall have a heavy extruded EPDM rubber gasket bonded to the cover interior to assure a continuous seal when compressed to the top surface of the curb.
   3. Cover Insulation: Fiberglass of 1 inch thickness, fully covered and protected by an 18 gauge aluminum liner.
   4. Curb: 12 inches in height and of 11 gauge aluminum. The curb shall be formed with a 3-1/2 inch wide flange with 7/16 inch diameter holes provided for securing to the roof deck. Curb shall be equipped with an integral metal cap flashing of the same gauge and material as the curb, fully welded at the corners, with flashing system, including stamped tabs, 6 inches on center, bent inward.
   5. Curb Insulation: Rigid, high-density fiberboard of 1 inch thickness on outside of curb.
   6. Lifting Mechanisms: Provide compression spring operators enclosed in telescopic tubes to provide, smooth, easy, and controlled cover operation throughout the entire arc of opening and closing. The upper tube shall be the outer tube to prevent accumulation of moisture, grit, and debris inside the lower tube assembly. The lower tube shall interlock with a flanged support shoe welded to the curb assembly.
   7. Hardware:
      a. Heavy pintle hinges.
      b. Cover shall be equipped with a spring latch with interior and exterior turn handles.
      c. Roof hatch shall be equipped with interior and exterior padlock hasps.
      d. The latch strike shall be a stamped component bolted to the curb assembly.
      e. Cover shall automatically lock in the open position with a rigid hold open arm equipped with a 1 inch diameter red vinyl grip handle to permit easy release for closing.
      f. Compression spring tubes shall be an anti-corrosive composite material and all other hardware shall be Type 316 stainless steel.
      g. Cover hardware shall be bolted into heavy gauge channel reinforcing welded to the underside of the cover and concealed within the insulation space.

2.3 ROOF HATCH GUARDS

A. Performance Characteristics:
   1. High visibility safety yellow color shall be molded in.
2. Hatch rail system shall attach to the cap flashing of the roof hatch and shall not penetrate any roofing material.

3. Hatch rail system shall satisfy the requirements of OSHA 29 CFR 1910.23 and shall meet OSHA strength requirements with a factor of safety of two.

4. UV and corrosion resistant construction with a twenty-five year warranty.

5. Self-closing gate shall be provided with hatch rail system.

B. Posts and Rails: Shall be round pultruded reinforced fire retardant yellow fiberglass treated with a UV inhibitor.

C. Hardware: Mounting brackets shall be 1/4 inch thick hot dip galvanized steel. Hinges and post guides shall be 6063-T5 aluminum. Fasteners shall be Type 316 stainless steel.

2.4 FABRICATION

A. Fabricate components free of visual distortion or defects. Weld corners and joints.

B. Provide for removal of condensation occurring within components or assembly.

C. Fit components for weathertight assembly.

PART 3 EXECUTION

3.1 INSTALLATION

A. Install roof hatches, roof hatch guards, and ladder safety posts in accordance with manufacturer's instructions.

B. Coordinate with installation of roofing system and related flashings for weathertight installation.

C. Apply bituminous paint on surfaces of units in contact with cementitious materials or dissimilar metals.

D. Test units for proper function and adjust until proper operation is achieved.

3.2 CLEANING

A. Clean exposed surfaces using methods acceptable to the manufacturer which will not damage finish.

END OF SECTION
PART 1 GENERAL

1.1 SECTION INCLUDES

A. Mineral wool safing insulation in wall and floor/ceiling construction.
B. Firestop sealants and caulks.
C. Elastomeric firestop sealants.
D. Firestop putty.
E. Intumescent putty pads.
F. Flexible firestop spray.
G. Head-of-wall gasket.
H. Firestop collars.
I. Firestopping for large openings.
J. Cast-in-place firestop devices.
K. Intumescent wrap.
L. Firestop mortar.
M. Fire-rated cable pathway.
N. Fire-rated HVAC retaining angles.
O. Firestop plugs.
P. Fire-rated T collar devices.
Q. Fire-rated grommets.

1.2 RELATED SECTIONS

A. Section 01 81 13 – Sustainable Design Requirements; for additional LEED requirements.
B. Section 03 30 00 – Cast-In-Place Concrete.
C. Section 07 92 00 – Joint Sealants.
D. Section 09 29 00 – Gypsum Board.
E. Divisions 21 – 23 Sections, as applicable to mechanical work.
F. Divisions 25 – 28 Sections, as applicable to electrical work.
1.3 REFERENCES

A. The publications listed below form a part of this Section to the extent referenced. The publications are referred to in the text by the basic designation only. Refer to Division 01 for definitions, acronyms, and abbreviations.

B. Standards, manuals, and codes refer to the latest edition of such standards, manuals, and codes in effect as of the date of issue of this Project Manual, unless indicated otherwise in CBC Chapter 35 and CFC Chapter 80.

C. Referenced Standards:

1.4 SUBMITTALS

A. Submit under provisions of Division 01.

B. LEED Submittal:
   1. Product Data for EQ Credit 2: For sealants, including printed statement of VOC content.

C. Provide manufacturer's brochures describing firestop materials and insulation proposed for use, and types of mechanical fasteners to be used in the installation of the firestopping materials.

D. Certificates of Compliance: Before installation of products specified in this Section, Contractor shall furnish to Architect a certificate certifying that materials to be incorporated in the work conform to specified requirements.

E. Submit certification that the installers of products specified in this Section meet the qualification requirements described in Article 1.7 of this Section.

F. Submit manufacturer's product literature and installation procedures for each type of firestop material to be installed. Literature shall indicate product characteristics, typical uses, performance and limitation criteria, and test data. Submit cured samples of firestop materials.
G. Shop drawings: Show typical installation details for the methods of installation. Indicate which firestop materials will be used where and application requirements to meet specific jobsite conditions.

H. Provide manufacturer’s Engineering Judgment (EJ) identification number and drawing details when no UL system is available for an application. Engineering Judgment shall be developed in accordance with the latest California Fire Code requirements. Engineering Judgment shall include both project name, and name of contractor who will install the firestop system in accordance with EJ drawing. Submit Engineering Judgment to DSA for review and approval prior to installation.

1.5 QUALITY ASSURANCE

A. Requirements of Regulatory Agencies: Materials and installation shall comply with requirements of governing regulations and authorities.

1. Comply with requirements of 2016 California Building Code, Chapter 7, “Fire and Smoke Protection Features”.

B. Firestopping systems (materials and design) shall be F-rated to meet the hourly rating of the wall or floor as tested by nationally accepted test agencies per ASTM E814 or UL 1479 in a configuration representative of field conditions. T-ratings for floors shall be as required in the 2016 CBC Chapter 7 “Fire and Smoke Protection Features”, as applicable to design conditions. L-ratings shall be tested in accordance with ANSI/UL1479 (smoke barriers) and ANSI/UL2079 (joints), such that for each 100 square feet of area, the total cumulative leakage of each firestop assembly shall not exceed 50 cubic feet per minute.

C. Unless specified and approved, no pipe insulation shall be removed; all insulation shall remain intact, continuous and undamaged when firestopped.

D. A manufacturer’s direct representative (not distributor or agent) shall be on-site prior to the initial installation of firestop systems to train appropriate Contractor personnel in proper selection and installation procedures. This shall be done per manufacturer’s written recommendations published in their literature and drawing details.

E. Firestop systems do not reestablish the structural integrity of load-bearing partitions/ assemblies, or support live loads and traffic. Installer shall consult the structural engineer prior to penetrating any load-bearing or shear wall assembly.

F. Firestop applications for which no UL tested system is available through an acceptable manufacturer, submit acceptable manufacturer’s Engineering Judgment derived from similar UL design systems or other acceptable tests, to local authorities having jurisdiction, for review and approval prior to installation. Engineering Judgment drawings shall meet the requirements set forth by the International Firestop Council (September 7, 1994).

1.6 INSTALLER QUALIFICATIONS

A. Engage an experienced installer who is certified, licensed, and FM Approved in accordance with FM 4991, certified by UL as a Qualified Contractor, or otherwise qualified by the firestopping manufacturer as having been provided the necessary training to install firestop products per specified requirements. A manufacturer’s willingness to sell its firestopping products to Contractor or to an Installer engaged by Contractor does not confer qualification on the buyer.
1.7 DEFINITION

A. Firestopping: Material or combination of materials used to retain integrity of fire-rated construction by maintaining an effective barrier against the spread of flame, smoke, water and hot gases through penetrations in fire-rated wall and floor assemblies.

1.8 SYSTEM DESCRIPTION

A. Firestopping materials shall comply with ASTM E119, ASTM E814, ASTM E1399, UL 263, UL 1479 and UL 2079 to achieve a fire rating as noted on Drawings.

B. Firestop all interruptions to fire rated assemblies, materials, and components.

1.9 DELIVERY, STORAGE AND HANDLING

A. Deliver materials to the project site in the manufacturer’s original packaging. Clearly identify manufacturer, contents, brand name, applicable standard, lot number, UL label and mixing and installation instructions.

B. Store materials off-ground and protect against weather, condensation and damage. Immediately remove damaged or deteriorated materials from the job site.

C. All firestop materials shall be installed prior to expiration of shelf life.

D. Do not install damaged or expired materials.

1.10 SCHEDULING

A. Coordinate installation with other trades whose work may be affected or have effect.

1.11 PROJECT CONDITIONS

A. Conform to manufacturer’s printed instructions for installation and, when applicable, curing in accordance with temperature and humidity. Conform to ventilation and safety requirements.

B. Do not use materials that contain flammable solvents.

C. Schedule installation of firestopping after completion of penetrating item installation but prior to covering or concealing of openings.

D. Verify existing conditions and substrates before starting work. Correct unsatisfactory conditions before proceeding.

E. Weather conditions:
   1. Do not proceed with installation of firestop materials when temperatures exceed the manufacturer’s recommended limitations for installation printed on product label and product data sheet.
   2. Do not install firestopping products when substrates are wet due to rain, frost, condensation, or other causes.

F. During installation, provide masking and drop cloths to prevent firestopping materials from contaminating any adjacent surfaces.
PART 2  PRODUCTS

2.1  GENERAL

A. LEED Requirements for VOC of Adhesives and Sealants: For field applications that are inside the weatherproofing system, use adhesives and sealants that comply with the limits set forth in South Coast Air Quality Management District (SCAQMD) Rule 1168 for VOC in g/L, less water, when calculated according to 40 CFR 59, Subpart D. Refer to LEED 2013 BD+C Reference Guide for list of sealant and adhesive types that must comply with VOC limits.

B. Provide and install firestopping materials to meet applicable codes and installation requirements for each firestopping application. Products using caulking, putty, wrap strips, mortar, composite boards and/or mechanical devices shall be used as appropriate for the specific condition.

C. When caulking is used, provide and install flexible caulking materials. Cured firestop materials 1/8 inch thick shall be able to bend around a 1 inch mandrel without breaking.

D. Provide products that upon curing do not re-emulsify, dissolve, leach, breakdown or otherwise deteriorate over time from exposure to atmospheric moisture, sweating pipes,ponding water or other forms of moisture characteristic during and after construction. Latex sealants containing sodium silicate or other water soluble intumescent ingredients are not permitted.

E. Provide firestop sealants sufficiently flexible to accommodate motion such as pipe vibration, water hammer, thermal expansion and other normal building movement without damage to the seal.

F. Pipe insulation shall not be removed, cut away or otherwise interrupted through wall or floor openings. Provide products appropriately tested for the thickness and type of insulation utilized.

G. Fire rated pathway devices shall be the preferred product and shall be installed in all locations where frequent cable moves, add-ons and changes will occur.

H. When mechanical cable pathways are not practical, openings within walls and floors designed to accommodate voice, data and video cabling shall be provided with re-enterable products specifically designed for retrofit.

I. Penetrants passing through fire-resistance rated floor-ceiling assemblies contained within chase wall assemblies shall be protected with products tested by being fully exposed to the fire outside of the chase wall. Systems within the UL Fire Resistance Directory that meet this criterion are identified with the words “Chase Wall Optional”.

J. Provide fire-resistant joint sealants sufficiently flexible to accommodate movement such as thermal expansion and other normal building movement without damage to the seal.

K. Provide fire-resistant joint sealants designed to accommodate a specific range of movement and tested for this purpose in accordance with a cyclic movement test criteria as outlined in UL 2079.
L. Provide penetration firestop systems subjected to an air leakage test conducted in accordance with Standard, UL 1479 for penetrations with published L-Ratings for ambient and elevated temperatures as evidence of the ability of firestop system to restrict the movement of smoke.

M. Provide T-Rating Collar Devices tested in accordance with ASTM E814 or UL 1479 for metallic pipe penetrations requiring T-Ratings per the applicable building code.

N. Provide firestopping composed of components that are listed as compatible with each other, the substrates forming openings and the items, if any, penetrating the firestopping under conditions of service and application, as demonstrated by the firestopping manufacturer based on testing and field experience.

O. Provide components for each firestopping system that is needed to install fill material. Use only components specified by the firestopping manufacturer and approved by the qualified testing agency for the designated fire-resistance rated systems.

P. At through penetrations of fire rated assemblies, provide a firestop system with an "F" rating as determined by UL 1479 or ASTM E814 that is equal to the time rating of construction assembly.

Q. At fire rated assemblies, provide a firestop system with an Assembly Rating as determined by UL 2079 that is equal to the time rating of construction assembly.

2.2 MINERAL WOOL INSULATION

A. Acceptable Manufacturers and Products:

B. At through penetrations, head of wall construction gaps, and perimeter safinng slots, provide required density mineral wool per tested system, installed with correct orientation for joint movement and properly compressed per tested system.

C. Accessories: Provide all accessories and anchors for installation as recommended by the manufacturer.

2.3 FIRESTOP SEALANTS

A. Sealant for penetrations by noncombustible items including steel pipe, copper pipe, rigid steel conduit and electrical metallic tubing (EMT).

B. Silicone Sealants:
   1. Acceptable Manufacturers and Products:
      d. Substitutions: Under provisions of Division 01.
2. Sealant shall be a one-part silicone compound, non-sag for vertical applications and self-leveling for horizontal applications. Sealant shall be UL Classified (UL 1479) and tested in accordance with ASTM E814 requirements. Penetrations in fire rated assemblies shall be protected and sealed in accordance with CBC Chapter 7 requirements.

C. Intumescent Latex Sealants:

1. Acceptable Manufacturers and Products:
   c. Substitutions: Under provisions of Division 01.

2. Sealant shall be a one-part intumescent latex compound. When exposed to high heat or flame, sealant shall be capable of expanding to seal off the annular spaces and voids at the joint. Expansion shall continue at temperatures greater than 230 degrees F. Sealant shall be thixotropic and suitable for caulking or troweling onto vertical and overhead surfaces. Sealant shall be UL Classified (UL 1479) and tested in accordance with ASTM E814 requirements. Penetrations in fire rated assemblies shall be protected and sealed in accordance with CBC Chapter 7 requirements.

2.4 ELASTOMERIC FIRESTOP SEALANT

A. Sealant for penetrations and joints between structurally separate sections of walls and floors at top-of-walls.

B. Acceptable Manufacturers and Products:
   1. STI. Product: SpecSeal Series ES100 Elastomeric Sealant.
   2. Hilti. Products: CFS-S SIL GG or CFS-S SIL SL.

C. Elastomeric sealant shall be a non-halogenated, latex-based or silicone-based, highly flexible caulk. The sealant shall be thixotropic for high-build application using standard caulking equipment or by troweling onto vertical surfaces or overhead. Self-leveling sealants are acceptable for horizontal applications. The sealant shall be UL Classified (UL 2079) and tested to the requirements of ASTM E814. Closures in fire rated assemblies shall be protected and sealed in accordance with CBC Chapter 7.

2.5 FIRESTOP PUTTY

A. Putty for penetrations by combustible items (penetrants consumed by high heat and flame) including insulated metal pipe, PVC jacketed flexible cable, or cable bundles and plastic pipe (closed piping systems). Clay-based products will not be allowed.

B. Acceptable Manufacturers and Products:
   1. STI. Product: SpecSeal SSP Putty.
   2. Substitutions: Under provisions of Division 01.
C. Putty shall be a one-part intumescent, non-hardening compound. The putty, when exposed to high heat or flame shall be capable of expanding to seal off annular spaces created. Range of continuing expansion shall be from 230 degrees F to greater than 1,000 degrees F. The putty shall be soft and pliable with aggressive adhesion. The putty shall be UL Classified (UL 1479) and tested to the requirements of ASTM E814. Penetrations in fire rated assemblies shall be protected and sealed in accordance with CBC Chapter 7.

2.6 INTUMESCENT PUTTY PAD

A. Firestop Putty Pads for Electrical Boxes: Intumescent moldable butyl-based firestop putty pad. Clay-based products will not be allowed.

B. Acceptable Manufacturers and Products:
   1. STI. Products:
      a. SpecSeal SSP4S 7.25 inches by 7.25 inches.
      b. SpecSeal SSP9S 9 inches by 9 inches.
   2. Substitutions: Under provisions of Division 01.

2.7 FLEXIBLE FIRESTOP SPRAY

A. Firestop spray for perimeter fire barrier system, fire-rated construction joints, and other gaps.

B. Acceptable Manufacturers and Products:
   1. STI. Products: SpecSeal AS200 Elastomeric Firestop Spray or SpecSeal Fast Tack Elastomeric Silicone/Urethane Hybrid Firestop Spray.
   2. Hilti. Product: CFS-SP WB.
   3. 3M. Products: Firedam Spray and Fire Barrier Spray.

C. Spray shall be flexible, sprayable water-based coating that dries in ambient conditions to form a flexible seal that will compress/extend with the intended range of the joint. The spray shall be UL classified (UL 2079) and tested to the requirements of ASTM E1966. Closures in fire rated assemblies shall be protected and sealed in accordance with CBC Chapter 7. Provide silicone-based firestopping products where building perimeter fire barrier systems are required.

2.8 HEAD-OF-WALL GASKET

A. Intumescent cover for head-of-wall track providing fire, smoke, and acoustic ratings.

B. Acceptable Manufacturers and Products:
   1. STI. Product: SpecSeal Series TTG SpeedFlexTrack Top Gasket.

C. Preformed gasket shall be UL classified (UL 2079) and tested to the requirements of ASTM E1966. Closures in fire rated assemblies shall be protected and sealed in accordance with CBC Chapter 7.
2.9 FIRESTOP COLLARS

A. Collars for penetrations by combustible plastic pipe (opening piping systems).

B. Acceptable Manufacturers and Products:
   1. STI. Products: SpecSeal SSC or SpecSeal LLC Firestop Collar.

C. Firestop collar shall be made of a galvanized steel housing and shall contain a section of intumescent material. The material shall be designed to expand when exposed to fire. The collars shall be UL classified (UL 1479) and tested to the requirements of ASTM E814. Closures in fire rated assemblies shall be protected and sealed in accordance with CBC Chapter 7.

2.10 FIRESTOPPING FOR LARGE OPENINGS

A. Firestopping for large size, complex penetrations made to accommodate cable trays, multiple steel and copper pipes and electrical busways in raceways. Products may be used in conjunction with other firestopping products, systems, and devices.

B. Acceptable Manufacturers and Products:
   1. STI. Products: SpecSeal SSB Firestop Pillows, SpecSeal CS Composite Sheet, or SpecSeal SSM Mortar.
   3. 3M. Product: Fire Barrier Pillows or Fire Barrier CS-195+ Composite Sheet and Fire Barrier Mortar.

C. For large openings, install intumescent compound or mortar. Intumescent compounds, when exposed to high heat or flame, shall be capable of expanding to seal off annular spaces created. Product shall be UL classified (UL 1479) and tested to the requirements of ASTM E814. Closures in fire rated assemblies shall be protected and sealed in accordance with CBC Chapter 7.

2.11 CAST-IN-PLACE FIRESTOP DEVICES

A. Devices for use with non-combustible and combustible pipes (closed and open piping systems), conduit, and cable bundles penetrating concrete floors and framed gypsum board wall assemblies.

B. Acceptable Manufacturers and Products:
   1. STI. Product: SpecSeal CD Cast-In Firestop Device.
      a. Accessories:
         1) Add Aerator Adapter when used in conjunction with aerator (Sovent) system.
         2) Metal Deck Adapters on corrugated metal decks.
         3) Extension Tubes where required for thick concrete floors.
   2. Hilti. Products:
a. CP 680-P Cast-in-Place Firestop Device.
   1) Add Aerator Adapter when used in conjunction with aerator (Sovent) system.

b. CP 680-M Cast-in-Place Firestop Device for use with non-combustible penetrants.

c. CP 681 Tub Box Kit for use with tub applications.


C. Acceptable Penetrations: Sealing pipes and cables up to 6 inches in diameter in penetration through fire-rated floors, suitable for: vented or closed plastic pipes, PVC, CPVC, ABS, innerduct, FRPP, steel, cast-iron, copper pipes, insulated steel and copper pipes, EMT and ENT electrical conduits, bundled cables, and blank openings.

2.12 INTUMESCENT WRAP

A. Intumescent Wrap: Precut wrap strips for plastic and insulated pipe penetration through rated assemblies.

B. Acceptable Manufacturers and Products:
   1. STI. Products: SpecSeal RED2 or SpecSeal BLU2 Wrap Strip.

2.13 FIRESTOP MORTAR

A. Fire-resistant, cement-based mortar for firestop-sealing medium-sized to large openings with non-combustible pipes or cable trays, and permanent fire seal for cables, cable trays and non-combustible pipes. For use with concrete and masonry assemblies, and for walls and floors rated up to three hours.

B. Acceptable Manufacturers and Products:
   1. STI. Product: SpecSeal SSM Firestop Mortar.

2.14 FIRE-RATED CABLE PATHWAY

A. Gangable fire-rated device modules capable of retrofit, comprised of steel raceway with intumescent foam pads allowing 0 percent to 100 percent cable fill for cable penetrations through gypsum or CMU walls, concrete floors, and concrete walls.

B. Acceptable Manufacturers and Products:
   1. STI. Product: SpecSeal EZ Path Pathway Device Series 22, 33 or 44.
   2. Substitutions: Under provisions of Division 01.

2.15 FIRE-RATED HVAC RETAINING ANGLES

A. Steel angle system with integral intumescent firestop gasket for use on steel HVAC ducts.

B. Acceptable Manufacturers and Products:
   1. STI. Product: SpecSeal Fyre-Flange Steel Firestop Retaining Angle.
2. Substitutions: Under provisions of Division 01.

2.16 FIRESTOP PLUGS

A. Re-enterable, foam rubber plug impregnated with intumescent material for use in blank openings and cable sleeves.

B. Acceptable Manufacturers and Products:
   1. STI. Product: SpecSeal FP Firestop Plug.
   2. Substitutions: Under provisions of Division 01.

2.17 FIRE-RATED T COLLAR DEVICES

A. Louvered steel collar system with synthetic aluminized polymer coolant wrap installed on metallic pipes where T Ratings are required by applicable building code requirements.

B. Acceptable Manufacturers and Products:
   1. STI. Product: SpecSeal T-Collar Device.
   2. Substitutions: Under provisions of Division 01.

2.18 FIRE-RATED GROMMETS

A. Molded two-piece grommet made from plenum grade polymer with a foam inner core for sealing individual cable penetrations up to 0.27 inch diameter.

B. Acceptable Manufacturers and Products:
   1. STI. Product: SpecSeal Ready Firestop Grommet.
   2. Substitutions: Under provisions of Division 01.

2.19 ACCESSORIES

A. Installation Accessories: Clips, collars, fasteners, temporary stops or dams, and other devices required to position and retain materials in place.

PART 3 EXECUTION

3.1 CONDITIONS REQUIRING FIRESTOPPING

A. General: Provide firestopping for conditions specified whether or not firestopping is indicated and, if indicated, whether such material is designed as insulation, safing or otherwise.

B. Penetrations:
   1. Penetrations include conduit, cable wire, pipe, duct or other elements that pass through one or both outer surfaces of a fire-rated floor, wall or partition.
   2. These requirements for penetrations shall apply whether or not sleeves have been provided, and whether or not penetrations are to be equipped with escutcheons or other trim. If penetrations are sleeved, firestop annular space, if any, between sleeve and wall opening.

C. Provide firestopping to fill miscellaneous voids and openings in fire-rated construction as specified herein.
D. Provide intumescent moldable pads over backs and sides of all electrical junction and utility boxes at fire rated walls.

3.2 EXAMINATION
A. Verify site conditions under provisions of Division 01.
B. Verify openings are ready to receive the work of this Section.

3.3 PREPARATION
A. Clean substrate surfaces of dirt, dust, grease, oil, loose material or other matter that may affect bond of firestopping material.
B. Remove incompatible materials that may affect bond.
C. Install noncombustible backing materials to arrest liquid material leakage.
D. Examine the areas and conditions where firestops are to be installed and notify Architect of conditions detrimental to the proper and timely completion of the work. Do not proceed with work until unsatisfactory conditions have been corrected by Contractor in a manner acceptable to Architect.
E. Verify penetrations are properly sized and in suitable condition for application of materials.
F. Provide masking and temporary covering to prevent soiling of adjacent surfaces by firestopping materials.
G. Comply with manufacturer’s recommendations for temperature and humidity conditions before, during and after installation of firestopping.

3.4 INSTALLATION
A. General:
   1. Installation of firestops shall be performed by an applicator/installer qualified and trained by the manufacturer. Installation shall be performed in strict accordance with manufacturer’s detailed installation procedures. Written verification of the manufacturer’s training shall be submitted to Architect.
   2. Apply firestops in accordance with fire test reports, fire resistance requirements, acceptable sample installations, manufacturer’s recommendations, and listing descriptions.
   3. Provide sprinkler piping with NFPA 13 required annular space using firestop to allow movement.
   4. Coordinate with plumbing, mechanical, electrical and other trades to assure that all pipe, conduit, cable and other items which penetrate fire-rated construction have been permanently installed prior to installation of firestops.
   5. All penetrations for pipes, conduits, tubing or other building service elements shall be installed below the head-of-wall joint such that the distance between the top of the wall and the top of the penetrant is a minimum of 3 inches, no exceptions.
C. Manufacturer's Instructions: Comply with manufacturer’s instructions for installation of through-penetration materials.
   1. Seal all holes or voids made by penetrations to ensure an air- and water-resistant seal.
   2. Protect materials from damage on surfaces subjected to traffic.

D. Field Quality Control:
   1. Prepare and install firestopping systems in accordance with manufacturer’s printed instructions and recommendations.
   2. Follow safety procedures recommended in the Material Safety Data sheets.
   3. Finish surfaces of firestopping which are to remain exposed in the completed work to a uniform and level condition.
   4. All areas of work must be accessible until inspection by the applicable Code authorities.
   5. Correct unacceptable firestop installations and provide additional inspection to verify compliance with this Section at no additional cost.
   6. All firestop assemblies shall be identified with a permanently affixed ID label as follows:
      a. Firestop System Warning Label: Minimum 3 inch by 5 inch label, red color or with red colored type and “WARNING” written in bold type. Label shall be adhesive backed or provide other means of permanent attachment. Identified or included spaces for the following information:
         1) Name of manufacturer.
         2) Name of Installer.
         3) Date firestop system was installed.
         4) Firestop System UL number or manufacturer's engineered design number.
         5) F Rating and T Rating as applicable.
   7. All fire-rated wall assemblies shall be identified with signs or by stenciling in accessible concealed floor, floor-ceiling, or attic spaces at intervals not exceeding 30 feet and within 15 feet of the end of each wall per CBC Section 703.7. Lettering shall be not less than 3 inches in height with a minimum 3/8 inch stroke in contrasting color, incorporating the appropriate wording such as: "FIRE AND/OR SMOKE BARRIER-PROTECT ALL OPENINGS", with the relevant hourly fire resistance rating clearly stated.
   8. Examine sealed penetration areas to ensure proper installation before concealing or enclosing areas.
   9. Keep areas of work accessible until inspection by applicable code authorities.
   10. Perform under this Section patching and repairing of firestopping caused by cutting or penetrating of existing firestop systems already installed by other trades.

E. Installation shall be completed in a neat, workmanlike manner according to manufacturer’s recommendations. Securely fasten and anchor insulation in place to prevent displacement or sagging of material. Safing insulation shall be adequately lapped.

F. Install material at fire rated horizontal to vertical assembly closures and at fire rated walls or partition openings which contain penetrating sleeves, piping, ductwork, conduit and other items requiring firestopping.

G. Apply primer and materials in accordance with manufacturer's instructions.
H. Apply firestopping material in sufficient thickness to achieve rating.
I. Compress fibered material to achieve a density of forty percent of its uncompressed density.
J. Dam material to remain.

3.5 INSPECTIONS

A. Firestopping inspections shall meet the requirements of CBC Section 1705A.17.

B. Inspection of completed work shall be performed by DSA and/or the building underwriter’s
desigee. If required by DSA or underwriter, inspections may be performed by an
independent, third-party construction inspection and testing service provided that:
1. Inspections are performed to the requirements of the following standards as applicable:
   b. Service Penetrations: ASTM E2174.
2. Individual(s) performing inspection shall provide evidence of valid Errors and Omissions
   Insurance coverage for this service.
3. Individual(s) performing inspection shall not have any financial connection to installer,
   firestop manufacturer, distributor or supplier.

3.6 CLEANING

A. Clean Work under provisions of Division 01.

B. Clean adjacent surfaces of firestopping materials.

C. Remove spilled and excess materials adjacent to firestopping without damaging adjacent
   surfaces.

D. Leave finished work in a neat and clean condition with no evidence of spillovers or damage
to adjacent surfaces.

3.7 PROTECTION OF FINISHED WORK

A. Protect finished Work under provisions of Division 01.

B. Protect adjacent surfaces from damage by material installation.

C. Where firestopping is installed at locations which will remain exposed in the completed work,
   provide protection as necessary to prevent damage to adjacent surfaces and finishes, and
   protect as necessary against damage from other construction activities.

END OF SECTION
SECTION 07 92 00

JOINT SEALANTS

PART 1 GENERAL

1.1 SECTION INCLUDES

A. Sealants.
B. Sealant Accessories.

1.2 RELATED SECTIONS

A. Section 01 81 13 – Sustainable Design Requirements; for additional LEED requirements.
B. Section 03 30 00 – Cast-In-Place Concrete.
C. Section 06 41 00 – Architectural Wood Casework.
D. Section 07 19 19 – Silicone Water Repellents.
E. Section 07 62 00 – Sheet Metal Flashing and Trim.
F. Section 07 84 00 – Firestopping.
G. Section 08 11 13 – Hollow Metal Doors and Frames.
H. Section 08 41 13 – Aluminum-Framed Entrances and Storefronts.
I. Section 08 81 00 – Glass Glazing.
J. Section 09 29 00 – Gypsum Board.

1.3 REFERENCES

A. The publications listed below form a part of this Section to the extent referenced. The publications are referred to in the text by the basic designation only. Refer to Division 01 for definitions, acronyms, and abbreviations.

B. Standards, manuals, and codes refer to the latest edition of such standards, manuals, and codes in effect as of the date of issue of this Project Manual, unless indicated otherwise in CBC Chapter 35 and CFC Chapter 80.

C. Referenced Standards:


1.4 SUBMITTALS

A. General: Submit in accordance with Division 01.

B. Product Data: Submit manufacturer’s descriptive literature and product specification for each product.

C. Samples: Submit manufacturer’s standard color ranges of exposed sealant materials for Architect’s selection.

D. Quality Assurance/Control Submittals:
   1. Product validation/assurance submittals.
   2. Manufacturer’s laboratory adhesion and stain testing results.
   3. Joint sealants field adhesion to joint substrates test results.

E. Sustainable Building Design Submittals: Submit per Division 01.
   1. MSDS.
   2. VOC.

F. Closeout Submittals:
   1. Cleaning and maintenance data.

1.5 DEFINITIONS

A. Sealant Types:
   1. S: Single component sealant, cures by moisture reaction.
   2. M: Multiple component sealant; cures by chemical reaction.

B. Sealant Grades:
   1. NS: Non-sag or gunnable sealant that permits application in joints on vertical surfaces without sagging or slumping.
   2. P: Pourable or self leveling sealant that has sufficient flow to form a smooth, level surface when applied in a horizontal joint.

C. Sealant Classes:
   1. 12.5: A sealant that when tested for adhesion and cohesion under cyclic movement shall withstand an increase and decrease of at least 12.5 percent of the joint width as measured at the time of application.
2. 25: A sealant that when tested for adhesion and cohesion under cyclic movement shall withstand an increase and decrease of at least 25 percent of the joint width as measured at the time of application.

3. 35: A sealant that when tested for adhesion and cohesion under cyclic movement shall withstand an increase and decrease of at least 35 percent of the joint width as measured at the time of application.

4. 50: A sealant that when tested for adhesion and cohesion under cyclic movement shall withstand an increase and decrease of at least 50 percent of the joint width as measured at the time of application.

5. 100/50: A sealant that when tested for adhesion and cohesion under cyclic movement shall withstand an increase of at least 100 percent and a decrease of at least 50 percent of the joint width as measured at the time of application.

D. Sealant Uses:
   1. A: Sealant acceptable for use on an aluminum substrate.
   2. G: Sealant acceptable for use on a glass substrate.
   3. I: Sealant designed for use in joints which are submerged continuously in a liquid.
      a. Immersion rated sealant applications require primer.
   5. NT: Sealant designed for use in joints in non-traffic areas.
   6. T: Sealant designed for use in joints in pedestrian and vehicular traffic areas such as walkways, plazas, decks, and parking garages.
   7. O: Sealant acceptable for use on substrates other than those listed above including, but not limited to, color anodized aluminum, metals other than aluminum, painted surfaces, brick, stone, tile, and wood.

E. Miscellaneous:
   1. FC: Fast cure sealants; provides lesser cure times than corresponding standard cure sealants.

1.6 SUSTAINABLE DESIGN REQUIREMENTS

A. Comply with Division 01.

B. Meet VOC requirements of South Coast Air Quality Management District (SCAQMD) Rule 1168. Information is available at www.aqmd.gov. VOC limit expressed in grams per liter as follows:

<table>
<thead>
<tr>
<th>Sealant</th>
<th>VOC Limit</th>
</tr>
</thead>
<tbody>
<tr>
<td>Architectural</td>
<td>250</td>
</tr>
<tr>
<td>Roadways</td>
<td>250</td>
</tr>
<tr>
<td>Single Ply Roof Material Installation/Repair</td>
<td>450</td>
</tr>
<tr>
<td>Nonmembrane Roof Installation/Repair</td>
<td>300</td>
</tr>
<tr>
<td>Other</td>
<td>420</td>
</tr>
<tr>
<td>Sealant Primer</td>
<td>VOC Limit</td>
</tr>
<tr>
<td>-------------------</td>
<td>-----------</td>
</tr>
<tr>
<td>Architectural – Nonporous</td>
<td>250</td>
</tr>
<tr>
<td>Architectural - Porous</td>
<td>775</td>
</tr>
<tr>
<td>Other</td>
<td>750</td>
</tr>
</tbody>
</table>

C. Provide sealants with no carcinogen or reproductive toxicant components at more than one percent of total mass of product as defined in the following lists:

2. California Air Resources Board (CARB), list of Toxic Air Contaminants (California Air Toxics). Information is available at www.arb.ca.gov/toxics.

1.7 QUALITY ASSURANCE

A. Qualifications:

1. Manufacturer Qualifications: Firm specializing in manufacturing products specified in this Section.
2. Applicator Qualifications: Firm specializing in installing work specified in this Section with experience on at least five projects of similar nature in past three years.

B. Product Validation/Assurance: Provide products with current SWRI Validation or provide independent third-party laboratory test results showing product meets performance requirements in accordance with ASTM C920 and as specified in this Section.

C. Compatibility: Materials forming joints and adjacent materials shall not adversely affect sealant materials or sealant color per ASTM C1087.

D. Staining: Sealants shall not stain joint substrates per ASTM C510, ASTM C1248, and ASTM D2203.

E. Manufacturer Adhesion, Cohesion, and Stain Testing: Provide manufacturer’s laboratory adhesion and cohesion testing per ASTM C719 and ASTM C794, and stain testing per ASTM C510, using specimens of actual substrates to ensure sealant compatibility with substrate before product acceptance.

F. Joint Sealants Field Test for Adhesion and Cohesion to Joint Substrates: Perform field tests for each elastomeric joint sealant with the manufacturer’s representative present prior to installation as follows:

1. Install joint sealants in five foot joint lengths. Allow sealant to fully cure before testing.
2. Make a knife cut of the sealant across the joint and along each side of the joint approximately 3 inches long.
3. Place a mark on the sealant tab, 1 inch from the adhered joint to the tab’s free end.
4. Grasp a 2 inch piece of sealant firmly just beyond the 1 inch mark and pull at a 90 degree angle.
5. Record whether or not sealant in joint maintained adhesion to substrate.
6. Record percentage length of sealant elongation.
7. Sealant product acceptance shall be based on pass/fail adhesion performance.
G. Coordination and Pre-Installation Meetings:
   1. Conduct pre-installation meeting in accordance with provisions of Division 01.
   2. Convene pre-installation meeting prior to commencing work of this Section.
   3. Take minutes of meeting. Distribute to all attendees and concerned parties within five days.
   4. Coordinate work in this Section with work in related Sections.

1.8 DELIVERY, STORAGE, AND HANDLING

A. Comply with requirements of Division 01.

B. Deliver materials in the unopened, original containers or unopened packages with manufacturer's name, labels, product identification, color, expiration period, curing time and mixing instructions for multi-component materials.

C. Storage and Protection: Store materials in a dry secure location with ambient temperature range of 60 degrees F to 80 degrees F.

1.9 PROJECT/SITE CONDITIONS

A. Do not install primers or sealants when ambient or joint surface temperatures are less than 40 degrees F, or as otherwise recommended by manufacturer.

1.10 SEQUENCING

A. Apply waterproofing, water repellents, and preservative finishes after sealants have fully cured.

1.11 WARRANTY

A. Comply with provisions of Division 01.

B. Provide manufacturer's warranty against material defects, air and water tightness, loss of adhesion, cohesion, and staining as follows:
   1. Silicone sealants – Twenty years.
   2. Urethane sealants – Five years.
   3. Other sealants – Two years.

C. Provide installer's two year workmanship warranty.

1.12 MAINTENANCE DATA

A. Submit in accordance with Division 01.

B. Provide cleaning and maintenance information, recommended inspection intervals, and instructions for repairing and replacing failed sealant joints.
PART 2 PRODUCTS

2.1 MANUFACTURERS

A. Acceptable Manufacturers:


B. Substitutions: Under provisions of Division 01.

2.2 SEALANTS

A. General:

1. Provide sealants that have been tested and found suitable for the substrates to which they will be applied.
2. Color: As selected by Architect from manufacturer’s full range of colors.

B. Exterior Sealants:

1. Exterior Perimeter Sealant: Polyurethane sealant; ASTM C920; Type M; Grade NS; Class 50; uses: A, I, M, NT, O, T.
   a. Products:
      1) Tremco Dymeric 240FC.
      2) BASF MasterSeal NP150 Tint Base.
      3) Sika Sikaflex-2c NS.
      4) or accepted equal.
   b. Use at exterior vertical joints bordered on one or both sides by:
      1) Porous materials such as concrete or masonry.
      2) Non-porous materials such as painted metal, anodized or mill finish aluminum.

2. Exterior Perimeter Sealant: Ultra-low modulus moisture curing, non-staining, non-bleeding silicone sealant; ASTM C920; Type S; Grade NS; Class 100/50; uses: A, G, M, NT, O.
   a. Products:
      1) Tremco Spectrem 1.
      2) Dow Corning Corp. 790 Silicone Building Sealant.
      3) Pecora 890NST.
4) Sika Sikasil WS-290.
5) or accepted equal.

b. Use at exterior joints bordered on one or both sides by concrete, metal, or window perimeters.

3. Glazing Sealant: Medium modulus, neutral curing, non-staining, non-bleeding silicone sealant; ASTM C920; Type S; Grade NS; Class 50; uses: A, G, M, NT, O.

a. Products:
   1) Tremco Spectrem 2.
   2) Dow Corning Corp. 795 Silicone Building Sealant.
   3) GE Silicones SilPruf SCS2000.
   4) Pecora 895NST.
   5) Sika Sikasil WS-295.
   6) or accepted equal.

b. Use at exterior joints in window wall systems such as glass to glass, glass to metal, and metal to metal joints.

4. Traffic Sealant: Self leveling, chemical curing, non-staining, non-bleeding polyurethane sealant; ASTM C920; Type M; Grade NS or Grade P; Class 25; uses: M, O, T.

a. Products:
   1) Tremco THC900.
   2) Pecora Corp. Urexpam NR-200.
   3) BASF MasterSeal SL 2.
   4) Sika Sikaflex-2c NS TG.
   5) or accepted equal.

b. Use at:
   1) Exterior horizontal traffic expansion joints in concrete with slopes less than five percent.
   2) Interior horizontal traffic joints in low-slope concrete with slopes less than five percent.

5. Traffic Sealant: Slope grade chemical curing, non-staining, non-bleeding polyurethane sealant; ASTM C920; Type M; Grade P; Class 25; use: T.

a. Products:
   1) Tremco THC 901.
   2) Pecora Corp. DynaTrol II-SG.
   3) BASF MasterSeal SL 2 Slope Grade.
   4) or accepted equal.

b. Use at:
   1) Exterior horizontal traffic expansion joints in concrete with slopes between five percent and ten percent.
6. Metal Lap and Bedding Sealant: Non-drying, non-skinning, non-curing flexible butyl rubber sealant; ASTM C1311; Type S; Grade NS; Class 10; uses: G, M, O.
   a. Products:
      1) Tremco Butyl Sealant.
      2) Pecora Corp. BA-98 Butyl Rubber Sealant.
      3) or accepted equal.
   b. Use for bedding thresholds, glazing secondary seals, and sheet metal flashing and trim not exposed to ultraviolet (UV) light.

7. Metal Lap and Bedding Sealant: High performance, moisture curing, gun grade polyurethane sealant; ASTM C920; Type S; Grade NS; Class 25; use: A, I, M, NT, O, T.
   a. Products:
      1) Tremco Vulkem 116.
      2) BASF MasterSeal TX1.
      3) Sika Sikaflex Textured Sealant.
      4) or accepted equal.
   b. Use for bedding thresholds, glazing secondary seals, and sheet metal flashing and trim exposed to ultraviolet (UV) light.

C. Interior Sealants:

1. Interior Sealant: Nonoxidizing, skinnable, paintable, gunnable, non-staining, non-bleeding acrylic latex sealant; ASTM C834; Type S; Grade NS; Class 12.5; use: O.
   a. Products:
      1) Tremco Tremflex 834.
      2) Pecora Corp. AC-20 + Silicone.
      3) or accepted equal.
   b. Use at interior trim and finish joints expecting minimal movement.

2. Interior Sealant: Low modulus, moisture curing, non-staining, non-bleeding polyurethane sealant; ASTM C920; Type S; Grade NS; Class 35; uses: A, M, NT, O.
   a. Products:
      1) Tremco Dymonic FC.
      2) Euclid Chemical Company Eucolastic 1NS.
      3) or accepted equal.
   b. Use at interior vertical expansion, control, and air seal joints.

3. Sanitary Sealant: Mildew resistant with fungicide, acetoxy curing, non-staining, non-bleeding silicone sealant; ASTM C920; Type S; Grade NS; Class 25; uses: A, G, NT, O.
   a. Products:
      1) Tremco Tremsil 200 Sanitary.
      2) Dow Corning Corp.785 Mildew Resistant.
      3) GE Silicones Sanitary SCS 1700.
      4) Pecora 898.
5) Sika Sikasil-N Plus US.
6) or accepted equal.
b. Use at interior joints with nonporous substrates around ceramic tile, showers, sinks and plumbing fixtures.

4. Acoustical Sealant: Non-skinning, non-hardening synthetic rubber sealant; ASTM C919; Type S; Grade NS; use: O.
a. Products:
   1) Tremco Acoustical Sealant.
   2) Pecora BA-98.
   3) or accepted equal.
b. Use at concealed joints and penetrations in interior acoustical walls.

5. Acoustical Sealant: Nonoxidizing, skinnable, paintable, gunnable, non-staining, non-bleeding acrylic latex sealant; ASTM C834 and C919; Type S; Grade NS; Class 12.5; use: O.
a. Products:
   1) Tremco Tremflex 834.
   2) Pecora Corp. AC-20 FTR.
   3) USG Sheetrock Brand Acoustical Sealant.
   4) or accepted equal.
b. Use at exposed joints and penetrations in interior acoustical walls.

2.3 ACCESSORIES

A. Joint Cleaner: Non-corrosive and non-staining type as recommended by sealant manufacturer; compatible with joint forming materials.

B. Primers: Non-staining, quick-drying type and consistency recommended by the sealant manufacturer for the particular application.

C. Joint Backing: Non-adhering backing to sealant; non-staining, compatible with sealant and primer such as round, closed cell polyethylene foam rod; oversized 25 percent to 50 percent larger than joint width. Materials impregnated with oil, bitumen or similar materials are not permitted.

D. Bond Breakers: Type and consistency recommended by the sealant manufacturer to suit the particular application.

E. Bond Breaker Tape: Self-adhesive, pressure sensitive polyethylene tape.

F. Masking Tape: Non-staining, non-absorbent tape compatible with joint sealants and adjacent joint surfaces.
PART 3  EXECUTION

3.1  EXAMINATION

A. Examine job site conditions; verify substrate, surfaces, and joint openings are ready to receive work and field measurements are as shown on drawings, as specified in this Section, and as recommended by manufacturer.

B. Report unacceptable conditions to Architect. Begin installation only when unacceptable conditions have been corrected.

3.2  PREPARATION

A. Clean, prepare, and prime joints in accordance with ASTM C1193 and manufacturer’s written instructions.

B. Remove loose materials and foreign matter that might impair sealant adhesion. Clean porous materials such as concrete or masonry by grinding, sand or water blast cleaning, mechanical abrading, acid washing or a combination of these methods as required to provide a clean, sound base surface for sealant adhesion.
   1. Remove laitance by acid washing, grinding or mechanical abrading.
   2. Remove form oils, release agents, chemical retardants, by sand or water blast cleaning.
   3. Blow from joints with oil-free compressed air loose particles resulting from grinding, abrading, or blast cleaning prior to sealant application.
   4. Do not apply sealant to masonry joints where water repellent has been applied. Apply water repellents or waterproofing treatments after sealants have fully cured. Coordinate with Section 07 19 19.

C. Mechanically or chemically clean nonporous surfaces such as metal and glass. Remove temporary protective coatings on metallic surfaces using solvents that leave no residue as recommended by metal surface manufacturer. When masking tape or strippable films are used, remove the tape or film and clean any residual adhesive. Apply and wipe-dry cleaning solvents using clean, lint-free cloths or paper towels, do not allow solvent to air dry without wiping.

D. Protect elements surrounding the work of this Section from damage or disfiguration. Apply masking tape to adjacent surfaces to prevent damage to finishes from sealant installation.

3.3  APPLICATION

A. Apply sealants in accordance with ASTM C1193, manufacturer’s written instructions, and accepted shop drawings.

B. Apply acoustical sealants in accordance with ASTM C919, manufacturer’s written instructions, and accepted shop drawings.

C. Apply sealant where indicated on the Drawings and at all exterior joints and openings in the building envelope that are observable sources of air or water infiltration.
D. Measure joint dimensions and size materials to achieve required width-to-depth ratios. Acceptable joint width-to-depth ratios:

<table>
<thead>
<tr>
<th>Material</th>
<th>Joint Width</th>
<th>Joint Depth</th>
</tr>
</thead>
<tbody>
<tr>
<td>Metal, glass, or other nonporous surfaces.</td>
<td>1/4 inch (minimum)</td>
<td>1/4 inch</td>
</tr>
<tr>
<td></td>
<td>Over 1/4 inch</td>
<td>1/2 of width</td>
</tr>
<tr>
<td>Wood, concrete, masonry, or other porous</td>
<td>1/4 inch (minimum)</td>
<td>1/4 inch</td>
</tr>
<tr>
<td>surfaces.</td>
<td>Over 1/4 inch</td>
<td>1/2 of width</td>
</tr>
<tr>
<td></td>
<td>Over 1/2 to 2 inches</td>
<td>Equal to width</td>
</tr>
<tr>
<td></td>
<td>Over 2 inches</td>
<td>As recommended by sealant manufacturer.</td>
</tr>
</tbody>
</table>

E. Install joint backing to achieve desired joint width-to-depth ratio. Roll the material into the joint to avoid lengthwise stretching. Do not twist or braid rod stock.

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

G. Apply primer where required and where recommended by sealant manufacturer for sealant adhesion.

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

I. Install sealants immediately after joint preparation.

J. Install sealants free of air pockets, foreign embedded matter, ridges, and sags.

K. Tool joints concave. Use dry tooling method.

3.4 CLEANING AND REPAIRING

A. Immediately clean work under provisions of Division 01.

B. Clean adjacent soiled surfaces. Use a cleaning agent as recommended in writing by the sealant manufacturer. Remove any masking tape immediately after tooling joints, leaving finished work in neat and clean condition.

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

3.5 PROTECTION OF FINISHED WORK

A. Protect finished installation under provisions of Division 01.

B. Protect sealant until cured.

C. Do not paint sealants until sealant is fully cured.

D. Do not paint silicone sealant.
E. Protect joint sealants from contact with contaminating substances and from damage. Cut out, remove and replace contaminated or damaged sealants, immediately, so that they are without contamination or damage at time of Project Completion.

END OF SECTION
PART 1  GENERAL

1.1  SECTION INCLUDES

A. Non-rated expansion joint assemblies for wall and roof surfaces.

1.2  RELATED SECTIONS

A. Section 05 40 00 – Cold-Formed Metal Framing.
B. Section 07 54 23 – Thermoplastic-Polyolefin Roofing.
C. Section 07 92 00 – Joint Sealants.
D. Section 09 22 16 – Non-Structural Metal Framing.
E. Section 09 29 00 – Gypsum Board.

1.3  REFERENCES

A. The publications listed below form a part of this Section to the extent referenced. The publications are referred to in the text by the basic designation only. Refer to Division 01 for definitions, acronyms, and abbreviations.

B. Standards, manuals, and codes refer to the latest edition of such standards, manuals, and codes in effect as of the date of issue of this Project Manual, unless indicated otherwise in CBC Chapter 35 and CFC Chapter 80.

C. Referenced Standards:


1.4  SUBMITTALS

A. Submit under provisions of Division 01.

B. Product Data: Provide joint assembly profiles, dimensions, locations in the Work, affected adjacent construction, anchorage devices, available colors and finish, and locations of splices.

C. Manufacturer's Installation Instructions: Indicate rough-in sizes. Provide templates for cast-in or placed frames or anchors, and indicate tolerances for item placement.
1.5 QUALITY ASSURANCE

A. Manufacturer: Sufficient experience specializing in the manufacturing of expansion joint assemblies utilizing membrane seals.

B. Application: Factory approved, trained and certified in the proper installation of the specified expansion control system.

1.6 FIELD MEASUREMENTS

A. Verify that field measurements are as instructed by the manufacturer.

1.7 DELIVERY, STORAGE AND HANDLING

A. Deliver products in each manufacturer's original, intact, labeled containers, pallets or bundles and store under shelter in a dry location with temperatures above 40 degrees F until installed. Store off the ground, protect from freezing, direct sun exposure in elevated temperatures and construction activities.

1.8 WARRANTY

A. The expansion system shall be warranted for a period of three years for normal usage under specified movements and design conditions.

B. The three year warranty shall warrant and provide at no charge, all materials and labor needed to properly repair or replace defective or damaged product within the term of the provided warranty.

PART 2 PRODUCTS

2.1 MANUFACTURERS

A. Balco, Inc. Products:
   1. Type 1: Model #LPRE-6 exterior roof to wall.
   2. Type 2: Model #FCVS-6-SAN exterior wall-to-wall.
   3. Type 3: Model #TCVS-6-SAN interior wall-to-wall.

B. MM Systems Corporation.

C. Watson Bowman Acme.

D. InPro Corporation.

E. Substitutions: Under provisions of Division 01.

2.2 MATERIALS

A. Extruded Aluminum: ASTM B221; 6063-T5 alloy for extrusions.


C. Threaded Fasteners: Aluminum or stainless steel.

D. Bituminous Coating: Cold-applied asphalt emulsion complying with ASTM D1187.

F. Provide 45 mil flexible EPDM Class I (per ASTM D4637) water barriers with drainage fittings and tubing at exterior joints for a waterproof installation.

2.3 FABRICATION

A. Joint Covers: Aluminum cover plate, aluminum frame construction, retainers with resilient filler strip, designed to permit ±100 percent joint movement with full recovery, flush and recess mounted; refer to Drawings for types and locations.

B. Back paint components in contact with cementitious materials with bituminous coating.

C. Shop-assemble components and package with anchors and fittings. At metal components, provide factory welded transitions and corners.

D. Provide joint components in single length wherever practical. Minimize site splicing.

E. Only straight, butt splice connections shall be allowed on the jobsite following manufacturer's written instructions utilizing specialty heat fusing equipment or the manufacturer's specialty splicing adhesive. All factory and field fused connections shall incorporate bonding of the complete seal profile. This includes fusing of all internal and external web configurations. All corner connections shall be factory fabricated.

PART 3 EXECUTION

3.1 EXAMINATION

A. Verify existing conditions prior to installation.

B. Verify that joint preparation and affected dimensions are acceptable.

3.2 PREPARATION

A. Provide anchoring devices for installation and embedment.

B. Provide templates and rough-in measurements.

3.3 INSTALLATION

A. Install components and accessories in accordance with manufacturer's instructions.

B. Align work plumb and level, flush with adjacent surfaces.

C. Rigidly anchor components to substrate to prevent misalignment.

D. Make allowances for change in joint size due to difference between installation and building operating temperatures.

E. Cover and protect expansion joint cover assemblies from construction traffic.

F. Interior Joints: Secure joint assembly in place with anchors spaced at 24 inches on center maximum.

G. Exterior Expansion Systems: Mechanically fasten frames to each side of joint and attach interior and exterior seals and water barrier systems.
H. Roof Joint Covers: Attach to curbs and substrates at 24 inches on center maximum.

I. Remove excess and misplaced sealants as work progresses.

J. Remove protective film or coverings from expansion joint covers upon completion of adjacent construction.

3.4 ADJUSTING AND PROTECTION

A. Adjust joint seal to freely accommodate joint movement.

B. Protect installation from damage by work of other Sections.

END OF SECTION
DIVISION 08
OPENINGS
SECTION 08 11 13
HOLLOW METAL DOORS AND FRAMES

PART 1  GENERAL

1.1  SECTION INCLUDES

A.  Standard hollow metal doors and frames.
    1.  Hollow metal doors, rated and non-rated.
    2.  Hollow metal frames, rated and non-rated.

B.  Borrowed lights (interior windows, fixed).

C.  Sidelights.

D.  Transoms.

E.  Door glazing.

F.  Door louvers.

G.  Finish: Field-painted, color as indicated on Drawings; if not indicated, to be selected by Architect. Provide exterior paint system on both interior and exterior sides, four edges, and frames of exterior doors.

1.2  RELATED SECTIONS

A.  Division 01 – Sustainable Design Requirements; for additional LEED requirements.

B.  Section 05 40 00 – Cold-Formed Metal Framing.

C.  Section 06 10 00 – Rough Carpentry.

D.  Section 07 25 00 – Weather Barriers.

E.  Section 07 92 00 – Joint Sealants.

F.  Section 08 14 00 – Wood Doors.

G.  Section 08 71 00 – Door Hardware.

H.  Section 08 81 00 – Glass Glazing.

I.  Section 08 88 13 – Fire Rated Glazing.

J.  Section 09 22 16 – Non-Structural Metal Framing.

K.  Section 09 29 00 – Gypsum Board.

L.  Section 09 91 00 – Painting.

M.  Division 26 Sections for electrical connections including conduit and wiring for door controls and operators.
1.3 REFERENCES

A. The publications listed below form a part of this Section to the extent referenced. The publications are referred to in the text by the basic designation only. Refer to Division 01 for definitions, acronyms, and abbreviations.

B. Standards, manuals, and codes refer to the latest edition of such standards, manuals, and codes in effect as of the date of issue of this Project Manual, unless indicated otherwise in CBC Chapter 35 and CFC Chapter 80.

C. Referenced Standards:

1. ANSI/SDI A250.6 – Recommended Practice for Hardware Reinforcing on Standard Steel Doors and Frames.

2. ANSI/SDI A250.8 – Standard Steel Doors and Frames.


9. California Building Code, Section 716 “Opening Protectives,” Paragraph 716.5 “Fire Door and Shutter Assemblies”.


12. NFPA 105 – Standard for the Installation of Smoke Door Assemblies and Other Opening Protectives.


15. NFRC 400 – Procedure for Determining Fenestration Product Air Leakage.


17. UL 10B – Fire Tests of Door Assemblies.

18. UL 10C – Positive Pressure Fire Tests of Door Assemblies.
19. UL 1784 – Air Leakage Tests for Door Assemblies.

1.4 SUBMITTALS

A. Submit under provisions of Division 01.

B. LEED Submittals: Provide the following, and comply with applicable requirements and procedures of Division 01.
   1. Product Data for EQ Credit 2: For paints and coatings, including printed statement of VOC content and chemical components.

C. Shop Drawings: Include illustrations and schedule of finish hardware, door and frame size, type, material, fire ratings, construction, finishing, anchoring, glazing, accessories, and preparation for installing hardware.
   1. Method of attachment of frames to structure shall be reviewed by Architect for acceptance or rejection.
   2. Details of conduit and preparations for power, signal, and control systems.

D. Templates: Furnish hardware templates to fabricator of frames to be factory prepared for installation of hardware. Refer to Section 08 71 00 for hardware requirements.

E. Manufacturer's Certificate for Exterior Door Assemblies: Certify that door assemblies meet air infiltration requirements of California Energy Code, California Code of Regulations, Title 24, Part 6, Section 116, as referenced in California Building Code, Chapter 13, “Energy Efficiency”.
   1. Air Leakage Limits: Manufactured exterior door assemblies shall have air infiltration rates not exceeding 0.3 cubic feet per minute per square foot of door area for nonresidential single doors (swinging and sliding), and 1.0 cubic feet per minute per square foot for nonresidential double doors (swinging), when tested according to NFRC 400 or ASTM E283 at a pressure differential of 75 pascals or 1.57 pounds per square foot.

F. Submit product data for type of metal primer proposed for use.

1.6 LEED COMPLIANCE DOCUMENTATION

A. Provide the following, and comply with applicable requirements and procedures of Division 01, LEED Online Letter Templates, and LEED 2013 BD+C Reference Guide:
   1. Product Data for MR Credit 3: For products having recycled content, documentation indicating percentages by weight of post-consumer and pre-consumer recycled content.
      a. Include statement indicating costs for each product having recycled content.
   2. Certificates for MR Credit 3: Provide certification for percentages of materials (based on cost) extracted, processed, and manufactured regionally within 100 miles of the project site.

1.7 DEFINITIONS

A. Minimum Thickness: Minimum thickness of base metal without coatings.

B. Standard Hollow Metal Work: Hollow metal work fabricated according to ANSI/SDI A250.8.
1.8 QUALITY ASSURANCE

A. Steel door and frame manufacturer shall be SDI certified.

B. Provide doors and frames complying with ANSI A250.8, ANSI/NAAMM-HMMA 861, and as specified herein.

1.9 REGULATORY REQUIREMENTS

A. Fire-Rated Doors and Frames: Provide doors and frames complying with NFPA 80 that are listed and labeled by a qualified testing agency, for fire-protection ratings indicated, based on testing at positive pressure according to NFPA 252 or UL 10C.
   1. Oversize Fire-Rated Door Assemblies: For units exceeding sizes of tested assemblies, provide certification by a qualified testing agency that doors comply with standard construction requirements for tested and labeled fire-rated door assemblies except for size.
   2. Temperature-Rise Limit: At vertical exit enclosures and exit passageways, provide doors that have a maximum transmitted temperature end point of not more than 450 degrees F above ambient after thirty minutes of standard fire-test exposure.

B. Testing of Fire-Rated Door and Frame Assembly: Conform to applicable requirements of NFPA 252 or UL 10C.

C. Doors and Frames for Smoke-Control Door Assemblies: Comply with applicable requirements of NFPA 105 or UL 1784.

D. Fire-Rated Door and Frame Labels: All fire rated doors and frames shall have metal labels (including "S" labels) permanently fastened to the jamb indicating the fire rating and Testing Agency name.
   1. Do not apply primer or paint over fire rating labels.

E. Fire-Rated, Borrowed-Light Frame Assemblies: Assemblies complying with NFPA 80 that are listed and labeled, by a testing and inspecting agency acceptable to authorities having jurisdiction, for fire-protection ratings indicated, based on testing according to NFPA 257 or UL 9. Label each individual glazed lite.

1.10 DELIVERY, STORAGE AND HANDLING

A. Deliver all materials under protective cover and store in upright position within a dry enclosed space in a manner that will prevent rust and damage. Do not create a humidity chamber by using a plastic or canvas shelter that is not adequately vented.

B. Deliver fully-welded frames with two removable spreader bars across bottom of door frames, tack welded to jambs and mullions.

1.11 PROJECT CONDITIONS

A. Field Measurements: Verify actual dimensions of openings by field measurements before fabrication.
1.12 COORDINATION

A. Coordinate installation of anchorages for hollow metal frames. Furnish setting drawings, templates, and directions for installing anchorages, including sleeves, concrete inserts, anchor bolts, and items with integral anchors. Deliver such items to Project site in time for installation.

PART 2 PRODUCTS

2.1 LEED™ REQUIREMENTS

A. Recycled Content: Provide products with recycled content such that post-consumer recycled content plus one-half of pre-consumer recycled content, calculated as percentages of total product weight, shall contribute to the LEED Credit requirement for recycled content.

B. VOC Content of Field-Applied Interior Paints and Coatings: Provide products that comply with the limits set forth in LEED 2013 BD+C Reference Guide for VOC content, exclusive of colorants added to a tint base, when calculated according to 40 CFR 59, Subpart D (EPA Method 24); these requirements do not apply to paints and coatings that are applied in a fabrication or finishing shop.

2.2 MANUFACTURERS

A. Acceptable Manufacturers, Hollow Metal Doors and Frames:

B. Substitutions: Under provisions of Division 01.

2.3 MATERIALS

A. Cold-Rolled Steel Sheets for Doors and Frames: Commercial Steel (CS), Type B, complying with ASTM A1008/A1008M.
   1. Use cold-rolled steel for door frames and exposed-to-view surfaces.

B. Hot-Rolled Steel Sheets and Strip for use at Door Frames: Commercial Steel (CS), Type B; complying with ASTM A1011/A1011M.
   1. Steel shall be free of mill scales, pitting, or surface defects; pickled and oiled.
   2. Use hot-rolled steel for reinforcement and concealed components only.

C. Factory-Applied Primer: Manufacturer’s standard primer, thickness: two mils minimum, and compatible with ferrous and galvanized metal primers specified in Section 09 91 00.

D. Refer to Section 08 81 00 and Section 08 88 13 for glass glazing requirements.

E. Refer to Section 08 71 00 for hardware requirements.
2.4 STANDARD HOLLOW METAL DOOR FABRICATION

A. General: Fabricate to sizes shown, providing necessary clearances and bevels to permit operation without binding. Doors shall be free from warp, wave, buckle or other defect. Doors shall be 1-3/4 inches thick, unless otherwise indicated on Drawings.

B. Flush Door Construction: Door shall be Grade III, Model 2, fabricated with face sheets of 16 gauge steel in accordance with ANSI/SDI A250.8 and galvanized to ASTM A653/A653M G60 at exterior locations and interior wet locations. Door shall be flush with edge seams, weld filled and ground smooth. Bevel lock edge 1/8 inch in 2 inches. Door shall be provided with 16 gauge steel top flush cap welded and ground smooth, and bottom inverted 14 gauge steel channels welded within the door. Door shall be reinforced, stiffened and sound deadened with impregnated kraft honeycomb core completely filling door cavity, and laminated to the inside faces of panels.

1. Exterior doors shall be insulated with an expanded polystyrene or polyurethane core, or as standard with manufacturer. Completely fill door cavity with insulation. Expanded polystyrene to be ASTM C578, Type 1 or Type 2, with minimum one pound per cubic foot density.

C. Preparation of Hardware: Per ANSI/SDI A250.6, door shall be mortised, reinforced, drilled and tapped at the factory from templates for all mortise hardware listed in the Hardware Schedule. Door shall be reinforced for surface applied hardware such as closers, checks, escutcheons and kick plates; drilling and tapping to be done in the field by door installer. Reinforcement to be 12 gauge for locksets and latchsets, and 14 gauge for surface applied hardware, except use 3/16-inch thick plate for butt hinges. Door shall be provided with reinforcing unit as recommended by lock manufacturer.

D. Hardware Mounting Heights and Door Clearances: In accordance with California Building Code and applicable requirements of Section 08 71 00.

2.5 STANDARD HOLLOW METAL FRAME FABRICATION

A. General:

1. Provide fully-welded frames; location as indicated on Drawings.

2. Hollow metal frames shall be formed to shapes and sizes shown.

B. Full Profile Welded Frames: Head and jamb splices shall be fabricated with mitered, coped and continuously welded inside and outside corners and be finished on the outside face to present a smooth surface for painting.

C. Frames shall be fabricated from 16 gauge steel, and shall be designed with integral stop and trim. All corners shall be reinforced with 18 gauge “L” shaped reinforcements welded on the inside face of the frame.

D. Reinforce frames wider than 48 inches with roll formed steel channels fitted tightly into frame head, flush with top.

E. Frames shall be galvanized to ASTM A653/A653M G60 at exterior locations and interior wet locations.
F. Preparation for Hardware: Per ANSI/SDI A250.6, frame shall be prepared at the factory for all hardware using templates furnished by hardware supplier. Locations of miscellaneous hardware shall conform to the recommendations for the Door and Hardware Institute. Mortise, reinforce, drill and tap for mortise type hardware. Reinforce frames for surface applied hardware; drilling and tapping to be done in the field by door installer.

1. Hardware cutouts shall have steel plate reinforcements with tapped holes fillet welded to frame on all four sides of the plate. Fillet welds shall be minimum 1 inch long. Reinforcement shall include 3/16 inch butt reinforcement; 12 gauge lock strike; 14 gauge for surface applied items.

2. Provide strike stops at frames to receive hollow metal or wood doors with holes for three rubber door silencers. On double door frames, provide for two silencers per door at head. Omit holes at frames to receive unitized gasketing; refer to Section 08 71 00.

2.6 BORROWED LIGHTS (INTERIOR WINDOWS, FIXED)

A. Interior Window Units: Furnish shop assembled and welded units for fixed windows, fabricated to the designs and dimensions indicated. Provide metal glazing stops and moldings of same gauge as frame on secure side of window for field assembly with countersunk oval head self-tapping screws spaced not over 16 inches on center. Frames shall be complete with all corners welded, ground smooth, and provided with anchors.

2.7 ANCHORS

A. Frame shall be anchored to structure with anchors appropriate for use with type of adjacent construction. Anchorage shall securely fasten frames to wall construction involved. Provide a minimum three anchors, including one adjustable floor anchor, at each door jamb. Anchors shall be minimum 16 gauge steel and shall provide stiffness and rigidity to keep frames square, in accurate position without twisting, buckling or warping. Fasteners to framing substrate shall be the following minimums; greater as required by the frame manufacturer or as conditions warrant: Max/min Height at 8'-3" for 3 anchors.

1. Wood Framing: Four #10 wood screws per strap anchor (two each side), length as required; fastener to penetrate a minimum of 1-1/2 inches into framing member.

2. Metal Framing: Two #10 self-tapping sheet metal screws per anchor, length as required; fastener to penetrate a minimum of 1/4 inch into framing member.

3. Concrete/Masonry: 1/4 inch diameter stainless steel wedge anchors, three per jamb, with 1-1/2 inches minimum embedment into substrate and 2 inches minimum edge distance to face of substrate.

2.8 PRIMING

A. Doors and frames shall be leveled and welds ground smooth. Apply mineral filler to eliminate weld scars and other blemishes.

B. Shop Priming: All surfaces shall be cleaned, phosphatized, and given one coat of baked-on rust-inhibiting primer in accordance with the Steel Door Institute specification "Test Procedure and Acceptance Criteria for Primer Painted Steel Doors and Frames".

1. Do not prime paint over fire-rated door and frame labels.
2.9 ACCESSORIES

A. Glazing Stops: LoPro by Anemostat or Slimline by Air Louvers, Inc. Galvanized steel; mitered corners; prepared for countersink style screws. Sizes as indicated on Drawings. Install glazing stop fasteners on the non-secure side of doors. Finish shall be factory primed to receive site paint finish, color as selected by Architect.

1. At fire-rated assemblies, fire-rating of glazing stops shall match fire-rating of opening. Fire-rated glazing stops shall bear the listing mark of Underwriters Laboratories and/or Warnock Hersey, and shall be visible without removal of the frame from the door.

B. Glass Glazing: As specified in Section 08 81 00 and Section 08 88 13.

PART 3 EXECUTION

3.1 EXAMINATION

A. Verify that opening sizes and tolerances are acceptable.

3.2 INSTALLATION

A. Install doors and frames in accordance with ANSI A250.8, and ANSI/NAAMM-HMMA 861, and UL 752, as applicable.

B. Set frame level and plumb, and brace adequately to prevent damage or distortion. Secure to structure with minimum of three anchors at each jamb. Field joints shall be welded, body puttied and ground smooth.

1. Removable Spreaders: Wherever possible, leave frame spreaders intact until frames are set perfectly square and plumb, and anchors are securely attached.

C. Door Installation in Hollow Metal Frames: Fit hollow metal and wood doors accurately in frames.

D. Coordinate installation of doors and frames with installation of doors specified in Section 08 14 00, hardware specified in Section 08 71 00, and glazing as specified in Section 08 81 00 and Section 08 88 13.

3.3 ERECTION TOLERANCES

A. Maximum Diagonal Distortion: 1/16 inch measured with straight edge, corner to corner.

3.4 ADJUST AND CLEAN

A. Prime Coat Touch-Up: Immediately after erection, sand smooth all rusted or damaged areas of prime coat and apply touch-up of compatible air-drying primer. Touch-up shall not be obvious.

B. Cleaning and Finishing: Upon completion of the work, clean all exposed surfaces, removing any discoloration or foreign matter, and touch up all abraded or cut areas and exposed edges with finishing material recommended by the manufacturer. Touch-up of finish shall not be obvious.

C. Final Adjustments: Adjust door for smooth and balanced door movement. Check and readjust operating finish hardware in hollow metal work immediately prior to final inspection. Leave work in complete and proper operating condition.
D. Defective Work: Remove and replace defective work, including doors and frames which are warped, bowed or otherwise damaged, as directed by Architect, at no cost to Owner.

E. Protection: Protect installed hollow metal work against damage from other construction work.

3.5 CLEAN-UP

A. Upon completion of the work of this Section, remove all excess materials, rubbish, and debris from the premises.

END OF SECTION
SECTION 08 14 00

WOOD DOORS

PART 1  GENERAL

1.1  SECTION INCLUDES

A. Rated and Non-Rated Flush Wood Doors.
B. Door Glazing.

1.2  RELATED SECTIONS

A. Division 01 – Sustainable Design Requirements; for additional LEED requirements.
B. Section 08 11 13 – Hollow Metal Doors and Frames.
C. Section 08 71 00 – Door Hardware.
D. Section 08 81 00 – Glass Glazing.
E. Section 08 88 13 – Fire Rated Glazing.

1.3  REFERENCES

A. The publications listed below form a part of this Section to the extent referenced. The publications are referred to in the text by the basic designation only. Refer to Division 01 for definitions, acronyms, and abbreviations.
B. Standards, manuals, and codes refer to the latest edition of such standards, manuals, and codes in effect as of the date of issue of this Project Manual, unless indicated otherwise in CBC Chapter 35 and CFC Chapter 80.

C. Referenced Standards:
   3. California Building Code, Section 716 "Opening Protective", Paragraph 716.5 "Fire Door and Shutter Assemblies".
   4. ITS Directory of Listed Products.
   7. UL 10C – Standard for Positive Pressure Fire Tests of Door Assemblies.
   8. WI/AWMAC North American Architectural Woodwork Standards, including WI Supplemental Text.

1.4  SUBMITTALS

A. Submit under provisions of Division 01.
B. LEED Submittals: Provide the following, and comply with applicable requirements and procedures of Division 01.

1. Product Data for EQ Credit 2: For adhesives and sealants, including printed statement of VOC content and chemical components.

2. EQ Credit 2:
   a. Manufacturer’s product data for each composite wood or agrifiber product used indicating that the product contains no added urea formaldehyde resins.
   b. Laminate adhesive manufacturer’s product data for each adhesive used indicating that the adhesive contains no added urea formaldehyde resins.

3. Certificates for MR Credit 3: Chain-of-custody certificates certifying that products specified to be made from certified wood comply with forest certification requirements. Include evidence that mill is certified for chain of custody by an FSC-accredited certification body.
   a. Include statement indicating costs for each certified wood product.

C. Shop Drawings: Illustrate door opening criteria, elevations, sizes, types, fire ratings, swings, undercuts required, special beveling, special blocking for hardware, and identify cutouts for glazing.

D. Product Data: Indicate door core materials and construction, veneer species and cut, type and characteristics; factory machining criteria, and factory finishing criteria.

E. Samples: Submit three sets of three samples each of door veneer, 8 inches x 8 inches in size, illustrating specified wood species, grain, and range of color.

1.5 QUALITY ASSURANCE

A. Single Source Responsibility: All doors specified in this Section shall be manufactured and provided by a single manufacturer to ensure door compatibility and quality.

B. Perform work in accordance with WI/AWMAC, Section 9, Custom Grade.

C. Other requirements shall conform to WDMA I.S. 1A-04 as follows:

<table>
<thead>
<tr>
<th>Performance Attribute</th>
<th>Duty Level</th>
</tr>
</thead>
<tbody>
<tr>
<td>Adhesive Bond Durability WDMA TM-6, 1988</td>
<td>Extra Heavy Duty</td>
</tr>
<tr>
<td>Cycle Slam WDMA TM-7, 1990</td>
<td>Type I</td>
</tr>
<tr>
<td>Hinge-Loading WDMA TM-8, 1990</td>
<td>1,000,000 cycles</td>
</tr>
<tr>
<td>Screwholding WDMA TM-10, 1990</td>
<td>550 pounds</td>
</tr>
<tr>
<td>Door Face Unblocked</td>
<td>550 pounds</td>
</tr>
<tr>
<td>Door Face (with optional blocking)</td>
<td>700 pounds</td>
</tr>
<tr>
<td>Vertical Door Edge</td>
<td>550 pounds</td>
</tr>
<tr>
<td>Horizontal Door Edge (applies when hardware attached)</td>
<td>300 pounds</td>
</tr>
<tr>
<td>Telegraph WDMA T-1</td>
<td>Maximum 0.010 inch per 3-inch span</td>
</tr>
</tbody>
</table>
Warp Tolerance WDMA T-2  Maximum 0.25 inch per 3 foot 6 inches by 7 foot door section
Squareness WDMA T-3  Diagonal Variance 0.125 inch

1.6 REGULATORY REQUIREMENTS

A. Fire-Rated Wood Doors: Doors complying with 2016 California Building Code (CBC), Section 716 “Opening Protectives”, Paragraph 716.5 “Fire Door and Shutter Assemblies”, and NFPA 80 that are listed and labeled by a qualified testing agency, for fire-protection ratings indicated, based on testing at positive pressure according to NFPA 252 or UL 10C, as applicable.

B. Fire Door Construction: Conform to NFPA 252.

C. Fire-Rated Doors: All fire rated doors shall have metal labels (including “S” labels) permanently fastened to the hinge stile indicating the fire rating and Testing Agency name. Do not apply primer or paint over fire rating labels.

1.7 QUALIFICATIONS

A. Manufacturer: Company specializing in manufacturing the products specified in this Section.

1.8 DELIVERY, STORAGE AND HANDLING

A. Deliver, store, protect and handle products to site under provisions of Division 01.

B. Accept doors on site in manufacturer’s packaging. Inspect for damage.

C. Comply with requirements in ANSI/WDMA I.S.1A: How to store, handle, finish, install and maintain wood doors.

D. In the event of damage, immediately make all repairs and replacements necessary at no additional cost to Owner.

E. Store flat on a level surface in a dry, well-ventilated building. Cover to keep clean but allow air circulation.

F. Handle with clean gloves and do not drag doors across one another or across other surfaces.

G. Do not subject door to abnormal heat, dryness or humidity.

H. Deliver in clean trucks and, in wet weather, under cover.

1.9 FIELD MEASUREMENTS

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

1.10 COORDINATION

A. Coordinate the work with door opening construction, doorframe, door hardware, and door glazing installation.
1.11 WARRANTY

A. Provide warranty under provisions of Division 01.

B. Warranty Period:
   1. Interior Solid Core Standard Doors: Life of installation.
   2. Include coverage for delamination of veneer, warping or twisting (not to exceed 1/4 inch in any face including diagonal) or other defects. Warranty shall cover replacement of door plus costs of hanging and finishing.

PART 2 PRODUCTS

2.1 MANUFACTURERS


E. Substitutions: Under provisions of Division 01.

2.2 LEED REQUIREMENTS

A. VOC Content of Adhesives and Sealants: For field applications that are inside the weatherproofing system, use adhesives and sealants that comply with the limits set forth in South Coast Air Quality Management District (SCAQMD) Rule 1168 for VOC content in g/L, less water, when calculated according to 40 CFR 59, Subpart D. Refer to LEED 2013 BD+C Reference Guide for list of sealant and adhesive types that must comply with VOC limits.

B. Composite wood and agrifiber products used on the interior of the building shall contain no added urea-formaldehyde resins.

C. Laminating adhesives used to fabricate on-site and shop-applied composite wood and agrifiber assemblies shall contain no added urea-formaldehyde resins.

2.3 DOOR CONSTRUCTION

A. All doors shall be 1-3/4 inch thickness, unless noted otherwise.

B. Solid, non-rated particleboard core: WI/AWMAC Section 9, 5-ply; Custom Grade.

C. Solid, 20-minute rated particleboard core: WI/AWMAC Section 9, 5-ply, Custom Grade.

D. Solid, 45-minute rated mineral core: WI/AWMAC Section 9. Stile edges shall be a minimum of 1 inch before trim on hinge side and 3/4 inch on lock side, including 1/4 inch outer edge band of hardwood.

E. Faces:
   1. Veneer Species: Stain grade select white maple veneer for transparent finish.
   2. Cut: Quarter cut.
3. Grade: A Grade.
5. Assembly of Veneer Leaves on Door Faces: Balance match.
6. Face veneers for pairs of doors shall be selected for color and grain match. Face veneers shall not be less than 1/50 inch at 12 percent moisture content after factory sanding. Crossbanding shall be high density fiberboard (HDF), MDF will not be allowed as a veneer substrate (crossband). Thin veneers are not acceptable.
7. Use solid stock for exposed edges to match face veneer.

F. Provide solid blocking on doors with surface mounted hardware or closers, for attachment with screws in lieu of through-bolts.

G. Top and bottom rails shall be a minimum of 2-1/4 inch before trimming, mill option species structural composite lumber for 20 minute rated and non-rated doors.

H. Fire Resistive Doors with 20 Minute Fire Rating (positive pressure): Construction shall have fire rating of not less than 20 minutes when tested in accordance with NFPA 252 or UL 10C.

I. Fire Resistive Doors with 45 Minute or Longer Fire Ratings (positive pressure): Meet requirements of, UL 10 (b)-80, and ASTM F152 for fire rating noted.

2.4 ADHESIVE

A. Facing Adhesive: Type I – waterproof, meeting VOC requirements of LEED EQ Credit 2.

2.5 ACCESSORIES

A. Glazing Stops: LoPro by Anemostat or Slimline by Air Louvers, Inc. Steel; mitered corners; prepared for countersink style screws. Sizes as indicated on Drawings. Install glazing stop fasteners on the non-secure side of doors. Factory paint finish in custom color as selected by Architect.

1. At fire-rated assemblies, fire-rating of glazing stops shall match fire-rating of opening. Fire-rated glazing stops shall bear the listing mark of Underwriters Laboratories and/or Warnock Hersey, and shall be visible without removal of the frame from the door.

B. Glass Glazing: As specified in Section 08 81 00 and Section 08 88 13.

2.6 FABRICATION

A. Fabricate non-rated doors in accordance with WI/AWMAC North American Architectural Woodwork Standards requirements.

B. Provide blocking at top of door for closer for attachment with screws.

C. Bond edge banding to cores.

D. Factory machine doors for finish hardware in accordance with hardware requirements and dimensions. Do not machine for surface hardware.

E. Undercut doors where indicated on Drawings.

F. Glass Cutouts: Provide cutouts for glass of size and shape indicated. Glass for doors is specified under Section 08 81 00 and Section 08 88 13.
G. Factory seal top and bottom rails before shipment.

H. Bevel both stiles 1/8 inch in 2 inches (3 degree bevel) and undersize doors 1/4 inch in width so that they swing freely and do not hinge bind.

2.7 FINISH

A. All doors shall be factory pre-finished, equal to WI/AWMAC Section 5, System #3, or accepted equal. Transparent finish, stain color and tone as selected by Architect and accepted on submitted sample. Apply finish at all faces and edges of doors.

PART 3 EXECUTION

3.1 EXAMINATION

A. Verify frame opening conditions.

B. Verify that opening sizes and tolerances are acceptable.

C. Do not install doors in frame openings that are not plumb or are out-of-tolerance for size or alignment.

3.2 INSTALLATION

A. Install rated and non-rated doors in accordance with WI/AWMAC Section 9 requirements, and UL or Intertek Testing Services (ITS) requirements.

B. Pre-adjust door height, supply doors with factory undercut.

C. Where required, trim non-rated door width by cutting equally on both jamb edges.

D. Where required, trim door height by cutting bottom edge to a maximum of 3/8 inch above finished floor or threshold.

E. Pilot drill screw and bolt holes.

F. Machine cut for hardware. Core for handsets and cylinders.

G. Coordinate installation of doors with installation of frames specified in Section 08 11 13, hardware specified in Section 08 71 00, and glazing as specified in Section 08 81 00 and Section 08 88 13.

3.3 INSTALLATION TOLERANCES

A. Maximum Diagonal Distortion (Warp): 1/4 inch measured with straight edge or taught string, corner to corner, over an imaginary 36 inch x 84 inch surface area.

B. Maximum Vertical Distortion (Bow): 1/4 inch measured with straight edge or taught string, top to bottom, over an imaginary 36 inch x 84 inch surface area.

3.4 ADJUSTING

A. Adjust work under provisions of Division 01.

B. Adjust door for smooth and balanced door movement, and wipe clean.
END OF SECTION
SECTION 08 31 00
ACCESS DOORS AND PANELS

PART 1 GENERAL

1.1 SECTION INCLUDES
   A. Non-fire-rated access doors.

1.2 RELATED SECTIONS
   A. Section 06 10 00 – Rough Carpentry.
   B. Section 09 22 16 – Non-Structural Metal Framing.
   C. Section 09 29 00 – Gypsum Board.
   D. Section 09 91 00 – Painting.

1.3 SUBMITTALS
   A. Submit under provisions of Division 01.
   B. Product Data: Include sizes, finish, and hardware.
   C. Shop Drawings: Show scheduled locations and details of adjoining work.

1.4 REGULATORY REQUIREMENTS
   A. Conform to requirements of CBC Section 1209 for access to unoccupied spaces.

1.5 PRE-INSTALLATION MEETINGS AND COORDINATION
   A. Conduct pre-installation meeting in accordance with provisions of Division 01.
   B. Convene pre-installation meeting prior to commencing work of this Section.
   C. Coordinate work in this Section with work in related Sections.

PART 2 PRODUCTS

2.1 MANUFACTURERS
   A. Acceptable Manufacturers:
   B. Substitutions: Under provisions of Division 01.
2.2 ACCESS DOORS

A. Non-Rated Access Doors for Gypsum Board:
   1. Product:
      a. Nystrom, Model NW.
      b. Karp, Model KDW.
   2. Components:
      a. Sizes: As shown on the Drawings.
      b. Frame: 16 gauge steel.
      c. Door: 14 gauge steel.
      d. Hinge: Concealed continuous piano hinge.
      e. Latch: Key operated, stainless steel cam and stud.
      f. Finish: Phosphate dipped, and prime coat of rust inhibitive electrostatic powder, baked grey enamel.

2.3 FABRICATION

A. Welded construction.

B. Manufacture each access panel assembly as an integral unit ready for installation.

C. Furnish with a sufficient quantity of 1/4 inch diameter mounting holes to secure access panels to types of supports indicated on Drawings.

D. Furnish number of latches required to hold panel in flush, smooth plane when closed.

PART 3 EXECUTION

3.1 EXAMINATION

A. Examine job site conditions and verify field dimensions. Verify structure is plumb, level, and parallel. Verify rough openings for door and frame are correctly sized and located.

B. Report unacceptable conditions to the Architect. Begin installation only when unacceptable conditions have been corrected.

3.2 INSTALLATION

A. Install in accordance with manufacturer's printed instructions and approved shop drawings.

B. Install units plumb, level, and square, and free from warp or twist while maintaining dimensional tolerances and alignment with surrounding construction. Secure rigidly in place.

C. Position unit to provide convenient access to concealed work requiring access.

3.3 ADJUSTING AND REPAIRING

A. Adjust panel after installation for proper operation.
B. Remove and replace panels or frames that are warped, bowed, or damaged.

END OF SECTION
SECTION 08 33 13
COILING COUNTER DOORS

PART 1  GENERAL

1.1  SECTION INCLUDES

A. Coiling counter doors; fire-rated; operating hardware; electric motor operation.

1.2  RELATED SECTIONS

A. Section 06 10 00 – Rough Carpentry.
B. Section 08 33 23 – Overhead Coiling Doors.
C. Section 09 22 16 – Non-Structural Metal Framing.
D. Section 09 29 00 – Gypsum Board.

1.3  REFERENCES

A. The publications listed below form a part of this Section to the extent referenced. The publications are referred to in the text by the basic designation only. Refer to Division 01 for definitions, acronyms, and abbreviations.

B. Standards, manuals, and codes refer to the latest edition of such standards, manuals, and codes in effect as of the date of issue of this Project Manual, unless indicated otherwise in CBC Chapter 35 and CFC Chapter 80.

C. Referenced Standards:

1. ASTM A653/A653M – Standard Specification for Steel Sheet, Zinc Coated (Galvanized) or Zinc-Iron Alloy-Coated (Galvannealed) by the Hot-Dip Process.
2. ASTM A666 – Standard Specification for Annealed or Cold-Worked Austenitic Stainless Steel Sheet, Strip, Plate, and Flat Bar.
4. NEMA 250 – Enclosures for Electrical Equipment (1000 Volts Maximum).
5. NEMA ICS 2 – Industrial Control and Systems: Controllers, Contactors, and Overload Relays, Rated Not More Than 2000 Volts AC or 750 Volts DC.
6. NEMA MG 1 – Motors and Generators.
9. UL 325 – Door, Drapery, Gate, Louver, and Window Operators and Systems.

1.4  SUBMITTALS

A. Submit under provisions of Division 01.
B. Shop Drawings: Indicate pertinent dimensioning, anchorage methods, hardware locations, wiring diagrams, and installation details. Method of anchorage to be acceptable to Architect.
   1. Verify locking requirements with Owner.

C. Product Data: Provide general construction, component connections and details.

D. Manufacturer's Installation Instructions: Indicate installation sequence and procedures, adjustment and alignment procedures.

1.5 SYSTEM DESCRIPTION

A. Motor operated unit with overhead counter balance device.

B. Face-of-wall surface mounted.

1.6 REGULATORY REQUIREMENTS

A. Fire-Rated Doors: All fire rated doors shall have metal labels (including "S" labels) permanently fastened to the jamb indicating the fire rating and Testing Agency name. Door assembly shall be in compliance with NFPA 80. Do not apply primer or paint over fire rating labels. Rating as indicated on Drawings.

1.7 MAINTENANCE DATA

A. Submit under provisions of Division 01.

B. Maintenance Data: Indicate lubrication requirements and frequency and periodic adjustments required.

1.8 DELIVERY, STORAGE AND HANDLING

A. Deliver materials and products in labeled protective packages. Store and handle in strict compliance with manufacturer's instructions and recommendations. Protect from damage from weather, excessive temperatures and construction operations.

1.9 FIELD MEASUREMENTS

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

PART 2 PRODUCTS

2.1 MANUFACTURERS AND PRODUCTS

A. Overhead Door Corp. Products:
   1. Door Assembly: Model 641.
   2. Operator: Model CDX.

B. Cornell Iron Works.

C. Cookson Company.

D. Substitutions: Under provisions of Division 01.
2.2 MATERIALS

A. Curtain: Conforming to the following:
   2. Nominal Slat Size: 1-1/2 inches wide x 1/2 inch deep x required length.
   3. Curtain Bottom: Fitted with single stainless steel angle bottom bar with 1/4 inch foam astragal and electric sensing edge.
   4. Provide endlocks for curtain alignment and to prevent lateral slat movement.

B. Guides: Stainless steel shapes.

C. Brackets: Steel plate to support counterbalance, curtain and hood.

D. Counterbalance: Helical torsion spring type housed in a steel tube or pipe barrel.

E. Hood:
   1. Provided with intermediate support brackets as required and fabricated of stainless steel.
   2. FM approved hood shall be equipped with thermally controlled, internal flame baffle.

F. Countertops:
   1. Plastic Laminated Fire Rated Countertops: Provide counter fire doors with plastic laminated fire rated countertops.
      a. Label: Plastic laminated fire rated countertops shall bear Warnock Hersey International 1-1/2 hour label for countertops up to 8 feet by 4 feet. Sizes over 8 feet by 4 feet shall bear an Warnock Hersey International Oversize Label.
      b. Shape: Provide shape as indicated on the Drawings. To include: I or T copable for face mounted doors. No aprons or additional pieces will be allowed.
      c. Core: Interior core of Georgia Pacific Firestop composite and high density particleboard.
      d. Finish: Top, bottom and all edges shall be covered with plastic laminate.
      e. Color: Top and all edges as selected by the Architect from any color from Formica, Wilsonart, or Nevamar brands of plastic laminate.
      f. Mounting Hardware: Provide with all necessary mounting hardware.

G. Finishes:
   1. All stainless steel components shall have a No. 4 finish.
   2. Non-galvanized exposed ferrous surfaces shall receive one coat of rust-inhibitive primer.

2.3 MOTOR OPERATION

A. Counter Door Operator:
   1. Electric Motor: Intermittent-duty, with instant reverse and automatic reset thermal overload. UL listed.
      a. Rating:
         1) 1/2 horsepower single phase.
         2) 115 V.
b. Motor frame shall comply with: NEMA 42 for 1/2 horsepower single phase.

c. Construction: Open drip-proof construction.

d. Reduction: Helical gear primary reduction and hardened bevel gear secondary reduction.

e. Duty cycle: Accommodate light duty usage, up to 4 cycles per hour.

f. Limit System: LimitLock limit system, magnetic type providing absolute positioning with push to set and remote setting capabilities. Limit System shall remain synchronized with the door during manual operation and supply power interruptions.

2. Control System: Microprocessor based with relay motor controls on a single board. System incorporates a 16 character Liquid Crystal Display (LCD) to display the system status. System shall include the following:

a. A delay-on-reverse operating protocol.

b. Maximum run timers in both directions of travel that limit motor run time in the event a problem occurs.

c. Provisions for the connection of a 2-wire monitored photo-eye or a 2-wire monitored edge sensor, as well as non-monitored 2-wire sensing edges, photo-eyes or other entrapment protection devices.

d. Control action will be constant contact close until a monitored entrapment device is installed, allowing for selection of momentary contact.

e. Provisions for connection of single and/or 3-button control stations.

f. On board open, close and stop control keys for local operation.

3. Mounting: Front of hood and chain/sprocket coupling to door.

4. Release: Release shall be a pull and hold type mechanism with single cable operation and an integrated interlock switch on hoist units.

5. Entrapment Protection: Control system shall have provisions to connect monitored entrapment protection devices such as monitored electric sensing edge, or monitored photo-eye and to provide constant contact close control operation in lieu of such devices.

6. Operator Controls:

a. Push-button and key operated control stations with open, close, and stop buttons.

b. Controls for interior location.

c. Controls flush mounted.

2.4 RATED DOOR RELEASE DEVICE

A. Time-delay release mechanism:

1. Voltage output 24 VDC.

2. Release time delay: Factory set at ten seconds can be field adjusted by dipswitch settings to 20 seconds, 30 seconds, and 60 seconds.

3. Shall use normally open proximity switch to detect door is closed or normally open down operator down limit switch.

4. Shall support two or four wire smoke detector system (maximum of four Class B Style A detectors). Release devices are normally open contacts. Provided with four wire detectors when detectors are specified with an end of line relay.
5. Unit shall have one 12 VDC battery with 24 VDC output.
6. Power Loss Time delay: 72 hours.
7. Unit shall power an optional ADA horn / strobe 24 VDC.
9. When used with and electric operator, the operator shall be modified to accept wiring from time-delay release mechanism.

PART 3 EXECUTION

3.1 EXAMINATION
A. Verify that opening sizes, tolerances and conditions are acceptable.

3.2 INSTALLATION
A. Install door unit assembly in accordance with manufacturer's instructions.
B. Install rolling counter fire doors in compliance with requirements of NFPA 80.
C. Use anchorage devices to securely fasten assembly to wall construction and building framing without distortion or stress.
D. Securely brace components suspended from structure. Secure guides to structural members only.
E. Fit and align assembly including hardware; level and plumb, to provide smooth operation.
F. Coordinate installation of electrical service with Division 26. Complete wiring from disconnect to unit components and controls.
G. Install and test fire release devices in accordance with the manufacturer's instructions and in compliance with applicable regulations and codes of the authority having jurisdiction. Reset components after testing.

3.3 ERECTION TOLERANCES
A. Maintain dimensional tolerances and alignment with adjacent work.
B. Maximum Variation from Plumb: 1/16 inch.
C. Maximum Variation from Level: 1/16 inch.
D. Longitudinal or Diagonal Warp: Plus or minus 1/8 inch per 10 foot straight edge.

3.4 ADJUSTING
A. Adjust work under provisions of Division 01.
B. Test for proper operation and adjust as necessary to provide proper operation without binding or distortion.
C. Adjust door, hardware and operating assemblies for smooth and noiseless operation.
3.5 DEMONSTRATION
  A. Engage a factory-authorized service representative to train Owner's maintenance personnel to adjust, operate, and maintain coiling counter doors.

3.6 CLEANING
  A. Clean work under provisions of Division 01.
  B. Clean door and components.
  C. Remove labels (except for fire-rating labels) and visible markings.
  D. Touch-up, repair or replace damaged products.

END OF SECTION
SECTION 08 33 23
OVERHEAD COILING DOORS

PART 1 GENERAL

1.1 SECTION INCLUDES

A. Overhead coiling service doors, fire-rated, operating hardware, motor operation.

1.2 RELATED SECTIONS

A. Section 06 10 00 – Rough Carpentry.
B. Section 08 31 00 – Access Doors and Panels.
C. Section 08 33 13 – Coiling Counter Doors.
D. Section 09 91 00 – Painting.
E. Division 26 – Electrical: Motor and Controls Connections.

1.3 REFERENCES

A. The publications listed below form a part of this Section to the extent referenced. The publications are referred to in the text by the basic designation only. Refer to Division 01 for definitions, acronyms, and abbreviations.

B. Standards, manuals, and codes refer to the latest edition of such standards, manuals, and codes in effect as of the date of issue of this Project Manual, unless indicated otherwise in CBC Chapter 35 and CFC Chapter 80.

C. Referenced Standards:
   1. ASTM A653 – Standard Specification for Steel Sheet, Zinc-Coated (Galvanized) or Zinc-Iron Alloy-Coated (Galvannealed) by the Hot-Dip Process.
   3. NEMA 250 – Enclosures for Electrical Equipment (1000 Volts Maximum).
   4. NEMA ICS 2 – Industrial Control and Systems Controllers, Contactors, and Overload Relays Rated 600 Volts.
   5. NEMA MG1 – Motors and Generators.
   8. UL 325 – Door, Drapery, Gate, Louver, and Window Operators and Systems.

1.4 SUBMITTALS

A. Submit under provisions of Division 01.

B. Shop Drawings: Indicate pertinent dimensioning, anchorage methods, hardware locations, electrical connections, and installation details. Method of attachment to structure shall be acceptable to Architect.
C. Product Data: Provide general construction, component connections and details.

D. Manufacturer's Installation Instructions: Indicate installation sequence and procedures, adjustment and alignment procedures.

1.5 REGULATORY REQUIREMENTS

A. Fire-Rated Doors: All fire rated doors shall have metal labels (including “S” labels) permanently fastened to the jamb indicating the fire rating and Testing Agency name. Door assemblies shall be in compliance with NFPA 80. Do not apply primer or paint over fire rating labels. Rating as indicated on Drawings.

1.6 SYSTEM DESCRIPTION

A. Motor operated unit with overhead counter balance device.

B. Face-of-wall surface mounted.

1.7 MAINTENANCE DATA

A. Submit under provisions of Division 01.

B. Maintenance Data: Indicate lubrication requirements and frequency, and periodic adjustments required.

1.8 DELIVERY, STORAGE AND HANDLING

A. Deliver materials and products in labeled protective packages. Store and handle in strict compliance with manufacturer's instructions and recommendations. Protect from damage from weather, excessive temperatures and construction operations.

1.9 FIELD MEASUREMENTS

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

PART 2 PRODUCTS

2.1 MANUFACTURERS

A. Overhead Door Corp., Products:
   1. Door: Model 631.
   2. Operator: RSX Series.

B. Cookson Company.

C. Cornell Iron Works, Inc.

D. Substitutions: Under provisions of Division 01.

2.2 MATERIALS

A. Curtain:
2. Nominal Slat Size: 2-5/8 inches wide x required length x 5/8 inch deep.

3. Curtain Bottom: Two – 1/8 inch thick galvanized steel angles bolted back-to-back with weather-stripping to provide curtain reinforcement and positive contact with floor when in closed position. Provide electric sensing edge.

4. End locks shall be installed on alternate slats.

B. Guides: Three - 3/16 inch thick galvanized structural steel angles, continuous, with vinyl weather seal at each jamb, on the exterior curtain side.

C. Counterbalance: Helical torsion spring type housed in a steel tube or pipe barrel, supporting the curtain with deflection limited to 0.03 inch per foot of span. Counterbalance shall be adjustable by means of an adjusting tension wheel. Provide 100,000 cycle springs.

D. Hood Enclosure:
   1. 24 gauge galvanized steel, internally reinforced to maintain rigidity and shape, weather-striped.
   2. FM approved hood shall be equipped with thermally controlled, internal flame baffle.

E. Brackets: Galvanized steel to support counterbalance, curtain, and hood.

2.3 MOTOR OPERATION

A. Standards: Motor operator unit approved and listed by UL Electrical equipment conforming to NEMA Standards.

B. Motor Operator Unit: Wall or bracket mounted in compact unit enclosed by metal housing, capable of moving curtain up or down at rate of not less than 2/3 foot per second nor more than one foot per second, consisting of motor connected to speed reducer, solenoid activated clutch brake, limit switch and emergency stop bar together with such controls as specified or required.

C. Current Characteristics for Motor and Controls: To suit that available at door locations as shown on Electrical Drawings.

D. Motor: One third horsepower, 208V, three-phase, heavy duty, high starting torque, Class A insulated, hoist duty motor. Horsepower rating shall have large overload factor.

E. Drive: Either direct motor connected or noiseless roller chain drive to speed reducing worm gear assembly submerged in oil bath. Sprocket and gears, steel with machine cut teeth, or high-strength gray cast iron with either machine cut teeth or machine molded from machine cut patterns. Bearings self-aligning precision ball bearings or permanently lubricated type.

F. Starter: Magnetic, across-the-line starter with thermal overload, under-voltage protection and magnetic reversing contactor, key-operated switch with three positions marked "UP," "DOWN," and "STOP" or "OPEN," "CLOSE" and "OFF." Recessed wall-mounted with stainless steel faceplate.

G. Limit Switch: Provide as needed to limit travel of curtain up and down. Timing shall not be affected when operation changes from motor to manual or when motor is removed.
H. Safety Switch: Provide interlocking safety switch to shut off current to motor when curtain is being manually operated. Provide emergency stop edge at bottom bar extending across full width of door to automatically stop or reverse downward travel of curtain when contact is made with obstruction in opening.

I. Emergency Operation: Provide endless galvanized chain within reach of floor and not more than 12 inches from wall, for manual operation in emergency. Manual operation shall be possible when motor is disconnected, or under any conditions that make power unit inoperable.

2.4 RATED DOOR RELEASE DEVICE

A. Time-delay release mechanism:
   1. Voltage Output: 24 VDC.
   2. Release Time Delay: Factory set at ten seconds; can be field adjusted by dipswitch settings to 20 seconds, 30 seconds, and 60 seconds.
   3. Shall use normally open proximity switch to detect door is closed or normally open down operator down limit switch.
   4. Shall support two or four wire smoke detector system (maximum of four Class B, Style A detectors). Release devices are normally open contacts. Provide with four wire detectors when detectors are specified with an end of line relay.
   5. Unit shall have one 12 VDC battery with 24 VDC output.
   7. Unit shall power a 24 VDC ADA horn / strobe.
   9. When used with an electric operator, the operator shall be modified to accept wiring from time-delay release mechanism.

2.5 FINISHES

A. Galvanized Steel: Slats, guides, and hood shall be galvanized in accordance with ASTM A653, and shall receive rust-inhibitive, roll coating process, including 0.2 mils thick baked-on prime paint, and 0.6 mils thick baked-on polyester top coat.
   1. Non-galvanized exposed ferrous surfaces shall receive one coat of rust-inhibitive primer.
   2. Field paint finish under provisions of Section 09 91 00. Color as selected by Architect.

PART 3 EXECUTION

3.1 EXAMINATION

A. Verify that opening sizes, tolerances and conditions are acceptable.

3.2 INSTALLATION

A. Install coiling door unit assembly in accordance with manufacturer's instructions.
B. Install rolling counter fire doors in compliance with requirements of NFPA 80.

C. Use anchorage devices to securely fasten assembly to wall construction and building framing without distortion or stress.

D. Securely brace components suspended from structure. Secure guides to structural members only.

E. Fit and align assembly including hardware level and plumb, to provide smooth operation.

F. Install hood.

G. Connect motor and key switch station to electrical service.

H. Install and test fire release devices in accordance with the manufacturer’s instructions and in compliance with applicable regulations and codes of the authority having jurisdiction. Reset components after testing.

3.3 ERECTION TOLERANCES

A. Maintain dimensional tolerances and alignment with adjacent work.

B. Maximum Variation from Plumb: 1/16 inch.

C. Maximum Variation from Level: 1/16 inch.

D. Longitudinal or Diagonal Warp: Plus or minus 1/8 inch in 10 feet.

3.4 ADJUSTING

A. Adjust work under provisions of Division 01.

B. Test for proper operation and adjust as necessary to provide proper operation without binding or distortion.

C. Adjust hardware and operating assemblies for smooth and noiseless operation.

D. Lubricate bearings and sliding parts as recommended by manufacturer.

E. Adjust seals to provide weathertight fit around entire perimeter.

3.5 DEMONSTRATION

A. Engage a factory-authorized service representative to train Owner's maintenance personnel to adjust, operate, and maintain overhead coiling doors.

3.6 CLEANING

A. Clean work under provisions of Division 01.

B. Clean door and components.

C. Remove labels (except for fire-rating labels) and visible markings.

D. Touch-up, repair or replace damaged products.

END OF SECTION
SECTION 08 36 29
OVERHEAD FOLDING DOORS

PART 1   GENERAL

1.1   SECTION INCLUDES

A. Automatic vertically retractable acoustical wall including all necessary hardware, seals, lifting machinery, and electrical controls.

1.2   RELATED SECTIONS

A. Section 05 12 00 – Structural Steel Framing.
B. Section 09 22 16 – Non-Structural Metal Framing.
C. Section 09 29 00 – Gypsum Board.
D. Section 09 81 00 – Acoustic Insulation.
E. Division 26 – Electrical.

1.3   REFERENCES

A. The publications listed below form a part of this Section to the extent referenced. The publications are referred to in the text by the basic designation only. Refer to Division 01 for definitions, acronyms, and abbreviations.

B. Standards, manuals, and codes refer to the latest edition of such standards, manuals, and codes in effect as of the date of issue of this Project Manual, unless indicated otherwise in CBC Chapter 35 and CFC Chapter 80.

C. Referenced Standards:
   1. ASTM C423, Measurement of Sound Absorption.
      a. Annex A1.15 Operable (Folding or Sliding Walls).
      b. Annex A1.15.3 Operation – “The specimen shall not be designated an operable wall unless it opens and closes in a normal manner. It shall be fully opened and closed at least five times after installation is completed and tested without further adjustments.”
   3. ASTM E413, Classification for Rating Sound Insulation.
   5. ISO 354, Measurement of Sound Absorption.

1.4   SUBMITTALS

A. Submit manufacturers’ technical data for operable wall specified herein.
B. Submit shop drawings showing complete layout of operable wall system based on field verified dimensions. The shop drawings shall include dimensional relationship to adjoining work. Include details indicating materials, finishes, tolerances, methods of attachment to building structure, and electrical requirements.

C. Submit certified test reports evidencing compliance to acoustical STC (Rw) requirements as specified in this Section and in accordance to references listed in this Section.

1.5 SYSTEM DESCRIPTION

A. Definition:

1. Automatic vertically retractable acoustical wall (from here on stated as operable wall for brevity) shall refer specifically to acoustical operable walls that, when in the down (closed) position, are hard, rigid, flat, plumb walls, made of a grid of rectangular acoustical panels, and when lifted (opened), fold upward vertically without the use of any manual labor, in a manner similar to an accordion, into a pocket in the ceiling. In the down (closed) position, the wall shall be comprised of two vertical planes of acoustical panels, separated by an acoustical air space.

2. The operable wall shall open and close in a manner similar to an accordion, in that all wall panels fold and unfold sequentially in an accordion fashion.

3. Drive System:
   a. Micro Drive System: The motor drive assembly is mounted directly above the centerline of the operable wall. Support steel is only required in one location.

4. The operable wall shall be opened and closed using two push button switches wired in series with power controlled by a single, three position key switch. Turning the key from the “off” position shall cause the wall to move in the designated direction “up” or “down" once both push buttons are depressed. When hand pressure is removed, the wall shall immediately stop. The operable wall shall stop in a quick and positive fashion without coasting. As a normal part of the operation, it shall be possible to partially open or close the wall, stop it, and then reverse the operation. There shall be two switches per operable wall, located on opposite sides of the wall at opposite ends of the wall, wired in series. One switch shall be equipped with an LED that flashes fault codes in case of a failure with the electrical system.

5. From a fully open position, the operable wall shall be able to go through its entire cycle of closing and/or opening without any manual intervention.

6. When the operable wall is being lowered (closed) it shall come automatically to rest once it has reached the fully down (closed) position.

7. When the operable wall is being lifted (opened) it shall come automatically to rest once it has reached the fully up (open) position.

8. The operable wall shall automatically and acoustically seal against the floor without the need for any manual intervention. The floor seals shall leave a joint between the floor and the bottom acoustical panels of not more than approximately 2 inches.

9. The operable wall shall automatically and acoustically seal against the two end walls without the need for any manual intervention. The end seals shall act in such a way as not to come into contact with the end walls while the operable wall is in motion. The end seals shall leave a joint between the acoustical panels and the end walls of no more than approximately 1 inch. Seals that rub or brush against the end walls are not acceptable. Once the wall reaches the full down position, the end seals shall activate automatically. The key switch shall not need to be held during the deployment of the ends seals.
10. The operable wall shall automatically and acoustically seal against the ceiling without any manual intervention. The top seals shall leave a joint between the top acoustical panels and the ceiling of the pocket of not more than approximately 2 inches.

11. The operable wall shall open and close at a constant nominal speed of approximately 5 to 10 vertical feet per minute.

12. When the operable wall is being lowered (closed), it shall stop if the leading (bottom) edge comes into firm contact with any object between it and the floor. The wall will then automatically reverse its direction and ascend for approximately 3 seconds to clear the object. The regular operation of the wall shall resume once the obstruction has been removed.

13. The operable wall shall be visibly flat and rigid in the down (closed) position.

14. There shall be no exposed hinges, brackets, or screws, and no part of the mechanical system shall be visible when the operable wall is in the down (closed) position.

15. All of the panel edges shall be right angled, with a minimum radius not more than 1/16 inch.

16. All of the panels shall be rectangular and nominally of the same size.

17. Joints between panel, vertical and horizontal, shall be no more than approximately 1/2 inch wide.

18. The operable wall shall stack in the up (open) position into a space no greater than 65 inches wide. The operable wall shall have a stacking height ratio in the range of 1:5 to 1:10, depending on the height of the wall.

19. Each acoustical panel shall be individually removable using only a screw driver. No special tools or equipment shall be required. The removal of a single acoustical panel shall not affect, dislocate or cause the removal of any adjacent panels or other acoustical panels.

20. The operable wall shall not weigh more than the following:
   a. Skyfold® Zenith 48: Approximately 6.0 pounds per square foot.
      1) This weight does not include the motor drive or the architectural finish on the acoustical panels and are based on 24 foot – 0 inch long operable wall.
   b. Size as indicated on Drawings.

21. A completely functioning operable wall, tested in full accordance and compliance with ASTM E90 (ISO 140-3), shall achieve, from an independent laboratory, a Sound Transmission Class (STC) rating (Rw value) of not less than the following:
   a. System STC 48 (Rw 47), Panel Construction STC 57 (Rw 56).

22. The operable wall shall be designed to have a design life of at least 10,000 complete cycles.

1.6 QUALITY ASSURANCE

A. All work and materials specified herein, shall be installed only by qualified representatives and/or installers and/or distributors of the manufacturer, according to the manufacturers written instructions.

B. The operable wall must be manufactured by a certified ISO-9001-2008 company or an equivalent quality control system.
1.7 SITE CONDITIONS

A. The floor underneath the operable wall along its axis shall be flat to within +/- 1/4 inch over the entire length of an operable wall. The peak to valley undulation of +/- 1/4 inch shall not be closer together than 24 inches and a peak to valley undulation of +/- 1/8 inch shall not be closer than 12 inches.

B. Support steel above the operable wall along its axis shall be parallel to the floor within +/-1/2 inch for the entire length of the operable wall. This includes loaded deflection. The beam must also be parallel to the centre line of the wall within ± 1/8 inch, left to right.

C. The fixed walls at either end of the operable wall shall be within +1/4 inch -0 inch, from plumb vertical.

D. The fixed walls at either end of the operable wall shall be flat to within +0 inch, -1/4 inch.

1.8 WARRANTY

A. Basic Warranty: The operable wall shall be warranted free from defects in material and workmanship for a period of two years or five thousand cycles, whichever occurs first, from the date of shipment. Provide Extended Parts Warranty which includes coverage on all parts for a period of ten years or five thousand cycles, whichever occurs first from date of project completion.

B. Acoustical Performance: The operable wall shall retain its acoustical properties for ten years from the date of shipment providing proper maintenance has been performed on the operable wall.

C. Parts and labor required to maintain the operable wall and part subject to normal wear and tear are not covered under the warranty and are the Owner’s responsibility.

PART 2 PRODUCTS

2.1 ACCEPTABLE MANUFACTURERS


B. Substitutions: Under provisions of Division 01.

2.2 MATERIALS

A. Acoustical Panels:
   1. Acoustical panels shall be faced with steel.
   2. Acoustical panels, together with all of the sound insulation, shall be made of non-combustible or fire-treated materials.
   3. Acoustical panels shall be fabricated to be as stiff as possible in order to satisfy the rigid criteria when the operable wall is down (closed) and to ensure that there is no interference between panels when the wall is in motion.
   4. Acoustical panels shall be architecturally flat with no bowing, oil canning, warping, waviness, or any other surface deformation and discontinuity.
5. Panel Finish: Manufacturer's standard white markerboard surface.

6. Acoustical panels shall meet the following STC ratings in accordance with ASTM E90 (ISO 140-3) specification as reported by an independent laboratory.

<table>
<thead>
<tr>
<th>Skyfold Product</th>
<th>Panel Construction</th>
<th>Fully Automatic Operable wall</th>
</tr>
</thead>
<tbody>
<tr>
<td>Skyfold Zenith 48</td>
<td>57 STC (56 Rw)</td>
<td>48 STC (47 Rw)</td>
</tr>
</tbody>
</table>

B. Folding Mechanism:

1. The hanging, folding and extension mechanism shall be made from structural grade aluminum extrusions and structural shapes, in order to minimize the weight of the system.

2. All wear surfaces, such as bushings, spacers, pins, discs, bearings, and sleeves shall be designed to function quietly and with minimum wear, over the 10,000 cycle design life of the operable wall.

3. The hangers, which fasten the lifting mechanism to the support steel, shall be fabricated from steel and shall be welded or bolted to the support steel supplied by others.

C. Motor Drive:

1. The motor drive shall be sized properly so that it can open and close the wall effectively over the 10,000 cycle design life of the wall, at the minimum design speed specified in this Section.

   a. 0.33 HP SK2382-71S/4 4.4 RPM.

2. The folding mechanism shall be designed to function as smoothly, quietly and safely as possible. Wherever possible, ball bearings shall be used instead of bushings and wear surfaces. Chain or belt drive systems will not be acceptable.

3. There shall be a wire rope cable for every set of folding mechanism. This cable shall be of 6 x 31 construction aircraft cable and shall be made of galvanized steel. The diameter of the cables shall be sized so that they shall be able to hold the entire weight of the wall, with the appropriate safety factor.

4. The cable wraps on yoyo drums with two safety wraps and multiple layers of cable.

5. The line shaft, sized to deliver the required torque with minimum deflection, shall support and rotate the cable drums.

6. Flange bearings shall be used for the drive system, located immediately on both sides of the drum assembly.

7. The motor drive shall be sized to deliver sufficient amount of torque to safely and effectively raise and lower the operable wall over its design life.

8. The motor drive shall use the latest in industry standards in thermal protection, overload protection, quick acting fuses, etc., in order to ensure the safety and reliability of the system.

D. Safety Equipment:

1. The operable wall shall employ an electromagnetic type of brake which shall activate firmly, without hesitation, when power is lost to the system. This brake shall have a minimum retarding torque rating equal to 200 percent of the motor drive's full load torque. The drive system shall be equipped with a manual override and a brake release lever.
2. The operable wall shall employ a dynamic brake, distinct and separate from the electromagnetic brake, in order to lower the wall at a controlled speed of no more than approximately 150 percent of the normal down speed, in the case of a catastrophic failure in the motor drive's power train. Alternately, the operable wall shall employ a brake, distinct and separate from the electromagnetic brake, in order to completely halt the downward motion of the wall in the case of a catastrophic failure in the power train.

3. The operable wall shall employ electrical or other limit switches in order to stop the wall at its up and down travel limits.

4. The operable wall shall employ an over torque detector in order to sense a jam in the system and to act as an over travel limit in the up direction should the primary limit switch fail to act. This over torque sensor shall be mechanical, using the motor's torque arm in its over torque detection.

5. The entire length of the bottom edge of the operable wall shall be equipped with a continuous pressure sensing strip which shall cut power to the motor drive and shall activate the electromagnetic brake, if the sensing edge comes in firm contact with an object, before the operable wall is in the full down (closed) position. The operable wall shall automatically reverse direction and ascend for approximately three seconds to clear the obstruction. The power shall remain cut to the motor drive until the switches have been released. The operation of the operable wall shall resume once the obstruction is removed.

E. Electrical:

1. The operable wall shall be equipped for 208V, 3 phase, 60Hz, 1.56A power supply to the electrical control box.

2. Standard electrical control box shall be NEMA 1.

3. Low voltage wiring (by others). 18 gauge wiring from the switches to the control box.

4. Switches: Two push button switches wired in series with power controlled by a single, three position key switch. One push button switch shall be equipped with an LED that flashes fault codes in case of an electrical system failure. Installation and wiring by others.

2.3 FABRICATION

A. Factory assemble all components, assemblies and systems into the largest possible assemblies in order to minimize the amount of assembly on site.

PART 3 EXECUTION

3.1 INSPECTION

A. Inspect the relevant aspects of the site such as the evenness of the floor, walls, structural steel, etc., and ensure that these are within the tolerances stated in this Section.

B. Confirm in writing to the Architect any deviations from these tolerances. Do not proceed until these conditions are satisfactorily corrected.

C. Verify all appropriate field measurements before manufacturing any components or assemblies.
3.2 INSTALLATION

A. Install overhead folding doors in accordance with the manufacturer's printed instructions.

B. The operable wall supplier shall not deliver or install this product until the Contractor can ensure in writing safe storage and protection for the operable wall for the duration of the project.

3.3 ADJUSTING AND CLEANING

A. Adjust and fine-tune the operable walls to ensure that all seals are operating and sealing properly and that the operable walls are in correct and smooth operation.

B. Clean any dirt, oil, grime, etc., on the acoustical panels per manufacturer's recommendations.

3.4 SPARE PARTS

A. Ensure the manufacturer has ample stock available for repairs.

END OF SECTION
SECTION 08 41 13
ALUMINUM-FRAMED ENTRANCES AND STOREFRONTS

PART 1 GENERAL

1.1 SECTION INCLUDES

A. Exterior aluminum storefront system, thermally broken.
B. Interior aluminum storefront system.
C. Aluminum and glass doors.
D. Vision glass.
E. Perimeter sealant.

1.2 RELATED SECTIONS

A. Division 01 – Sustainable Design Requirements; for additional LEED requirements.
B. Section 05 12 00 – Structural Steel Framing.
C. Section 05 40 00 – Cold-Formed Metal Framing.
D. Section 06 10 00 – Rough Carpentry.
E. Section 07 25 00 – Weather Barriers.
F. Section 07 92 00 – Joint Sealants.
G. Section 08 71 00 – Door Hardware.
H. Section 08 81 00 – Glass Glazing.

1.3 REFERENCES

A. The publications listed below form a part of this Section to the extent referenced. The publications are referred to in the text by the basic designation only. Refer to Division 01 for definitions, acronyms, and abbreviations.

B. Standards, manuals, and codes refer to the latest edition of such standards, manuals, and codes in effect as of the date of issue of this Project Manual, unless indicated otherwise in CBC Chapter 35 and CFC Chapter 80.

C. Referenced Standards:
   1. AA – Designation System for Aluminum Finishes.
   2. AAMA SFM-1 – Aluminum Store Front and Entrance Manual.


8. NFRC 100 – Procedure for Determining Fenestration Product U-Factors.


1.4 SUBMITTALS

A. Submit under provisions of Division 01.

B. LEED Submittals: Provide the following, and comply with applicable requirements and procedures of Division 01.

1. Product Data for EQ Credit 2: For adhesives and sealants, including printed statement of VOC content and chemical components.

2. Product Data for EQ Credit 2: For paints and coatings, including printed statement of VOC content and chemical components.

C. Shop Drawings: Indicate system dimensions, framed opening requirements and tolerances, affected related Work, expansion and contraction joint location and details, and anchor type, size, and spacing, and location, size and shape of attachment clips and associated fasteners. Provide structural calculations for each clip and all components of clip connection at each attachment point.

D. Product Data: Provide component dimensions, describe components within assembly, including anchorage, fasteners, and glass.

E. Submit two samples, 12 inches by 12 inches minimum in size, illustrating pre-finished aluminum surface, EPDM or neoprene gasketing, glass and glazing materials, and flexible flashing membrane.

F. Provide windload and deadload charts to verify that the system meets all design loads and meets the minimum pounds per square foot required at the location of the project.

1.5 LEED COMPLIANCE DOCUMENTATION

A. Provide the following, and comply with applicable requirements and procedures of Division 01, LEED Online Letter Templates, and LEED 2013 BD+C Reference Guide:

1. Product Data for MR Credit 3: For products having recycled content, documentation indicating percentages by weight of post-consumer and pre-consumer recycled content.
   a. Include statement indicating costs for each product having recycled content.

2. Certificates for MR Credit 3: Provide certification for percentages of materials (based on cost) extracted, processed, and manufactured regionally within 100 miles of the project site.
1.6 SYSTEM DESCRIPTION

A. Aluminum storefront system includes shop fabricated, factory pre-finished tubular aluminum sections and doors, glass, related flashings, anchorage, and attachment devices.

1.7 PERFORMANCE REQUIREMENTS

A. Air leakage of window system shall not exceed 0.3 cubic feet per minute per square foot of window area at a pressure differential of 1.57 pounds per square foot when tested according to NFRC 400 or ASTM E283.

B. Air leakage of each single entrance door shall not exceed 0.3 cubic feet per minute per square foot of door area at a pressure differential of 1.57 pounds per square foot when tested according to NFRC 400 or ASTM E283.

C. Air leakage of each set of double entrance doors shall not exceed 1.0 cubic feet per minute per square foot of door area at a pressure differential of 1.57 pounds per square foot when tested according to NFRC 400 or ASTM E283.

1.8 REGULATORY REQUIREMENTS

A. Window systems and exterior doors shall be certified under provisions of the 2016 California Energy Code, Section 116.

1. Fenestration product's U-factor shall be rated in accordance with NFRC 100, using the specific glazing, window system, and door assemblies to be installed on the project.
   a. If there is less than 10,000 square feet of site-built fenestration on the project, the default U-factor may be calculated as set forth in Reference Nonresidential Appendix NA6.

2. A fenestration product's Solar Heat Gain Coefficient (SHGC) shall be rated in accordance with NFRC 200, using the specific glazing, window system, and door assemblies to be installed on the project.
   a. If there is less than 10,000 square feet of site-built fenestration on the project, the default SHGC may be calculated as set forth in Reference Nonresidential Appendix NA6.

3. Provide label certificate for each type of window and door product indicating compliance with the U-factors listed in Table 116-A, SHGC values listed in Table 116-B, and air leakage requirements specified in this Section. Field-fabricated fenestration and exterior doors may only be installed when documentation indicating compliance with the above has been provided.

4. A Certificate of Acceptance shall be submitted to the enforcement agency that certifies that the fenestration product meets the acceptance requirements.

1.9 QUALITY ASSURANCE

A. Perform Work in accordance with AAMA SFM-1.

B. These requirements establish standards of design and quality for material, construction and workmanship. When substitute products of equal quality are to be submitted, Contractor shall submit for consideration supporting technical literature, samples, drawings and performance data so these items may be evaluated.
C. The approved manufacturer's recommended installation procedures will become the basis for inspecting or rejecting actual installation procedures used on the work.

D. Single Source Responsibility: Provide storefront system, doors, and accessories produced as standard products of one single manufacturer.

1.10 QUALIFICATIONS

A. Manufacturer and Installer: Company specializing in manufacturing aluminum glazing systems.

1.11 DELIVERY, STORAGE AND HANDLING

A. Deliver, store, protect and handle products to site under provisions of Division 01.

B. Protect pre-finished aluminum surfaces with strippable coating. Do not use adhesive papers or sprayed coatings that bond when exposed to sunlight or weather.

1.12 WARRANTIES

A. Storefront System:
   1. Provide written warranty in form acceptable to Owner jointly signed by manufacturer, installer and Contractor warranting work to be watertight, free from defective materials, defective workmanship, glass breakage due to defective design, and agreeing to replace components which fail within one year from date of Project Completion.
   2. Warranty shall cover following:
      a. Complete watertight and airtight system installation within specified tolerances.
      b. System is structurally sound and free from distortion.

B. Finish:
   1. Finished coating system specified in this Section, as applied over aluminum extrusions, shall be warranted for a period of ten years from date of Project Completion.

PART 2 PRODUCTS

2.1 MANUFACTURERS

A. Acceptable Manufacturers:
      a. Trifab VG 451T exterior storefront with Series 500 doors.
      b. Trifab VG 451 interior storefront.

B. Substitutions: Under provisions of Division 01.
2.2 MATERIALS

A. LEED Requirements:
   1. Recycled content: Provide products with post-consumer and pre-consumer recycled content, calculated as percentages of total product weight.
      a. Post-consumer recycled content plus one-half of pre-consumer recycled content shall constitute a part of applicable LEED Credit requirement for recycled content.

B. Extruded Aluminum: ASTM B221; 6063 alloy, T6 temper. Wall thickness shall provide structural strength to meet specified performance requirements.

C. Sheet Aluminum: ASTM B209.

D. Fasteners: Stainless steel.

E. Perimeter Anchors: Stainless steel.

F. Perimeter Clips: Steel with one coat of shop primer.
   1. Acceptable structural attachment locations are indicated on the Structural Drawings. For aesthetic purposes, also coordinate locations and appearance of connections exposed to view with Architect.
   2. Manufacturer shall be responsible for sizing, providing and installing all clips and associated fasteners. Clips and fasteners shall not be fabricated or installed until the Shop Drawings have received final acceptance from Architect.

2.3 DOORS

A. Doors: Corner construction shall consist of mechanical clip fastening, SIGMA deep penetration and minimum 1-1/8 inch long fillet welds. Glazing stops shall be snap-in type with EPDM flashing gaskets. Refer to Drawings for stile and rail sizes.
   1. Hardware: As specified in Section 08 71 00. Hardware shall be installed at the factory prior to shipment.
   2. Thresholds: Thresholds shall be one piece thresholds in a bed of mastic. Threshold shall set no higher than 1/2 inch from the lowest floor surface. When complete, threshold shall be accessible.

B. Weather-strip: Door manufacturer's standard felt insert strip designed into door system along perimeter door edges.

2.4 ACCESSORIES

A. Flashings and Closures: 0.050 inch thick aluminum, finish to match window wall system finish where exposed.

2.5 GLASS AND GLAZING MATERIALS

A. Glass and Glazing Materials:
   1. Exterior Storefront System and Doors: 1 inch insulated glass units as specified in Section 08 81 00.
   2. Interior Storefront System and Doors: 1/4 inch glass as specified in Section 08 81 00.
B. Glazing gaskets and seals used for aluminum work shall be an integrated glazing system designed by the aluminum work manufacturer to produce a watertight assembly, and shall be physically and chemically compatible with each other and with adjacent materials.
   1. Neoprene and EPDM materials shall not come in contact with silicone sealant materials.
   2. Gaskets shall be designed, when in final compression form, to be compressed a minimum of 25 percent and a maximum of 40 percent, and to exert a pressure of between four pounds and ten pounds pressure per linear inch.
   3. All side light and transom glass shall be set with the same type and size of glazing gasket material.

C. Contractor shall provide and set lead blocking for all window systems installed. Each glass panel supplied shall display a factory mark certifying each glass panel is manufactured of tempered glass. Plate glass and laminated glass will not be acceptable.

2.6 FLEXIBLE FLASHING MATERIALS

A. Flexible Flashing Materials: As specified in Section 07 25 00.

2.7 SEALANT MATERIALS

A. LEED Requirements:
   1. VOC Content of Adhesives and Sealants: For field applications that are inside the weatherproofing system, use adhesives and sealants that comply with the limits set forth in South Coast Air Quality Management District (SCAQMD) Rule 1168 for VOC content in g/L, less water, when calculated according to 40 CFR 59, Subpart D. Refer to LEED 2013 BD+C Reference Guide for list of sealant and adhesive types that must comply with VOC limits.

B. Sealant and Backing Materials: As specified in Section 07 92 00.

2.8 FABRICATION

A. Fabricate components with minimum clearances and shim spacing around perimeter of assembly, yet enabling installation and dynamic movement of perimeter seal.

B. Accurately fit and secure joints and corners. Make joints flush, hairline, and weatherproof. Sealant will not be allowed at exposed joints.

C. Prepare components to receive anchor devices. Fabricate anchors.

D. Arrange fasteners and attachments to conceal from view.

E. Prepare components with internal reinforcement of 1/4 inch thick galvanized steel mounting backing plates for door hardware and hinge hardware as per ASTM A36.

F. Exposed work shall be carefully matched to produce continuity of line, design and finish. Joints in exposed work, unless otherwise shown or required for thermal movement, shall be accurately fitted, rigidly secured with hairline contacts and sealed watertight.

G. Removable members such as glass stops shall be extruded and securely engaged into adjacent components as indicated by product manufacturer.

H. Face clearances between glass and stop shall comply with code requirements and glass manufacturer's recommendations.
I. All fasteners shall be of sufficient strength to support both horizontal wind load and vertical dead load, with a Factor of Safety of 1.5. They shall be spaced and be sized to develop the maximum strength of the members they secure or support. Washers, where required, shall be of the same material as the fastener. Unless otherwise shown or approved, fastening systems shall be concealed.

J. Install internal steel stiffeners within the window wall system as required to meet the windload/deflection requirements at the location of this project.

K. Sealants, gaskets, setting blacks, tapes and separators, where used, shall be physically and chemically compatible with each other and with adjacent materials. Items shall be installed so that they will not become dislodged during or after assembly of units.

2.9 SPECIAL REQUIREMENTS

A. Dissimilar Materials Protection: Use chromate gasketing to separate aluminum surfaces in contact with other metals, plaster or concrete, or heavy coat of alkali resistant bituminous paint. Aluminum need not be separated from stainless or galvanized steel.

2.10 FINISH

A. All aluminum extrusions shall have Architectural Class I finish per Aluminum Association Standard AA-M12 C22 A41, clear anodized, complying with AAMA 611, 0.7 mil minimum thickness.

PART 3  EXECUTION

3.1 EXAMINATION

A. Verify dimensions, tolerances and method of attachment with other work.

B. Verify wall openings and adjoining air and vapor seal materials are ready to receive work of this Section.

3.2 INSTALLATION

A. Install window wall systems and doors in accordance with manufacturer's instructions and AAMA SFM-1. Manufacturer shall provide installation instructions and installer shall comply with these instructions.

B. Align assembly plumb and level, free of warp or twist. Maintain assembly dimensional tolerances, aligning with adjacent work.

C. Attach to structure to permit sufficient adjustment to accommodate construction tolerances and other irregularities.

D. Provide alignment attachments and shims to permanently fasten system to building structure.

E. Frames shall be anchored to structure with concealed fasteners appropriate for use with type of adjacent construction. Fasteners shall securely fasten frames to wall construction involved. Fasteners shall provide stiffness and rigidity to keep frames square, in accurate position without twisting, buckling or warping. Fasteners to framing substrate shall be the following minimums; greater as required by the window wall manufacturer or as conditions warrant:
1. Wood Framing: #14 stainless steel wood screws at 12 inches on center all around with 2 inches minimum penetration into the framing member.

2. Metal Framing: #14 stainless steel self-tapping sheet metal screws at 12 inches on center all around by length as required to penetrate framing member 1/4 inch minimum.

3. Concrete/Masonry: 1/4 inch diameter stainless steel wedge anchors at 24 inches on center with 1-1/2 inch minimum embedment into substrate and 2 inches minimum edge distance to face of substrate.

F. Install perimeter flexible flashing membrane around all window openings in accordance with manufacturers' installation instructions and under provisions of Section 07 25 00.

G. Install perimeter metal flashings.

H. Install perimeter sealant to method required to achieve performance criteria and installation criteria described in Section 07 92 00.

I. Set thresholds in bed of mastic and secure with mechanical fasteners, minimum three per threshold.

J. Refer to Section 08 71 00 for hardware installation requirements.

K. Install glass in accordance with Section 08 81 00, to glazing method required to achieve performance criteria.

3.3 TOLERANCES

A. Maximum Variation from Plumb: 0.06 inch every 3 feet non-cumulative or 0.06 inch per 10 feet, whichever is less.

B. Maximum Misalignment of Two Adjoining Members Abutting in Plane: 1/32 inch.

3.4 CLEARANCES

A. Top and sides of door shall have a minimum of 1/16 inch to a maximum of 1/8 inch clearance.

B. Bottom of door and threshold shall have a minimum of 1/8 inch to a maximum of 1/4 inch clearance.

C. All doorframes shall be measured with the minimum clearance of exact size or a maximum of 1/4 inch overall clearance to fit sides of opening to 1/8 inch at top of opening.

D. All installation clearances for door frame and door in either newly constructed openings or as replacement units for existing openings will by strictly adhered to. No other minimum or maximum clearances will be acceptable and will prove cause for total replacement of the opening at the sole expense to Contractor.

E. Mortise hardware shall fit flush with finished trim moldings and applied directly to recessed sidewalls of the door and or frame system. Cutouts in door or frame moldings shall require separate screw applied tabs or straps on which to mount concealed hardware per manufacturer's templates as detailed on Drawings. Where shims and spaces are required for finished appearance, they shall provide full and solid bearing for the hardware.
3.5 ADJUSTING
A. Adjust work under provisions of Division 01.
B. Adjust operating hardware for smooth operation.

3.6 CLEANING
A. Clean work under provisions of Division 01.
B. Remove protective material from pre-finished aluminum surfaces.
C. Wash down surfaces with a solution of mild detergent in warm water, applied with soft, clean wiping cloths. Take care to remove dirt from corners. Wipe surfaces clean.
D. Remove excess sealant by method acceptable to sealant manufacturer.

3.7 PROTECTION OF FINISHED WORK
A. Protect finished Work under provisions of Division 01.
B. Protect finished Work from damage.

END OF SECTION
PART 1    GENERAL

1.1    SECTION INCLUDES

A. Fixed metal-framed unit skylights.
B. Integral counter-flashings.
C. Insulated curb with integral safety grid.

1.2    RELATED SECTIONS

A. Section 06 10 00 – Rough Carpentry.
B. Section 07 54 23 – Thermoplastic-Polyolefin Roofing.

1.3    REFERENCES

A. The publications listed below form a part of this Section to the extent referenced. The publications are referred to in the text by the basic designation only. Refer to Division 01 for definitions, acronyms, and abbreviations.

B. Standards, manuals, and codes refer to the latest edition of such standards, manuals, and codes in effect as of the date of issue of this Project Manual, unless indicated otherwise in CBC Chapter 35 and CFC Chapter 80.

C. Referenced Standards:
   3. California Code of Regulations, Title 8, Division 1, Chapter 4, Sub-Chapter 7 – General Industrial Safety Orders.
   4. NFRC 100 – Procedure for Determining Fenestration Product U-Factors.

1.4    SUBMITTALS

A. Submit shop drawings and product data under provisions of Division 01.

B. Provide configurations, dimensions, locations, methods of construction, location and spacing of anchorage, joinery, finishes, size, shape, thickness and alloy of framing materials, glazing materials and installation details. Submit structural calculations from a Structural Engineer licensed in the State of California demonstrating compliance with the structural requirements specified.
C. Include characteristics of light admitted, transparency and insulation value of unit.

D. Submit manufacturer’s installation instructions under provisions of Division 01.

1.5 PERFORMANCE REQUIREMENTS

A. Skylight units shall be tested, labeled, and certified to AAMA/WDMA/CSA 101/I.S.2/440-08 to comply with CBC Sections 2405.5 and 2610.

B. Air leakage of skylight shall not exceed 0.3 cubic feet per minute per square foot of glazing area at a pressure differential of 1.57 pounds per square foot when tested according to NFRC-400 or ASTM E283.

C. System to provide for expansion and contraction within system components caused by a cycling temperature range of 170 degrees F without causing detrimental effects to system or components.

D. Design and size members to withstand wind loads, dead loads, and live loads caused by snow, hail, and pressure or suction of wind acting vertically as calculated in accordance with CBC.

1.6 REGULATORY REQUIREMENTS

A. Skylights shall be certified under provisions of the 2016 California Energy Code, Section 116.

1. A skylight’s U-factor shall be rated in accordance with NFRC 100, using the specific glazing and frame assemblies to be installed on the Project.

2. A skylight’s Solar Heat Gain Coefficient (SHGC) shall be rated in accordance with NFRC 200, using the specific glazing and frame assemblies to be installed on the Project.

3. Provide factory-applied temporary labels, not to be removed before inspection by the enforcement agency, listing the certified U-factor and SHGC, and certifying that the air leakage requirements specified in this Section are met for each type of skylight, and have a factory-applied permanent label if the product is rated using NFRC procedures. Fenestration products may only be installed when documentation indicating compliance with the above has been provided.

4. A Certificate of Acceptance shall be submitted to the enforcement agency that certifies that the skylight product meets the acceptance requirements.

B. Skylights shall conform to requirements of California Code of Regulations, Title 8, General Industrial Safety Orders, Article 3212.

1.7 DELIVERY STORAGE AND HANDLING

A. Deliver skylight system, components and materials in manufacturer’s standard protective packaging.

B. Store skylight panels on the long edge, several inches above the ground, blocked and under cover to prevent warping. In accordance with manufacturer’s storage and handling instructions.
PART 2  PRODUCTS

2.1  MANUFACTURERS

A. Sunoptics Prismatic Skylights. Products:
   1. Unit Skylights: Frame Model 800MD, curb mounted.
      b. AAMA Certified Products Report Number 95749.01-301-44.
      c. NFRC Simulation Report Number A2457.01-301-45.
      a. Intertek/AAMA Test Report No. F4987.01-301-44.

B. Bristolite Daylighting Systems.

C. O'Keeffe's Skylights.

D. Lane-Aire Manufacturing Corporation.

E. Substitutions: Under provisions of Division 01.

2.2  SKYLIGHT

A. Nominal Sizes: As indicated on Drawings.

B. Dome Shapes:
   1. Pyramid
   2. Double Hip.

C. Glazing: Double glazed using 50 CC2 50 percent Impact Modified acrylic clear prismatic outer lens over 50 CC2 50 percent Impact Modified acrylic white inner lens, air sealed.
   1. Solar Heat Gain Coefficient: 0.42.
   2. U Value: 0.74.
   3. Visible Light Transmission: 0.68.

D. Frame: Skylight frames shall be fabricated from 6063-T6 aluminum, finish as selected by Architect. Frames shall have integral condensation and weepage gutters which drain interior moisture to the outside. Corners shall be mitered and welded. Skylight frames shall be insulated and thermally broken. The acrylic glazing shall be separated from the skylight frame with an EPDM rubber air seal gasket.

2.3  ACCESSORIES

A. Anchorage Devices: Type recommended by manufacturer.

B. Counter-flashings: Same metal type and finish as roof flashing metal.

C. Protective Back Coating: Bituminous.

D. Sealant: As specified in Section 07 92 00.
2.4 INSULATED CURB

A. Premanufactured insulated curb shall be fabricated from galvanized steel with rigid insulation, integral safety grid, and wood nailer for attachment of skylight frame; all welded construction.

1. Exterior Wall: 18 gauge galvanized steel, mill finish.
2. Interior Wall: 18 gauge galvanized steel, white paint finish.
3. Insulation: 1-1/2 inch rigid foam insulation. Insulation shall be full height and continuous around exterior perimeter of curb with no voids or gaps.
4. Safety Grid: 0.162-inch diameter cold-rolled galvanized steel wire mesh with 75,000 PSI tensile strength, welded at 4 inches on center each direction. Grid shall be attached to curb framing with mechanical fasteners.
5. Wood Nailers: 2 x 2 pressure treated nailer continuous around and fastened to curb top.
6. Top of curb shall be level. Fabricate bottom of curb to match roof slope.

2.5 FABRICATION

A. Fabricate in accordance with manufacturer recommendations free of visual distortion and defects.

B. Provide for removal of condensation.

C. Provide weathertight assembly.

D. Fabricate to drain water entering joints, or migrating moisture occurring within unit, to exterior.

E. Factory-fabricate and preassemble in largest size assembly consistent with economic considerations for shipping to and handling at the job site.

PART 3 EXECUTION

3.1 INSTALLATION

A. Install skylights, curb, and safety grids in accordance with manufacturer’s instructions.

B. Installation of the plastic skylights in fire retardant roofs shall not be started until the units proposed have been approved by the State Fire Marshal, DSA.

1. Review shall be based on test data from an acceptable testing laboratory or evidence of listing with the State Fire Marshal.

C. Coordinate with installation of roofing system, curbs, and related flashings.

D. Apply bituminous paint on aluminum surfaces of units in contact with cementitious materials or dissimilar metals.

E. Provide weathertight installation.

END OF SECTION
SECTION 08 62 23
TUBULAR SKYLIGHTS

PART 1 GENERAL

1.1 SECTION INCLUDES

A. Tubular Skylights.

B. Integral Counter-Flashings.

C. Pre-Manufactured Curbs.

1.2 RELATED SECTIONS

A. Division 01 – Sustainable Design Requirements; for additional LEED requirements

B. Section 05 31 00 – Steel Decking.

C. Section 07 54 23 – Thermoplastic-Polyolefin Roofing.

D. Section 07 62 00 – Sheet Metal Flashing and Trim.

E. Section 09 51 13 – Acoustical Panel Ceilings.

1.3 REFERENCES

A. The publications listed below form a part of this Section to the extent referenced. The publications are referred to in the text by the basic designation only. Refer to Division 01 for definitions, acronyms, and abbreviations.

B. Standards, manuals, and codes refer to the latest edition of such standards, manuals, and codes in effect as of the date of issue of this Project Manual, unless indicated otherwise in CBC Chapter 35 and CFC Chapter 80.

C. Reference Standards:


11. FS TT-C-494B – Coating Compound, Bituminous, Solvent Type, Acid Resistant.
13. UL 181 – Factory Made Air Ducts and Air Connectors

1.4 SUBMITTALS

A. Submit shop drawings and product data under provisions of Division 01.
   1. Provide configurations, dimensions, locations, fastening methods, and installation details.
   2. Include characteristics of light admitted, transparency and insulating value of unit.
   3. Submit manufacturer’s installation instructions under provisions of Division 01.
   4. Provide samples of product as requested by the Architect.

B. LEED Submittals: Provide the following, and comply with applicable requirements and procedures of Division 01.
   1. Product Data for MR Credit 3: For products having recycled content, documentation indicating percentages by weight of post-consumer and pre-consumer recycled content.
   2. Include statement indicating costs for each product having recycled content.
   3. List of Daylight Credits available for the products specified.
   5. Data on Regional Credits which may be available for the project location.
   6. [Data on Perimeter and Non-Perimeter Controllability of Systems for use of Daylight Dimmer option with the products specified.]
   7. Data on potential Innovation in Design Credits which may be available for the innovative use of the products specified.

1.5 PERFORMANCE REQUIREMENTS

A. Completed tubular skylight assemblies shall be capable of meeting the following performance requirements:
   1. Air Infiltration Test: Air infiltration shall not exceed 0.30 cubic feet per minute per square foot aperture with a pressure delta of 1.57 pounds per square foot across the tube when tested in accordance with ASTM E283.
   2. Water Resistance Test: No uncontrolled water leakage at 10.5 pounds per square foot pressure differential with water rate of five gallons per hour per square foot when tested in accordance with ASTM E547.
3. Uniform Load Test:
   a. No breakage, permanent damage to fasteners, hardware parts, or damage to make tubular skylight system inoperable or cause excessive permanent deflection of any section when tested at a positive load of 150 pounds per square foot or negative load of 70 pounds per square foot.
   b. All units shall be tested and labeled with a safety factor of three for positive pressure and two for negative pressure, acting normal to plane of roof in accordance with AAMCA/WDMA/CSA 101/1.S.2/A440-08.

4. Flammability:
   a. When used with the Dome Edge Protection Band, all domes shall meet fire rating requirements as described in the 2016 California Building Code (CBC).
   c. Smoke Density – Rating no greater than 450 per ASTM E84 in way intended for use, Classification C.
   d. Rate of Burn and/or Extent – Maximum Burning Rate: 2.5 inches per minute per ASTM D635, Classification CC-2.
   e. Rate of Burn and/or Extent – Maximum burn Extent: 1 inch per ASTM D635, Classification CC-1.

1.6 QUALITY ASSURANCE
   A. Installer Qualifications. Factory authorized installer.
   B. Manufacturer Qualifications: Engaged in manufacture of tubular skylights for minimum fifteen years.

1.7 SEQUENCING AND SCHEDULING
   A. Coordinate work of this Section with the work of other trades.

1.8 DELIVERY, STORAGE, AND HANDLING
   A. Store products in manufacturer’s unopened packaging until ready for installation.

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

1.10 WARRANTY
   A. Tubular Skylight Assembly: Manufacturer’s standard ten year warranty.

PART 2 PRODUCTS

2.1 MANUFACTURERS
   A. Basis-of-Design: Solatube International, Inc., Products:

B. No known equal.

2.2 MATERIALS

A. LEED Requirements, Recycled Content:
   1. Provide products with post-consumer and pre-consumer recycled, calculated as percentages of total product weight.
      a. Post-consumer recycled content plus one-half of pre-consumer recycled content shall constitute a part of applicable LEED Credit requirement for recycled content.

2.3 TUBULAR SKYLIGHT ASSEMBLIES

A. General: Transparent roof-mounted skylight dome and self-flashing curb, reflective tube, and ceiling level diffuser assembly, transferring sunlight to interior spaces; complying with ICC AC-16.

1. Roof Dome Assembly: Transparent, UV and impact resistant dome with flashing base supporting dome and top of tube.
   a. Outer Dome Glazing: Type DA, 0.125 inch minimum thickness injection molded acrylic classified as CC2 material; UV inhibited, impact modified acrylic blend.

2. Raybender 3000: Variable prism optic molded into outer dome to capture low angle sunlight and limit high angle sunlight.

3. Roof Flashing Base: One piece, seamless, leak-proof flashing functioning as base support for dome and top of tube.
   a. Base Material: Sheet steel, corrosion resistant conforming to ASTM A653/A653M or ASTM A463/A463M, 0.028 inch thick.
      1) Base Style: Type FC curb cap with inside dimensions of 27 inches by 27 inches to cover base curb.
      2) Dome Edge Protection Band: Type PB. Galvanized steel; nominal thickness of 0.039 inches.

4. Curb: Model RPC-3 as manufactured by Roof Products, Inc. with the following characteristics:
   b. Corners: Mitered and welded with welds sealed and prime painted after fabrication.
   c. Mounting Flange: 2 inches wide, integral to frame, and welded.
   d. Wood Nails: Factory installed, 2 x 2 pressure treated, continuous around top perimeter of frame.
   e. Insulation: Factory installed 1-1/2 inch thick three pound density fiberglass insulation continuous around inside of frame.
   f. Size and Height: As indicated on Drawings.

5. Tube Ring: Attached to top of base section; 0.090 inch nominal thickness injection molded high impact PVC to prevent thermal bridging between base flashing and tubing and channel condensed moisture out of tubing.

6. Dome Seal: Adhesive backed weatherstrip 0.63 inch tall by 0.28 inch.
7. Reflective Tubes: Aluminum sheet, thickness 0.018 inch.
   a. Interior Finish: Spectralight Infinity high reflectance specular finish on exposed reflective surface. Specular reflectance for visible spectrum (400 nm to 760 nm) greater than 99 percent. Total solar spectrum reflectance (400 nm to 2500 nm) not less than 93 percent.
   b. Color: a* and b* (defined by CIE L*a*b* color model) shall not exceed plus 2 or be less than minus 2 as determined in accordance to ASTM E308.
   c. Top Tube Angle Adapter and Bottom Tube Angle Adapter Kit, Type AK; reflective thirty degree adjustable top and bottom angle adapters (one each) 16 inches long.
   d. Extension Tubes:
      1) Type EXX; Reflective extension tube, notched for open ceiling diffuser attachment, 24 inches long.
      2) Reflective Ninety Degree Adjustable Tube: Provide manufacturer’s standard extension tube angle adapters for applications requiring two Type A2 0 to ninety degree extension tube angle adapters.
   e. Diffuser Assemblies for Tubes Penetrating Ceilings:
      1) Ceiling mounted box transitioning from round tube to square ceiling assembly, supporting light transmitting surface at bottom termination of tube; 23.8 inches by 23.8 inches square frame.
      2) Box shall be fabricated of opaque polymeric material, classified as CC2, Class C, 0.110 inch thick.
   f. Natural Effect Lens: Acrylic, classified as CC2, Class C, 0.060 inch thick, with open cell foam seal to minimize condensation and bug, dirt, and air-infiltration per ASTM E283.
   g. Lens: Optiview Fresnel lens, Classified as CC2, designed to maximize light output and diffusion with extruded aluminum frame. Visible Light Transmission shall be greater than ninety percent at 0.022 inch thick.

8. Accessories:
   a. Thermal Insulation Panel.
   b. Security Bars: Type B, 0.375 inch stainless steel bars across flashing diameter opening.
   c. Wire Suspension Kit: Type E, Use the wire suspension kit when additional bracing to the structure is required.

2.4 ACCESSORIES

A. Fasteners: Same material as metals being fastened, non-magnetic steel, non-corrosive metal of type recommended by manufacturer.

B. Suspension Wire: Steel, annealed, galvanized finish, size and type for application and ceiling system requirement.

C. Sealant: Polyurethane or copolymer based elastomeric sealant as recommended by manufacturer.
PART 3 EXECUTION

3.1 EXAMINATION

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

B. Immediately notify Architect if substrate conditions are unsatisfactory. Do not proceed with work until unsatisfactory conditions are corrected.

3.2 PREPARATION

A. Clean surfaces thoroughly prior to installation.

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

3.3 INSTALLATION

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

B. After installation of first unit, field test to determine adequacy of installation. Conduct water test in presence of Owner, Architect, Contractor, or their designated representative. Correct unsatisfactory conditions before proceeding with installation of subsequent units.

3.4 PROTECTION

A. Protect installed products until completion of project.

B. Touch-up, repair or replace damaged products before Project Completion.

END OF SECTION
PART 1   GENERAL

1.1   SECTION INCLUDES

A. BHMA finish door hardware for gates and hollow metal, wood, and aluminum doors.

B. Accessories including but not limited to door stops, kickplates, and push/pull plates.

C. Weatherstripping, seals, and thresholds.

D. Auxiliary Locks (Padlocks.)

E. Removal of existing hardware at existing doors and frames and replacement with new hardware.

1.2   PRODUCTS SUPPLIED BUT NOT INSTALLED UNDER THIS SECTION

A. Hardware templates for doors, frames, and gates.

1.3   RELATED SECTIONS

A. Section 05 50 00 – Metal Fabrications: Decorative fences and gates.

B. Section 07 92 00 – Joint Sealants.

C. Section 08 11 13 – Hollow Metal Doors and Frames.

D. Section 08 14 00 – Wood Doors.

E. Section 08 41 13 – Aluminum Framed Entrances and Storefronts.

F. Section 08 71 13 – Automatic Door Operators.

G. Divisions 26 through 28: Electrical rough in, wiring and connectors for electrified hardware including, but not limited to:

   1. Wire and connectivity from ceiling through frame to electrified hardware devices including non-Section 08 71 00 task of providing wiring inside of doors.

   2. Section 08 71 13 “Automatic Door Operators”.

   3. Automatic Door Operators e-power or emergency power connectivity scope: At non-fire and non-smoke rated openings that have auto operators provide emergency power backup.

1.4   REFERENCES

A. The publications listed below form a part of this Section to the extent referenced. The publications are referred to in the text by the basic designation only.

   1. Refer to Division 01 for definitions, acronyms, and abbreviations.

   2. Unless otherwise noted; standards, manuals, and codes refer to the latest edition as of the issue date of this Project Manual.
B. Conform to the following Referenced Standards and Requirements:
   2. ADA – Americans with Disabilities Act - 2010 Standards for Accessible Design.
   4. ANSI/BHMA 156.19 American National Standard for power high and low energy operated doors.
   5. ANSI A156 Series – Builders Hardware Manufacturers Association (BHMA) Standards Set.
   6. AAADM – American Association of Automatic Door Manufacturers.

C. Conform to the following Regulatory Requirements (CBC – 2016 California Building Code):
   1. Doors / Doorways as part of an accessible route shall comply with CBC Sections 11B-404.
   2. All hardware for accessible doors shall meet the requirements of CBC Sections 11B-404.2.7, 11B-404.2.9, and 1010.1.9.1.
   3. The clear opening width for a door shall be 32 inches minimum. The swinging doors it shall be measured between the face of the door and the frame stop, with the door open 90 degrees.
      a. There shall be no projections into it below 34 inches above finish floor and 4 inch maximum projections into it between 34 inches and 80 inches above finish floor or ground.
      b. Door closers and stops shall be permitted to be 78 inches minimum above finish floor or ground per CBC Section 11B-404.2.3.2.
   4. Hand-activated door opening hardware, handles, pulls, latches, locks, and other operating devices on accessible doors:
      a. Shall be operable with one hand and shall not require tight grasping, pinching, or twisting of the wrist.
      b. Lever hardware shall be so mounted / centered between 36 inches and 44 inches above finished floor or ground.
      c. Panic hardware shall be so mounted / centered between 36 inches and 44 inches above finished floor or ground. The clear width of the exit way is not less than 32 inches measured between the face of the door and the opposite stop per CBC Section 11B-404.2.3.
      d. Where slider doors are in the fully open position, operating hardware shall be fully exposed and usable from both sides per CBC Section 11B-404.2.7.
      e. Hardware for door handles, pulls, latches, locks and other operating devices for use on means of egress doors shall comply with SFM Standard 12-10-2, Section 12-10-202 as contained in CCR Title 24, Part 12.
   5. The force for pushing or pulling a door open shall be as follows per CBC Section 11B-404.2.9:
      a. Interior hinged doors, sliding or folding doors and exterior hinged doors operating force required to push or pull open a door shall not exceed 5 pounds (22.2 N). Required fire doors shall have the minimum opening force allowable by DSA, not to exceed 15 pounds (66.7N).
1) These forces do not apply with to the force required to retract latch bolts or disengage other devices that hold the door in a closed position.

2) These forces do not apply with to the force required to retract latch bolts or disengage other devices that hold the door in a closed position.

b. The force required to activate any operable parts, such as retracting latch bolts or disengaging other devices, shall be no greater than 5 pounds to comply with CBC Section 11B-309.4.

c. Forces shall be applied to the latch side of the door per CBC Section 1010.1.3.1.

6. Door closing speeds shall be as follows per CBC 2016 Section 11B-404.2.8:
   a. Mount door closers for maximum swing of door before setting stops.
   b. Doors/gates closers, when provided, shall have sweep period adjusted: minimum of 5 seconds for a door/gate to close from the 90 degree position to the 12 degree position.
   c. Doors/gates with spring hinges require a minimum of 1.5 seconds to close from the 70 degree to the closed position.

7. Thresholds shall comply with CBC 2016.

8. Floor stops shall not be located in the path of travel and 4 inches maximum from walls.

9. Hardware (including panic hardware) shall not be provided with "Night Latch" (NL) function for any accessible doors or gates unless the following conditions are met per DSA interpretation 10-08 DSA / AC (External), revised 4/28/09. Such conditions must be clearly demonstrated and indicated in the specifications for devices:
   a. Such hardware has a "dogging" feature.
   b. It is dogged during the time the facility is open.
   c. Such "dogging" operation is performed only by employees as their job function (non-public use).

10. Pair of doors: limit swing of one leaf to 90 degrees so that a clear floor space is provided beyond the arc of the swing for the wall-mounted tactile sign per CBC Section 11B-703.4.2.

1.5 COORDINATION:

A. The hardware groups/sets specified in Section 08 71 00 - Part 3 are intended to establish type and design standard when used together with the requirements of this Section, Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections. Examine Contract Documents and furnish proper hardware for door openings. Refer to specifications for clarification and detailed requirements and provide products and services in specifications even if not written in hardware groups/sets in Section 08 71 00 - Part 3.

B. Coordinate work of this Section with other directly affected Sections involving manufacturer of any internal reinforcement for door hardware. In particular, coordinate door preparation in accordance with applicable regulatory and trade standards specified.

1. Provide hardware templates to door and frame manufacturer. Provide two templates to those manufacturers who are not currently registered template book holders.

2. Provide finish hardware schedule for use by the door and frame suppliers.

3. Where hardware sets/groups have different information than the specifications, refer to
the Specifications and Drawings for clarification and bid combined hardware sets/groups and Contract Documents/Specifications. Provide combined materials/devices at time of submittals in addition to other coordination items:

a. Coordinate keying requirements as specified in this Section.

C. Convene coordination meeting between all opening vendors and installers at least two weeks prior to purchasing doors, frames, door hardware, and electrical devices required for complete systems.

1. Required attendance includes, but is not limited to, the following: Contractor, hardware supplier and/or installer, door supplier and/or installer, frame supplier and/or installer, auto operator vendor and/or installer, security card reader vendor and/or installer, and electrical contractor.

2. Contractor shall be responsible for verifying that the door hardware accepted for installation is compatible for use with the doors and door-frames.

3. For card reader interface with applicable door devices, security vendor and/or installer (coordinate accordingly) shall have a written agenda and plan on how scope related to electrified devices will be installed to have a complete wired and operational card access system. The card reader interface scope includes, but is not limited to, card reader input and output coordination on the electric locking device power supply, electric locking devices and connectivity, and confirmation of a complete, wired, and operational card access system. Provide all required relays and devices as part of the overall system in accordance system requirements at no additional cost.

4. For auto operator interface with applicable door devices, auto operator vendor and/or installer (coordinate accordingly) shall have a written agenda and plan on how scope related to electrified devices will be installed to have a complete wired and operational auto operator system. The auto operator interface scope includes, but is not limited to, connectivity and inputs for push-plates, BEA BR3 or accepted equal required auto operator relays, electric locking devices, and confirmation of the complete, wired, and operational auto operator system. Provide all required relays and devices as part of the overall system in accordance with system requirements at no additional cost.

1.6 SUBMITTALS

A. General: Submit in accordance with Division 01.

B. Pre-Hardware Schedule:

1. Report all prevailing conditions that will adversely affect satisfactory execution of work. Examine existing doors and/or frames scheduled for hardware replacement.

C. Submit a detailed door and hardware schedule according to the following:

1. Hardware Schedule:

a. Submit hard copies of hardware schedule (number of copies per Division 01) as well as submit editable, PDF files via electronic email of ftp site process in vertical format as illustrated by the Sequence of Format for the Hardware Schedule as published by the Door and Hardware Institute. Schedules which do not comply will be returned for correction before checking. Horizontal-type schedules will be returned for correction before checking.
b. Hardware schedule shall clearly indicate each hardware group specified and manufacturer of each item proposed. Vertical schedule format sample:

<table>
<thead>
<tr>
<th>Quantity</th>
<th>Device Description</th>
<th>Device # (include specification language)</th>
<th>Finish</th>
<th>Manufacturer</th>
</tr>
</thead>
<tbody>
<tr>
<td>4</td>
<td>Hinges</td>
<td>5BB1HW 4.5 x 4.5 NRP x fasteners</td>
<td>630</td>
<td>IVES</td>
</tr>
<tr>
<td>1</td>
<td>ADA Flush Cup Pull</td>
<td>1111A x fasteners</td>
<td>626</td>
<td>TR</td>
</tr>
<tr>
<td>1</td>
<td>Lockset</td>
<td>L464T x fasteners</td>
<td>630</td>
<td>SC</td>
</tr>
<tr>
<td>1</td>
<td>I/C or Non-IC Cylinders</td>
<td>Rim or Mortise x appropriate cam x blocking rings as required (rim or mortise type and quantity as required by locking device)</td>
<td>626</td>
<td>SC</td>
</tr>
<tr>
<td>1</td>
<td>Permanent Core</td>
<td>20-740</td>
<td>626</td>
<td>SC</td>
</tr>
<tr>
<td>1</td>
<td>Stop and Holder</td>
<td>1261</td>
<td>626</td>
<td>TR</td>
</tr>
<tr>
<td>1</td>
<td>Door Silencers</td>
<td>SR64 or SR65 (as required)</td>
<td>GR</td>
<td>IV</td>
</tr>
</tbody>
</table>

2. Provide two copies of illustrations from manufacturer's catalogs and data in brochure form.

3. Wiring Information: Provide manufacturers' wiring information including manufacturers' door elevation diagrams for electrified hardware based on Door Hardware Institute (DHI) core class “Electrified Architectural Hardware” DHI class #COR133. Provide information with hardware schedule submittal for review. Provide detailed wiring diagrams with hardware delivery to jobsite.

4. Review of schedules does not relieve the Contractor of providing all hardware required for the Work, whether or not such hardware was inadvertently omitted from Submittal.

D. Templates:
1. Provide listing of manufacturer's template numbers for each item of hardware in hardware schedule.
2. Submit templates and "Reviewed Hardware Schedule" to door and frame supplier and others as applicable to enable proper and accurate sizing and locations of cutouts and reinforcing.

E. Installation Instructions:
1. Provide manufacturer's written installation and adjustment instructions for finish hardware.
2. Send installation instructions to site with hardware.
F. Single Manufacturers for Manufacturer’s Devices.
   1. Obtain each type of hardware from single manufacturer, although several may be
      indicated as offering products complying with requirements.

G. Contract Closeout Submittals: Include specific requirements indicated below.
   1. Operating and maintenance manuals: Submit three sets containing the following:
      a. Complete information in care, maintenance, and adjustment, data on repair and
         replacement parts, and information on preservation of finishes.
      b. Catalog pages for each product.
      c. Name, address, and phone number of local representative for each manufacturer.
      d. Parts list for each product.
      e. Copy of final accepted hardware schedule, edited to reflect “As installed”.
      f. Copy of final keying schedule.

1.7 QUALITY ASSURANCE:

A. Supplier Qualifications and Documentation:
   1. Hardware Supplier Qualifications: Firm specializing in the supply and servicing of
      institutional and commercial door hardware; accredited by manufacturers; and having a
      minimum of three years documented experience. Hardware supplier to furnish list of at
      least ten past, finished projects. Include date competed, project location, and references.
      At least one member of the firm’s staff shall be a member of DHI in good standing.

B. Manufacturer of Submitted Devices - Qualifications and Documentation:
   1. Manufacturer Qualifications: Manufacturer specializing in manufacturing institutional and
      commercial door hardware with a minimum five years with the following documented
      experience. Furnish list of at least ten past, finished projects. Include date competed,
      project location, and references. Past project contact information will determine if
      Builders Hardware is acceptable.

C. Installer of Submitted Devices - Qualifications and Documentation:
   1. Installer of assembly shall be trained in the trade of hanging commercial doors on
      commercial frames with commercial hardware. Supplier and Installer of door assemblies
      shall be authorized representative of manufacturers and have minimum of five years
      successful experience in detailing, supplying, and installing door assemblies specified on
      projects of similar size, complexity, and type to this Project. Provide written
      documentation to show closers will be installed by an individual with successful
      experience installing closers to meet 5-pound opening force for non-rated door
      complexity.

1.8 DELIVERY, STORAGE, AND HANDLING

A. Comply with requirements of Division 01.

B. Deliver products in manufacturer’s original containers, dry and undamaged, with seals and
   labels intact.

C. Storage: Store materials in a cool and dry location, elevated from the ground and protected
   from the elements, and secured from theft or pilferage.
1.9 WARRANTY
A. Comply with provisions of Division 01.
B. Warranty installed units to be free from defects in material and workmanship as follows:
   1. Hinges: Lifetime Warranty (Life of Building).
   2. Locksets and Exit Devices: Three years.
   3. Closers: Ten years.
   4. All other hardware: Two years.

1.10 MAINTENANCE
A. Provide special wrenches and tools applicable to each special hardware component.
B. Provide maintenance tools and accessories supplied by hardware manufacturer.

PART 2 PRODUCTS

2.1 FINISHES
A. Where hardware groups/sets have different information, refer to the following for clarification. Provide hardware groups/sets devices/finishes, along with added finishes below, as indicated on drawings and detailed requirements for each type of device:
   1. Typical BHMA finish designation references:
      a. BHMA 630 – satin stainless steel.
      b. BHMA 626 – satin chromium plated brass or bronze.
      c. BHMA 689 – sprayed aluminum paint finish.

2.2 EXISTING CONDITIONS AND PRODUCTS
A. Examine Contract Documents and furnish proper finishes and services for each door and gate opening (door, gate, frame, and hardware).
B. Existing Remaining Hardware:
   1. See Section 08 71 00 as well as Contract Documents for additional hardware requirements.

2.3 RECYCLED CONTENT
A. Provide products with at least the following content:
   1. Mortise Locks: 40 percent post-consumer recycled content.
   2. Cylindrical Locks: 30 percent post-consumer recycled content.
   3. Closers: 30 percent post-consumer recycled content.
   4. Exit Devices: 40 percent post-consumer recycled content.
   5. Steel Hinges: 35 percent pre-consumer recycled content.
   6. Steel Kick Plates: 35 percent pre-consumer recycled content.

2.4 HARDWARE TEMPLATE
A. Make templates for hardware to be applied to gates and metal doors or pre-finished doors.

B. Hinge templates shall conform to ANSI A156.7.

C. Promptly furnish template information or templates to door and frame manufacturers.

D. Coordinate hardware items to prevent interference with each other.

2.5 EXIT DOORS

A. Where hardware groups/sets have different information, refer to the following for clarification. Provide hardware groups/sets devices along with added devices as indicated on drawings and detailed requirements for each type of device. Provide all specifications even if not written in hardware sets/groups.

B. Provide all hardware necessary to meet the requirements of CBC for exit doors, as well as to other requirements specified, even if such hardware is not specifically mentioned under Article "Hardware Schedule" of this Section.

2.6 SCREWS, BOLTS, AND FASTENING DEVICES

A. Exposed head oval phillips type screws in countersunk holes unless otherwise specified. Use screws, bolts, washers, grommets, nuts, and other fastening devices of appropriate length, type, head, metal, and finish as necessary for proper match and application of hardware.

B. Threshold anchors shall be Flat Sleeve Anchors cadmium plated expansion anchor screw in one unit.

2.7 SUBSTITUTIONS

A. Products referenced by specific brand names and model numbers have been identified by Owner to match other products in use either completed or in the course of completion. No substitutions permitted per Public Contract Code Section 3400.

1. Otherwise refer to Division 01 for substitutions.

2.8 HANGING HARDWARE

A. Hydraulic Closers / Hinge Devices:

1. Acceptable Manufacturers:
   a. Locinox Manufacturing (no known equal).

2. Mammoth 180-Degree Hydraulic Closers/Hinges Set.

3. Heavy duty full surface mounted hinge and vertical built-in closer not exceed 5 pounds opening force.

B. Gate Hanging Devices:

1. Heavy duty full surface mounted hinge:
   a. Where "CBW-HD Series" hinge-type devices are specified in hardware group/sets, provide CBW-HD Series, full surface hinges by Crown Industrial, South San Francisco, CA; (650) 952-5150; http://www.crown-industrial.com/, or accepted equal.

   b. Provide at least two hinges per gate leaf.

   1) Provide two CBW-HD Series hinges for doors up to 72 inches high and one
additional CBW-HD Series hinge for each 30 inches of height or fraction thereof.

2) Furnish three CBW-HD Series hinges for doors over 36 inches wide regardless of the gate height.

3) Provide additional number of offset hinge devices to meet hinge manufacturer device warranty and gate warranty.

c. Provide widths sufficient to clear trim projection when door swings 180 degrees. Confirm hinge sizing with frame details. All doors shall swing 180 degrees if opening will allow. Provide wide throw hinges where required.

d. Provide non-removable pins at exterior doors and where required by Owner for security reasons.

e. Gate hinges shall be mounted and welded in accordance with manufacturer’s recommendations.

1) Coordinate with welding requirements in Contact Documents.

2) Provide devices ground smooth and painted to match gate/fence system – see Section 09 91 00 for paint and primer requirements.

f. Products by the following manufacturers will be considered for acceptance providing all specified criteria have been met in full. Furnish all items and components of hardware required to complete the work in accordance with specifications, Contract Documents, and intended operation.


2) Ameristar.

3) Monumental Iron Works.

2. Gates specified with standard butt-type hinges, pivots, and/or floor closers:

a. See butt-type hinge, pivot, and floor closer requirements below.

C. Butt Hinges:

1. Butt hinges shall be manufactured in accordance with ANSI/BHMA A156.1.

2. Where hardware groups/sets have different information (number of hinges and sizing), refer to the following for clarification. Provide hardware groups/sets devices along with added devices as indicated on Drawings and detailed requirements for each type of device.

a. Butt hinges shall be manufactured in accordance with ANSI/BHMA A156.1.

b. Provide wide throw hinges where required:

1) Whether new or existing openings (existing doors or frames to remain), submit and provide hinge widths sufficient to clear trim projection when door swings 180 degrees. All doors shall swing 180 degrees if wall allows.

2) Utilize wide throw type hinges to clear frame or wall obstructions/cladding in order for doors to completely open (see 180 degree language above).

3) Where a door closer device is specified and will be installed on pull side/hinged side of doors (i.e. closers will hit walls or other surfaces when door is completely open), provide wide throw type hinges to give sufficient pocket depth to hide closer behind door. Do not pinch or crush closer between the door and wall surface.

4) Confirm hinge sizing with frame and wall details.

c. Provide “weight/strength” as specified in hardware groups/sets in Part 3 (hinge
nomenclature basis-of-design weight/strength).

d. For doors 1-3/4 inches thick and up to 36 inches wide, provide hinge height of 4-1/2 inches.

e. For doors 1-3/4 inches thick and 37 inches to 48 inches wide, provide heavy duty, four ball bearing hinges and height of 5 inches.

f. If hardware sets specify height (example: 5 inches tall at 36 inch wide door), provide height as specified for project standards at these locations.

g. Provide two butts for doors up to 60 inches high and one additional butt for each 30 inches of height or fraction thereof.

h. Provide non-removable pins at exterior doors.

i. Provide ball-bearing hinges. Non-ball-bearing hinges are not acceptable.

j. Electric Hinges: Provide electrified hinges with certified UL Listed, concealed wires. Provide electric hinges with standardized wire colors to accommodate up to 12 wires (4, 6, 8 or 12 as required per to provide sufficient number of concealed wires to accommodate electric function of specified hardware). If additional wires are specified (more than needed for electrified devices), provide the wires specified.

k. For existing or retrofit openings, verify hinges in field before submittals. See additional specifications in Part 3, hardware group sets as well as drawings for additional existing or retrofit requirements.

D. Continuous Hinges:

1. Acceptable Stainless-Steel Manufacturers:
   a. Markar Manufacturing.
   b. Ives Manufacturing by Allegion.
   c. Pemko Manufacturing.
   d. Bommer Manufacturing.
   e. Select Hinges.
   f. McKinney Products Co.
   g. Stanley Works.

2. Where hardware groups/sets have different information, refer to the following for clarification. Provide hardware groups/sets devices along with added devices as indicated on Drawings and detailed requirements for each type of device:

   a. Provide widths sufficient to clear trim projection when door swings 180 degrees. Confirm hinge sizing with frame details. All doors shall swing 180 degrees if opening will allow. Provide wide throw hinges where required.

   b. Provide continuous hinge that meet cycle testing in accordance with ANSI/BHMA Standard A156.26, Grade 1.

   c. Stainless steel hinges shall meet abuse test (ASTM F1450).

2.9 SECURING DEVICES (LATCHING SYSTEMS)

A. Provide all latching devices that are lockable including, but not limited to, door locks and panic/exit devices that comply with CBC Sections 1010.1.9 through 1010.1.11. All new construction projects shall include locks that allow the doors to be locked from the inside. This requirement applies to classrooms and any other school room with an occupancy of five or more persons, but does not include doors that are locked from the outside at all times or student restrooms.

B. Mortise Locksets, Latchsets:
   1. Acceptable Manufacturers:
      a. Schlage Lock Co. L9000 Series.
      b. Owner’s standard, no substitutions permitted.
   2. Levers:
      a. Provide levers to return to door within 1/2 inch.
      b. Traditional Square Style as specified.
      c. Provide exterior side lever trim with vandal resistant feature (heavy duty lever trim designed to withstand abuse and vandalism):
         1) Schlage L9000 series Vandigard™. Vandigard example nomenclature: Storeroom Lockset LV9080 (added “V” nomenclature after the “L” nomenclature for lockset to have increased strength against abuse or vandalism) Locked lever freely rotates up and down while remaining securely locked. Provide seven-year warranty.
   3. Where hardware groups/sets have different information, refer to the following for clarification. Provide hardware groups/sets devices along with added devices as indicated on Drawings and detailed requirements for each type of device:
      a. Locksets shall meet the requirements of ANSI/BHMA A156.13-1994, Operational Grade 1.
      b. Provide only thumbturn devices that meet accessibility requirements. Example: Schlage #L283-722 devices. No center pivoting thumbturns allowed.
      c. If deadbolts or lockbolts are utilized on the project, devices shall be interconnected with the latching mechanism on all egress doors to provide single movement function to unlatch doors.
      d. Backset: 2-3/4 inches. Provide minimum 1 inch throw stainless steel deadbolt
         Provide minimum 3/4 inch throw for latch bolt.
      e. Strikes:
         1) Provide ANSI 4-7/8 inch standard strike.
         2) Provide curved lip-type strike at all locations if possible to prevent catching clothing or other objects on strike. Where required, provide detail and flat strike.
         3) Where required, provide extended lip strike so that the lock or latchset latch will not come in contact with frame or added trim on or adjacent to the frame. Example: Don Jo device #MEST-104, but provide submitted manufacturer equivalent extended lip strike.
         4) Where required, provide open back strike and protected to allow practical and secure operation.
         5) Existing Strikes:
a) Field verify existing strikes. Provide and install new ANSI 4-7/8 inch or standard 2-3/4 inch strikes to match existing frame preparation/template unless “Unit-type” locks and latchsets were previously installed.

b) Where “Unit-type” locks and latchsets were previously installed, as part of Contract, provide labor and material to retrofit “Unit-type” locks and latchsets strikes to become ANSI 4-7/8 inch for mortise devices.

C. Exit Devices and Removable Mullions: ANSI A156.3, Grade 1; UL Listed.

1. Acceptable Manufacturers:
   a. Von Duprin.
   b. Owner’s standard, no substitutions permitted.

2. Where hardware groups/sets have different information, refer to the following for clarification. Provide hardware groups/sets devices along with added devices as indicated on Drawings and detailed requirements for each type of device:
   a. All exit devices shall be UL listed for panic.
   c. Where removable mullions are not specified in hardware groups, provide keyed removable mullions at all locations in order for door to properly latch and secure rooms and buildings with rim or mortise type exit/panic bar devices.
      1) Provide stabilizers for removable mullions at all locations.
   d. Whether or not specified throughout project, verify if Electrical, IDF and other rooms with electrical coordination have 800 amps or more than 800 amps housed within the rooms. At these rooms, if lever locksets are specified, credit the locking device and provide the Von Duprin mortise-type panic device #9975NL-F x 996L-M x key override.
   e. Trim:
      1) Where lever trim is specified, provide lever design to match lockset levers.
      2) Provide exit device lever trim with vandal resistant feature (heavy duty lever trim designed to with stand abuse and vandalism):
         a) Von Duprin 996 R/V.
   f. The unlatching force of panic hardware shall not exceed 5 pounds, applied in the direction of travel, certified by UL to meet requirements of CBC Section 11B-309.4 (Von Duprin nomenclature “AX”).
   g. All exit devices shall be shipped to project site with exit device, isometric cap as to not catch items on panic device push bar (Von Duprin nomenclature “PA”).
D. Flush Bolts and Dust Proof Strikes:
   1. Acceptable Manufacturers:
      b. McKinney Products.
      c. Rockwood.
      d. Hager Manufacturing.
      e. Ives Manufacturing.
   2. Where hardware groups/sets have different information, refer to the following for clarification. Provide hardware groups/sets devices along with added devices as indicated on Drawings and detailed requirements for each type of device:
      a. Non-rated Openings: Where not specified in hardware sets provide supply two flush bolts for inactive leaf of pairs of locked and latched doors. Locate centerline of top bolt not more than 78 inches from finished floor. Provide dustproof strike for bottom bolts, type as required for floor condition.

E. Coordinators:
   1. Manufacturers:
      b. McKinney Products.
      c. Rockwood.
      d. Hager Manufacturing.
      e. Ives Manufacturing.
   2. Where hardware groups/sets have different information, refer to the following for clarification. Provide hardware groups/sets devices along with added devices as indicated on Drawings and detailed requirements for each type of device:
      a. Provide filler bars for total opening width, closer mounting brackets to allow proper installation of stop mounted hardware without damaging coordinator, carry bars, and special preparation for top latches where applicable.

F. Fire Control Key Boxes:
   1. Product: Rapid Entry System.
   3. Recessed mount, UL-listed, heavy-duty unit; fabricate from 1/4-inch-thick steel plate.
   4. Provide with restricted keying as required by Local Fire Department.
   5. Provide one box at each main entry from each parking area designated with a fire emergency lane.

2.10 KEY SYSTEMS (CYLINDERS, CORES AND KEYS.)

A. Where hardware groups/sets have different information, refer to the following for clarification. Provide hardware groups/sets devices along with added devices as indicated on drawings and detailed requirements for each type of device (keying specifications below override hardware set/group nomenclature):
B. Re-Key Existing Doors:
   1. Re-key all existing doors: examine existing openings/doors and during submittal provide plan for re-keying existing hardware to match new keying system (below and specified in hardware set/groups below).
   2. Provide hardware necessary for completion of the work.

C. Key Systems (Cylinders, Cores and Keys):
   1. Manufacturers:
      a. Schlage Lock Co.
      b. Existing building site standard, no substitutions.
   2. For all locking or dogging devices, provide complete keying system whether or not specified in Section 08 71 00, Part 3 hardware sets including lock cores, mortise cylinders, and rim cylinders keyed as directed by Owner in submittal process. Key System shall be:
   3. Keyway: Provide as instructed by Owner during submittal process.

D. Keying Requirements:
   1. Provide keyed, construction cores and keys during the construction period.
      a. Provide full sized cylinders or brass construction cores and brass keys at all interior and exterior doors. Plastic cores are not permitted.
      b. Construction control and operating keys and core shall not be part of the Owner’s permanent keying system or furnished in the same keyway or key section as the Owner’s permanent keying system. Permanent cores and keys (prepared according to the accepted keying schedule) shall be furnished to the Owner.
   2. Keying Meeting and Programming Schedule:
      a. After hardware has been submitted and reviewed in accordance with Division 01 requirements and Section 08 71 00, arrange a keying matrix/programming meeting with Owner and hardware supplier/Vendor representing the Schlage Restricted Keyway system.
         1) Copies of the reviewed door and frame submittals shall be brought to the meeting with card reader and keyed doors highlighted for review.
         2) Follow procedures for keying meeting and programming schedule as outlined by the Door Hardware Institute. DHI procedures are based on example Door Hardware Institute core class entitled Masterkeying class #AHC200.
      b. Keying meeting to produce a programming schedule/matrix based on the following:
         1) Furnish keys in the following quantities (total quantity of keys part of bid package):
            a) 5 each Grand master-keys per set.
            b) 6 each Masterkeys per set.
            c) 3 each Change keys each lock, core or cylinder.
            d) 5 each Permanent Extractor keys.
            e) 9 each Construction masterkeys.
            f) 2 each Construction Core Extractor keys.
2) Provide keying system expansion parameters.
   a) Plan twenty changes directly under the grand.
   b) Plan ten master keys.
   c) Plan fifty changes each for each master.
3) Permanent keys and cores shall be stamped with the applicable key mark for identification. The visual key control marks or codes shall not include the actual key cuts.
4) Permanent keys shall be stamped "Do Not Duplicate".
   c. Furnish meeting notes and three complete, typed copies of keying and programming schedule to Owner for final review.
   d. Furnish keying and programming schedule to Schlage manufacturing factory for production of cores, cylinders and other keyed devices.
3. Transmit pinned cores/cylinders as well as cut grand masterkeys, masterkeys, change keys and other security keys to Owner by Registered Mail, return receipt requested.
4. Install permanent cores in presence of Owner.

2.11 CLOSING DEVICE

A. Surface Mounted Closers:
   1. Acceptable Manufacturers:
      a. LCN Manufacturing – 4040XP Series as scheduled.
      b. Owner’s standard, no substitutions permitted.

B. Where hardware groups/sets have different information, refer to the following for clarification. Provide hardware groups/sets devices along with added devices as indicated on Drawings and detailed requirements for each type of device:
   1. ANSI A156.4, Grade 1; UL Listed; meets UL 10C and SFM Standard 12-7-4 for positive pressure fire test.
   2. Closers shall have multi-size spring power adjustment to permit setting of spring from 1 through 6 with additional spring power available. Provide ADA compliant setting nomenclature during submittals as recommended by closer manufacturer.
   3. Submit correct closer type as to be able to install closers on non-public side of doors (examples include but are not limited to 1) interior side of storage/electrical type rooms; 2) not in corridors/public areas 3) stair side of stairway doors; and at exterior locations, install closers inside of building (in conditioned spaces)).
   4. Installation Plates, Brackets, and Miscellaneous Adapters:
      a. Existing Closer Covers: At door/opening locations where closer cover is missing, provide new closer cover.
      b. Provide drop plates, brackets, or adapters for arms as required to suit details and install as directed by manufacturer’s templates.
         1) Furnish and install drop plates at reverse bevel doors and at doors with 170 degrees to 180 degrees swing.
2) Furnish and install blade, angle or applied stops as required where frame does not permit installation of the standard soffit plate (see example below, field verify brackets and shims required before submittals, provide written language in submittals for how areas requiring special brackets).

<table>
<thead>
<tr>
<th>Example Special Bracket (for existing openings)</th>
<th>Coordinate the LCN part # will be compatible with the LNC closer and submit LCN or custom bracket as required</th>
</tr>
</thead>
<tbody>
<tr>
<td>PA SHOE ADAPTER, 4030-418</td>
<td></td>
</tr>
<tr>
<td>Provides horizontal mounting surface for parallel arm shoe on single rabbed or flush frame.</td>
<td></td>
</tr>
<tr>
<td>CUSH FLUSH PANEL ADAPTER, 4030-419</td>
<td></td>
</tr>
<tr>
<td>Provides horizontal mounting surface for CUSH shoe on single rabbed or flush frame.</td>
<td></td>
</tr>
</tbody>
</table>

2.12 AUTOMATIC OPERATORS

A. See Section 08 71 13

2.13 STOPS AND HOLDERS

A. Floor Stops:

1. Acceptable Manufacturers:
   a. Ives Manufacturing.
   c. Rockwood.
   d. Hager Manufacturing.
   e. McKinney Products.

2. Where hardware groups/sets have different information, refer to the following for clarification. Provide hardware groups/sets devices along with added devices as indicated on Drawings and detailed requirements for each type of device:

a. Stops, Bumpers and/or Holders shall meet the requirements of BHMA A156.16, Grade 1.

b. Existing Door Stops:
   1) At door/opening where stops and/or holders are existing, uninstall existing stops and provide new door stops as specified in Part 3 "hardware set/groups":
   2) Fill holes from current or previous renovations (concrete as required, car bondo, and/or sand and paint (per Division 09 for paint and primer requirements).
   3) At door/opening locations where existing "kick down" type stops and holders are on existing doors (old Basis-of-Design: Trimco 1220 series), uninstall existing "kick down" type stops and provide new door stops.
2.14 ACCESSORIES

A. Kick/Mop Plates:
   1. Acceptable Manufacturers:
      a. Ives Manufacturing.
      c. Rockwood.
      d. Hager Manufacturing.
      e. McKinney Products.

B. Where hardware groups/sets have different information, refer to the following for clarification. Provide hardware groups/sets devices along with added devices as indicated on Drawings and detailed requirements for each type of device.
   1. Size at single doors:
      a. Push side of door two inch less than door width. Hardware set/group nomenclature: 2 inches LDW.
      b. Pull side and one inch less than door width. Hardware set/group nomenclature: 1-inch LDW.
   2. At pairs of doors:
      a. Width shall be one inch less than door width unless doors have protective edge guards or center mullions.
   3. Height shall be 10 inches, unless otherwise indicated.

C. Push/Pull Plates:
   1. Acceptable manufacturers.
      a. Ives Manufacturing.
      c. Rockwood.
      d. Hager Manufacturing.
      e. McKinney Products.

D. Lock Guards:
   1. Acceptable Manufacturers:
      a. Ives Manufacturing.
      c. Rockwood.
      d. Hager Manufacturing.
      e. McKinney Products.
E. Smoke Seals, Intumescent Seals, Sound Seals, and/or Weatherstripping.
   1. Acceptable Manufacturers:
      a. Pemko Manufacturing, Inc.
      b. National Guard.
      d. McKinney Products.
   2. No intumescent material is allowed on door frames. Where CBC requirements for positive pressure must be met, doors shall include all requirements as part of the door construction per 'Category A' guidelines as published by ITS/Warnock-Hersey. Only smoke gasketing applied around the perimeter of the frame to meet the 'S' smoke rating is permissible in instances where smoke control is required.

F. Light or Sound Seals:
   1. Acceptable Manufacturers:
      b. National Guard.
      d. McKinney Products.
   2. Where hardware groups/sets have different information, refer to the following for clarification. Provide hardware groups/sets devices along with added devices as indicated on Drawings and detailed requirements for each type of device:
      a. In the field cutting or notching of sound gasket hardware shall not be permitted.
      b. Submit and supply 29310CS or 350CSR type gasketing in lengths appropriate for template hardware. Examples below are not exhaustive; see hardware and door templating requirements.
         1) When rim-type exit/panic devices are used in conjunction with the 29310CS or 350CSR, order different lengths of 29310CS or 350CSR for latching side jamb to coordinate with -type exit/panic device, surface mounted latch. Do not install seal at roller-type latch location.
         2) When stop mounted overhead closer devices are used in conjunction with the 29310CS or 350CSR, provide the correct drop plates, brackets, and/or closer arms to not cut or notch the 29310CS or 350CSR. Provide full, header width of 29310CS or 350CSR type devices. Example: If a parallel arm closer is utilized then provide offset arms like those used for surface mounted overhead stops, drop plates, and brackets.

G. Door Silencers:
   1. Acceptable Manufacturers:
      a. Ives Manufacturing.
      c. Rockwood.
      d. Hager Manufacturing.
      e. McKinney Products.
H. Astragals, Door Bottoms, and Thresholds:

1. Acceptable Manufacturers:
   a. Pemko Manufacturing, Inc.
   b. National Guard Products (NGP).
   d. McKinney Products.

2. Thresholds shall comply with CBC 2016 and shall not exceed 1/2 inch in height.

3. Thresholds shall wrap frame stops (cut around stops, then continue into rabbits and face of frame).
   a. Whether or not specified below, where thresholds are larger than frames all thresholds to have beveled miter ends.
   b. 45-degree miter cut and a closed end, welded with returns to door/frame (example: NGP manufacturing nomenclature RCE throughout).

I. Drip Guard:

1. Provide at exterior doors exposed to rain.

2. Size: Full Frame Width (FFW).

3. Provide devices painted to match adjacent frame. See Division 09 for paint and primer requirements.

J. Gates and Gate Hardware Accessories:

1. Provide welded astragals, lock patches (templates), and/or welded mounting devices required for a complete installation of specified hardware, whether or not shown on Drawings and details. Weld in accordance with manufacturer’s recommendations. Provide devices ground smooth and paint to match gate/fence system. See Section 09 91 00 for paint and primer requirements. Inserted pictures below are examples of lock patches and/or welded mounting devices. Template gates for each type of hardware device:

2. Gate Astragal:
   a. Provide fully welded astragal full height of gate to overlap either adjacent fence post or the adjacent gate at pair of gates.
      1) Provide full height astragal in width indicated on Drawings. If not indicated, provide astragal width no less than 2 inches wide. See inserted picture below.
      2) Provide full height astragal overlap width per details. If not indicated, provide overlap of astragal no less than 3/4 inch wide.
3) Provide 1/8 inch astragal thickness. See inserted picture below.

4) Where Pemko Manufacturing 357 Series astragal is utilized by gate manufacturer, do not use screws or order with screw holes. Nomenclature: ND prefix or suffix required by Pemko on 357 Series astragal.

b. Provide devices ground smooth and painted to match gate/fence system. See Section 09 91 00 for paint and primer requirements.

3. Gate Cainbolts:
   a. Where nomenclature or device “524 Series” non-padlock cainbolt-type devices are specified in hardware group/sets, provide by Crown Industrial, South San Francisco, CA; (650) 952-5150; http://www.crown-industrial.com/, or accepted equal.

b. Where nomenclature or device “stock #0524PL and/or part #0000478” series padlockable cainbolt-type devices are specified in hardware group/sets, provide series by Crown Industrial, South San Francisco, CA; (650) 952-5150; http://www.crown-industrial.com/, or accepted equal.

c. On pairs of gates that have egress lever trim and or exit/panic device push-pad trim on active side gate, install cainbolt away from the door edge so that both the cainbolt and supplied the padlock cannot not impede the active gate from opening at any time, providing free egress.

d. Provide compatible galvanized steel pipe cainbolt receptor and strike plate mounted in concrete slab as required.

   1) At padlockable cainbolts, provide sufficient cainbolt receptor depth to enable use of padlock.

   2) Provide cainbolt receptors at both closed position of gate and open position of gate at 90 degrees, unless shown differently on Drawings.

e. Cainbolt shall be mounted and welded in accordance with manufacturer’s recommendations.

   1) Coordinate with other welding requirements in Contract Documents.

   2) Provide devices ground smooth and painted to match gate/fence system. See Section 09 91 00 for paint and primer requirements.

f. Products by the following manufacturers will be considered for acceptance providing all specified criteria have been met in full. Furnish all items and components of hardware required to complete the work in accordance with specifications, Contract Documents, and intended operation.


   2) Ameristar.

   3) Monumental Iron Works.
2.15 POWER SUPPLIES, ELECTRIFIED HARDWARE, AND WIRES

A. The “Request-to-Exit” feature as described below is a security feature that announces / tells the security system if occupants is leaving the building interior area and similar to a motion-sensor the “Request-to-Exit” switch or device does not affect egress of the doors (unless noted, all doors in hardware group/sets are free egress at all times with no special knowledge to exit).

B. Door Position Switches
   1. Door position switch is written in hardware sets to be coordination “place-holders”. Do not order final door position switches, but prepare doors and frames as follows: Door and frame supplier shall coordinate doors and frames to accept door position switch devices that are accepted during the submittals. Doors and frames shall be delivered to jobsite with door position switch cuts/preparations. Final switches shall be provided and installed in pre-cut frame and door head by security vendor. Coordinate with Divisions 25-28 and applicable plans.

C. Power Supplies, Wires, and Relays:
   1. Where hardware groups/sets have different information (number of hinge wires and power supply information), refer to the following specifications for clarification and submit according to complete and intended electrified system per Contract Documents.
      a. Provide required connections to accommodate security electronics for remote site monitoring of all electrified components and functions.
      b. If Von Duprin panic devices are used:
         1) E996 = PS902 1-3, PS902 4R 1-4, PS904 4 RL 1-4 and or with e-strike also.
         2) QEL = PS902 2 RS 1-2, PS904 4 RL 1-2 with A/O, PS904 4 RL 1-4, PS906 (2) 4 RL up to 4-8

D. Electronic Keyswitch Devices:
   1. Acceptable Manufacturers:
      b. Securitron.
      c. SDC.
      d. Camden Door Controls.
PART 3 EXECUTION

3.1 EXAMINATION

A. Examine doors and frames and verify mounting locations as indicated on shop drawings.

B. Report unacceptable conditions to the Architect. Begin installation only when unacceptable conditions have been corrected.

C. Existing doors and frames: Examine existing doors and frames scheduled for hardware replacement. Provide hardware necessary for completion of the work to conform with the intent of this Section as to quality, function and code compliance.

3.2 INSTALLATION

A. Install in accordance with manufacturer's printed instructions and approved shop drawings.

B. Door-Floor Clearances:
   1. Unless otherwise shown, provide the following door-floor clearances:
      a. Labeled doors: 3/8 inch maximum over floor or threshold.
      b. No threshold: 3/8 inch maximum for metal and wood doors.
      c. With threshold: 1/8 inch.
      d. Carpet: 1/8 inch over top of nap.
   2. Undercut doors so that the sweeps still fit tight against the sill or threshold condition, but as the door opens and sweeps away from sill or threshold, the door bottoms do not rub on the floor. Metal installation parts of door bottoms are typically part of the door assembly and only the gap between the metal part and sill/threshold are seen as the undercut (means and methods: coordinate as required for door and hardware with finish floors, toppings, thresholds and performance ratings).

C. Hardware Placement:
   1. Unless otherwise shown or required by CBC 2016, ADA Act - 2010 Standards for Accessible Design and/or Title 24, place hardware at the following heights:
      a. Hinges: Door and frame manufacturer's standard or existing location scope per additional specifications and plans.
      b. Lever handles for latchsets, lockset and panic/exit device pull, lever trim:
         1) 38 inches above finish floor/surface.
         2) At existing openings, lever hardware shall be so mounted / centered between 36 inches and 44 inches above finished floor or ground.
         3) Verify manufacturer's template with door design.
         4) Verify in field site templates for existing doors and frames before submittals, provide written language in submittals for how areas requiring retrofit will be installed to meet CBC 2016.
c. Panic devices push bar:
   1) Panic hardware shall be so mounted / centered between 36 inches and 44 inches above finished floor or ground.
   2) Verify manufacturer’s template with door design to meet CBC 2016 exterior, pull side trim.
   3) Verify in field site templates for existing doors and frames before submittals, provide written language in submittals for how areas requiring retrofit will be installed to meet CBC 2016.

d. Door Pulls and Push Bars (centerline): mounted / centered 42 inches above finished floor or ground.

e. Door Push Plates (centerline): mounted / centered 42 inches above finished floor or ground.

2. Hardware for door handles, pulls, latches, locks and other operating devices for use on means of egress doors shall comply with SFM Standard 12-10-2, Section 12-10-202 as contained in CCR Title 24, Part 12.

D. Installation:

1. Except for hinges, do not install hardware until painting and finishing work is completed.

2. Pre-drill pilot holes in wood for screws. Drill and tap for surface mounted hardware on metal.


4. Locksets: Install locks with keyways in proper position. Install levers, roses, and escutcheons firmly affixed.

5. Closers:

   a. To open and latch smoke or fire rated doors correctly. Positive latch at all times for rated doors when door is not in use. Install closer units per factory templates to meet manufacturer requirements.

   b. To meet non-rated opening/exterier opening force requirements as well as close and latch non-smoke non-fire rated doors:

      1) Closers are to be installed as close to the hinge side of door as possible by a trained installer per this Section, Part 1 “Quality Assurance, Installer Qualifications”, installer an authorized representative of manufacturers, minimum of five years successful experience installing closers to meet 5-pound opening force for non-rated door complexity”.

      2) For non-smoke or non-fire rated doors, before installation of closers install one mockup door for each kind of closer application (example: parallel, regular arm, stop arm and/or top-jamb arm application if specified). Confirm doors meet 5-pound opening force and still close door. This will ensure proper installation for doors to open at 5 pounds opening force before remaining non-rated opening closers are installed.

   c. Mount door closers for maximum swing but at non-rated doors to meet 5-pound opening force. At all possible openings, mount door closers for maximum swing of door before setting stops.
d. Drawings may show doors open to only 90 degrees (Revit or CAD system set up), but unless noted or specified with limiter (stop arm devices below), all doors to open for maximum swing against adjacent 180 wall if nothing inhibits door from doing so. Include wide-throw hinges per specs and installation for 170 degree to 180 degree or maximum swing of door before installing stops. Mount door closers for maximum swing, but at non-rated doors to meet 5-pound opening force.

6. Floor Stops: Floor stops shall be installed a maximum of 4 inches from adjacent walls.

7. Auto Door Bottom (411 or 420 series as typically specified) to not be adjusted until substantial completion. Door bottoms are to be raised to highest position while construction occurs (so to not have rubber seal torn or damaged by debris under the door). At substantial completion, adjust door bottom to fully engage and touch the floor for proper sound dampening.

8. Silencers: Set in place before adjusting strikes.

9. Thresholds and Raindrips: Set in waterproof sealant and fasten anchors in pre-drilled countersunk holes 18 inch on center maximum spacing and within 3 inches of each end. Minimum three anchors per threshold.

10. Examine existing openings (frames and/or doors) scheduled for hardware replacement or refurbishment: Where hardware groups/sets have different information, refer to the following for clarification.

   a. Provide hardware groups/sets devices along with added devices as indicated on drawings and detailed requirements for each type of device (including but not limited to requirements in the above specification language, architectural plans, door schedule pages, door details pages and/or full specification documents.)

   b. Frame may have bent out of "plumb, square and true": Shim and adjust doors to swing per manufacturer's recommendations "plumb, square and true". Provide hardware necessary for completion of the work to conform with the intent of this Section as to quality, function and code compliance.

   c. Uninstall hardware at existing doors and do not re-install new or old hardware until painting and finishing work is completed.

   d. Where either #1) new doors are to be installed at existing frames or #2) existing doors and frame are to remain, the new mounting heights for latching devices may not align with the existing hardware preparations/templating:

      1) Prepare openings to accept the new hardware (including but not limited to new hinges, strikes and strike location, and/or additional hardware required.

      2) Verify in field existing hanging/hinge requirements for installation (see specifications and manufacturer's printed instructions).

         a) Where continuous hinges are installed in place of butt-type hinges, fill abandoned hinge openings/preps in the existing frames with device #HF-45 or SHF-45 per below:

         b) Furnish and install correct sized shims and filler plates: sized to either Don Jo device #HF-45 or SHF-45 or size as required for each opening.

      3) Verify in field existing closers requirements for installation (see specifications and manufacturer's printed instructions).

      4) Verify in field existing locking device requirements for installation (see specifications and manufacturer's printed instructions).
a) Verify in field existing strikes. Provide and install new ANSI 4-7/8 inch or standard 2-3/4 inch strikes to match existing frame preparation/template unless indicated in hardware group sets below or if “Unit-type” locks and latchsets were previously installed.

b) Where “Unit-type” locks and latchsets where previously installed, as part of Contract, provide labor and material to retrofit “Unit-type” lock and latchset strikes: At these locations new strikes to be cut in and become ANSI 4-7/8 inch strikes.

c) At exit/panic device locations, provide new strikes as required for hardware latching systems.

5) Where CBC 2016 does not inhibit the re-use of doors and frames, fill abandoned openings/preparations in the existing openings.

a) At non-rated openings (non-smoke or non-fire doors), fill abandoned holes and penetrations with project specific wood blocks and or like gauge metal shim, fill with project compliant bondo, grind/sand smooth surface smooth, and prime/paint (see Division 09 for bondo, paint and primer requirements).

b) Drilling of existing doors for electrified-wire runs to electrified locking systems to be performed by a certified Warnock-Hershey or Intertek door and hardware installer:

c) After modifications and/or rehabilitation of fire or smoke or rated openings re-certify door and frame labels through an approved UL listed agency (Intertek or equal recertification representative: Intertek re-certification company information: Intertek main phone number 800-967-5352 web: www.intertek-etsemko.com

3.3 PAINT OR FIELD FINISHES

A. Coordinate with Contact Documents including, but not limited to Section 09 91 00 for paint and primer requirements.

3.4 ADJUSTING

A. Adjust parts for smooth, uniform operation.

B. Lubricate moving parts with manufacturer recommended lubricant.

C. Replace units that cannot be adjusted and lubricated to operate freely and smoothly as intended for the application.

D. Adjust door closer devices:

1. Adjust closer operating,
   a. Interior and Exterior Doors: not to exceed 5.0 pounds force.
   b. When fire doors are required, the maximum effort to operate the door may be increased to the minimum allowed by the appropriate administrative authority, not to exceed 15 pounds opening force.

2. Adjust closer delay and operating speeds to comply with requirements of CBC 2016 (Section 11B-404.2.8.1) and ADA – Americans with Disabilities Act - 2010 Standards for Accessible Design.
a. Doors/gates closers, when provided, shall have sweep period adjusted: minimum of 5 seconds for a door/gate to close from the 90 degree position to the 12 degree position.

3.5 CLEANING

A. Clean as recommended by manufacturer. Do not use materials or methods which may damage finish or surrounding construction.

3.6 HARDWARE SCHEDULE

A. Manufacturers Legend:

<table>
<thead>
<tr>
<th>Code</th>
<th>Name</th>
</tr>
</thead>
<tbody>
<tr>
<td>IV</td>
<td>H.B. Ives</td>
</tr>
<tr>
<td>SC</td>
<td>Schlage</td>
</tr>
<tr>
<td>VO</td>
<td>Von Duprin</td>
</tr>
<tr>
<td>LC</td>
<td>LCN Closers</td>
</tr>
<tr>
<td>MA</td>
<td>Markar</td>
</tr>
<tr>
<td>MC</td>
<td>McKinney</td>
</tr>
<tr>
<td>PE</td>
<td>Pemko</td>
</tr>
<tr>
<td>TR</td>
<td>Trimco</td>
</tr>
<tr>
<td>AD</td>
<td>Adams Rite</td>
</tr>
<tr>
<td>RX</td>
<td>Rixson</td>
</tr>
<tr>
<td>CR</td>
<td>Crown Industrial Manufacturing</td>
</tr>
<tr>
<td>LO</td>
<td>Locinox Manufacturing</td>
</tr>
</tbody>
</table>

B. The “Request-to-Exit” feature as described below is a security feature that announces/tells the security system if occupant is leaving the building interior area and similar to a motion-sensor the “Request-to-Exit” switch or device does not affect egress of the doors (unless noted, all doors in hardware group/set are free egress at all times with no special knowledge to exit).

C. Hardware Columns - Example (Legend):

<table>
<thead>
<tr>
<th>Qty</th>
<th>Device Description</th>
<th>Device # (include specification language)</th>
<th>Finish</th>
<th>Manu</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

D. The following hardware sets are intended to establish type and standard of quality when used together with the requirements of this Section (see above Section and related Sections including Division 01).

1. Examine Contract Documents and furnish proper hardware for door openings.
2. Refer to Door Schedule on the Drawings for Hardware Group/Set assignments for each opening.
3. Blank space below and after a Group/Set is intentional to avoid, if possible, splitting a Hardware Group/Set onto two pages.
# Exterior Hardware Sets (Two-Digit Set Numbers)

## Hardware Group/Set #01

In addition to the devices specified in hardware group/set below, also coordinate devices in specification Section 08 71 13 "Automatic Door Operators" and Electrical (furnish and install doors, frames and related scope per complete Contract Documents):

<table>
<thead>
<tr>
<th>Item</th>
<th>Description</th>
<th>Model/Part Number</th>
<th>Quantity</th>
<th>Unit</th>
<th>Notes</th>
</tr>
</thead>
<tbody>
<tr>
<td>1 Ea.</td>
<td>Hinge</td>
<td>T4A3386 5&quot; tall x NRP (width size and quantity per Section 08 71 00)</td>
<td>630 MC</td>
<td>Trimmer</td>
<td></td>
</tr>
<tr>
<td>2 Ea.</td>
<td>Electrified Hinge</td>
<td>T4A3386 5&quot; tall x 8-wire x 5&quot; tall x NRP (width size and quantity per 08 7100)</td>
<td>630 MC</td>
<td>Trimmer</td>
<td></td>
</tr>
<tr>
<td>1 Ea.</td>
<td>Keyed Removable Mullion</td>
<td>KR4954 (HM or AL series as required)</td>
<td>SP2 VO</td>
<td>Trim</td>
<td></td>
</tr>
<tr>
<td>1 Ea.</td>
<td>Mullion Storage Kit</td>
<td>MT54</td>
<td>VO</td>
<td>Trim</td>
<td></td>
</tr>
<tr>
<td>1 Ea.</td>
<td>Rim-Type Exit/Panic Device x Key Override</td>
<td>SD RX QEL AX PA 99L-NL x 110NL</td>
<td>626 VO</td>
<td>Trim</td>
<td></td>
</tr>
<tr>
<td>1 Ea.</td>
<td>Rim-Type Exit/Panic Device</td>
<td>SD RX QEL AX PA 99EO</td>
<td>626 VO</td>
<td>Trim</td>
<td></td>
</tr>
<tr>
<td>2 Ea.</td>
<td>Offset Pull</td>
<td>AP423-J-72&quot; x 630 (do not block emergency key override)</td>
<td>630 TR</td>
<td>Trim</td>
<td></td>
</tr>
<tr>
<td>4 Ea.</td>
<td>Primus I/C Cylinders (Rim or Mortise)</td>
<td>20-757 or 20-763 x appropriate cam x blocking rings as required (rim or mortise type and quantity as required by locking device)</td>
<td>626 SC</td>
<td>Trim</td>
<td></td>
</tr>
<tr>
<td>4 Ea.</td>
<td>Permanent Core</td>
<td>20-740</td>
<td>626 SC</td>
<td>Trim</td>
<td></td>
</tr>
<tr>
<td>2 Ea.</td>
<td>Overhead Low Energy Operator System</td>
<td>See Section 08 71 13</td>
<td></td>
<td>Trim</td>
<td></td>
</tr>
<tr>
<td>1 Ea.</td>
<td>Cylinder and Keying for Electrified On-Off Keyswitch (device in Section 08 71 13 &quot;Automatic Door Operators&quot;)</td>
<td>20-757 or 20-763 x appropriate cam x blocking rings as required (rim or mortise type and quantity as required by locking device)</td>
<td>626 SC</td>
<td>Trim</td>
<td></td>
</tr>
<tr>
<td>1 Ea.</td>
<td>Section 08 71 13 Permanent Core</td>
<td>20-740</td>
<td>626 SC</td>
<td>Trim</td>
<td></td>
</tr>
<tr>
<td>2 Ea.</td>
<td>Floor Stop</td>
<td>Auxiliary Stop 7280. Installed only after punch walk/substantial completion. After auto operator is opened as far as possible with motor driven power only (without occupant excessive force), install stop no more than 4&quot; from frame/hinge, quarter inch past the most open position of the auto operator.).</td>
<td>630 TR</td>
<td>Trim</td>
<td></td>
</tr>
<tr>
<td>1 Ea.</td>
<td>Mullion Seal</td>
<td>5110BL</td>
<td>PE</td>
<td>Trim</td>
<td></td>
</tr>
<tr>
<td>2 Ea.</td>
<td>Door Bottom Sweep</td>
<td>90100CNB</td>
<td>PE</td>
<td>Trim</td>
<td></td>
</tr>
<tr>
<td>1 Ea.</td>
<td>Threshold</td>
<td>2727A or 176A or per detail (sized to fit the condition)</td>
<td>PE</td>
<td>Trim</td>
<td></td>
</tr>
<tr>
<td>1 Ea.</td>
<td>Power Supplies</td>
<td>PS904 4 RL</td>
<td>VO</td>
<td>Trim</td>
<td></td>
</tr>
<tr>
<td>2 Ea.</td>
<td>Request to Exit Device (see free egress note in above specifications)</td>
<td>Specified in above locking hardware (coordinate with Divisions 25-28 and applicable drawings). The &quot;Request-to-Exit&quot; feature as described below is a security feature that announces/tells the security system if occupant is leaving the building interior area and similar to a motion-sensor the &quot;Request-to-Exit&quot; switch or</td>
<td></td>
<td>Trim</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>---</td>
<td>---</td>
<td>---</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>2 Ea.</strong></td>
<td>Door Position Switch (also known as Alarm Contacts)</td>
<td>Prep/Template door and frame only if DPS devices are specified by security (coordinate door and frame preparation/templates for DPS devices ordered and installed by Divisions 25-28 and applicable drawings)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>1 Ea.</strong></td>
<td>At exterior-side of building furnish and install single-gang, keyswitch as required to turn off exterior #ingress'.</td>
<td>#653-14 DPDT maintained single direction x SF-626 by Locknetics manufacturing.</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>1 Ea.</strong></td>
<td>At interior-side of building furnish and install single-gang, keyswitch as required so that it &quot;locks down&quot; perimeter of this door to meet CBC Sections 1010.1.9 through 1010.1.11.</td>
<td>#653-14 DPDT maintained single direction x SF-626 by Locknetics manufacturing. In case of emergency as described in CBC 1010.1.9 through 1010.1.11 coordinate and verify key-switch #653-14 DPDT shall drop power to auto operator and locking system (part of system to lock exterior-side of doors without going outside to lock the door).</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
| **1 Ea.** | Coordinate with electrical design for locations and additional non-Section 08 71 00 scope (including but not limited to wire / connectivity from ground or ceiling through frame to electified devices) | By electrical as required per Contract Documents:  
- Coordinate with electrical design for locations and wire/connectivity scope (non-Section 08 71 13, see Divisions 25-28 and applicable drawings).  
- Coordinate with single gang, electrical keyed cylinders in 08 71 13 “Automatic Door Operators" to meet CBC Sections 1010.1.9 through 1010.1.11 systems (lock down operation from interior). |

**NOTE 1** – coordination for interior two-way switch on/off station to lock down doors: During building emergency, an interior, two-way switch on/off station is to be provided to drop power to panic devices (locking doors) and exterior side auto operator actuator for no entrance into building by un-authorized occupants (coordinate integration with power supplies and auto operator system). Coordinate with Electrical/Security Divisions 25-28 and applicable plans.

**NOTE 2**: Balance of perimeter seals and meeting stiles by door manufacturer. Furnish and install all devices and components for hardware groups/set above in accordance with Contract Documents (including but not limited to additional hardware devices required in specifications language above, architectural plans and full specification documents).
## Hardware Group/Set #02

<table>
<thead>
<tr>
<th>Item Description</th>
<th>Quantity</th>
<th>Model/Detail</th>
</tr>
</thead>
<tbody>
<tr>
<td>Hinge</td>
<td>2</td>
<td>T4A3386 5&quot; tall x NRP (width size and quantity per Section 08 71 00)</td>
</tr>
<tr>
<td>Electrified Hinge</td>
<td>2</td>
<td>T4A3386 5&quot; tall x 8-wire x 5&quot; tall x NRP (width size and quantity per Section 08 71 00)</td>
</tr>
<tr>
<td>Keyed Removable Mullion</td>
<td>1</td>
<td>KR4954 (HM or AL series as required)</td>
</tr>
<tr>
<td>Mullion Storage Kit</td>
<td>1</td>
<td>MT54</td>
</tr>
<tr>
<td>Rim-Type Exit/Panic Device</td>
<td>2</td>
<td>SD RX QEL AX PA 99EO</td>
</tr>
<tr>
<td>Pulls</td>
<td>2</td>
<td>1185 SO x full height pull (length to be determined by the following: top of pull starts 4&quot; below top of door, bottom of pull 12&quot; AFF)</td>
</tr>
<tr>
<td>Primus I/C Cylinders (Rim or Mortise)</td>
<td>1</td>
<td>20-757 or 20-763 x appropriate cam x blocking rings as required (rim or mortise type and quantity as required by locking device)</td>
</tr>
<tr>
<td>Permanent Core</td>
<td>1</td>
<td>20-740</td>
</tr>
<tr>
<td>Closer</td>
<td>2</td>
<td>4040XP EDA</td>
</tr>
<tr>
<td>Concealed Overhead Stops</td>
<td>2</td>
<td>1ADJ Series (size -336 or as required by door width)</td>
</tr>
<tr>
<td>Mullion Seal</td>
<td>1</td>
<td>5110BL</td>
</tr>
<tr>
<td>Door Bottom Sweep</td>
<td>2</td>
<td>90100CNB</td>
</tr>
<tr>
<td>Threshold</td>
<td>1</td>
<td>2727A or 176A or per detail (sized to fit the condition)</td>
</tr>
<tr>
<td>Power Supplies</td>
<td>1</td>
<td>PS904 4 RL</td>
</tr>
<tr>
<td>Request to Exit Device (see free egress note in above specifications)</td>
<td>2</td>
<td>Specified in above locking hardware (coordinate with divisions 25-28 and applicable drawings).</td>
</tr>
<tr>
<td>Door Position Switch (also known as Alarm Contacts)</td>
<td>2</td>
<td>Prep/Template door and frame only if DPS devices are specified by security (coordinate door and frame preparation/templates for DPS devices ordered and installed by Divisions 25-28 and applicable drawings)</td>
</tr>
<tr>
<td>At interior-side of building furnish and install single-gang, keyswitch as required so that it &quot;locks down&quot; perimeter of this door to meet CBC Sections 1010.1.9 through 1010.1.11.</td>
<td>1</td>
<td>#653-14 DPDT maintained single direction x SF-626 by Locknetics manufacturing. In case of emergency as described in CBC Sections 1010.1.9 through 1010.1.11 coordinate and verify key-switch #653-14 DPDT shall drop power locking system (part of system to lock exterior-side of doors without going outside to lock the door).</td>
</tr>
<tr>
<td>Cylinder and Keying for Electrified On-Off Keyswitch</td>
<td>1</td>
<td>20-757 or 20-763 x appropriate cam x blocking rings as required (rim or mortise type and quantity as required by locking device)</td>
</tr>
<tr>
<td>Permanent Core</td>
<td>1</td>
<td>20-740</td>
</tr>
<tr>
<td>Coordinate with electrical design for locations and additional non-Section 08 71 00 scope</td>
<td>1</td>
<td>By electrical as required per Contract Documents: - Coordinate with electrical design for locations and wire/connectivity scope (non-Section 08 71 13, see Divisions 25-28 and applicable drawings).</td>
</tr>
</tbody>
</table>
| (including but not limited to wire / connectivity from ground or ceiling through frame to electrified devices) | 25-28 and applicable drawings).  
- Coordinate with single gang, electrical keyed cylinders to meet CBC Sections 1010.1.9 through 1010.1.11 systems (lock down operation from interior). |

**NOTE 1** — coordination for interior two-way switch on/off station to lock down doors: During building emergency, an interior, two-way switch on/off station is to be provided to drop power to locking doors for no entrance into building by un-authorized occupants (coordinate integration with power supplies and auto operator system). Coordinate with Electrical/Security Divisions 25-28 and applicable plans.

**NOTE 2**: Balance of perimeter seals and meeting stiles by door manufacturer. Furnish and install all devices and components for hardware groups/set above in accordance with Contract Documents (including but not limited to additional hardware devices required in specifications language above, architectural plans and full specification documents).
## Hardware Group/Set #03

In addition to the devices specified in hardware group/set below, also coordinate devices in specification Section 08 71 13 "Automatic Door Operators" and Electrical (furnish and install doors, frames and related scope per complete Contract Documents):

<table>
<thead>
<tr>
<th>Ea.</th>
<th>Description</th>
<th>Specification</th>
<th>Quantity</th>
<th>Code</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Hinge</td>
<td>T4A3386 5&quot; tall x NRP (width size and quantity per Section 08 71 00)</td>
<td>630</td>
<td>MC</td>
</tr>
<tr>
<td>1</td>
<td>Electrified Hinge</td>
<td>T4A3386 5&quot; tall x 8-wire x 5&quot; tall x NRP (width size and quantity per 08 7100)</td>
<td>630</td>
<td>MC</td>
</tr>
<tr>
<td>1</td>
<td>Rim-Type Exit/Panic Device x Key Override</td>
<td>SD RX QEL AX PA 99L-NL x 110NL</td>
<td>626</td>
<td>VO</td>
</tr>
<tr>
<td>1</td>
<td>Pulls</td>
<td>1185 SO x full height pull (length to be determined by the following: top of pull starts 4&quot; below top of door, bottom of pull 12&quot; AFF) x E x 1 (.5&quot; 630 no insert) x 630. Insert so that 1185 does not interfere with keyed, cylinder(s)</td>
<td>630</td>
<td>TR</td>
</tr>
<tr>
<td>2</td>
<td>Primus I/C Cylinders (Rim or Mortise)</td>
<td>20-757 or 20-763 x appropriate cam x blocking rings as required (rim or mortise type and quantity as required by locking device)</td>
<td>626</td>
<td>SC</td>
</tr>
<tr>
<td>2</td>
<td>Permanent Core</td>
<td>20-740</td>
<td>626</td>
<td>SC</td>
</tr>
<tr>
<td>1</td>
<td>Overhead Low Energy Operator System</td>
<td>See Section 08 71 13</td>
<td></td>
<td></td>
</tr>
<tr>
<td>1</td>
<td>Cylinder and Keying for Electrified On-Off Keyswitch (device in 08 71 13 &quot;Automatic Door Operators&quot;)</td>
<td>20-757 or 20-763 x appropriate cam x blocking rings as required (rim or mortise type and quantity as required by locking device)</td>
<td>626</td>
<td>SC</td>
</tr>
<tr>
<td>1</td>
<td>Section 08 71 13 Permanent Core</td>
<td>20-740</td>
<td>626</td>
<td>SC</td>
</tr>
<tr>
<td>1</td>
<td>Floor Stop</td>
<td>Auxiliary Stop 7280. Installed only after punch walk/substantial completion. After auto operator is opened as far as possible with motor driven power only (without occupant excessive force), install stop no more than 4&quot; from frame/hinge, quarter inch past the most open position of the auto operator.</td>
<td>630</td>
<td>TR</td>
</tr>
<tr>
<td>1</td>
<td>Door Bottom Sweep</td>
<td>90100CNB</td>
<td></td>
<td>PE</td>
</tr>
<tr>
<td>1</td>
<td>Threshold</td>
<td>2727A or 176A or per detail (sized to fit the condition)</td>
<td></td>
<td>PE</td>
</tr>
<tr>
<td>1</td>
<td>Power Supplies</td>
<td>PS904 4 RL</td>
<td></td>
<td>VO</td>
</tr>
<tr>
<td>1</td>
<td>Request to Exit Device (see free egress note in above specifications)</td>
<td>Specified in above locking hardware (coordinate with Divisions 25-28 and applicable drawings).</td>
<td></td>
<td></td>
</tr>
<tr>
<td>1</td>
<td>Door Position Switch (also known as Alarm Contacts)</td>
<td>Prep/Template door and frame only if DPS devices are specified by security (coordinate door and frame preparation/templates for DPS devices ordered and installed by Divisions 25-28 and applicable drawings)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>1</td>
<td>At exterior-side of building furnish and install single-gang, keyswitch as required to</td>
<td>#653-14 DPDT maintained single direction x SF-626 by Locknetics manufacturing.</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>---</td>
<td>---</td>
<td>---</td>
<td></td>
<td></td>
</tr>
<tr>
<td>1</td>
<td>Ea.</td>
<td>At interior-side of building furnish and install single-gang, keyswitch as required so that it &quot;locks down&quot; perimeter of this door to meet CBC Sections 1010.1.9 through 1010.1.11.</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>#653-14 DPDT maintained single direction x SF-626 by Locknetics manufacturing. In case of emergency as described in CBC Sections 1010.1.9 through 1010.1.11 coordinate and verify key-switch #653-14 DPDT shall drop power to auto operator and locking system (part of system to lock exterior-side of doors without going outside to lock the door).</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>By electrical as required per Contract Documents:</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>- Coordinate with electrical design for locations and wire/connectivity scope (non-Section 08 71 13, see Divisions 25-28 and applicable drawings).</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>- Coordinate with single gang, electrical keyed cylinders in Section 08 71 13 “Automatic Door Operators” to meet CBC Sections 1010.1.9 through 1010.1.11 systems (lock down operation from interior).</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

NOTE 1 – coordination for interior two-way switch on/off station to lock down doors: During building emergency, an interior, two-way switch on/off station is to be provided to drop power to panic devices (locking doors) and exterior side auto operator actuator for no entrance into building by un-authorized occupants (coordinate integration with power supplies and auto operator system). Coordinate with Electrical/Security Divisions 25-28 and applicable plans.  

NOTE 2: Balance of perimeter seals and meeting stiles by door manufacturer. Furnish and install all devices and components for hardware groups/set above in accordance with Contract Documents (including but not limited to additional hardware devices required in specifications language above, architectural plans and full specification documents).
<table>
<thead>
<tr>
<th>Hardware Group/Set #04</th>
<th>Ea.</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>1 Ea. Closer</td>
<td></td>
<td>4040XP EDA</td>
</tr>
<tr>
<td>1 Ea. Stop</td>
<td></td>
<td>1209</td>
</tr>
<tr>
<td>1 Ea. Door Bottom Sweep</td>
<td></td>
<td>315CN</td>
</tr>
<tr>
<td>1 Ea. Threshold</td>
<td></td>
<td>2727A or 176A or per existing detail (sized to fit the condition)</td>
</tr>
<tr>
<td>1 Ea. Rain Drip</td>
<td></td>
<td>Per architectural details and flashing at uncovered areas (or by door manufacturer to meet no water penetration warranties — verify before submittals). For hollow metal doors, provide 346C x FFW full rain drips by Pemko or approved equal</td>
</tr>
<tr>
<td>1 Ea. Door Position Switch (also known as Alarm Contacts)</td>
<td></td>
<td>Prep/Template door and frame only if DPS devices are specified by security (coordinate door and frame preparation/templates for DPS devices ordered and installed by Divisions 25-28 and applicable drawings)</td>
</tr>
<tr>
<td>1 Ea. Coordinate with existing electrical: At interior-side of building furnish and install single-gang, keyswitch as required so that it &quot;locks down&quot; perimeter of this door to meet CBC 1010.1.9 through 1010.1.11.</td>
<td></td>
<td>#653-14 DPDT maintained single direction x SF-626 by LockNetics manufacturing. In case of emergency as described in CBC 1010.1.9 through 1010.1.11 coordinate and verify key-switch #653-14 DPDT shall drop power locking system (part of system to lock exterior-side of doors without going outside to lock the door).</td>
</tr>
<tr>
<td>1 Ea. Cylinder and Keying for Electrified On-Off Keyswitch</td>
<td></td>
<td>20-757 or 20-763 x appropriate cam x blocking rings as required (rim or mortise type and quantity as required by locking device)</td>
</tr>
<tr>
<td>1 Ea. Electrified On-Off Keyswitch Permanent Core</td>
<td></td>
<td>20-740</td>
</tr>
<tr>
<td>1 Ea. Coordinate with electrical for locations and additional non-Section 08 71 00 scope (including but not limited to wire / connectivity from ground or ceiling through frame to electrified devices)</td>
<td></td>
<td>By electrical as required per Contract Documents:</td>
</tr>
<tr>
<td></td>
<td></td>
<td>- Coordinate with electrical design for locations and wire/connectivity scope (non-Section 08 71 13, see Divisions 25-28 and applicable drawings).</td>
</tr>
<tr>
<td></td>
<td></td>
<td>- Coordinate with single gang, electrical keyed cylinders in 08 71 13 &quot;Automatic Door Operators&quot; to meet CBC Sections 1010.1.9 through 1010.1.11 systems (lock down operation from interior).</td>
</tr>
</tbody>
</table>

NOTE 1 – coordination for interior two-way switch on/off station to lock down doors: During building emergency, an interior, two-way switch on/off station is to be provided to drop power to locking doors for no entrance into building by un-authorized occupants (coordinate integration with power supplies and auto operator system). Coordinate with Electrical/Security Divisions 25-28 and applicable plans.

NOTE 2 - remainder of work: Non-Section 08 7100 tasks including, but not limited to Section 07 92 00 sealants and/or Section 09 91 00 prime/paint. Furnish scope in accordance with Contract Documents. Tasks / scope for painting when Section 08 71 00 hardware s adjacent to painted areas, doors or frames includes uninstalling hardware, painting/finish as required by other scope, then reinstall hardware according to manufacturer’s original warranties and recommendations.
<table>
<thead>
<tr>
<th>Hardware Group/Set #05</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>- Ea. Hinge</strong></td>
</tr>
<tr>
<td><strong>2 Ea. Electrified Hinge</strong></td>
</tr>
<tr>
<td><strong>1 Ea. Keyed Removable Mullion</strong></td>
</tr>
<tr>
<td><strong>1 Ea. Mullion Storage Kit</strong></td>
</tr>
<tr>
<td><strong>1 Ea. Rim-Type Exit/Panic Device x Key Override</strong></td>
</tr>
<tr>
<td><strong>1 Ea. Rim-Type Exit/Panic Device</strong></td>
</tr>
<tr>
<td><strong>1 Ea. Power Supplies</strong></td>
</tr>
<tr>
<td><strong>1 Ea. Anti-Vandal Pulls</strong></td>
</tr>
<tr>
<td><strong>1 Ea. Anti-Vandal Pulls</strong></td>
</tr>
<tr>
<td><strong>1 Ea. Primus I/C Cylinders (Rim or Mortise)</strong></td>
</tr>
<tr>
<td><strong>1 Ea. Permanent Core</strong></td>
</tr>
<tr>
<td><strong>2 Ea. Closer</strong></td>
</tr>
<tr>
<td><strong>2 Ea. Kick Plate</strong></td>
</tr>
<tr>
<td><strong>2 Ea. Stop</strong></td>
</tr>
<tr>
<td><strong>1 Ea. Seals</strong></td>
</tr>
<tr>
<td><strong>1 Ea. Mullion Seal</strong></td>
</tr>
<tr>
<td><strong>2 Ea. Door Bottom Sweep</strong></td>
</tr>
<tr>
<td><strong>1 Ea. Threshold</strong></td>
</tr>
</tbody>
</table>

**Diagram:**

1 Ea. Rain Drip: Per architectural details and flashing at uncovered areas (or by door manufacturer to meet no water penetration warranties – verify before submittals). For hollow metal doors, provide 346C x FFW full raindrops by Pemko or approved equal

2 Ea. Request to Exit Device: Specified in above locking hardware (coordinate with Divisions
<p>| | | |</p>
<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>(see free egress note in above specifications)</td>
<td>25-28 and applicable drawings).</td>
</tr>
<tr>
<td>2 Ea.</td>
<td>Door Position Switch (also known as Alarm Contacts)</td>
<td>Prep/Template door and frame only if DPS devices are specified by security (coordinate door and frame preparation/templates for DPS devices ordered and installed by Divisions 25-28 and applicable drawings)</td>
</tr>
<tr>
<td>1 Ea.</td>
<td>Coordinate with existing electrical: At interior-side of building furnish and install single-gang, keyswitch as required so that it &quot;locks down&quot; perimeter of this door to meet CBC 1010.1.9 through 1010.1.11.</td>
<td>#653-14 DPDT maintained single direction x SF-626 by Locknetics manufacturing. In case of emergency as described in CBC 1010.1.9 through 1010.1.11 coordinate and verify key-switch #653-14 DPDT shall drop power locking system (part of system to lock exterior-side of doors without going outside to lock the door).</td>
</tr>
<tr>
<td>1 Ea.</td>
<td>Cylinder and Keying for Electrified On-Off Keyswitch</td>
<td>20-757 or 20-763 x appropriate cam x blocking rings as required (rim or mortise type and quantity as required by locking device)</td>
</tr>
<tr>
<td>1 Ea.</td>
<td>Electrified On-Off Keyswitch Permanent Core</td>
<td>20-740</td>
</tr>
</tbody>
</table>
| 1 Ea. | Coordinate with electrical for locations and additional non-Section 08 71 00 scope (including but not limited to wire / connectivity from ground or ceiling through frame to electrified devices) | By electrical as required per Contract Documents:  
- Coordinate with electrical design for locations and wire/connectivity scope (non-Section 08 71 13, see Divisions 25-28 and applicable drawings).  
- Coordinate with single gang, electrical keyed cylinders to meet CBC Sections 1010.1.9 through 1010.1.11 systems (lock down operation from interior). |

NOTE 1 – coordination for interior two-way switch on/off station to lock down doors: During building emergency, an interior, two-way switch on/off station is to be provided to drop power to locking doors for no entrance into building by un-authorized occupants (coordinate integration with power supplies and auto operator system). Coordinate with Electrical/Security Divisions 25-28 and applicable plans.

NOTE 2: Furnish scope in accordance with Contract Documents. Tasks/scope for painting when Section 08 71 00 hardware is adjacent to painted areas, doors or frames includes uninstalling hardware, painting/finish as required by other scope, then reinstall hardware according to manufacturer's original warranties and recommendations.
<table>
<thead>
<tr>
<th>Item Description</th>
<th>Specification</th>
<th>Quantity</th>
<th>Unit</th>
<th>Notes</th>
</tr>
</thead>
<tbody>
<tr>
<td>Hinge</td>
<td>T4A3386 5' tall x NRP (width size and quantity per Section 08 71 00)</td>
<td>630</td>
<td>MC</td>
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</tr>
<tr>
<td>Electrified Hinge</td>
<td>T4A3386 5' tall x 8-wire x 5&quot; tall x NRP (width size and quantity per Section 08 71 00)</td>
<td>630</td>
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<td></td>
</tr>
<tr>
<td>Rim-Type Exit/Panic Device x Key Override</td>
<td>SD RX QEL AX PA 99L-NL x 110NL</td>
<td>626</td>
<td>VO</td>
<td></td>
</tr>
<tr>
<td>Power Supplies</td>
<td>PS904 4 RL (final to be selected)</td>
<td>626</td>
<td>VO</td>
<td></td>
</tr>
<tr>
<td>Anti-Vandal Pulls</td>
<td>VR910NL series (coordinate with 99L-NL x 110NL)</td>
<td>630</td>
<td>IV</td>
<td></td>
</tr>
<tr>
<td>Primus I/C Cylinders (Rim or Mortise)</td>
<td>20-757 or 20-763 x appropriate cam x blocking rings as required (rim or mortise type and quantity as required by locking device)</td>
<td>626</td>
<td>SC</td>
<td></td>
</tr>
<tr>
<td>Permanent Core</td>
<td>20-740</td>
<td>626</td>
<td>SC</td>
<td></td>
</tr>
<tr>
<td>Closer</td>
<td>4040XP EDA</td>
<td>689</td>
<td>LC</td>
<td></td>
</tr>
<tr>
<td>Kick Plate</td>
<td>KO050 10&quot; tall x 2&quot; LDW (less door width) x B4E (beveled edges) x counter sunk where door allows</td>
<td>630</td>
<td>TR</td>
<td></td>
</tr>
<tr>
<td>Stop</td>
<td>1209</td>
<td>630</td>
<td>TR</td>
<td></td>
</tr>
<tr>
<td>Seals</td>
<td>S88D seals (head and jambs) by Pemko or approved seal manufacturer.</td>
<td>626</td>
<td>SC</td>
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<tr>
<td>Door Bottom Sweep</td>
<td>315CN by Pemko or approved seal manufacturer.</td>
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<tr>
<td>Threshold</td>
<td>2727A or 176A or per existing detail (sized to fit the condition) by Pemko or approved seal manufacturer.</td>
<td>626</td>
<td>SC</td>
<td></td>
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<tr>
<td>Rain Drip</td>
<td>Per architectural details and flashing at uncovered areas (or by door manufacturer to meet no water penetration warranties – verify before submittals). For hollow metal doors, provide 346C x FFW full raindrips by Pemko or approved equal</td>
<td>626</td>
<td>SC</td>
<td></td>
</tr>
<tr>
<td>Request to Exit Device (see free egress note in above specifications)</td>
<td>Specified in above locking hardware (coordinate with Divisions 25-28 and applicable drawings).</td>
<td>626</td>
<td>SC</td>
<td></td>
</tr>
<tr>
<td>Door Position Switch (also known as Alarm Contacts)</td>
<td>Prep/Template door and frame only if DPS devices are specified by security (coordinate door and frame preparation/templates for DPS devices ordered and installed by Divisions 25-28 and applicable drawings)</td>
<td>626</td>
<td>SC</td>
<td></td>
</tr>
<tr>
<td>Coordinate with existing electrical: At interior-side of building furnish and install single-gang, keyswitch as required so that it &quot;locks down&quot; perimeter of this door to meet CBC Sections 1010.1.9 through 1010.1.11.</td>
<td>#653-14 DPDT maintained single direction x SF-626 by Locknetics manufacturing. In case of emergency as described in CBC Sections 1010.1.9 through 1010.1.11 coordinate and verify key-switch #653-14 DPDT shall drop power locking system (part of system to lock exterior-side of doors without going outside to lock the door).</td>
<td>626</td>
<td>SC</td>
<td></td>
</tr>
<tr>
<td>Cylinder and Keying for Electrified On-Off Keyswitch</td>
<td>20-757 or 20-763 x appropriate cam x blocking rings as required (rim or mortise type and quantity as required by locking device)</td>
<td>626</td>
<td>SC</td>
<td></td>
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<tr>
<td>Electrified On-Off Keyswitch Permanent Core</td>
<td>20-740</td>
<td>626</td>
<td>SC</td>
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</tr>
<tr>
<td>1</td>
<td>Ea.</td>
<td>Coordinate with electrical for locations and additional non-Section 08 71 00 scope (including but not limited to wire / connectivity from ground or ceiling through frame to electrified devices)</td>
<td></td>
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</tr>
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</tr>
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<td></td>
<td></td>
<td>By electrical as required per Contract Documents:</td>
<td></td>
<td></td>
</tr>
<tr>
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<td></td>
<td>- Coordinate with electrical design for locations and wire/connectivity scope (non-Section 08 71 13, see Divisions 25-28 and applicable drawings).</td>
<td></td>
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</tr>
<tr>
<td></td>
<td></td>
<td>- Coordinate with single gang, electrical keyed cylinders to meet CBC Sections 1010.1.9 through 1010.1.11 systems (lock down operation from interior).</td>
<td></td>
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</tr>
</tbody>
</table>

NOTE 1 – coordination for interior two-way switch on/off station to lock down doors: During building emergency, an interior, two-way switch on/off station is to be provided to drop power to locking doors for no entrance into building by un-authorized occupants (coordinate integration with power supplies and auto operator system). Coordinate with Electrical/Security Divisions 25-28 and applicable plans.

NOTE 2: Furnish scope in accordance with Contract Documents. Tasks/scope for painting when 08 71 00 hardware s adjacent to painted areas, doors or frames includes uninstalling hardware, painting/finish as required by other scope, then reinstall hardware according to manufacturer’s original warranties and recommendations.
## Hardware Group/Set #07

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<thead>
<tr>
<th>EA</th>
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<th>Quantity</th>
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<td>1</td>
<td>Hinge</td>
<td>T4A3386 5&quot; tall x NRP (width size and quantity per Section 08 71 00)</td>
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<tr>
<td>1</td>
<td>Electrified Hinge</td>
<td>T4A3386 5&quot; tall x 8-wire x 5&quot; tall x NRP (width size and quantity per 08 7100)</td>
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<td>MC</td>
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<tr>
<td>1</td>
<td>Rim-Type Exit/Panic Device x Key Override</td>
<td>SD RX QEL AX PA 99L-NL x 110NL</td>
<td>626</td>
<td>VO</td>
<td></td>
</tr>
<tr>
<td>1</td>
<td>Power Supplies</td>
<td>PS904 4 RL (final to be selected)</td>
<td></td>
<td></td>
<td>VO</td>
</tr>
<tr>
<td>1</td>
<td>Anti-Vandal Pulls</td>
<td>VR910NL series (coordinate with 99L-NL x 110NL)</td>
<td>630</td>
<td>IV</td>
<td></td>
</tr>
<tr>
<td>1</td>
<td>Primus I/C Cylinders (Rim or Mortise)</td>
<td>20-757 or 20-763 x appropriate cam x blocking rings as required (rim or mortise type and quantity as required by locking device)</td>
<td>626</td>
<td>SC</td>
<td></td>
</tr>
<tr>
<td>1</td>
<td>Permanent Core</td>
<td>20-740</td>
<td>626</td>
<td>SC</td>
<td></td>
</tr>
<tr>
<td>1</td>
<td>Closer</td>
<td>4040XP EDA</td>
<td>689</td>
<td>LC</td>
<td></td>
</tr>
<tr>
<td>1</td>
<td>Kick Plate</td>
<td>KO050 10&quot; tall x 2&quot; LDW (less door width) x B4E (beveled edges) x counter sunk where door allows</td>
<td>630</td>
<td>TR</td>
<td></td>
</tr>
<tr>
<td>1</td>
<td>Stop</td>
<td>1209</td>
<td>630</td>
<td>TR</td>
<td></td>
</tr>
<tr>
<td>1</td>
<td>Seals</td>
<td>S88D seals (head and jambs) by Pemko or approved seal manufacturer.</td>
<td></td>
<td></td>
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</tr>
<tr>
<td>1</td>
<td>Door Bottom Sweep</td>
<td>315CN by Pemko or approved seal manufacturer.</td>
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</tr>
<tr>
<td>1</td>
<td>Threshold</td>
<td>2727A or 176A or per existing detail (sized to fit the condition) by Pemko or approved seal manufacturer.</td>
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</tr>
<tr>
<td>1</td>
<td>Rain Drip</td>
<td>Per architectural details and flashing at uncovered areas (or by door manufacturer to meet no water penetration warranties — verify before submittals). For hollow metal doors, provide 346C x FFW full raindrips by Pemko or approved equal</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>1</td>
<td>Request to Exit Device (see free egress note in above specifications) Specified in above locking hardware (coordinate with Divisions 25-28 and applicable drawings).</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>1</td>
<td>Door Position Switch (also known as Alarm Contacts)</td>
<td>Prep/Template door and frame only if DPS devices are specified by security (coordinate door and frame preparation/templates for DPS devices ordered and installed by Divisions 25-28 and applicable drawings)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>1</td>
<td>Coordinate with existing electrical: At interior-side of building furnish and install single-gang, keyswitch as required so that it &quot;locks down&quot; perimeter of this door to meet CBC Sections 1010.1.9 through 1010.1.11.</td>
<td>#653-14 DPDT maintained single direction x SF-626 by Locknetics manufacturing. In case of emergency as described in CBC Sections 1010.1.9 through 1010.1.11 coordinate and verify key-switch #653-14 DPDT shall drop power locking system (part of system to lock exterior-side of doors without going outside to lock the door).</td>
<td></td>
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</tr>
<tr>
<td>1</td>
<td>Cylinder and Keying for Electrified On-Off Keyswitch</td>
<td>20-757 or 20-763 x appropriate cam x blocking rings as required (rim or mortise type and quantity as required by locking device)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>1</td>
<td>Electrified On-Off Keyswitch Permanent Core</td>
<td>20-740</td>
<td></td>
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<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>Coordinate with electrical for locations and additional non-Section 08 71 00 scope (including but not limited to wire / connectivity from ground or ceiling through frame to electrified devices)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>---</td>
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<td>---</td>
<td></td>
<td></td>
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</tr>
<tr>
<td></td>
<td></td>
<td>By electrical as required per Contract Documents:</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>- Coordinate with electrical design for locations and wire/connectivity scope (non-Section 08 71 13, see Divisions 25-28 and applicable drawings).</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>- Coordinate with single gang, electrical keyed cylinders to meet CBC Sections 1010.1.9 through 1010.1.11 systems (lock down operation from interior).</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**NOTE 1** – coordination for interior two-way switch on/off station to lock down doors: During building emergency, an interior, two-way switch on/off station is to be provided to drop power to locking doors for no entrance into building by un-authorized occupants (coordinate integration with power supplies and auto operator system). Coordinate with Electrical/Security Divisions 25-28 and applicable plans.

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### Hardware Group/Set #08

<table>
<thead>
<tr>
<th>Item</th>
<th>Description</th>
<th>Quantity</th>
<th>Comments</th>
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</thead>
<tbody>
<tr>
<td>1 Ea</td>
<td>Hinge T4A3386 5” tall x NRP (width size and quantity per Section 08 71 00)</td>
<td>630</td>
<td>MC</td>
</tr>
<tr>
<td>1</td>
<td>Electrified Hinge T4A3386 5” tall x 8-wire x 5” tall x NRP</td>
<td>630</td>
<td>MC</td>
</tr>
<tr>
<td>1</td>
<td>Electrified Lockset L9092T EU x 17A RX</td>
<td>630</td>
<td>SC</td>
</tr>
<tr>
<td>1</td>
<td>Power Supply Task Furnish &amp; install #1) single gang power drop located above</td>
<td>626</td>
<td>SC</td>
</tr>
<tr>
<td></td>
<td>or near door (not in corridor or public view, but above ceiling line where possible); #2) provide power supply #BPS-24-2 x Securitron manufacturing; #3) run conduit from middle hinge through frame &amp; complete wiring as required to meet manufacturer warranties (locks, hinges &amp; power supply manufacturer warranty).</td>
<td></td>
<td></td>
</tr>
<tr>
<td>1</td>
<td>Primus I/C Cylinders (Rim or Mortise) 20-757 or 20-763 x appropriate cam x</td>
<td>626</td>
<td>SC</td>
</tr>
<tr>
<td></td>
<td>blocking rings as required (rim or mortise type and quantity as required by locking device)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>1</td>
<td>Permanent Core 20-740</td>
<td>626</td>
<td>SC</td>
</tr>
<tr>
<td>1</td>
<td>Closer 4040XP EDA</td>
<td>689</td>
<td>LC</td>
</tr>
<tr>
<td>1</td>
<td>Kick Plate KO050 10” tall x 2” LDW (less door width) x B4E (beveled edges) x</td>
<td>630</td>
<td>TR</td>
</tr>
<tr>
<td></td>
<td>counter sunk where door allows</td>
<td></td>
<td></td>
</tr>
<tr>
<td>1</td>
<td>Stop 1209</td>
<td>630</td>
<td>TR</td>
</tr>
<tr>
<td>1</td>
<td>Seals S88D seals (head and jambs) by Pemko or approved seal manufacturer.</td>
<td>626</td>
<td>SC</td>
</tr>
<tr>
<td>1</td>
<td>Door Bottom Sweep 315CN by Pemko or approved seal manufacturer.</td>
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</tr>
<tr>
<td>1</td>
<td>Threshold 2727A or 176A or per existing detail (sized to fit the condition) by Pemko or approved seal manufacturer.</td>
<td>626</td>
<td>SC</td>
</tr>
<tr>
<td>1</td>
<td>Rain Drip Per architectural details and flashing at uncovered areas (or by door manufacturer to meet no water penetration warranties — verify before submittals). For hollow metal doors, provide 346C x FFW full raindrips by Pemko or approved equal</td>
<td>630</td>
<td>TR</td>
</tr>
<tr>
<td>1</td>
<td>Request to Exit Device (see free egress note in above specifications)</td>
<td></td>
<td>Specified in above locking hardware (coordinate with Divisions 25-28 and applicable drawings).</td>
</tr>
<tr>
<td>1</td>
<td>Door Position Switch (also known as Alarm Contacts) Prep/Template door and frame only if DPS devices are specified by security (coordinate door and frame preparation/templates for DPS devices ordered and installed by Divisions 25-28 and applicable drawings)</td>
<td></td>
<td>Specified in above locking hardware (coordinate with Divisions 25-28 and applicable drawings).</td>
</tr>
<tr>
<td>1</td>
<td>Coordinate with existing electrical: At interior-side of building furnish and install single-gang, keyswitch as required so that it &quot;locks down&quot; perimeter of this door to meet CBC Sections 1010.1.9 through 1010.1.11. #653-14 DPDT maintained single direction x SF-626 by Locknetics manufacturing. In case of emergency as described in CBC Sections 1010.1.9 through 1010.1.11 coordinate and verify key-switch #653-14 DPDT shall drop power locking system (part of system to lock exterior-side of doors without going outside to lock the door).</td>
<td>626</td>
<td>SC</td>
</tr>
<tr>
<td>1</td>
<td>Cylinder and Keying for Electrified On-Off 20-757 or 20-763 x appropriate cam x blocking rings as required (rim or mortise type and quantity as required by locking device)</td>
<td>626</td>
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</tr>
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<td></td>
<td>Keyswitch</td>
<td>required by locking device</td>
<td></td>
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<tr>
<td>----</td>
<td>---------------------------------------------------------------------------</td>
<td>----------------------------</td>
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</tr>
<tr>
<td>1</td>
<td>Ea. Electrified On-Off&lt;br&gt;Keyswitch Permanent Core</td>
<td>20-740</td>
<td>626</td>
</tr>
<tr>
<td>1</td>
<td>Ea. Coordinate with electrical for locations and additional non-Section 08 71 00 scope&lt;br&gt;including but not limited to wire / connectivity from ground or ceiling through frame to electrified devices</td>
<td>By electrical as required per Contract Documents:&lt;br&gt;- Coordinate with electrical design for locations and wire/connectivity scope (non-Section 08 71 13, see Divisions 25-28 and applicable drawings).&lt;br&gt;- Coordinate with single gang, electrical keyed cylinders to meet CBC Section 1010.1.9 through 1010.1.11 systems (lock down operation from interior).</td>
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**NOTE 1** — coordination for interior two-way switch on/off station to lock down doors: During building emergency, an interior, two-way switch on/off station is to be provided to drop power to locking doors for no entrance into building by un-authorized occupants (coordinate integration with power supplies and auto operator system). Coordinate with Electrical/Security Divisions 25-28 and applicable plans.

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<th>Quantity</th>
<th>Unit</th>
<th>Notes</th>
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<tbody>
<tr>
<td>-</td>
<td>Hinge</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>630</td>
<td>T4A3386 5&quot; tall x NRP (width size and quantity per Section 08 71 00)</td>
<td>MC</td>
<td></td>
<td></td>
</tr>
<tr>
<td>1</td>
<td>Electrified Hinge</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>630</td>
<td>T4A3386 5&quot; tall x 8-wire x 5&quot; tail x NRP (width size and quantity per Section 08 71 00)</td>
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<td></td>
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<tr>
<td>1</td>
<td>Electrified Lockset</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>630</td>
<td>L9092T EU x 17A RX</td>
<td>SC</td>
<td></td>
<td></td>
</tr>
<tr>
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<td>Power Supply Task</td>
<td></td>
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<td></td>
</tr>
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<td></td>
<td>Furnish &amp; install #1) single gang power drop located above or near door (not in corridor or public view, but above ceiling line where possible); #2) provide power supply #BPS-24-2 x Securitron manufacturing; #3) run conduit from middle hinge through frame &amp; complete wiring as required to meet manufacturer warranties (locks, hinges &amp; power supply manufacturer warranty)</td>
<td></td>
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<tr>
<td>1</td>
<td>Primus I/C Cylinders (Rim or Mortise)</td>
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<td>626</td>
<td>20-757 or 20-763 x appropriate cam x blocking rings as required (rim or mortise type and quantity as required by locking device)</td>
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<td></td>
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<tr>
<td>1</td>
<td>Closer</td>
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<td></td>
</tr>
<tr>
<td>689</td>
<td>4040XP EDA</td>
<td>LC</td>
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<tr>
<td>1</td>
<td>Kick Plate</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>630</td>
<td>KO050 10&quot; tall x 2&quot; LDW (less door width) x B4E (beveled edges) x counter sunk where door allows</td>
<td>TR</td>
<td></td>
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<tr>
<td>1</td>
<td>Stop</td>
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<td></td>
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<td>Seals</td>
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<tr>
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<td>S88D seals (head and jamb) by Pemko or approved seal manufacturer.</td>
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<td></td>
</tr>
<tr>
<td>1</td>
<td>Door Bottom Sweep</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>315CN</td>
<td>by Pemko or approved seal manufacturer.</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>1</td>
<td>Threshold</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>2727A</td>
<td>2727A or 176A or per existing detail (sized to fit the condition) by Pemko or approved seal manufacturer.</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>1</td>
<td>Rain Drip</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Per architectural details and flashing at uncovered areas (or by door manufacturer to meet no water penetration warranties — verify before submittals). For hollow metal doors, provide 346C x FFW full raindrips by Pemko or approved equal</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>1</td>
<td>Request to Exit Device (see free egress note in above specifications)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Specified in above locking hardware (coordinate with Divisions 25-28 and applicable drawings).</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>1</td>
<td>Door Position Switch (also known as Alarm Contacts)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Prep/Template door and frame only if DPS devices are specified by security (coordinate door and frame preparation/templates for DPS devices ordered and installed by Divisions 25-28 and applicable drawings)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>1</td>
<td>Coordinate with existing electrical: At interior-side of building furnish and install single-gang, keyswitch as required so that it &quot;locks down&quot; perimeter of this door to meet CBC Sections 1010.1.9 through 1010.1.11.</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>#653-14 DPDT maintained single direction x SF-626 by Locknetics manufacturing. In case of emergency as described in CBC Sections 1010.1.9 through 1010.1.11 coordinate and verify key-switch #653-14 DPDT shall drop power locking system (part of system to lock exterior-side of doors without going outside to lock the door).</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>1</td>
<td>Cylinder and Keying for Electrified On-Off</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>626</td>
<td>20-757 or 20-763 x appropriate cam x blocking rings as required (rim or mortise type and quantity as</td>
<td>SC</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Keyswitch</td>
<td>required by locking device</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>-----------</td>
<td>---------------------------</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>1 Ea.</td>
<td>Electrified On-Off</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>20-740</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Keyswitch Permanent</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Core</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>1 Ea.</td>
<td>Coordinate with electrical</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>for locations and</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>additional non-Section</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>08 71 00 scope</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>(including but not limited</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>to wire / connectivity</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>from ground or ceiling</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>through frame to</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>electrified devices)</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

By electrical as required per Contract Documents:
- Coordinate with electrical design for locations and wire/connectivity scope (non-Section 08 71 13, see Divisions 25-28 and applicable drawings).
- Coordinate with single gang, electrical keyed cylinders to meet CBC Sections 1010.1.9 through 1010.1.11 systems (lock down operation from interior).

NOTE 1 – coordination for interior two-way switch on/off station to lock down doors: During building emergency, an interior, two-way switch on/off station is to be provided to drop power to locking doors for no entrance into building by unauthorized occupants (coordinate integration with power supplies and auto operator system). Coordinate with Electrical/Security Divisions 25-28 and applicable plans.

NOTE 2: Furnish scope in accordance with Contract Documents. Tasks scope for painting when Section 08 71 00 hardware s adjacent to painted areas, doors or frames includes uninstalling hardware, painting/finish as required by other scope, then reinstall hardware according to manufacturer’s original warranties and recommendations.
### Hardware Group/Set #10

<table>
<thead>
<tr>
<th>Item</th>
<th>Description</th>
<th>Quantity</th>
<th>Unit</th>
<th>Code</th>
</tr>
</thead>
<tbody>
<tr>
<td>Hinge</td>
<td>T4A3386 x NRP (size and quantity per Section 08 71 00)</td>
<td>1</td>
<td>Ea.</td>
<td>630</td>
</tr>
<tr>
<td>Electrified Hinge</td>
<td>T4A3386 8-wire NRP (size and quantity per Section 08 71 00)</td>
<td>1</td>
<td>Ea.</td>
<td>630</td>
</tr>
<tr>
<td>Electrified Lockset</td>
<td>L9092T EU x 17A RX</td>
<td>1</td>
<td>Ea.</td>
<td>630</td>
</tr>
<tr>
<td>Power Supply Task</td>
<td>Furnish &amp; install #1) single gang power drop located above or near door (not in corridor or public view, but above ceiling line where possible); #2) provide power supply #BPS-24-2 x Securitron manufacturing; #3) run conduit from middle hinge through frame &amp; complete wiring as required to meet manufacturer warranties (locks, hinges &amp; power supply manufacturer warranty).</td>
<td>1</td>
<td>Ea.</td>
<td>626</td>
</tr>
<tr>
<td>Primus I/C Cylinders (Rim or Mortise)</td>
<td>20-757 or 20-763 x appropriate cam x blocking rings as required (rim or mortise type and quantity as required by locking device)</td>
<td>1</td>
<td>Ea.</td>
<td>626</td>
</tr>
<tr>
<td>Permanent Core</td>
<td>20-740</td>
<td>1</td>
<td>Ea.</td>
<td>626</td>
</tr>
<tr>
<td>Closer x Stop Arm at 90-degrees</td>
<td>4040XP CUSH</td>
<td>1</td>
<td>Ea.</td>
<td>689</td>
</tr>
<tr>
<td>Kick Plate</td>
<td>KO050 10&quot; tall x 2&quot; LDW (less door width) x B4E (beveled edges) x counter sunk where door allows</td>
<td>1</td>
<td>Ea.</td>
<td>630</td>
</tr>
<tr>
<td>Stop</td>
<td>1209</td>
<td>1</td>
<td>Ea.</td>
<td>630</td>
</tr>
<tr>
<td>Seals</td>
<td>S88D seals (head and jambs) by Pemko or approved seal manufacturer.</td>
<td>1</td>
<td>Ea.</td>
<td>630</td>
</tr>
<tr>
<td>Door Bottom Sweep</td>
<td>315CN by Pemko or approved seal manufacturer.</td>
<td>1</td>
<td>Ea.</td>
<td>626</td>
</tr>
<tr>
<td>Threshold</td>
<td>2727A or 176A or per existing detail (sized to fit the condition) by Pemko or approved seal manufacturer.</td>
<td>1</td>
<td>Ea.</td>
<td>626</td>
</tr>
<tr>
<td>Rain Drip</td>
<td>Per architectural details and flashing at uncovered areas (or by door manufacturer to meet no water penetration warranties – verify before submittals). For hollow metal doors, provide 346C x FFW full raindrips by Pemko or approved equal</td>
<td>1</td>
<td>Ea.</td>
<td>630</td>
</tr>
<tr>
<td>Request to Exit Device (see free egress note in above specifications)</td>
<td>Specified in above locking hardware (coordinate with Divisions 25-28 and applicable drawings).</td>
<td>1</td>
<td>Ea.</td>
<td>630</td>
</tr>
<tr>
<td>Door Position Switch (also known as Alarm Contacts)</td>
<td>Prep/Template door and frame only if DPS devices are specified by security (coordinate door and frame preparation/templates for DPS devices ordered and installed by Divisions 25-28 and applicable drawings)</td>
<td>1</td>
<td>Ea.</td>
<td>626</td>
</tr>
<tr>
<td>Cylinder and Keying for</td>
<td>20-757 or 20-763 x appropriate cam x blocking rings</td>
<td>1</td>
<td>Ea.</td>
<td>626</td>
</tr>
</tbody>
</table>

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08 71 00  
Door Hardware  
Page 44  
Lionakis No. 017034  
December 5, 2018
<table>
<thead>
<tr>
<th></th>
<th>Electrified On-Off Keyswitch</th>
<th>as required (rim or mortise type and quantity as required by locking device)</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>1 Ea.</td>
<td>Electrified On-Off Keyswitch Permanent Core</td>
<td>20-740</td>
<td>626</td>
</tr>
</tbody>
</table>

| 1 Ea. | Coordinate with electrical for locations and additional non-Section 08 71 00 scope (including but not limited to wire / connectivity from ground or ceiling through frame to electrified devices) | By electrical as required per Contract Documents:  
- Coordinate with electrical design for locations and wire/connectivity scope (non-Section 08 71 13, see Divisions 25-28 and applicable drawings).  
- Coordinate with single gang, electrical keyed cylinders to meet CBC Sections 1010.1.9 through 1010.1.11 systems (lock down operation from interior). |

NOTE 1 – coordination for interior two-way switch on/off station to lock down doors: During building emergency, an interior, two-way switch on/off station is to be provided to drop power to locking doors for no entrance into building by unauthorized occupants (coordinate integration with power supplies and auto operator system). Coordinate with Electrical/Security Divisions 25-28 and applicable plans.

NOTE 2: Furnish scope in accordance with Contract Documents. Tasks/scope for painting when Section 08 71 00 hardware is adjacent to painted areas, doors or frames includes uninstalling hardware, painting/finish as required by other scope, then reinstall hardware according to manufacturer’s original warranties and recommendations.
## Hardware Group/Set #11

<table>
<thead>
<tr>
<th>Item</th>
<th>Description</th>
<th>Quantity</th>
<th>Unit</th>
<th>Notes</th>
</tr>
</thead>
<tbody>
<tr>
<td>Hinge</td>
<td>T4A3386 x NRP (size and quantity per Section 08 71 00)</td>
<td>1</td>
<td>Ea.</td>
<td>630 MC</td>
</tr>
<tr>
<td>Electrified Hinge</td>
<td>T4A3386 8-wire NRP (size and quantity per Section 08 71 00)</td>
<td>1</td>
<td>Ea.</td>
<td>630 MC</td>
</tr>
<tr>
<td>Electrified Lockset</td>
<td>L9092T EU x 17A RX</td>
<td>1</td>
<td>Ea.</td>
<td>630 SC</td>
</tr>
<tr>
<td>Power Supply Task</td>
<td>Furnish &amp; install #1) single gang power drop located above or near door (not in corridor or public view, but above ceiling line where possible); #2) provide power supply #BPS-24-2 x Securitron manufacturing; #3) run conduit from middle hinge through frame &amp; complete wiring as required to meet manufacturer warranties (locks, hinges &amp; power supply manufacturer warranty).</td>
<td>1</td>
<td>Ea.</td>
<td>626 SC</td>
</tr>
<tr>
<td>Primus I/C Cylinders (Rim or Mortise)</td>
<td>20-757 or 20-763 x appropriate cam x blocking rings as required (rim or mortise type and quantity as required by locking device)</td>
<td>1</td>
<td>Ea.</td>
<td>626 SC</td>
</tr>
<tr>
<td>Permanent Core</td>
<td>20-740</td>
<td>1</td>
<td>Ea.</td>
<td>626 SC</td>
</tr>
<tr>
<td>Closer x Stop Arm at 90-degrees</td>
<td>4040XP CUSH</td>
<td>1</td>
<td>Ea.</td>
<td>689 LC</td>
</tr>
<tr>
<td>Kick Plate</td>
<td>KO050 10&quot; tall x 2&quot; LDW (less door width) x B4E (beveled edges) x counter sunk where door allows</td>
<td>1</td>
<td>Ea.</td>
<td>630 TR</td>
</tr>
<tr>
<td>Stop</td>
<td>1209</td>
<td>1</td>
<td>Ea.</td>
<td>630 TR</td>
</tr>
<tr>
<td>Seals</td>
<td>S88D seals (head and jambs) by Pemko or approved seal manufacturer.</td>
<td>1</td>
<td>Ea.</td>
<td>626 SC</td>
</tr>
<tr>
<td>Door Bottom Sweep</td>
<td>315CN by Pemko or approved seal manufacturer.</td>
<td>1</td>
<td>Ea.</td>
<td>626 SC</td>
</tr>
<tr>
<td>Threshold</td>
<td>2727A or 176A or per existing detail (sized to fit the condition) by Pemko or approved seal manufacturer.</td>
<td>1</td>
<td>Ea.</td>
<td>626 SC</td>
</tr>
<tr>
<td>Rain Drip</td>
<td>Per architectural details and flashing at uncovered areas (or by door manufacturer to meet no water penetration warranties – verify before submittals). For hollow metal doors, provide 346C x FFW full raindrips by Pemko or approved equal</td>
<td>1</td>
<td>Ea.</td>
<td>630 TR</td>
</tr>
<tr>
<td>Request to Exit Device (see free egress note in above specifications)</td>
<td>Specified in above locking hardware (coordinate with Divisions 25-28 and applicable drawings).</td>
<td>1</td>
<td>Ea.</td>
<td>626 SC</td>
</tr>
<tr>
<td>Door Position Switch (also known as Alarm Contacts)</td>
<td>Prep/Template door and frame only if DPS devices are specified by security (coordinate door and frame preparation/templates for DPS devices ordered and installed by Divisions 25-28 and applicable drawings)</td>
<td>1</td>
<td>Ea.</td>
<td>626 SC</td>
</tr>
<tr>
<td>Coordinate with existing electrical: At interior-side of building furnish and install single-gang, keyswitch as required so that it &quot;locks down&quot; perimeter of this door to meet CBC Sections 1010.1.9 through 1010.1.11</td>
<td>#653-14 DPDT maintained single direction x SF-626 by Locknetics manufacturing. In case of emergency as described in CBC Sections 1010.1.9 through 1010.1.11 coordinate and verify key-switch #653-14 DPDT shall drop power locking system (part of system to lock exterior-side of doors without going outside to lock the door).</td>
<td>1</td>
<td>Ea.</td>
<td>626 SC</td>
</tr>
<tr>
<td>Cylinder and Keying for</td>
<td>20-757 or 20-763 x appropriate cam x blocking rings</td>
<td>1</td>
<td>Ea.</td>
<td>626 SC</td>
</tr>
<tr>
<td>Quantity</td>
<td>Description</td>
<td>Model/Part No.</td>
<td>Notes</td>
<td></td>
</tr>
<tr>
<td>----------</td>
<td>-------------</td>
<td>----------------</td>
<td>-------</td>
<td></td>
</tr>
<tr>
<td>1 Ea.</td>
<td>Electrified On-Off Keyswitch Permanent Core</td>
<td>20-740</td>
<td>SC</td>
<td></td>
</tr>
</tbody>
</table>

**NOTE 1** – coordination for interior two-way switch on/off station to lock down doors: During building emergency, an interior, two-way switch on/off station is to be provided to drop power to locking doors for no entrance into building by un-authorized occupants (coordinate integration with power supplies and auto operator system). Coordinate with Electrical/Security Divisions 25-28 and applicable plans.

**NOTE 2**: Furnish scope in accordance with Contract Documents. Tasks/scope for painting when Section 08 71 00 hardware s adjacent to painted areas, doors or frames includes uninstalling hardware, painting/finish as required by other scope, then reinstall hardware according to manufacturer’s original warranties and recommendations.
### Hardware Group/Set #12

<table>
<thead>
<tr>
<th>Qty</th>
<th>Description</th>
<th>Specification</th>
<th>Cost</th>
</tr>
</thead>
</table>
| 6   | Hinges at existing frame conditions              | T4A3386 heavy duty hinges or TA2314 medium duty hinges x 630 finish by McKinney manufacturing:  
  - Verify in field existing frame preparation/templates and submit, furnish and install hinges to match existing frame.  
  - Provide hinge width to enable door to open 175 degrees to hit stop. | 630   |
| 1   | Inactive Leaf: Lockable Cain Bolt Receiver/Strike | 0524PL and/or part #0000478 x black zinc x Stainless Steel Ground Receiver/Strike | CR    |
| 1   | Inactive Leaf: Padlock                          | By Owner                                                                      |       |
| 1   | Storeroom-Type Lockset                          | ND80TD x RHO x 10-025                                                        | 626   |
| 1   | Permanent Core                                  | 20-740                                                                        | 626   |
| 1   | Latch Protector                                 | 5001-T                                                                        | 626   |
| 2   | Armor Plate                                     | KA050 34" tall x 2" LDW (less door width) x B4E (beveled edges) x counter sunk where door allows | 630   |
| 2   | Door Stop                                       | 1209                                                                          | 630   |
| 1   | Seals                                           | S88D (head and jambs) by Pemko or approved manufacturer.                     |       |
| 2   | Door Bottom Sweep                               | 315CN by Pemko or approved manufacturer.                                      |       |
| 1   | Threshold                                       | Replace in kind if 1/2" tall condition or provide 2727A or 176A or per existing detail (sized to fit the condition) by Pemko or approved seal manufacturer. |       |
| 1   | Rain Drip                                       | Per architectural details and flashing at uncovered areas (or by door manufacturer to meet no water penetration warranties – verify before submittals). For hollow metal doors, provide 346C x FFW full raindrops by Pemko or approved equal |       |

**NOTE** - Furnish and install all devices and components for hardware groups/set above in accordance with Contract Documents (including but not limited to additional hardware devices required in specifications language above, architectural plans and full specification documents).
### Hardware Group/Set #13

<table>
<thead>
<tr>
<th>Item</th>
<th>Description</th>
<th>Notes</th>
</tr>
</thead>
<tbody>
<tr>
<td>6 Ea.</td>
<td>Gate Hinge/Hanging Devices</td>
<td>Precision Engineered High Capacity Hinges # CBW875-HD Series (quantity per specifications and manufacturer's recommendations) CR</td>
</tr>
<tr>
<td>2 Ea.</td>
<td>Lockable Cainbolt-Type Devices</td>
<td>0524PL and/or part #0000478 x 24&quot;x black zinc x Stainless Steel Ground Receiver/Strike CR</td>
</tr>
<tr>
<td>2 Ea.</td>
<td>Padlocks</td>
<td>KS43F320 (2&quot; inch shackle) SC</td>
</tr>
<tr>
<td>2 Ea.</td>
<td>Permanent Cores</td>
<td>20-740 626 SC</td>
</tr>
<tr>
<td>2 Ea.</td>
<td>Floor Stops and Holders</td>
<td>1804 630 AB</td>
</tr>
<tr>
<td>1 Ea.</td>
<td>Full Height Astragal</td>
<td>Per specifications (utilized as a positive stop – when gate closes against the astragals the opening cannot swing back in toward the egress side) Painted</td>
</tr>
<tr>
<td>1 Ea.</td>
<td>Knox Box</td>
<td>3200 Series (per specifications) and for locations as shown on Architectural Drawings (Recessed mount, UL-listed, heavy-duty unit; fabricate from 1/4-inch-thick steel plate with restricted keying as required by Local Fire Department)</td>
</tr>
</tbody>
</table>

**NOTE:** Furnish all devices and components for hardware groups/set above in accordance with Contract Documents (including but not limited to additional hardware devices required in Section 08 71 00 language, architectural plans and full specification documents).

### Hardware Group/Set #14

<table>
<thead>
<tr>
<th>Item</th>
<th>Description</th>
<th>Notes</th>
</tr>
</thead>
<tbody>
<tr>
<td>6 Ea.</td>
<td>Gate Hinge/Hanging Devices</td>
<td>Precision Engineered High Capacity Hinges # CBW875-HD Series (quantity per specifications and manufacturer's recommendations) CR</td>
</tr>
<tr>
<td>1 Ea.</td>
<td>Inactive Leaf Lockable Cainbolt-Type Devices</td>
<td>0524PL and/or part #0000478 x 24&quot;x black zinc x Stainless Steel Ground Receiver/Strike CR</td>
</tr>
<tr>
<td>1 Ea.</td>
<td>Inactive Leaf Padlock</td>
<td>KS43F320 (2&quot; inch shackle) SC</td>
</tr>
<tr>
<td>1 Ea.</td>
<td>Mortise-Type Exit/Panic Device – NL</td>
<td>AX PA 9975NL-OP mounted with SNB 626 VO</td>
</tr>
<tr>
<td>1 Ea.</td>
<td>Anti-Vandal Pulls</td>
<td>VR910NL series (coordinate with 9975NL-OP) 630 IV</td>
</tr>
<tr>
<td>1 Ea.</td>
<td>Primus I/C Cylinders (Rim or Mortise)</td>
<td>20-757 or 20-763 x appropriate cam x blocking rings as required (rim or mortise type and quantity as required by locking device) 626 SC</td>
</tr>
<tr>
<td>1 Ea.</td>
<td>Padlock and Exit/Panic Device Permanent Cores</td>
<td>20-740 626 SC</td>
</tr>
<tr>
<td>2 Ea.</td>
<td>Floor Stops and Holders</td>
<td>1804 630 AB</td>
</tr>
<tr>
<td>1 Ea.</td>
<td>Full Height Astragal</td>
<td>Per specifications (utilized as a positive stop – when gate closes against the astragals the opening cannot swing back in toward the egress side) Painted</td>
</tr>
<tr>
<td>4 Ea.</td>
<td>Bottom of doors to be greater than 10&quot; Clear, Unobstructed and Smooth Surface</td>
<td>Both sides of gates by gate manufacturer (ground smooth, primed and painted to match gate). Painted</td>
</tr>
</tbody>
</table>

**NOTE:** Furnish all devices and components for hardware groups/set above in accordance with Contract Documents (including but not limited to additional hardware devices required in Section 08 71 00 language, architectural plans and full specification documents).
### Hardware Group/Set #15

<table>
<thead>
<tr>
<th>Quantity</th>
<th>Item Description</th>
<th>Specification/Details</th>
<th>Notes</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Set Hydraulic Closers / Hinges</td>
<td>Mammoth 180-Degree Hydraulic Closers/Hinges Set</td>
<td>LO</td>
</tr>
<tr>
<td>1</td>
<td>Ea. Mortise-Type Exit/Panic Device – NL</td>
<td>AX PA 9975NL-OP mounted with SNB</td>
<td>626</td>
</tr>
<tr>
<td>1</td>
<td>Ea. Anti-Vandal Pulls</td>
<td>VR910NL series (coordinate with 9975NL-OP)</td>
<td>630</td>
</tr>
<tr>
<td>1</td>
<td>Ea. Primus I/C Cylinders (Rim or Mortise)</td>
<td>20-757 or 20-763 x appropriate cam x blocking rings as required (rim or mortise type and quantity as required by locking device)</td>
<td>626</td>
</tr>
<tr>
<td>1</td>
<td>Ea. Floor Stops and Holder</td>
<td>1804</td>
<td>630</td>
</tr>
<tr>
<td>1</td>
<td>Ea. Full Height Astragal</td>
<td>Per specifications (utilized as a positive stop – when gate closes against the astragals the opening cannot swing back in toward the egress side)</td>
<td>Painted</td>
</tr>
<tr>
<td>2</td>
<td>Ea. Bottom of doors to be greater than 10° Clear, Unobstructed and Smooth Surface</td>
<td>Both sides of gates by gate manufacturer (ground smooth, primed and painted to match gate)</td>
<td>Painted</td>
</tr>
</tbody>
</table>

**NOTE**: Furnish all devices and components for hardware groups/set above in accordance with Contract Documents (including but not limited to additional hardware devices required in Section 08 71 00 language, architectural plans and full specification documents).

### Hardware Group/Set #16

<table>
<thead>
<tr>
<th>Quantity</th>
<th>Item Description</th>
<th>Specification/Details</th>
<th>Notes</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Set Hydraulic Closers / Hinges</td>
<td>Mammoth 180-Degree Hydraulic Closers/Hinges Set</td>
<td>LO</td>
</tr>
<tr>
<td>1</td>
<td>Ea. Storeroom Lockset</td>
<td>LV9080T x 06A</td>
<td>626</td>
</tr>
<tr>
<td>1</td>
<td>Ea. Primus I/C Cylinders (Rim or Mortise)</td>
<td>20-757 or 20-763 x appropriate cam x blocking rings as required (rim or mortise type and quantity as required by locking device)</td>
<td>626</td>
</tr>
<tr>
<td>1</td>
<td>Ea. Floor Stops and Holder</td>
<td>1804</td>
<td>630</td>
</tr>
<tr>
<td>1</td>
<td>Ea. Full Height Astragal</td>
<td>Per specifications (utilized as a positive stop – when gate closes against the astragals the opening cannot swing back in toward the egress side)</td>
<td>Painted</td>
</tr>
<tr>
<td>2</td>
<td>Ea. Bottom of doors to be greater than 10° Clear, Unobstructed and Smooth Surface</td>
<td>Both sides of gates by gate manufacturer (ground smooth, primed and painted to match gate)</td>
<td>Painted</td>
</tr>
</tbody>
</table>

**NOTE**: Furnish all devices and components for hardware groups/set above in accordance with Contract Documents (including but not limited to additional hardware devices required in Section 08 71 00 language, architectural plans and full specification documents).
### Interior Hardware Sets (Three-Digit Set Numbers)

<table>
<thead>
<tr>
<th>Hardware Group/Set #101</th>
<th>Description</th>
<th>Quantity</th>
<th>Requirement</th>
<th>1 EA.</th>
<th>Notes</th>
</tr>
</thead>
<tbody>
<tr>
<td>1 Hinge</td>
<td>T4A3386 5&quot; tall x NRP (width size and quantity per Section 08 71 00)</td>
<td>630</td>
<td>MC</td>
<td></td>
<td></td>
</tr>
<tr>
<td>1 Keyed Removable</td>
<td>KR4954 (HM or AL series as required)</td>
<td>SP2 8</td>
<td>VO</td>
<td></td>
<td></td>
</tr>
<tr>
<td>1 Mullion Storage Kit</td>
<td>MT54</td>
<td></td>
<td>VO</td>
<td></td>
<td></td>
</tr>
<tr>
<td>1 Rim-Type Exit/Panic</td>
<td>CDSI AX PA 99L-NL x 110NL</td>
<td>626</td>
<td>VO</td>
<td></td>
<td></td>
</tr>
<tr>
<td>1 Rim-Type Exit/Panic</td>
<td>CDSI AX PA 99EO</td>
<td>626</td>
<td>VO</td>
<td></td>
<td></td>
</tr>
<tr>
<td>2 Pulls</td>
<td>1185 SO x full height pull (length to be determined by the following: top of pull starts 4&quot; below top of door, bottom of pull 12&quot; AFF) x E x 1 (.5&quot; 630 no insert) x 630.</td>
<td>630</td>
<td>TR</td>
<td></td>
<td></td>
</tr>
<tr>
<td>4 Primus I/C Cylinders</td>
<td>20-757 or 20-763 x appropriate cam x blocking rings as required (rim or mortise type and quantity as required by locking device)</td>
<td>626</td>
<td>SC</td>
<td></td>
<td></td>
</tr>
<tr>
<td>4 Permanent Core</td>
<td>20-740</td>
<td>626</td>
<td>SC</td>
<td></td>
<td></td>
</tr>
<tr>
<td>2 Closer</td>
<td>4040XP EDA</td>
<td>689</td>
<td>LC</td>
<td></td>
<td></td>
</tr>
<tr>
<td>2 Concealed Overhead</td>
<td>1ADJ Series (size -336 or as required by door width)</td>
<td>630</td>
<td>RX</td>
<td></td>
<td></td>
</tr>
<tr>
<td>1 Mullion Seal</td>
<td>5110BL x by Pemko approved equal</td>
<td></td>
<td>PE</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**NOTE 1:** Balance of perimeter seals and meeting stiles by door manufacturer.

**NOTE 2:** Furnish and install all devices and components for hardware groups/set above in accordance with Contract Documents (including but not limited to additional hardware devices required in specifications language above, architectural plans and full specification documents).
## Hardware Group/Set #102

<table>
<thead>
<tr>
<th>Quantity</th>
<th>Item Description</th>
<th>Specification</th>
<th>Notes</th>
</tr>
</thead>
<tbody>
<tr>
<td>2</td>
<td>Electrified Hinge</td>
<td>T4A3386 8-wire (size and quantity per Section 08 71 00)</td>
<td>630 MC</td>
</tr>
<tr>
<td>1</td>
<td>Fioe Rated Keyed Removable Mullion</td>
<td>KR9954 (HM or AL series as required)</td>
<td>SP28 VO</td>
</tr>
<tr>
<td>1</td>
<td>Mullion Storage Kit</td>
<td>MT54</td>
<td>VO</td>
</tr>
<tr>
<td>1</td>
<td>Rim-Type Exit/Panic Device x Electrified Lever and Key Override</td>
<td>RX AX PA 99L-F x E996L</td>
<td>626 VO</td>
</tr>
<tr>
<td>1</td>
<td>Rim-Type Exit/Panic Device (no exterior trim)</td>
<td>RX AX PA 99EO-F</td>
<td>626 VO</td>
</tr>
<tr>
<td>2</td>
<td>Primus I/C Cylinders (Rim or Mortise)</td>
<td>20-757 or 20-763 x appropriate cam x blocking rings as required (rim or mortise type and quantity as required by locking device)</td>
<td>626 SC</td>
</tr>
<tr>
<td>2</td>
<td>Permanent Core</td>
<td>20-740</td>
<td>626 SC</td>
</tr>
<tr>
<td>2</td>
<td>Closer</td>
<td>4040XP EDA</td>
<td>689 LC</td>
</tr>
<tr>
<td>2</td>
<td>Kick Plate</td>
<td>KO050 10&quot; tall x 2&quot; LDW (less door width) x B4E (beveled edges) x counter sunk where door allows</td>
<td>630 TR</td>
</tr>
<tr>
<td>2</td>
<td>Stop</td>
<td>1270CVPV</td>
<td>626 TR</td>
</tr>
<tr>
<td>1</td>
<td>Mullion Seal</td>
<td>5110BL</td>
<td>PE</td>
</tr>
<tr>
<td>1</td>
<td>Power Supplies</td>
<td>PS902</td>
<td>VO</td>
</tr>
<tr>
<td>2</td>
<td>Request to Exit Device (see free egress note in above specifications)</td>
<td>Specified in above locking hardware (coordinate with Divisions 25-28 and applicable drawings)</td>
<td></td>
</tr>
<tr>
<td>2</td>
<td>Door Position Switch (also known as Alarm Contacts)</td>
<td>Prep/Template door and frame only if DPS devices are specified by security (coordinate door and frame preparation/templates for DPS devices ordered and installed by Divisions 25-28 and applicable drawings)</td>
<td></td>
</tr>
<tr>
<td>1</td>
<td>Coordinate with existing electrical: At interior-side of building furnish and install single-gang, keyswitch as required so that it &quot;locks down&quot; perimeter of this door to meet CBC Sections 1010.1.9 through 1010.1.11.</td>
<td>#653-14 DPDT maintained single direction x SF-626 by Locknetics manufacturing. In case of emergency as described in CBC Sections 1010.1.9 through 1010.1.11 coordinate and verify key-switch #653-14 DPDT shall drop power locking system (part of system to lock exterior-side of doors without going outside to lock the door).</td>
<td></td>
</tr>
<tr>
<td>1</td>
<td>Cylinder and Keying for Electrified On-Off Keyswitch</td>
<td>20-757 or 20-763 x appropriate cam x blocking rings as required (rim or mortise type and quantity as required by locking device)</td>
<td>626 SC</td>
</tr>
<tr>
<td>1</td>
<td>Electrified On-Off Keyswitch Permanent Core</td>
<td>20-740</td>
<td>626 SC</td>
</tr>
</tbody>
</table>

By electrical as required per Contract Documents:
- Coordinate with electrical design for locations and wire/connectivity scope (non-Section 08 71 00 scope, see Divisions 25-28 and applicable drawings).
| (including but not limited to wire / connectivity from ground or ceiling through frame to electrified devices) | - Coordinate with single gang, electrical keyed cylinders to meet CBC Sections 1010.1.9 through 1010.1.11 systems (lock down operation from interior). |

**NOTE 1** – coordination for interior two-way switch on/off station to lock down doors: During building emergency, an interior, two-way switch on/off station is to be provided to drop power to locking doors for no entrance into building by un-authorized occupants (coordinate integration with power supplies and auto operator system). Coordinate with Electrical/Security Divisions 25-28 and applicable plans.

**NOTE 2:** Furnish scope in accordance with Contract Documents. Tasks/scope for painting when Section 08 71 00 hardware s adjacent to painted areas, doors or frames includes uninstalling hardware, painting/finish as required by other scope, then reinstall hardware according to manufacturer’s original warranties and recommendations.
<table>
<thead>
<tr>
<th>Description</th>
<th>Model/Description</th>
<th>Quantity</th>
<th>Type</th>
</tr>
</thead>
<tbody>
<tr>
<td>2 Ea. Electric Hinge</td>
<td>T4A3386 8-wire (size and quantity per Section 08 71 00)</td>
<td>630</td>
<td>MC</td>
</tr>
<tr>
<td>1 Ea. Fire Rated Keyed Removable Mullion</td>
<td>KR9954 (HM or AL series as required)</td>
<td>SP2</td>
<td>VO</td>
</tr>
<tr>
<td>1 Ea. Mullion Storage Kit</td>
<td>MT54</td>
<td></td>
<td>VO</td>
</tr>
<tr>
<td>1 Ea. Rim-Type Exit/Panic Device x Electrified Lever and Key Override</td>
<td>RX AX PA 99L-F x E996L</td>
<td>626</td>
<td>VO</td>
</tr>
<tr>
<td>1 Ea. Rim-Type Exit/Panic Device (no exterior trim)</td>
<td>RX AX PA 99EO-F</td>
<td>626</td>
<td>VO</td>
</tr>
<tr>
<td>2 Ea. Primus I/C Cylinders (Rim or Mortise)</td>
<td>20-757 or 20-763 x appropriate cam x blocking rings as required (rim or mortise type and quantity as required by locking device)</td>
<td>626</td>
<td>SC</td>
</tr>
<tr>
<td>2 Ea. Permanent Core</td>
<td>20-740</td>
<td>626</td>
<td>SC</td>
</tr>
<tr>
<td>1 Ea. RHR Door: Closer</td>
<td>4040XP CUSH</td>
<td>689</td>
<td>LC</td>
</tr>
<tr>
<td>1 Ea. LHR Door: Closer</td>
<td>4040XP EDA</td>
<td>689</td>
<td>LC</td>
</tr>
<tr>
<td>2 Ea. Kick Plate</td>
<td>KO050 10&quot; tall x 2&quot; LDW (less door width) x B4E (beveled edges) x counter sunk where door allows</td>
<td>630</td>
<td>TR</td>
</tr>
<tr>
<td>1 Ea. LHR Door: Stop</td>
<td>1270CVPV</td>
<td>626</td>
<td>TR</td>
</tr>
<tr>
<td>1 Ea. Mullion Seal</td>
<td>5110BL</td>
<td></td>
<td>PE</td>
</tr>
<tr>
<td>1 Ea. Power Supplies</td>
<td>PS902</td>
<td></td>
<td>VO</td>
</tr>
<tr>
<td>2 Ea. Request to Exit Device (see free egress note in above specifications)</td>
<td>Specified in above locking hardware (coordinate with Divisions 25-28 and applicable drawings).</td>
<td></td>
<td></td>
</tr>
<tr>
<td>2 Ea. Door Position Switch (also known as Alarm Contacts)</td>
<td>Prep/Template door and frame only if DPS devices are specified by security (coordinate door and frame preparation/templates for DPS devices ordered and installed by Divisions 25-28 and applicable drawings)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>1 Ea. Coordinate with existing electrical: At interior-side of building furnish and install single-gang, keyswitch as required so that it &quot;locks down&quot; perimeter of this door to meet CBC Sections 1010.1.9 through 1010.1.11.</td>
<td>#653-14 DPDT maintained single direction x SF-626 by Locknetics manufacturing. In case of emergency as described in CBC Sections 1010.1.9 through 1010.1.11 coordinate and verify key-switch #653-14 DPDT shall drop power locking system (part of system to lock exterior-side of doors without going outside to lock the door).</td>
<td></td>
<td></td>
</tr>
<tr>
<td>1 Ea. Cylinder and Keying for Electrified On-Off Keyswitch</td>
<td>20-757 or 20-763 x appropriate cam x blocking rings as required (rim or mortise type and quantity as required by locking device)</td>
<td>626</td>
<td>SC</td>
</tr>
<tr>
<td>1 Ea. Electrified On-Off Keyswch Permanent Core</td>
<td>20-740</td>
<td>626</td>
<td>SC</td>
</tr>
<tr>
<td>1 Ea. Coordinate with electrical for locations and additional non-Section</td>
<td>By electrical as required per Contract Documents:</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>- Coordinate with electrical design for locations and additional non-Section</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
| 08 71 00 scope (including but not limited to wire/connectivity from ground or ceiling through frame to electrified devices) | wire/connectivity scope (non-Section 08 71 13, see Divisions 25-28 and applicable drawings).  
- Coordinate with single gang, electrical keyed cylinders to meet CBC Sections 1010.1.9 through 1010.1.11 systems (lock down operation from interior). |
<table>
<thead>
<tr>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>1 Ea.</td>
<td>Threshold</td>
</tr>
<tr>
<td></td>
<td>Threshold #2749A x 2749A special 16&quot; wide (welded Pemko based per special detail) x wrap frame stops x beveled miter ends per specifications x mastic per specifications x by Pemko approved equal</td>
</tr>
</tbody>
</table>

**NOTE 1** – coordination for interior two-way switch on/off station to lock down doors: During building emergency, an interior, two-way switch on/off station is to be provided to drop power to locking doors for no entrance into building by un-authorized occupants (coordinate integration with power supplies and auto operator system). Coordinate with Electrical/Security Divisions 25-28 and applicable plans.

**NOTE 2:** Furnish scope in accordance with Contract Documents. Tasks/scope for painting when Sections 08 71 00 hardware s adjacent to painted areas, doors or frames includes uninstalling hardware, painting/finish as required by other scope, then reinstall hardware according to manufacturer’s original warranties and recommendations.
<table>
<thead>
<tr>
<th>Hardware Group/Set #104</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>- Ea.</strong></td>
</tr>
<tr>
<td><strong>1 Ea.</strong></td>
</tr>
<tr>
<td><strong>1 Ea.</strong></td>
</tr>
<tr>
<td><strong>1 Ea.</strong></td>
</tr>
<tr>
<td><strong>1 Ea.</strong></td>
</tr>
<tr>
<td><strong>1 Ea.</strong></td>
</tr>
<tr>
<td><strong>1 Ea.</strong></td>
</tr>
<tr>
<td><strong>1 Ea.</strong></td>
</tr>
<tr>
<td><strong>1 Ea.</strong></td>
</tr>
</tbody>
</table>
| **1 Ea.** | Seals | Provide seals at head and jambs:  
- If frame is hollow metal, furnish S88D seals (head and jambs) by Pemko or approved seal manufacturer.  
- If frame is aluminum, then seals are to be furnished by aluminum frame manufacturer (for sound dampening if non-rated opening) | | |
| **1 Ea.** | Request to Exit Device (see free egress note in above specifications) | Specified in above locking hardware (coordinate with Divisions 25-28 and applicable drawings). | | |
| **1 Ea.** | Door Position Switch (also known as Alarm Contacts) | Prep/Template door and frame only if DPS devices are specified by security (coordinate door and frame preparation/templates for DPS devices ordered and installed by Divisions 25-28 and applicable drawings) | | |
| **1 Ea.** | Coordinate with electrical for locations and additional non-Section 08 71 00 scope (including but not limited to wire / connectivity from ground or ceiling through frame to electrified devices) | By electrical as required per Contract Documents:  
- Coordinate with electrical design for locations and wire/connectivity scope (non-Section 08 71 13, see Divisions 25-28 and applicable drawings).  
- Coordinate with electrical to meet CBC Sections 1010.1.9 through 1010.1.11 systems (lock down operation from interior). | | |
NOTE 1 – coordination for interior two-way switch on/off station to lock down doors: During building emergency, an interior, two-way switch on/off station is to be provided to drop power to locking doors for no entrance into building by un-authorized occupants (coordinate integration with power supplies and auto operator system). Coordinate with Electrical/Security Divisions 25-28 and applicable plans.

NOTE 2: Furnish scope in accordance with Contract Documents. Tasks/scope for painting when Section 08 71 00 hardware is adjacent to painted areas, doors or frames includes uninstalling hardware, painting/finish as required by other scope, then reinstall hardware according to manufacturer's original warranties and recommendations.

### Hardware Group/Set #105

<table>
<thead>
<tr>
<th>EA.</th>
<th>Item</th>
<th>Description</th>
<th>Unit</th>
<th>Notes</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Hinge</td>
<td>T4A3386 (size and quantity per Section 08 71 00)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>1</td>
<td>Electrified Hinge</td>
<td>T4A3386 8-wire NRP (size and quantity per 08 7100)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>1</td>
<td>Electrified Lockset</td>
<td>L9092T EU x 17A RX</td>
<td></td>
<td></td>
</tr>
<tr>
<td>1</td>
<td>Power Supply Task</td>
<td>Furnish &amp; install #1 single gang power drop located above or near door (not in corridor or public view, but above ceiling line where possible); #2 provide power supply #BPS-24-2 x Securitron manufacturing; #3 run conduit from middle hinge through frame &amp; complete wiring as required to meet manufacturer warranties (locks, hinges &amp; power supply manufacturer warranty).</td>
<td></td>
<td></td>
</tr>
<tr>
<td>1</td>
<td>Primus I/C Cylinders</td>
<td>20-757 or 20-763 x appropriate cam x blocking rings as required (rim or mortise type and quantity as required by locking device)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>1</td>
<td>Permanent Core</td>
<td>20-740</td>
<td></td>
<td></td>
</tr>
<tr>
<td>1</td>
<td>Closer</td>
<td>4040XP x EDA (installed push-side of door if door swings out) or 4040XP REG (installed pull-side of door if door swings in)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>1</td>
<td>Kick Plate</td>
<td>KO0050 10&quot; tall x 2&quot; LDW (less door width) x B4E (beveled edges) x counter sunk where door allows</td>
<td></td>
<td></td>
</tr>
<tr>
<td>1</td>
<td>Stop</td>
<td>1214</td>
<td></td>
<td></td>
</tr>
<tr>
<td>1</td>
<td>Seals</td>
<td>Provide seals at head and jambs:</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>- If frame is hollow metal, furnish S88D seals (head and jambs) by Pemko or approved seal manufacturer.</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>- If frame is aluminum, then seals are to be furnished by aluminum frame manufacturer (for sound dampening if non-rated opening)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>1</td>
<td>Exit Device</td>
<td>Specified in above locking hardware (coordinate with Divisions 25-28 and applicable drawings).</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>(see free egress note in above specifications)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>1</td>
<td>Door Position Switch</td>
<td>Prep/Template door and frame only if DPS devices are specified by security (coordinate door and frame preparation/templates for DPS devices ordered and installed by Divisions 25-28 and applicable drawings)</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>(also known as Alarm Contacts)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>1</td>
<td>Coordinate with electrical for locations and additional non-Section 08 71 00 scope (including but not limited)</td>
<td>By electrical as required per Contract Documents:</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Coordinate with electrical design for locations and wire/connectivity scope (non-Section 08 71 13, see Divisions 25-28 and applicable drawings).</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>to wire / connectivity from ground or ceiling through frame to electrified devices</td>
<td>Coordinate with electrical to meet CBC Sections 1010.1.9 through 1010.1.11 systems (lock down operation from interior).</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**NOTE 1** – coordination for interior two-way switch on/off station to lock down doors: During building emergency, an interior, two-way switch on/off station is to be provided to drop power to locking doors for no entrance into building by unauthorized occupants (coordinate integration with power supplies and auto operator system). Coordinate with Electrical/Security Divisions 25-28 and applicable plans.

**NOTE 2:** Furnish scope in accordance with Contract Documents. Tasks/scope for painting when Section 08 71 00 hardware is adjacent to painted areas, doors or frames includes uninstalling hardware, painting/finish as required by other scope, then reinstall hardware according to manufacturer's original warranties and recommendations.
<table>
<thead>
<tr>
<th>Item</th>
<th>Description</th>
<th>Specification</th>
<th>Location</th>
<th>Code</th>
</tr>
</thead>
<tbody>
<tr>
<td>1 Ea.</td>
<td>Hinge</td>
<td>T4A3386 (size and quantity per Section 08 71 00)</td>
<td>630</td>
<td>MC</td>
</tr>
<tr>
<td>1 Ea.</td>
<td>Electrified Hinge</td>
<td>T4A3386 8-wire NRP (size and quantity per 08 7100)</td>
<td>630</td>
<td>MC</td>
</tr>
<tr>
<td>1 Ea.</td>
<td>Electrified Lockset</td>
<td>L9092T EU x 17A RX</td>
<td>630</td>
<td>SC</td>
</tr>
<tr>
<td>1 Ea.</td>
<td>Power Supply Task</td>
<td>Furnish &amp; install #1) single gang power drop located above or near door (not in corridor or public view, but above ceiling line where possible); #2) provide power supply #BPS-24-2 x Securitron manufacturing; #3) run conduit from middle hinge through frame &amp; complete wiring as required to meet manufacturer warranties (locks, hinges &amp; power supply manufacturer warranty).</td>
<td></td>
<td></td>
</tr>
<tr>
<td>1 Ea.</td>
<td>Primus I/C Cylinders (Rim or Mortise)</td>
<td>20-757 or 20-763 x appropriate cam x blocking rings as required (rim or mortise type and quantity as required by locking device)</td>
<td>626</td>
<td>SC</td>
</tr>
<tr>
<td>1 Ea.</td>
<td>Permanent Core</td>
<td>20-740</td>
<td>626</td>
<td>SC</td>
</tr>
<tr>
<td>1 Ea.</td>
<td>Closer</td>
<td>4040XP REG x special back to back template with 1ADJ or equal concealed overhead stop</td>
<td>689</td>
<td>LC</td>
</tr>
<tr>
<td>1 Ea.</td>
<td>Overhead Stop</td>
<td>1ADJ series (sized -336 or as required by door width)</td>
<td>630</td>
<td>RX</td>
</tr>
<tr>
<td>1 Ea.</td>
<td>Kick Plate</td>
<td>KO050 10&quot; tall x 2&quot; LDW (less door width) x B4E (beveled edges) x counter sunk where door allows</td>
<td>630</td>
<td>TR</td>
</tr>
<tr>
<td>1 Ea.</td>
<td>Seals</td>
<td>Provide seals at head and jambs: - If frame is hollow metal, furnish S88D seals (head and jambs) by Pemko or approved seal manufacturer. - If frame is aluminum, then seals are to be furnished by aluminum frame manufacturer (for sound dampening if non-rated opening)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>1 Ea.</td>
<td>Request to Exit Device (see free egress note in above specifications)</td>
<td>Specified in above locking hardware (coordinate with Divisions 25-28 and applicable drawings).</td>
<td></td>
<td></td>
</tr>
<tr>
<td>1 Ea.</td>
<td>Door Position Switch (also known as Alarm Contacts)</td>
<td>Prep/Template door and frame only if DPS devices are specified by security (coordinate door and frame preparation/templates for DPS devices ordered and installed by Divisions 25-28 and applicable drawings)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>1 Ea.</td>
<td>Coordinate with electrical for locations and additional non-Section 08 71 00 scope (including but not limited to wire / connectivity from ground or ceiling through frame to electrified devices)</td>
<td>By electrical as required per Contract Documents: - Coordinate with electrical design for locations and wire/connectivity scope (non-Section 08 71 13, see Divisions 25-28 and applicable drawings). - Coordinate with electrical to meet CBC Sections 1010.1.9 through 1010.1.11 systems (lock down operation from interior).</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
NOTE 1 – coordination for interior two-way switch on/off station to lock down doors: During building emergency, an interior, two-way switch on/off station is to be provided to drop power to locking doors for no entrance into building by un-authorized occupants (coordinate integration with power supplies and auto operator system). Coordinate with Electrical/Security Divisions 25-28 and applicable plans.

NOTE 2: Furnish scope in accordance with Contract Documents. Tasks/scope for painting when Section 08 71 00 hardware s adjacent to painted areas, doors or frames includes uninstalling hardware, painting/finish as required by other scope, then reinstall hardware according to manufacturer’s original warranties and recommendations.

<table>
<thead>
<tr>
<th>Hardware Group/Set #107</th>
</tr>
</thead>
<tbody>
<tr>
<td>- Ea. Hinge</td>
</tr>
<tr>
<td>1 Ea. Electrified Hinge</td>
</tr>
<tr>
<td>1 Ea. Electrified Lockset</td>
</tr>
<tr>
<td>1 Ea. Power Supply Task</td>
</tr>
<tr>
<td>1 Ea. Primus I/C Cylinders (Rim or Mortise)</td>
</tr>
<tr>
<td>1 Ea. Permanent Core</td>
</tr>
<tr>
<td>1 Ea. Closer x Stop Arm</td>
</tr>
<tr>
<td>1 Ea. Kick Plate</td>
</tr>
<tr>
<td>1 Ea. Seals</td>
</tr>
<tr>
<td></td>
</tr>
<tr>
<td></td>
</tr>
<tr>
<td>1 Ea. Surface Applied Seal</td>
</tr>
<tr>
<td>1 Ea. Auto Door Bottom (sound dampening)</td>
</tr>
<tr>
<td>1 Ea. Thermal Break Threshold</td>
</tr>
<tr>
<td>1 Ea. Request to Exit Device (see free egress note in above specifications)</td>
</tr>
<tr>
<td>1 Ea. Door Position Switch (also known as Alarm)</td>
</tr>
<tr>
<td></td>
</tr>
<tr>
<td>---</td>
</tr>
<tr>
<td>1</td>
</tr>
</tbody>
</table>

**NOTE 1** – coordination for interior two-way switch on/off station to lock down doors: During building emergency, an interior, two-way switch on/off station is to be provided to drop power to locking doors for no entrance into building by un-authorized occupants (coordinate integration with power supplies and auto operator system). Coordinate with Electrical/Security Divisions 25-28 and applicable plans.

**NOTE 2:** Furnish scope in accordance with Contract Documents. Tasks/scope for painting when Section 08 71 00 hardware s adjacent to painted areas, doors or frames includes uninstalling hardware, painting/finish as required by other scope, then reinstall hardware according to manufacturer’s original warranties and recommendations.

### Hardware Group/Set #108

<table>
<thead>
<tr>
<th></th>
<th>Description</th>
<th>Specifications</th>
<th>Quantity</th>
<th>Status</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Primus I/C Cylinders (Rim or Mortise)</td>
<td>20-757 or 20-763 x appropriate cam x blocking rings as required (rim or mortise type and quantity as required by locking device)</td>
<td>626</td>
<td>SC</td>
</tr>
<tr>
<td>1</td>
<td>Permanent Core</td>
<td>20-740</td>
<td>626</td>
<td>SC</td>
</tr>
</tbody>
</table>

**NOTE 1:** For doors/openings assigned this hardware group/set, the cylinder is for unit-type pricing. At each opening assigned this hardware group/set, provide final keying as required per locking and/or key control devices. Examples include, but are not limited to, rolling gates or coiling door locking devices and/or control switches that activate or control the on/off switches).

**NOTE 2:** Furnish all devices and components for hardware groups/set above in accordance with Contract Documents including, but not limited to, notes below, additional hardware devices requirements in the above specification language, architectural plans, and full specification documents.
# Hardware Group/Set #109

<table>
<thead>
<tr>
<th>Ea.</th>
<th>Hinge</th>
<th>Description</th>
<th>Unit Count</th>
<th>Location</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Classroom-Type Lockset</td>
<td>L9071T 17A</td>
<td>626</td>
<td>MA</td>
</tr>
<tr>
<td>2</td>
<td>I/C Cylinders (Rim or Mortise)</td>
<td>20-757 or 20-763 x appropriate cam x blocking rings as required (rim or mortise type and quantity as required by locking device)</td>
<td>626</td>
<td>SC</td>
</tr>
<tr>
<td>2</td>
<td>Permanent Core</td>
<td>20-740</td>
<td>626</td>
<td>SC</td>
</tr>
<tr>
<td>1</td>
<td>Surface Closer</td>
<td>4040XP EDA (installed push-side of door if door swings out) or 4040XP REG (installed pull-side of door if door swings in)</td>
<td>689</td>
<td>LC</td>
</tr>
<tr>
<td>1</td>
<td>Kick Plate</td>
<td>KO050 10&quot; tall x 2&quot; LDW (less door width) x B4E (beveled edges) x counter sunk where door allows</td>
<td>630</td>
<td>TR</td>
</tr>
<tr>
<td>1</td>
<td>Mop Plate (inswing doors only)</td>
<td>KM050 6&quot; tall x 1&quot; LDW (less door width) x B4E (beveled edges) x counter sunk where door allows</td>
<td>630</td>
<td>TR</td>
</tr>
<tr>
<td>1</td>
<td>Stop</td>
<td>1270CV</td>
<td>626</td>
<td>TR</td>
</tr>
<tr>
<td>1</td>
<td>Seal (sound dampening)</td>
<td>Provide seals at head and jambs:</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>- If frame is hollow metal, furnish S773D seals (head and jambs) by Pemko or approved seal manufacturer.</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>- If frame is aluminum, then seals are to be furnished by aluminum frame manufacturer (for sound dampening if non-rated opening)</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

NOTE: Furnish all devices and components for hardware groups/set above in accordance with Contract Documents including, but not limited to, additional hardware devices requirements in the above specification language, architectural plans, and full specification documents.

# Hardware Group/Set #110

<table>
<thead>
<tr>
<th>Ea.</th>
<th>Hinge</th>
<th>Description</th>
<th>Unit Count</th>
<th>Location</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Classroom-Type Lockset</td>
<td>L9071T 17A</td>
<td>626</td>
<td>SC</td>
</tr>
<tr>
<td>2</td>
<td>I/C Cylinders (Rim or Mortise)</td>
<td>20-757 or 20-763 x appropriate cam x blocking rings as required (rim or mortise type and quantity as required by locking device)</td>
<td>626</td>
<td>SC</td>
</tr>
<tr>
<td>2</td>
<td>Permanent Core</td>
<td>20-740</td>
<td>626</td>
<td>SC</td>
</tr>
<tr>
<td>1</td>
<td>Closer</td>
<td>4040XP REG x special back to back template with 1ADJ or equal concealed overhead stop</td>
<td>689</td>
<td>LC</td>
</tr>
<tr>
<td>1</td>
<td>Overhead Stop</td>
<td>1ADJ series (sized -336 or as required by door width)</td>
<td>630</td>
<td>RX</td>
</tr>
<tr>
<td>1</td>
<td>Kick Plate</td>
<td>KO050 10&quot; tall x 2&quot; LDW (less door width) x B4E (beveled edges) x counter sunk where door allows</td>
<td>630</td>
<td>TR</td>
</tr>
<tr>
<td>1</td>
<td>Mop Plate (inswing doors only)</td>
<td>KM050 6&quot; tall x 1&quot; LDW (less door width) x B4E (beveled edges) x counter sunk where door allows</td>
<td>630</td>
<td>TR</td>
</tr>
<tr>
<td>1</td>
<td>Seal (sound dampening)</td>
<td>Provide seals at head and jambs:</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>- If frame is hollow metal, furnish S773D seals (head and jambs) by Pemko or approved seal manufacturer.</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>- If frame is aluminum, then seals are to be furnished by aluminum frame manufacturer (for sound dampening if non-rated opening)</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
NOTE: Furnish all devices and components for hardware groups/set above in accordance with Contract Documents including, but not limited to, additional hardware devices requirements in the above specification language, architectural plans, and full specification documents.

<table>
<thead>
<tr>
<th>Hardware Group/Set #111</th>
<th>Ea.</th>
<th>Item</th>
<th>Description</th>
<th>Code</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>Hinge</td>
<td>T4A3386 (size and quantity per Section 08 71 00)</td>
<td>630</td>
</tr>
<tr>
<td>1</td>
<td>Ea.</td>
<td>Privacy x Occupancy Indicator</td>
<td>L9456T x 17A #L283-722, interior ADA large thumbturn and exterior side emergency cylinder/key override with Occupancy Indicator</td>
<td>626</td>
</tr>
<tr>
<td></td>
<td></td>
<td>I/C Cylinders (Rim or Mortise)</td>
<td>20-757 or 20-763 x appropriate cam x blocking rings as required (rim or mortise type and quantity as required by locking device)</td>
<td>626</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Permanent Core</td>
<td>20-740</td>
<td>626</td>
</tr>
<tr>
<td>1</td>
<td>Ea.</td>
<td>Surface Closer</td>
<td>4040XP EDA (installed push-side of door if door swings out) or 4040XP REG (installed pull-side of door if door swings in)</td>
<td>689</td>
</tr>
<tr>
<td>1</td>
<td>Ea.</td>
<td>Kick Plate</td>
<td>KO050 10&quot; tall x 2&quot; LDW (less door width) x B4E (beveled edges) x counter sunk where door allows</td>
<td>630</td>
</tr>
<tr>
<td>1</td>
<td>Ea.</td>
<td>Mop Plate (inwing doors only)</td>
<td>KM050 6&quot; tall x 1&quot; LDW (less door width) x B4E (beveled edges) x counter sunk where door allows</td>
<td>630</td>
</tr>
<tr>
<td>1</td>
<td>Ea.</td>
<td>Stop</td>
<td>1270CV</td>
<td>626</td>
</tr>
</tbody>
</table>

NOTE: Furnish all devices and components for hardware groups/set above in accordance with Contract Documents including, but not limited to, additional hardware devices requirements in the above specification language, architectural plans, and full specification documents.
### Hardware Group/Set #112

<table>
<thead>
<tr>
<th>Ea.</th>
<th>Hinge</th>
<th>Details</th>
<th>Quantity</th>
<th>Code</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Classroom-Type Lockset</td>
<td>L9071T 17A</td>
<td>626</td>
<td>MA</td>
</tr>
<tr>
<td>2</td>
<td>I/C Cylinders (Rim or Mortise)</td>
<td>20-757 or 20-763 x appropriate cam x blocking rings as required (rim or mortise type and quantity as required by locking device)</td>
<td>626</td>
<td>SC</td>
</tr>
<tr>
<td>2</td>
<td>Permanent Core</td>
<td>20-740</td>
<td>626</td>
<td>SC</td>
</tr>
<tr>
<td>1</td>
<td>Surface Closer</td>
<td>4040XP EDA (installed push-side of door if door swings out) or 4040XP REG (installed pull-side of door if door swings in)</td>
<td>689</td>
<td>LC</td>
</tr>
<tr>
<td>1</td>
<td>Kick Plate</td>
<td>KO050 10&quot; tall x 2&quot; LDW (less door width) x B4E (beveled edges) x counter sunk where door allows</td>
<td>630</td>
<td>TR</td>
</tr>
<tr>
<td>1</td>
<td>Stop</td>
<td>1270CV</td>
<td>626</td>
<td>TR</td>
</tr>
<tr>
<td>1</td>
<td>Seal</td>
<td>Provide seals at head and jambs:</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>- If frame is hollow metal, furnish S773D seals (head and jambs) by Pemko or approved seal manufacturer.</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>- If frame is aluminum, then seals are to be furnished by aluminum frame manufacturer (for sound dampening if non-rated opening)</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**NOTE:** Furnish all devices and components for hardware groups/set above in accordance with Contract Documents including, but not limited to, additional hardware devices requirements in the above specification language, architectural plans, and full specification documents.

### Hardware Group/Set #113

<table>
<thead>
<tr>
<th>Ea.</th>
<th>Hinge</th>
<th>Details</th>
<th>Quantity</th>
<th>Code</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Push Plate</td>
<td>1001-3-20&quot; x custom 20&quot; high plate (total size 4&quot; wide x 20&quot; tall) x CuVerro Bactericidal Copper in 630 base and stainless colored finish (samples required per above)</td>
<td>TR</td>
<td></td>
</tr>
<tr>
<td>1</td>
<td>Pull plate</td>
<td>1017-3 x CuVerro Bactericidal Copper in 630 base and stainless colored finish (samples required per above)</td>
<td>TR</td>
<td></td>
</tr>
<tr>
<td>1</td>
<td>Surface Closer</td>
<td>4040XP EDA (installed push-side of door if door swings out) or 4040XP REG (installed pull-side of door if door swings in)</td>
<td>689</td>
<td>LC</td>
</tr>
<tr>
<td>1</td>
<td>Kick Plate</td>
<td>KO050 10&quot; tall x 2&quot; LDW (less door width) x B4E (beveled edges) x counter sunk where door allows</td>
<td>630</td>
<td>TR</td>
</tr>
<tr>
<td>1</td>
<td>Mop Plate</td>
<td>KM050 10&quot; tall x 1&quot; LDW (less door width) x B4E (beveled edges) x counter sunk where door allows</td>
<td>630</td>
<td>TR</td>
</tr>
<tr>
<td>1</td>
<td>Floor Stop</td>
<td>1209</td>
<td>626</td>
<td>TR</td>
</tr>
<tr>
<td>1</td>
<td>Seal (sound dampening)</td>
<td>Provide seals at head and jambs:</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>- If frame is hollow metal, furnish S773D seals (head and jambs) by Pemko or approved seal manufacturer.</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>- If frame is aluminum, then seals are to be furnished by aluminum frame manufacturer (for sound dampening if non-rated opening)</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

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Contract Documents including, but not limited to, additional hardware devices requirements in the above specification language, architectural plans, and full specification documents.

### Hardware Group/Set #114

<table>
<thead>
<tr>
<th>Ea.</th>
<th>Hinge</th>
<th>Description</th>
<th>Quantity/Measurements</th>
<th>Unit</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Classroom-Type Lockset</td>
<td>T4A3386 (size and quantity per Section 08 71 00)</td>
<td>630 MC</td>
<td></td>
</tr>
<tr>
<td>2</td>
<td>I/C Cylinders (Rim or Mortise)</td>
<td>L9071T 17A</td>
<td>626 MA</td>
<td></td>
</tr>
<tr>
<td>2</td>
<td>Permanent Core</td>
<td>20-740</td>
<td>626 SC</td>
<td></td>
</tr>
<tr>
<td>1</td>
<td>Kick Plate</td>
<td>KO050 10&quot; tall x 2&quot; LDW (less door width) x B4E (beveled edges) x counter sunk where door allows</td>
<td>630 TR</td>
<td></td>
</tr>
<tr>
<td>1</td>
<td>Stop</td>
<td>1270CV</td>
<td>626 TR</td>
<td></td>
</tr>
<tr>
<td>1</td>
<td>Seal (sound dampening)</td>
<td>Provide seals at head and jambs:</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>- If frame is hollow metal, furnish S773D seals (head and jambs) by Pemko or approved seal manufacturer.</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>- If frame is aluminum, then seals are to be furnished by aluminum frame manufacturer (for sound dampening if non-rated opening)</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

NOTE: Furnish all devices and components for hardware groups/set above in accordance with Contract Documents including, but not limited to, additional hardware devices requirements in the above specification language, architectural plans, and full specification documents.

### Hardware Group/Set #115

<table>
<thead>
<tr>
<th>Ea.</th>
<th>Hinge</th>
<th>Description</th>
<th>Quantity/Measurements</th>
<th>Unit</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Classroom-Type Lockset</td>
<td>T4A3386 (size and quantity per Section 08 71 00)</td>
<td>630 MC</td>
<td></td>
</tr>
<tr>
<td>2</td>
<td>I/C Cylinders (Rim or Mortise)</td>
<td>L9071T 17A</td>
<td>626 MA</td>
<td></td>
</tr>
<tr>
<td>2</td>
<td>Permanent Core</td>
<td>20-740</td>
<td>626 SC</td>
<td></td>
</tr>
<tr>
<td>1</td>
<td>Overhead Stop</td>
<td>9ADJ series (sized -336 or as required by door width)</td>
<td>630 RX</td>
<td></td>
</tr>
<tr>
<td>1</td>
<td>Kick Plate</td>
<td>KO050 10&quot; tall x 2&quot; LDW (less door width) x B4E (beveled edges) x counter sunk where door allows</td>
<td>630 TR</td>
<td></td>
</tr>
<tr>
<td>1</td>
<td>Mop Plate</td>
<td>KM050 10&quot; tall x 1&quot; LDW (less door width) x B4E (beveled edges) x counter sunk where door allows</td>
<td>630 TR</td>
<td></td>
</tr>
<tr>
<td>1</td>
<td>Seal (sound dampening)</td>
<td>Provide seals at head and jambs:</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>- If frame is hollow metal, furnish S773D seals (head and jambs) by Pemko or approved seal manufacturer.</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>- If frame is aluminum, then seals are to be furnished by aluminum frame manufacturer (for sound dampening if non-rated opening)</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

NOTE: Furnish all devices and components for hardware groups/set above in accordance with Contract Documents including, but not limited to, additional hardware devices requirements in the above specification language, architectural plans, and full specification documents.
## Hardware Group/Set #116

<table>
<thead>
<tr>
<th>Ea.</th>
<th>Hinge</th>
<th>Description</th>
<th>Price</th>
<th>Code</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Storeroom-Type Lockset</td>
<td>L9080T 06A</td>
<td>630</td>
<td>MC</td>
</tr>
<tr>
<td>1</td>
<td>I/C Cylinders (Rim or Mortise)</td>
<td>20-757 or 20-763 x appropriate cam x blocking rings as required (rim or mortise type and quantity as required by locking device)</td>
<td>626</td>
<td>SC</td>
</tr>
<tr>
<td>1</td>
<td>Permanent Core</td>
<td>20-740</td>
<td>626</td>
<td>SC</td>
</tr>
<tr>
<td>1</td>
<td>Surface Closer</td>
<td>4040XP CUSH arm desired unless doors swings into room (install CUSH stop arm push-side of door if door swings out) or 4040XP REG (installed pull-side of door if door swings in)</td>
<td>689</td>
<td>LC</td>
</tr>
<tr>
<td>1</td>
<td>Kick Plate</td>
<td>KO050 10&quot; tall x 2&quot; LDW (less door width) x B4E (beveled edges) x counter sunk where door allows</td>
<td>630</td>
<td>TR</td>
</tr>
<tr>
<td>1</td>
<td>Stop (at inswinging doors only)</td>
<td>1214</td>
<td>626</td>
<td>TR</td>
</tr>
</tbody>
</table>

1 Ea. Seal

Provide seals at head and jambs:
- If frame is hollow metal, furnish S88D seals (head and jambs) by Pemko or approved seal manufacturer.
- If frame is aluminum, then seals are to be furnished by aluminum frame manufacturer (for sound dampening if non-rated opening).

**NOTE:** Furnish all devices and components for hardware groups/set above in accordance with Contract Documents including, but not limited to, additional hardware device requirements in the above specification language, architectural plans, and full specification documents.

## Hardware Group/Set #117

<table>
<thead>
<tr>
<th>Ea.</th>
<th>Hinge</th>
<th>Description</th>
<th>Price</th>
<th>Code</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Classroom-Type Lockset</td>
<td>L9071T 17A</td>
<td>630</td>
<td>MC</td>
</tr>
<tr>
<td>2</td>
<td>I/C Cylinders (Rim or Mortise)</td>
<td>20-757 or 20-763 x appropriate cam x blocking rings as required (rim or mortise type and quantity as required by locking device)</td>
<td>626</td>
<td>SC</td>
</tr>
<tr>
<td>2</td>
<td>Permanent Core</td>
<td>20-740</td>
<td>626</td>
<td>SC</td>
</tr>
<tr>
<td>1</td>
<td>Surface Closer</td>
<td>4040XP CUSH arm desired unless doors swings into room (install CUSH stop arm push-side of door if door swings out) or 4040XP REG (installed pull-side of door if door swings in)</td>
<td>689</td>
<td>LC</td>
</tr>
<tr>
<td>1</td>
<td>Kick Plate</td>
<td>KO050 10&quot; tall x 2&quot; LDW (less door width) x B4E (beveled edges) x counter sunk where door allows</td>
<td>630</td>
<td>TR</td>
</tr>
<tr>
<td>1</td>
<td>Door Stop</td>
<td>1270CV (provide for doors that swing into rooms where REG arm closer is utilized)</td>
<td>626</td>
<td>TR</td>
</tr>
</tbody>
</table>
| 1   | Seal                      | Provide seals at head and jambs:
- If frame is hollow metal, furnish S88D seals (head and jambs) by Pemko or approved seal manufacturer.
- If frame is aluminum, then seals are to be furnished by aluminum frame manufacturer (for sound dampening if non-rated opening) |
<table>
<thead>
<tr>
<th>Qty</th>
<th>Description</th>
<th>Specification</th>
<th>Cost</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Auto Door Bottom (sound dampening)</td>
<td>411APKL or 420APKL (as required per door material or wood or hollow metal) by Pemko or approved manufacturer.</td>
<td></td>
</tr>
<tr>
<td>1</td>
<td>Threshold (sound dampening)</td>
<td>270A (4&quot; with non-slip groove) or per detail sized to fit the condition x FSL25 by Pemko or approved manufacturer.</td>
<td></td>
</tr>
</tbody>
</table>

**NOTE:** Furnish all devices and components for hardware groups/set above in accordance with Contract Documents including, but not limited to, additional hardware devices requirements in the above specification language, architectural plans, and full specification documents.

### Hardware Group/Set #118

<table>
<thead>
<tr>
<th>Qty</th>
<th>Description</th>
<th>Specification</th>
<th>Cost</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Hinge</td>
<td>TA2314 (size and quantity per Section 08 71 00)</td>
<td>630</td>
</tr>
<tr>
<td>1</td>
<td>Office-Type Lockset</td>
<td>L9050 x #06A lever x L583-363 ADA Large Thumbturn</td>
<td>630</td>
</tr>
<tr>
<td>1</td>
<td>I/C Cylinders (Rim or Mortise)</td>
<td>20-757 or 20-763 x appropriate cam x blocking rings as required (rim or mortise type and quantity as required by locking device)</td>
<td>626</td>
</tr>
<tr>
<td>1</td>
<td>Permanent Core</td>
<td>20-740</td>
<td>626</td>
</tr>
<tr>
<td>1</td>
<td>Kick Plate</td>
<td>KO050 10&quot; tall x 2&quot; LDW (less door width) x B4E (beveled edges) x counter sunk where door allows</td>
<td>630</td>
</tr>
<tr>
<td>1</td>
<td>Door Stop</td>
<td>1270CV</td>
<td>626</td>
</tr>
<tr>
<td>1</td>
<td>Seal (sound dampening)</td>
<td>Provide seals at head and jambs:</td>
<td></td>
</tr>
<tr>
<td></td>
<td>- If frame is hollow metal, furnish S88D seals (head and jambs) by Pemko or approved seal manufacturer.</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>- If frame is aluminum, then seals are to be furnished by aluminum frame manufacturer (for sound dampening if non-rated opening)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>1</td>
<td>Auto Door Bottom (sound dampening)</td>
<td>411APKL or 420APKL (as required per door material or wood or hollow metal) by Pemko or approved manufacturer.</td>
<td></td>
</tr>
<tr>
<td>1</td>
<td>Threshold (sound dampening)</td>
<td>270A (4&quot; with non-slip groove) or per detail sized to fit the condition x FSL25 by Pemko or approved manufacturer.</td>
<td></td>
</tr>
</tbody>
</table>

**NOTE:** Furnish all devices and components for hardware groups/set above in accordance with Contract Documents including, but not limited to, additional hardware devices requirements in the above specification language, architectural plans, and full specification documents.

### Hardware Group/Set #119

<table>
<thead>
<tr>
<th>Qty</th>
<th>Description</th>
<th>Specification</th>
<th>Cost</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Hinge</td>
<td>T4A3386 (size and quantity per Section 08 71 00)</td>
<td>630</td>
</tr>
<tr>
<td>2</td>
<td>Classroom-Type Lockset</td>
<td>L9071T 17A</td>
<td>630</td>
</tr>
<tr>
<td>2</td>
<td>I/C Cylinders (Rim or Mortise)</td>
<td>20-757 or 20-763 x appropriate cam x blocking rings as required (rim or mortise type and quantity as required by locking device)</td>
<td>626</td>
</tr>
<tr>
<td>2</td>
<td>Permanent Core</td>
<td>20-740</td>
<td>626</td>
</tr>
<tr>
<td>1</td>
<td>Surface Closer</td>
<td>4040XP EDA</td>
<td>689</td>
</tr>
<tr>
<td>1</td>
<td>Kick Plate</td>
<td>KO050 10&quot; tall x 2&quot; LDW (less door width) x B4E (beveled edges) x counter sunk where door allows</td>
<td>630</td>
</tr>
<tr>
<td>1</td>
<td>Door Stop</td>
<td>1209</td>
<td>630</td>
</tr>
<tr>
<td>1</td>
<td>Seal (sound dampening)</td>
<td>Provide seals at head and jambs:</td>
<td></td>
</tr>
<tr>
<td></td>
<td>- If frame is hollow metal, furnish S88D seals (head and jambs) by Pemko or approved seal manufacturer.</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
### Hardware Group/Set #120

<table>
<thead>
<tr>
<th>Description</th>
<th>Part Number</th>
<th>Quantity</th>
<th>Location</th>
</tr>
</thead>
<tbody>
<tr>
<td>Swing Clear Hinge</td>
<td>HG-329</td>
<td>1</td>
<td>MA</td>
</tr>
<tr>
<td>Storeroom-Type Lockset</td>
<td>L9080T 06A</td>
<td>1</td>
<td>SC</td>
</tr>
<tr>
<td>I/C Cylinders (Rim or Mortise)</td>
<td>20-757 or 20-763 x appropriate cam x blocking rings as required (rim or mortise type and quantity as required by locking device)</td>
<td>1</td>
<td>SC</td>
</tr>
<tr>
<td>Permanent Core</td>
<td>20-740</td>
<td>1</td>
<td>SC</td>
</tr>
<tr>
<td>Kick Plate</td>
<td>KO050 10&quot; tall x 2&quot; LDW (less door width) x B4E (beveled edges) x counter sunk where door allows</td>
<td>1</td>
<td>TR</td>
</tr>
<tr>
<td>Stop</td>
<td>1261 at non-rated doors.</td>
<td>1</td>
<td>TR</td>
</tr>
<tr>
<td>Door Silencers at non-Smoke or non-Fire Rated Applications</td>
<td>SR64 or SR65 (as required)</td>
<td>3</td>
<td>IV</td>
</tr>
</tbody>
</table>

**NOTE:** Furnish all devices and components for hardware groups/set above in accordance with Contract Documents including, but not limited to, additional hardware devices requirements in the above specification language, architectural plans, and full specification documents.

### Hardware Group/Set #121

<table>
<thead>
<tr>
<th>Description</th>
<th>Part Number</th>
<th>Quantity</th>
<th>Location</th>
</tr>
</thead>
<tbody>
<tr>
<td>Hinge</td>
<td>T4A3386 (size and quantity per Section 08 71 00)</td>
<td>1</td>
<td>MC</td>
</tr>
<tr>
<td>Classroom-Type Lockset</td>
<td>L9071T 17A</td>
<td>1</td>
<td>SC</td>
</tr>
<tr>
<td>I/C Cylinders (Rim or Mortise)</td>
<td>20-757 or 20-763 x appropriate cam x blocking rings as required (rim or mortise type and quantity as required by locking device)</td>
<td>2</td>
<td>SC</td>
</tr>
<tr>
<td>Permanent Core</td>
<td>20-740</td>
<td>1</td>
<td>SC</td>
</tr>
<tr>
<td>Surface Closer</td>
<td>4040XP REG</td>
<td>1</td>
<td>LC</td>
</tr>
<tr>
<td>Kick Plate</td>
<td>KO050 10&quot; tall x 2&quot; LDW (less door width) x B4E (beveled edges) x counter sunk where door allows</td>
<td>1</td>
<td>TR</td>
</tr>
<tr>
<td>Door Stop</td>
<td>1270CV</td>
<td>1</td>
<td>TR</td>
</tr>
</tbody>
</table>
| Seal | Provide seals at head and jambs:  
- If frame is hollow metal, furnish S88D seals (head and jambs) by Pemko or approved seal manufacturer.  
- If frame is aluminum, then seals are to be furnished by aluminum frame manufacturer (for sound dampening if non-rated opening) | 1 | |

**NOTE:** Furnish all devices and components for hardware groups/set above in accordance with Contract Documents including, but not limited to, additional hardware devices requirements in the
above specification language, architectural plans, and full specification documents.

**Hardware Group/Set #122**

<table>
<thead>
<tr>
<th>Ea.</th>
<th>Hinge</th>
<th>Description</th>
<th>Code</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Hinge</td>
<td>TA2314 (size and quantity per Section 08 71 00)</td>
<td>630</td>
</tr>
<tr>
<td>1 Ea.</td>
<td>Classroom-Type Lockset</td>
<td>L9070T 17A</td>
<td>626</td>
</tr>
<tr>
<td>1 Ea.</td>
<td>I/C Cylinders (Rim or Mortise)</td>
<td>20-757 or 20-763 x appropriate cam x blocking rings as required (rim or mortise type and quantity as required by locking device)</td>
<td>626</td>
</tr>
<tr>
<td>1 Ea.</td>
<td>Permanent Core</td>
<td>20-740</td>
<td>626</td>
</tr>
<tr>
<td>1 Ea.</td>
<td>Overhead Stop</td>
<td>10 series (sized -336 or as required by door width)</td>
<td>630</td>
</tr>
<tr>
<td>1 Ea.</td>
<td>Kick Plate</td>
<td>KO050 10&quot; tall x 2&quot; LDW (less door width) x B4E (beveled edges) x counter sunk where door allows</td>
<td>630</td>
</tr>
<tr>
<td>3 Ea.</td>
<td>Door Silencers</td>
<td>SR64 or SR65 (as required)</td>
<td>GR</td>
</tr>
</tbody>
</table>

**NOTE:** Furnish all devices and components for hardware groups/set above in accordance with Contract Documents including, but not limited to, additional hardware devices requirements in the above specification language, architectural plans, and full specification documents.

**Hardware Group/Set #123**

<table>
<thead>
<tr>
<th>Ea.</th>
<th>Hinge</th>
<th>Description</th>
<th>Code</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Hinge</td>
<td>T4A3386 (size and quantity per Section 08 71 00)</td>
<td>630</td>
</tr>
<tr>
<td>1 Ea.</td>
<td>Latching Flush Bolt Sets</td>
<td>Provide either #3820 at top x 3810 and 3911 dust proof strike for metal doors or if doors are wood #3825L at top x 3815L and 3911 dust proof strike</td>
<td>626/</td>
</tr>
<tr>
<td>1 Ea.</td>
<td>Active Leaf: Left Hand-Side Classroom-Type Lockset</td>
<td>L9071T 17A</td>
<td>630</td>
</tr>
<tr>
<td>2 Ea.</td>
<td>I/C Cylinders (Rim or Mortise)</td>
<td>20-757 or 20-763 x appropriate cam x blocking rings as required (rim or mortise type and quantity as required by locking device)</td>
<td>626</td>
</tr>
<tr>
<td>2 Ea.</td>
<td>Permanent Core</td>
<td>20-740</td>
<td>626</td>
</tr>
<tr>
<td>1 Ea.</td>
<td>Coordinator</td>
<td>#3094 series x filler plates x mounting brackets as required for coordinated hardware x painted to match frame</td>
<td>689</td>
</tr>
<tr>
<td>2 Ea.</td>
<td>Surface Closer</td>
<td>4040XP CUSH</td>
<td>630</td>
</tr>
<tr>
<td>2 Ea.</td>
<td>Kick Plate</td>
<td>KO050 10&quot; tall x 2&quot; LDW (less door width) x B4E (beveled edges) x counter sunk where door allows</td>
<td>630</td>
</tr>
<tr>
<td>2 Ea.</td>
<td>Mop Plate</td>
<td>KO050 10&quot; tall x 2&quot; LDW (less door width) x B4E (beveled edges) x counter sunk where door allows</td>
<td>630</td>
</tr>
<tr>
<td>1 Ea.</td>
<td>Active/Inactive Edge Guard Set</td>
<td>EG-308 x EG-308T x all hardware cutouts x UL (coordinate as required for overlapping astragal)</td>
<td>630</td>
</tr>
<tr>
<td>1 Ea.</td>
<td>Overlapping Astragal Seals (sound dampening)</td>
<td>S77D seals (head and jambs) by Pemko or approved seal manufacturer.</td>
<td></td>
</tr>
<tr>
<td>1 Ea.</td>
<td>Seal</td>
<td>Provide seals at head and jambs:</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>- If frame is hollow metal, furnish S88D seals (head and jambs) by Pemko or approved seal manufacturer.</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>- If frame is aluminum, then seals are to be furnished by aluminum frame manufacturer (for sound dampening if non-</td>
<td></td>
</tr>
</tbody>
</table>
NOTE: Furnish all devices and components for hardware groups/set above in accordance with Contract Documents including, but not limited to, additional hardware devices requirements in the above specification language, architectural plans, and full specification documents.

### Hardware Group/Set #124

<table>
<thead>
<tr>
<th>Ea.</th>
<th>Hinge</th>
<th>T4A3386 (size and quantity per Section 08 71 00)</th>
<th>630</th>
<th>MC</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Latching Flush Bolt Sets</td>
<td>Provide either #3820 at top x 3810 and 3911 dust proof strike for metal doors or if doors are wood #3825L at top x 3815L and 3911 dust proof strike</td>
<td>626/630</td>
<td>TR</td>
</tr>
<tr>
<td>1</td>
<td>Active Leaf: Right Hand-Side Classroom-Type Lockset</td>
<td>L9071T 17A</td>
<td>630</td>
<td>SC</td>
</tr>
<tr>
<td>2</td>
<td>I/C Cylinders (Rim or Mortise)</td>
<td>20-757 or 20-763 x appropriate cam x blocking rings as required (rim or mortise type and quantity as required by locking device)</td>
<td>626</td>
<td>SC</td>
</tr>
<tr>
<td>2</td>
<td>Permanent Core</td>
<td>20-740</td>
<td>626</td>
<td>SC</td>
</tr>
<tr>
<td>2</td>
<td>Overhead Stop</td>
<td>9ADJ series (sized -336 or as required by door width)</td>
<td>630</td>
<td>RX</td>
</tr>
<tr>
<td>2</td>
<td>Kick Plate</td>
<td>KO050 10&quot; tall x 2&quot; LDW (less door width) x B4E (beveled edges) x counter sunk where door allows</td>
<td>630</td>
<td>TR</td>
</tr>
<tr>
<td>2</td>
<td>Door Silencers</td>
<td>SR64 or SR65 (as required)</td>
<td>GR</td>
<td>IV</td>
</tr>
</tbody>
</table>

NOTE: Furnish all devices and components for hardware groups/set above in accordance with Contract Documents including, but not limited to, additional hardware devices requirements in the above specification language, architectural plans, and full specification documents.

### Hardware Group/Set #125

<table>
<thead>
<tr>
<th>Ea.</th>
<th>Swing Clear Hinge</th>
<th>HG-329</th>
<th>630</th>
<th>MA</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Classroom-Type Lockset</td>
<td>L9071T 17A</td>
<td>630</td>
<td>SC</td>
</tr>
<tr>
<td>2</td>
<td>I/C Cylinders (Rim or Mortise)</td>
<td>20-757 or 20-763 x appropriate cam x blocking rings as required (rim or mortise type and quantity as required by locking device)</td>
<td>626</td>
<td>SC</td>
</tr>
<tr>
<td>2</td>
<td>Permanent Core</td>
<td>20-740</td>
<td>626</td>
<td>SC</td>
</tr>
<tr>
<td>1</td>
<td>Closer x Stop Arm at 90-degrees</td>
<td>4040XP CUSH</td>
<td>689</td>
<td>LC</td>
</tr>
<tr>
<td>1</td>
<td>Kick Plate</td>
<td>KO050 10&quot; tall x 2&quot; LDW (less door width) x B4E (beveled edges) x counter sunk where door allows</td>
<td>630</td>
<td>TR</td>
</tr>
<tr>
<td>1</td>
<td>Mop Plate</td>
<td>KM050 10&quot; tall x 1&quot; LDW (less door width) x B4E (beveled edges) x counter sunk where door allows</td>
<td>630</td>
<td>TR</td>
</tr>
</tbody>
</table>
| 1   | Seal (sound dampening) | Provide seals at head and jambs:  
- If frame is hollow metal, furnish S88D seals (head and jambs) by Pemko or approved seal manufacturer.  
- If frame is aluminum, then seals are to be furnished by aluminum frame manufacturer (for sound dampening if non-rated opening) | | |

NOTE: Furnish all devices and components for hardware groups/set above in accordance with Contract Documents including, but not limited to, additional hardware devices requirements in the above specification language, architectural plans, and full specification documents.
### Hardware Group/Set #126

<table>
<thead>
<tr>
<th>Quantity</th>
<th>Description</th>
<th>Model/Details</th>
<th>Unit_price</th>
<th>Class</th>
</tr>
</thead>
</table>
| 3        | Hinges at existing frame conditions             | T4A3386 heavy duty hinges or TA2314 medium duty hinges x 630 finish by McKinney manufacturing:  
- Verify in field existing frame preparation/templates and submit, furnish and install hinges to match existing frame.  
- Provide hinge width to enable door to open 175 degrees to hit stop. | 630 MC     |       |
| 1        | Storeroom-Type Lockset                          | ND80TD x RHO x 10-025                                                        | 626 SC     |       |
| 1        | Permanent Core                                  | 20-740                                                                       | 626 SC     |       |
| 1        | Closer x Stop Arm at 90-degrees                 | 4040XP CUSH                                                                  | 689 LC     |       |
| 1        | Kick Plate                                      | KO050 10" tall x 2" LDW (less door width) x B4E (beveled edges) x counter sunk where door allows | 630 TR     |       |
| 1        | Seals                                           | S88D (head and jambs) by Pemko or approved manufacturer.                     |            |       |

**NOTE:** Furnish and install all devices and components for hardware groups/set above in accordance with Contract Documents (including but not limited to additional hardware devices required in specifications language above, architectural plans and full specification documents).

### Hardware Group/Set #127

<table>
<thead>
<tr>
<th>Quantity</th>
<th>Description</th>
<th>Model/Details</th>
<th>Unit_price</th>
<th>Class</th>
</tr>
</thead>
</table>
| 6        | Hinges at existing frame conditions             | T4A3386 heavy duty hinges or TA2314 medium duty hinges x 630 finish by McKinney manufacturing:  
- Verify in field existing frame preparation/templates and submit, furnish and install hinges to match existing frame.  
- Provide hinge width to enable door to open 175 degrees to hit stop. | 630 MC     |       |
| 1        | Auto Flush Bolt (top latch only where possible) | At non-rated 20 minute rated wood doors or at all hollow metal doors provide either #3810 (metal doors) or #3815L (wood doors) as required per door material.  
- For wood doors over 20 minutes in rating, provide top & bottom Flushbolts #3815L x #3815L and dust proof strike device #3911  
- For metal doors over 20 minutes in rating, provide fire bolt #3850 (no bottom bolt or dust proof strike). | 626/630 TR |       |
<p>| 1        | Storeroom-Type Lockset                          | ND80TD x RHO x 10-025                                                        | 626 SC     |       |
| 1        | Permanent Core                                  | 20-740                                                                       | 626 SC     |       |
| 1        | Coordinator                                     | #3094 series x filler plates x mounting brackets as required for coordinated hardware x painted to match frame |            | TR    |
| 2        | Closer x Stop Arm at 90-degrees                 | 4040XP CUSH                                                                  | 689 LC     |       |
| 2        | Kick Plate                                      | KO050 10&quot; tall x 2&quot; LDW (less door width) x B4E                             | 630 TR     |       |</p>
<table>
<thead>
<tr>
<th>EA</th>
<th>Item</th>
<th>Description</th>
<th>Section</th>
<th>Code</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Seals</td>
<td>S88D (head and jambs) by Pemko or approved manufacturer</td>
<td>680</td>
<td>MC</td>
</tr>
<tr>
<td>1</td>
<td>Astragal</td>
<td>355CS x S77 seal by Pemko or approved manufacturer</td>
<td>680</td>
<td>MC</td>
</tr>
</tbody>
</table>

**NOTE** - Furnish and install all devices and components for hardware groups/set above in accordance with Contract Documents (including but not limited to additional hardware devices required in specifications language above, architectural plans and full specification documents).

---

**Hardware Group/Set #128**

<table>
<thead>
<tr>
<th>EA</th>
<th>Item</th>
<th>Description</th>
<th>Section</th>
<th>Code</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Classroom-Type Lockset</td>
<td>L9071T 17A</td>
<td>680</td>
<td>SC</td>
</tr>
<tr>
<td>2</td>
<td>I/C Cylinders (Rim or Mortise)</td>
<td>20-757 or 20-763 x appropriate cam x blocking rings as required (rim or mortise type and quantity as required by locking device)</td>
<td>680</td>
<td>SC</td>
</tr>
<tr>
<td>2</td>
<td>Permanent Core</td>
<td>20-740</td>
<td>680</td>
<td>SC</td>
</tr>
<tr>
<td>1</td>
<td>Kick Plate</td>
<td>KO050 10&quot; tall x 2&quot; LDW (less door width) x B4E (beveled edges) x counter sunk where door allows</td>
<td>680</td>
<td>TR</td>
</tr>
<tr>
<td>1</td>
<td>Door Stop</td>
<td>1270CV</td>
<td>680</td>
<td>TR</td>
</tr>
<tr>
<td>1</td>
<td>Seal (sound dampening)</td>
<td>Provide seals at head and jambs:</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>- If frame is hollow metal, furnish S88D seals (head and jambs) by Pemko or approved seal manufacturer</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>- If frame is aluminum, then seals are to be furnished by aluminum frame manufacturer (for sound dampening if non-rated opening)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>1</td>
<td>Auto Door Bottom</td>
<td>411APKL or 420APKL (as required per door material or wood or hollow metal) by Pemko or approved manufacturer</td>
<td>680</td>
<td>TR</td>
</tr>
<tr>
<td>1</td>
<td>Threshold (sound dampening)</td>
<td>270A (4&quot; with non-slip groove) or per detail sized to fit the condition x FSL25 by Pemko or approved manufacturer</td>
<td>680</td>
<td>TR</td>
</tr>
</tbody>
</table>

**NOTE**: Furnish all devices and components for hardware groups/set above in accordance with Contract Documents including, but not limited to, additional hardware devices requirements in the above specification language, architectural plans, and full specification documents.

END OF SECTION
SECTION 08 71 13

AUTOMATIC DOOR OPERATORS

PART 1 GENERAL

1.1 SECTION INCLUDES
   A. BHMA finish door hardware for swing doors.
   B. Electrified, swinging door automatic operators devices.
   C. Accessories including but not limited to actuating controls and safety sensors at designated doors.
   D. Removal of existing hardware at existing doors and frames and replacement with new hardware.

1.2 PRODUCTS SUPPLIED BUT NOT INSTALLED UNDER THIS SECTION
   A. Hardware templates for doors and frames.

1.3 RELATED SECTIONS
   A. Section 07 92 00 – Joint Sealants.
   B. Section 08 11 13 – Hollow Metal Doors and Frames.
   C. Section 08 41 13 – Aluminum Framed Entrances and Storefronts.
   D. Section 08 71 00 – Door Hardware.
   E. Divisions 26 through 28: Electrical rough in, wiring and connectors for electrified hardware including, but not limited to:
      1. Wire and connectivity from ceiling through frame to electrified hardware devices including non-Section 08 71 00 task of providing wiring inside of doors.
      2. Automatic Door Operators e-power or emergency power connectivity scope: At non-fire and non-smoke rated openings that have auto operators provide emergency power backup.

1.4 PRODUCTS SUPPLIED BUT NOT INSTALLED UNDER THIS SECTION
   A. Hardware templates for doors and frames.

1.5 REFERENCES
   A. The publications listed below form a part of this Section to the extent referenced. The publications are referred to in the text by the basic designation only.
      1. Refer to Division 01 for definitions, acronyms, and abbreviations.
      2. Unless otherwise noted; standards, manuals, and codes refer to the latest edition as of the issue date of this Project Manual.
   B. Conform to the following Referenced Standards and Requirements:
2. ADA – Americans with Disabilities Act - 2010 Standards for Accessible Design.
3. AAADM – American Association of Automatic Door Manufacturers.
5. ANSI/BHMA 156.19 American National Standard for power high and low energy operated doors.
6. ANSI A156 Series – Builders Hardware Manufacturers Association (BHMA) Standards.

1.6 COORDINATION

A. Coordinate work of this Section with Sections involving manufacturer of internal reinforcement for doors, frames, and hardware.
   1. Coordinate work in this Section with work in related Sections.
   2. This Section's hardware sets/groups as specified in Part 3 are intended to establish type and design standard when used together with the requirements of specifications, drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections. Where hardware sets/groups have different information than the specifications refer to the specifications and drawings for clarification and bid combined hardware sets/groups and Contract Documents/specifications (provide combined materials/devices at time of submittals).

B. Provide hardware templates to door and frame manufacturer. Provide two templates to those manufacturers who are not currently registered template book holders. Contractor shall be responsible for verifying that the door hardware accepted for installation is compatible for use with the doors and door frames.

C. Coordinate keying requirements as specified in Section 08 71 00 “Door Hardware”.

D. Convene coordination meeting between all opening vendors and installers at least two weeks prior to purchasing doors, frames, door hardware and electrical devices required for complete systems.
   1. Required attendance includes but is not limited to the following: Contractor; hardware supplier and/or installer; door supplier and/or installer; frame supplier and/or installer; auto operator vendor and/or installer; security card reader vendor and/or installer; and electrical.
   2. Contractor shall be responsible for verifying that the door hardware accepted for installation is compatible for use with the doors and door-frames.
   3. For card reader interface with applicable door devices, security vendor and/or installer (coordinate accordingly) to have a written agenda and plan on how scope related to electrified devices will be installed to have a complete wired and operational card access system. The card reader interface scope includes but is not limited to card reader inputs and output coordination on the electric locking device power supply, electric locking devices and connectivity as well as confirmation of a complete, wired and operational card access system. Provide all required relays and devices as part of the overall system in accordance system requirements at no additional cost to Owner.
   4. For auto operator interface with applicable door devices, auto operator vendor and/or installer (coordinate accordingly) to have a written agenda and plan on how scope related to electrified devices will be installed to have a complete wired and operational auto operator system. The auto operator interface scope includes but is not limited to
connectivity and inputs for push-plates, BEA BR3 (or approved equal required auto operator relays), electric locking devices, as well as confirmation of the complete, wired and operational auto operator system. Provide all required relays and devices as part of the overall system in accordance system requirements at no additional cost to Owner.

E. Examine Contract Documents and furnish proper hardware for door openings. Example includes, but is not limited to system integration:

1. Provide electrical interface control capability for card reader or keypad operation of swinging automatic entrances on doors with electric locking. Integrate swinging automatic entrances with other systems as required for a complete working installation.

2. Where required for proper operation, provide a time delay relay to signal automatic door operator to activate only after electric lock system is released.

3. Electrical System Roughing-in: Coordinate layout and installation of swinging automatic entrances with connections to, power supplies and remote activation devices. Review details and conditions prior to ordering material.

1.7 SUBMITTALS

A. General: Submit in accordance with Division 01.

B. Pre-Hardware Schedule:

1. Report all prevailing conditions that will adversely affect satisfactory execution of work. Examine existing doors and/or frames scheduled for hardware replacement.

C. Submit a detailed door and hardware schedule according to the following:

1. Hardware Schedule:
   a. Submit hard copies of hardware schedule (number of copies per Division 01) as well as submit editable, PDF files via electronic email of ftp site process in vertical format as illustrated by the Sequence of Format for the Hardware Schedule as published by the Door and Hardware Institute. Schedules which do not comply will be returned for correction before checking. Horizontal-type schedules will be returned for correction before checking.
   
   b. Hardware schedule shall clearly indicate each hardware group specified and manufacturer of each item proposed.

2. Provide two copies of illustrations from manufacturer’s catalogs and data in brochure form.

3. Wiring Information: Provide manufacturers’ wiring information including manufacturers’ door elevation diagrams for electrified hardware based on Door Hardware Institute (DHI) core class “Electrified Architectural Hardware” DHI class #COR133. Openings where only magnetic hold-opens or door position switches are specified do not require wiring information. Provide information with hardware schedule submittal for review. Provide detailed wiring diagrams with hardware delivery to jobsite.

4. Review of schedules does not relieve the Contractor of providing all hardware required for the Work, whether or not such hardware was inadvertently omitted from Submittal.

D. Templates:

1. Provide listing of manufacturer’s template numbers for each item of hardware in hardware schedule.
2. Submit templates and "Reviewed Hardware Schedule" to door and frame supplier and others as applicable to enable proper and accurate sizing and locations of cutouts and reinforcing.

E. Installation Instructions:
   1. Provide manufacturer's written installation and adjustment instructions for finish hardware.
   2. Send installation instructions to site with hardware.

F. Contract Closeout Submittals (include specific requirements indicated):
   1. Operating and maintenance manuals.
      a. Complete information in care, maintenance, and adjustment, data on repair and replacement parts, and information on preservation of finishes.
      b. Catalog pages for each product.
      c. Name, address, and phone number of local representative for each manufacturer.
      d. Parts list for each product.
      e. Copy of final accepted hardware schedule, edited to reflect "As installed".
   2. Copy of final keying schedule.
   3. Maintenance data and devices:
      a. Submit two copies of operator maintenance manuals that include the following items:
         1) Lubrication instructions.
         2) Operator maintenance instructions.
      b. Provide special wrenches and tools applicable to each different or special component.
      c. Provide maintenance tools and accessories supplied by manufacturer.

1.8 QUALITY ASSURANCE

A. Operator Device Supplier Qualifications: Firm specializing in the supply and servicing of institutional and commercial low energy operator devices and sliding automatic doors; accredited by manufacturers; and having a minimum of three years documented experience. Hardware supplier to furnish list of at least ten completed projects complete with date competed, project location and project contact information.

B. Manufacturer Qualifications and Documentation:
   1. Operator Device Manufacturer Qualifications: Manufacturer specializing in manufacturing institutional and commercial high and low energy operator devices with a minimum five years with the following documented experience. Furnish list of at least ten past, finished projects. Include date competed, project location, references, and past project contact information to determine if commercial high and low energy operator devices are acceptable.

   2. Manufactured devices submitted must have a factory certified central dispatch service for warranty. System to be available 24 hours a day, 365 days per year to obtain malfunction information and dispatch appropriate service agency to the customer location.
C. Installer Qualifications and Documentation:

1. Company specializing in installing the products specified in this Section shall have minimum ten years' experience and be a member of the American Association of Automatic Door Manufacturers (AAADM). A completed AAADM compliance form shall be submitted as proof of compliance with current ANSI/BHMA 156.19 American National Standard for power high and low energy operated doors as well as high energy operators. Doors shall be inspected and form shall be signed by an AAADM certified inspector prior to placing doors in operation.

2. Operator Device Installer qualifications: The installer of assembly shall be trained in the trade of installing and start-up of commercial high or low energy operator devices and sliding automatic doors. Supplier and Installer of door assemblies shall be authorized representative of manufacturers and have minimum of five years successful experience in detailing, supplying and installing commercial high and low energy operator devices and sliding automatic doors specified on projects of similar size, complexity and type to this Project.

3. Local certified distributor to install operator in accordance with current ANSI/BHMA 156.19 American National Standard for High and Low Energy Power Operated Doors and local applicable codes. For low energy applications, local certified distributor to install operator in accordance with ANSI 156.19, ANSI 117.1, NFPA 101 and local applicable codes.

1.9 DELIVERY, STORAGE, AND HANDLING

A. Comply with requirements of Division 01.

B. Deliver products in manufacturer's original containers, dry and undamaged, with seals and labels intact.

C. Storage: Store materials in a cool and dry location, elevated from the ground and protected from the elements, and secured from theft or pilferage.

1.10 WARRANTY

A. Comply with provisions of Division 01.

B. Unless otherwise specified below, furnish to Owner a written manufacturer's two year extended guarantee for automatic door operators against defects in materials and workmanship.

PART 2 PRODUCTS

2.1 MATERIALS: GENERAL REQUIREMENTS

A. The Specifications are intended to cover all doors in the Project and establish a type and standard of quality, but it is the responsibility of the Contractor to furnish proper hardware for all openings and for a complete installation. Where Hardware Groups/Sets have different information refer to the following specifications for clarification and detailed requirements. Provide all devices whether specified or not in hardware sets/groups.
2.2 FINISHES
A. Where hardware groups/sets have different information, refer to the following for clarification. Provide hardware groups/sets devices/finishes, along with added finishes below, as indicated on drawings and detailed requirements for each type of device:
   1. Typical BHMA finish designation references:
      a. BHMA 630 – satin stainless steel.
      b. BHMA 626 – satin chromium plated brass or bronze.
      c. BHMA 628 – satin or dull aluminum, clear anodized (uncoated).
      d. BHMA 689 – sprayed aluminum paint finish.

2.3 EXISTING CONDITIONS AND PRODUCTS
A. Examine Contract Documents and furnish proper finishes and services for each door opening (door, frame, and hardware).
B. Field verify existing door and framing systems. Do not demo existing auto operator systems, until compete assessment and report via RFI process can establish if existing operators can be salvaged and re-used or new operators specified below are required (furnish and supply device and installation pricing for new operators at this time).

2.4 HARDWARE TEMPLATE
A. Promptly furnish template information or templates to door and frame manufacturers.
B. Coordinate hardware items to prevent interference with each other.

2.5 FASTENINGS
A. Fastenings shall match hardware material and finish.
B. Use screws, bolts, washers, grommets, nuts, and other fastening devices of appropriate size, length, type, head, metal and finish as necessary for proper match and application of hardware. Machine screws and tamping shields for attaching hardware to concrete, stone, or masonry.
C. Provide nonferrous or corrosion-resistant steel fasteners exposed to weather.

2.6 SUBSTITUTIONS
A. Products referenced by specific brand names and model numbers have been identified by Owner to match other products in use either completed or in the course of completion. No substitutions permitted per Public Contract Code Section 3400.
   1. Otherwise refer to Division 01 for substitutions.

2.7 LOW ENERGY AUTOMATIC OPERATOR DEVICES
A. Overhead surface or concealed mounted devices:
   1. Furnish 4-1/2 inch wide by 6 inch tall devices only.
2. Furnish and install UL rated 4000LE/4900LE low energy operators by Horton manufacturing.

B. Providing operator can #1) open auto pull door closed against room air pressure differences; #2) open/close 400 pound door (whether or not doors on this project are 400+ pounds) #3) concealed arm in top of door rail (operator acts as opening unit with Dorma extra length to pivoting system – see Section 08 71 00); and #4) all specified criteria must be met in full (all components required to complete the work in accordance with specifications and intended operation) the following manufactures and devices will be considered for approval utilizing Contract Documents substitution process:

1. Stanley Magic.
2. ED400 Series by Dorma Manufacturing.

C. Contract directly with member of the American Association of Automatic Door Manufacturers (AAADM, not as a sub-contract to the door supplier).


D. Where Hardware Groups/Sets have different information, refer to the following specifications for clarification and detailed requirements:

1. Drop Plates, Brackets or Adapters (see snippet below with filler plate example):
   a. Provide complete drop plates / brackets as required to suit details.
   b. Do not install auto operators with space remaining between the wall and auto operator body. Provide non-ferrous, galvanized metal shims and/or metal space blocking between auto operator body and wall conditions.
   c. Finished surface and edges of backer plates shall be smooth and dry Backer rods and finish sealants are only allowed where primer and paint can be applied so that daily cleaners can be utilized to clean surfaces without cleaners stripping sealants and/or paints.

2. Provide required relays and devices as part of the overall system in accordance system requirements. Units shall have relay contact for interfacing products. Door operator shall have input line rating of 120 VAC unit shall have an internal circuit breaker switch to interrupt input power for servicing. Unit shall be U.L. Listed for automatic closing door. Unit shall be in compliance with the requirements of the Americans with Disabilities Act (ADA) and ANSI standards A117.1 and A156.19.

3. Provide adjustment for opening, closing, and checking speeds, as well as length of time door remains open. Provide units that can be utilized as a hold open devices (door placed in opened position when device three-way switch is engaged to “hold open” position.
4. Provide Automatic Operators with external "On/Off/Hold-Open three-way switch" as part of overall/complete system. Low energy operator manufacturer to have hold open keyed rocker as part of overall system and installed on auto operator external body above frame (door placed in opened position when keyed rocker three-way switch is engaged to "hold open" position (On/Off/Hold Open). Basis of design below (example only): LCN Rocker switch #8310-806R, type 3 position (on/off/hold-open), but coordinate with Auto Operator manufacturer to verify correct keyed rocker switch size and type.

5. Provide Automatic Operators with external On/Off two-way switch to be installed at ADA height of between 38 inches and 44 inches Above Finish Floor (AFF): #653-14 DPDT maintained single direction x SF-626 by Locknetics manufacturing.

Single Gang

a. Where pairs of doors have two separate Automatic Operators provide one external On/Off/Hold-Open three-way switch to operate both doors/operators.

6. Relays, Timer, and Logic Modules Devices:

a. At all auto door operators locations, provide BEA device # BR3 relay, timer, and logic modules (required for interface to indicated security components; and shall be assembled, connected, and fully contained within the power supply enclosure).

7. Safety Sensor Devices:

a. At specified low energy operators locations in hardware sets below, provide one safety sensor device at each leaf.

b. Design basis of design - device #OPTEX Pro-Swing Elite #OA-603BL x OC904C x required relays.

c. Safety sensor devices installed on door as shown below:

d. Safety sensor devices are not to be utilized for opening sensors. Opening actuation by wall mounted push plates or separate infrared presence sensor as scheduled.
e. Sensor devices are to be active infrared presence/safety sensor. The function of device is to protect the door from closing on a person or object in the swing-area detection zone.

f. Provide additional lockout module devices as required as some of the newer auto operator device manufacturers have a built-in lockout. Provide a fully functional system to meet design intent. Lockout module is typically determined by the door controller/control box.

g. Provide installation back plates and devices as required for each type of door/frame condition:

E. Push Plates and Touch-Activated Automatic Door Controls:

1. Provide Automatic Operators devices with external Actuators. Card readers also to be utilized at exterior doors where indicated in drawings and as scheduled. Push-and-Go type features are not acceptable.


3. Products:
   a. Bollard Mounting: See hardware group/sets.
   b. Bar Actuator: Wikk Touch-Activated "INGRESS'R" device as scheduled, or equal.

4. Where Hardware Groups/Sets have different information, refer to the following specifications for clarification and detailed requirements:
   b. Furnish and install touch-activated automatic door controls in Type 304 stainless steel finishes with international symbol of accessibility and lettering "push to open" engraved and applied in permanent blue enamel.
   c. Mounting: flush-type compatible with touch-activated automatic door controls. Provide complete installation brackets or adapters for automatic operator actuators to suit application.
2.8 POWER SUPPLIES

A. Where Hardware Groups/Sets have different information (number of wires and missing power supply devices and information), refer to the following for clarification and submit according to complete and intended electrified system.

1. Coordinate use of power supplies with door and frame locations. Provide power supplies, relays and battery backup units as part of the overall system in accordance with the manufacturer's warranty and system requirements.

2. Output shall be filtered and regulated. Relay, timer, and logic modules shall be provided as required for interface to indicated security components; and shall be assembled, connected, and fully contained within the power supply enclosure.

PART 3 EXECUTION

3.1 EXAMINATION

A. The operator installer shall examine the areas and conditions under which the automatic operators are to be installed and notify the Design Professional in writing of conditions detrimental to the proper and timely completion of the work. Do not proceed with the work until satisfactory conditions have been corrected.

B. Measurements: Verify all dimensions by taking field measurements before any material is fabricated and shipped to the job site.

3.2 INSTALLATION

A. Install all devices in accordance with manufacturer's printed instructions and approved shop drawings. Install all devices level and plumb.

B. Projecting Items: Install or re-install wrappings furnished by the manufacturer.

C. Coordinate operator installation with electrical connection requirements.

D. Sealants: Furnish and install all sealants indicated or required to complete installation per Section 07 92 00.

E. Install equipment per current ANSI/BHMA A156.19 American National Standard for Power Assist and Low Energy Power Operated Doors and as directed by American Association of Automatic Door Manufacturers (AAADM) recommendations.

F. Push plates and touch-activated automatic door controls:

1. Install touch-activated automatic door controls at mounting height 3 inches above finished floor or as indicated on the Drawings.

2. Mount touch-activated automatic door controls securely in place to supports with fasteners supplied by manufacturer.

3.3 TESTING, ADJUSTING AND INSPECTION

A. Repair or replace installations which do not perform according to manufacturer's printed instructions and approved shop drawings.
B. Adjust parts for smooth, uniform operation. Lubricate moving parts with manufacturer recommended lubricant. Replace units that cannot be adjusted and lubricated to operate freely and smoothly as intended for the application.

C. Adjust door closer devices (inner unit within Auto Operator devices):
   1. Adjust closer operating effort to conform to 2016 CBC Chapter 11B, Section 11B-404.2.9.
      a. Interior and Exterior Doors: Not to exceed 5.0 pounds force.
   2. Adjust closer delay and operating speeds to comply with requirements of CBC and Chapter 11B, Part 2, Title 24 CCR and the Americans with Disabilities Act Architectural Guidelines, Article 4.13.10.
   3. Door closers shall have sweep period adjusted so that from an open position of 90 degrees, the time required to move the door to a position of 12 degrees from the latch is 5 seconds minimum per 2016 CBC Chapter 11B, Section 404.2.8.1.

3.4 CLEANING

A. After repeated operation of completed installation, readjust door operators and controls for smooth, quiet and optimum operating condition and safety. Clean surfaces promptly after installation. Provide protective treatment and other precautions required through the remainder of the construction period to ensure that automatic operators will be without damage or deterioration.

B. Defective Work: Remove and replace any defective work that cannot be properly repaired, cleaned or touched up.

C. Just prior to final acceptance of building or as directed, remove protective paper coverings and clean and polish hardware.

3.5 HARDWARE GROUP/SETS

A. Manufacturer Abbreviations:

<table>
<thead>
<tr>
<th>Manufacturer</th>
<th>Abbreviation</th>
</tr>
</thead>
<tbody>
<tr>
<td>BEA Manufacturing</td>
<td>BEA</td>
</tr>
<tr>
<td>Wikk Manufacturing</td>
<td>WIK</td>
</tr>
<tr>
<td>Horton Manufacturing</td>
<td>HOR</td>
</tr>
<tr>
<td>Optex</td>
<td>OPT</td>
</tr>
</tbody>
</table>

B. The “Request-to-Exit” feature as described below is a security feature that announces/tells the security system if occupant is leaving the building interior area and similar to a motion-sensor the “Request-to-Exit” switch or device does not affect egress of the doors (unless noted, all doors in hardware group/sets are free egress at all times with no special knowledge to exit).

C. Hardware Columns - Example (Legend):

<table>
<thead>
<tr>
<th>Qty</th>
<th>Device Description</th>
<th>Device # (include specification language)</th>
<th>Finish</th>
<th>Manu</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
D. The following hardware sets are intended to establish type and standard of quality when used together with the requirements of this Section (see above Section and related Sections including Division 01).

1. Examine Contract Documents and furnish proper hardware for door openings.

2. Refer to Door Schedule on the Drawings for Hardware Group/Set assignments for each opening.

3. Blank space below and after a Group/Set is intentional to avoid, if possible, splitting a Hardware Group/Set onto two pages.
For all doors assigned Hardware Groups/Sets #01 on the door schedule, provide the following:

In addition to the devices specified in hardware group/set below, also coordinate devices in specification Section 08 71 00 “Door Hardware” (furnish and install doors, frames and related scope per complete Contract Documents):

<p>| | | |</p>
<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>2</td>
<td>Ea.</td>
<td>Overhead Low Energy Operators: Surface or Concealed 4-1/2&quot; wide (final to be selected)</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Per Section 08 71 13 and the following: Low Energy Operator Device: Horton Push-Side 4000LE required in one complete case. Provide custom pivot/spindle length as required per Section 08 71 00 and existing conditions. Provide custom mounting plates and extended arm for conditions.</td>
</tr>
<tr>
<td>2</td>
<td>Ea.</td>
<td>Touch-Activated Actuators (also known as Wall Push-Plates)</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Furnish and install #Ingress'r model #I36-5 x Wikk, narrow model (only 4.25-inch-wide) x hardwired, stainless steel with blue wheelchair logo and added text “PUSH TO OPEN” by Wikk manufacturing.</td>
</tr>
<tr>
<td>1</td>
<td>Ea.</td>
<td>At exterior-side of building furnish and install single-gang, keyswitch as required to turn off exterior #Ingress'r.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>#653-14 DPDT maintained single direction x SF-626 by Locknetics manufacturing.</td>
</tr>
<tr>
<td>1</td>
<td>Ea.</td>
<td>At interior-side of building furnish and install single-gang, keyswitch as required so that it &quot;locks down&quot; perimeter of this door to meet CBC Sections 1010.1.9 through 1010.1.11.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>#653-14 DPDT maintained single direction x SF-626 by Locknetics manufacturing.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>- In case of emergency as described in CBC Sections 1010.1.9 through 1010.1.11 coordinate and verify key-switch #653-14 DPDT shall drop power to auto operator and locking system (part of system to lock exterior-side of doors without going outside to lock the door).</td>
</tr>
<tr>
<td>2</td>
<td>Ea.</td>
<td>Bollard (final to be selected)</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Wikk #BPS SM PRP36CL 6&quot; x 6&quot; x 42&quot; Tall, clear anodized aluminum (628), surface mount with concealed mounting base, removable black ABS cap, templated/coordinated with both the Ingress’r and on side of bollard install Locknetics #653-14 DPDT device within Wikk raindrip cover.</td>
</tr>
<tr>
<td>1</td>
<td>Ea.</td>
<td>Relay Device (or submit approved relay by auto operator vendor)</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Provide BEA BR3, 10-BR3 or equal relay: operator vendor/installer to interface inputs / outputs</td>
</tr>
<tr>
<td>2</td>
<td>Ea.</td>
<td>Request to Exit Device (see free egress note in above specifications)</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Specified in Section 08 71 00 locking hardware (coordinate with Divisions 25-28 and applicable drawings).</td>
</tr>
<tr>
<td>1</td>
<td>Ea.</td>
<td>Coordinate with electrical design for locations and additional non-Section 08 71 13 scope (including but not limited to wire / connectivity from ground or ceiling through frame to electrified devices)</td>
</tr>
<tr>
<td></td>
<td></td>
<td>By electrical as required per Contract Documents:</td>
</tr>
<tr>
<td></td>
<td></td>
<td>- Coordinate with electrical design for locations and wire/connectivity scope (non-Section 08 71 13, see Divisions 25-28 and applicable drawings).</td>
</tr>
<tr>
<td></td>
<td></td>
<td>- Coordinate with single gang, electrical keyed cylinders in Section 08 71 13 “Automatic Door Operators” to meet CBC Sections 1010.1.9 through 1010.1.11 systems (lock down operation from interior).</td>
</tr>
</tbody>
</table>
NOTE 1 – Coordination for interior two-way switch on/off station to lock down doors: During building emergency, an interior, two-way switch on/off station is to be provided to drop power to panic devices (locking doors) and exterior side auto operator actuator for no entrance into building by un-authorized occupants (coordinate integration with power supplies and auto operator system). Coordinate with Electrical/Security Divisions 25-28 and applicable plans.

NOTE 2: Furnish and install all devices and components for hardware groups/set above in accordance with Contract Documents (including but not limited to additional hardware devices required in specifications language above, architectural plans and full specification documents).

Hardware Group/Sets #02 - Set not utilized in this Section (see Section 08 71 00)

Blank space below and after a Group/Set is intentional to avoid, if possible, splitting a Hardware Group/Set onto two pages
For all doors assigned Hardware Groups/Sets #03 on the door schedule, provide the following:

In addition to the devices specified in hardware group/set below, also coordinate devices in specification Section 08 71 00 “Door Hardware” (furnish and install doors, frames and related scope per complete Contract Documents):

<table>
<thead>
<tr>
<th>Quantity</th>
<th>Item Description</th>
<th>Details</th>
</tr>
</thead>
<tbody>
<tr>
<td>1 Ea.</td>
<td>Overhead Low Energy Operators: Surface or Concealed 4-1/2&quot; wide (final to be selected)</td>
<td>Per Section 08 71 13 and the following: Low Energy Operator Device: Horton Push-Side 4000LE required in one complete case. Provide custom pivot/spindle length as required per Section 08 71 00 and existing conditions. Provide custom mounting plates and extended arm for conditions.</td>
</tr>
<tr>
<td>1 Ea.</td>
<td>Touch-Activated Actuators (also known as Wall Push-Plates)</td>
<td>Furnish and install #Ingress'r model #I36-5 x Wikk, narrow model (only 4.25-inch-wide) x hardwired, stainless steel with blue wheelchair logo and added text “PUSH TO OPEN” by Wikk manufacturing.</td>
</tr>
<tr>
<td>1 Ea.</td>
<td>At exterior side of building furnish and install single-gang, keyswitch as required to turn off exterior #Ingress'r.</td>
<td>#653-14 DPDT maintained single direction x SF-626 by Locknetics manufacturing.</td>
</tr>
<tr>
<td>1 Ea.</td>
<td>At interior-side of building furnish and install single-gang, keyswitch as required so that it “locks down” perimeter of this door to meet CBC Sections 1010.1.9 through 1010.1.11.</td>
<td>#653-14 DPDT maintained single direction x SF-626 by Locknetics manufacturing. - In case of emergency as described in CBC Sections 1010.1.9 through 1010.1.11 coordinate and verify key-switch #653-14 DPDT shall drop power to auto operator and locking system (part of system to lock exterior-side of doors without going outside to lock the door).</td>
</tr>
<tr>
<td>2 Ea.</td>
<td>Bollard</td>
<td>Wik #BPS SM PRP36CL 6&quot; x 6&quot; x 42&quot; Tall, clear anodized aluminum (628), surface mount with concealed mounting base, removable black ABS cap, templated/coordinated with both the Ingress’r and on side of bollard install Locknetics #653-14 DPDT device within Wikk raindrop cover.</td>
</tr>
<tr>
<td>1 Ea.</td>
<td>Relay Device (or submit approved relay by auto operator vendor)</td>
<td>Provide BEA BR3, 10-BR3 or equal relay: operator vendor/installer to interface inputs / outputs</td>
</tr>
<tr>
<td>1 Ea.</td>
<td>Request to Exit Device (see free egress note in above specifications)</td>
<td>Specified in Section 08 71 00 locking hardware (coordinate with Divisions 25-28 and applicable drawings).</td>
</tr>
<tr>
<td>1 Ea.</td>
<td>Coordinate with electrical design for locations and additional non-Section 08 71 13 scope (including but not limited to wire / connectivity from ground or ceiling through frame to electrified devices)</td>
<td>By electrical as required per Contract Documents: - Coordinate with electrical design for locations and wire/connectivity scope (non-Section 08 71 13, see Divisions 25-28 and applicable drawings). - Coordinate with single gang, electrical keyed cylinders in Section 08 71 13 “Automatic Door Operators” to meet CBC Sections 1010.1.9 through 1010.1.11 systems (lock down operation from interior).</td>
</tr>
</tbody>
</table>
NOTE 1 – coordination for interior two-way switch on/off station to lock down doors: During building emergency, an interior, two-way switch on/off station is to be provided to drop power to panic devices (locking doors) and exterior side auto operator actuator for no entrance into building by un-authorized occupants (coordinate integration with power supplies and auto operator system). Coordinate with Electrical/Security Divisions 25-28 and applicable plans.

NOTE 2: Furnish and install all devices and components for hardware groups/set above in accordance with Contract Documents (including but not limited to additional hardware devices required in specifications language above, architectural plans and full specification documents).

END OF SECTION
SECTION 08 81 00
GLASS GLAZING

PART 1 GENERAL

1.1 SECTION INCLUDES
A. Glass and glazing for windows and doors.
B. Mirrors.

1.2 RELATED SECTIONS
A. Section 07 92 00 – Joint Sealants: Sealant and back-up material.
B. Section 08 11 13 – Hollow Metal Doors and Frames: Glazed doors.
C. Section 08 14 00 – Wood Doors: Glazed doors.
D. Section 08 41 13 – Aluminum Framed Entrances and Storefronts.

1.3 REFERENCES
A. The publications listed below form a part of this Section to the extent referenced. The publications are referred to in the text by the basic designation only. Refer to Division 01 for definitions, acronyms, and abbreviations.

B. Standards, manuals, and codes refer to the latest edition of such standards, manuals, and codes in effect as of the date of issue of this Project Manual, unless indicated otherwise in CBC Chapter 35 and CFC Chapter 80.

C. Referenced Standards:


1.4 SUBMITTALS

A. Submit under provisions of Division 01.

B. Product Data on Glass Types Specified: Provide structural, physical and environmental characteristics, size limitations, and special handling or installation requirements.

C. Product Data on Glazing Compounds: Provide chemical, functional, and environmental characteristics, limitations, and special handling or installation requirements. Identify available colors.

D. Submit documentation indicating that all tempered glazing to be installed on this project is certified by the Safety Glazing Certification Council.

E. Samples:

1. Glass: Submit two samples, 12 inches x 12 inches in size, illustrating each type of glazing.

2. Glazing Sealant: Submit 3 inch long bead of glazing sealant, color as selected by Architect.

1.5 PERFORMANCE / DESIGN CRITERIA

A. Glass Strength: Analysis shall comply with ASTM E1300, Determining Load Resistance of Glass in Buildings. Provide glass products in the thickness and strengths (annealed or heat treated) required to meet or exceed the following criteria based on project loads and in-service conditions.

1. Minimum thickness of annealed or heat-treated glass products to be selected so the worst case probability of failure does not exceed the following:
   a. Eight breaks per thousand for glass installed vertically or not fifteen degrees or more from the vertical plane and under wind action.
   b. One break per thousand for glass installed fifteen degrees or more from the vertical plane and under action of wind and/or snow.

2. Deflection must be limited to prevent disengagement from the frame and be less than or equal to 3/4 inch or L/175.
B. Thermal and Optical Performance: Provide glass products with performance properties specified in this Section. Performance properties shall be manufacturer's published data as determined according to the following procedures:

1. Center of glass U-Value: NFRC 100 methodology using LBNL WINDOW 5.2 computer program.
2. Center of glass solar heat gain coefficient: NFRC 200 methodology using LBNL-35298 WINDOW 5.2 computer program.

1.6 QUALITY ASSURANCE


B. Installer's Qualifications: The installation shall be performed only by an installation firm normally engaged in this business. All work shall be performed by qualified mechanics that specialize in glazing and glass installation.

C. Safety glazing shall meet the requirements of 2016 CBC Section 2406 and shall be identified in accordance with 2016 CBC Sections 2403.1 and 2406.3, with identification etched in glass.

1.7 JOB AND ENVIRONMENTAL CONDITIONS

A. Do not install glazing when ambient temperature is less than 40 degrees F.

B. Maintain minimum ambient temperature before, during and 48 hours after installation of glazing compounds.

1.8 FIELD MEASUREMENTS

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

1.9 COORDINATION

A. Coordinate Work with glazing frames, wall openings, and adjacent Work.

1.10 WARRANTY

A. Provide five year limited warranty from date of manufacture for insulating units that are glazed in accordance with manufacturer’s glazing instructions.

B. Provide five year limited warranty for spandrel glass.

PART 2 PRODUCTS

2.1 GENERAL

A. All glass shall be graded and meet requirements of ASTM C1036 and ASTM C1048, Type 1, quality q3. Each sheet of glass delivered and installed shall have affixed thereto the manufacturer's grade label.

B. All Low-E coated glass shall have a permanent marking affixed at the spacer identifying the coated surface.
C. Glazing material installed in Hazardous Locations subject to human impact shall be certified and permanently labeled as meeting applicable requirements referenced in NFPA 80 and 2016 CBC Section 2406.
   1. CPSC 16 CFR 1201, Category I and II.

2.2 GLASS TYPES

A. Float Glass:
   1. Acceptable Manufacturers:
      a. Vitro Architectural Glass, a Division of PPG Industries.
      b. Oldcastle Glass.
      c. Viracon.
      d. Guardian.
      e. Substitutions: Under provisions of Division 01.
   2. Material: 1/4 inch thick clear glass, tempered where required by CBC and where indicated on Drawings.

B. Low-E Insulating Glass:
   1. Acceptable Manufacturers:
      b. Oldcastle Glass.
      c. Viracon.
      d. Guardian.
      e. Substitutions: Under provisions of Division 01.
   2. Material: 1 inch thick hermetically sealed assembly consisting of 1/4 inch thick Low-E clear glass on the outboard surface (coating on the #2 surface), 1/2 inch air space and 1/4 inch thick clear glass on the inboard surface with a Summer Daytime U-value of 0.26 or less, Solar Heat Gain Coefficient (SHGC) of 0.27 or less, and Visible Light Transmittance of 64 percent. Glass shall be heat strengthened; tempered where required by CBC and where indicated on Drawings.

C. Insulating Spandrel Glass:
   1. Acceptable Manufacturers:
      a. Vitro Architectural Glass, a Division of PPG Industries.
      b. Oldcastle Glass.
      c. Viracon.
      d. Guardian.
      e. Substitutions: Under provisions of Division 01.
   2. Material: 1-inch hermetically sealed assembly consisting of 1/4-inch Low-E clear glass on the outboard surface, 1/2-inch air space, and 1/4-inch clear glass on the inboard surface with ceramic coating (frit) on the #3 surface. Glass shall be heat strengthened; tempered where required by CBC and where indicated on Drawings. Frit pattern and color as selected by Architect.
D. Mirrors:
   1. Acceptable Manufacturers:
      a. Vitro Architectural Glass, a Division of PPG Industries.
      b. Oldcastle Glass.
      c. Viracon.
      d. Guardian.
      e. Substitutions: Under provisions of Division 01.
   2. Material, Mirror Glass: 1/4 inch thick clear tempered safety glass with copper and silver coating, organic overcoating, square and lapped edges. Sizes as indicated on Drawings.

2.3 GLAZING SEALANT

A. Glazing Sealants: ASTM C920, Type S, Grade NS, Uses “G” and “A”. Dow Corning 795, Tremco “Proglaze” or GE Silicone Sealants; Tremco “Mono” acrylic sealant or accepted equal. All sealants shall be compatible with the type of glazing and window frame to which they are applied.

2.4 GLAZING ACCESSORIES

A. Setting Blocks: Neoprene EPDM blocks with a Shore A durometer hardness of 85, ±5 percent, chemically compatible with sealant used.

B. Spacer Shims: Neoprene, 50-60 Shore A durometer hardness, minimum 3 inches long by one half the height of the glazing stop by thickness to suit application.

C. Glazing Tape: Prefoamed butyl compound with integral resilient tube spacing device; 10-15 Shore A durometer hardness; coiled on release paper; black color; Tremco No. 440 tape.

D. Glazing Splines: Resilient polyvinyl chloride extruded shape to suit glazing channel retaining slot; black color.

E. Miscellaneous: Furnish all primers-sealers, setting blocks, shims, spacers, compression seals, etc., as required for a first class workmanlike job.

2.5 FABRICATION

A. Flat Glass:
   1. Comply with ASTM C1036 Standard Specification for Flat Glass, Type 1, Class 1 (clear) or Class 2 (tinted, heat-absorbing and light reducing) and Quality q3.
   2. ASTM C1048 Heat Treated Flat Glass, Kind HS or FT, Condition A (uncoated), B (spandrel glass, one surface coated), or C (other coated glass).
      a. Heat Treated Flat Glass to be by horizontal (roller hearth) process with inherent rollerwave distortion parallel to the bottom edge of the glass as installed.
      b. Maximum peak to valley rollerwave 0.003 inch in the central area and 0.008 inch within 10.5 inches of the leading and trailing edge.
      c. Maximum bow and warp 1/32 inch per lineal foot.
      d. All tempered architectural safety glass shall conform to ANSI Z97.1 and CPSC 16 CFR 1201.
e. For all fully tempered glass, provide heat soak testing conforming to EN14179 which includes a two hour dwell at 290 degrees C, ±10 degrees C.

B. Insulating Glass:
   a. Units shall be certified for compliance by the IGCC in accordance with the above ASTM test method.
2. The unit overall thickness tolerance shall be -1/16 inch / +1/32 inch. Unit constructed with patterned glass shall be +/-1/16 inch.
5. Sealed Insulating Glass Units to be double sealed with a primary seal of polyisobutylene and a secondary seal of silicone.
   a. The minimum thickness of the secondary seal shall be 1/16 inch.
   b. The target width of the primary seal shall be 5/32 inch.
   c. There shall be no voids or skips in the primary seal.
   d. Up to a maximum of 3/32 inch of the airspacer may be visible above the primary polyisobutylene sealant.
   e. Gaps or skips between primary and secondary sealant are permitted to a maximum width of 1/16 inch by maximum length of 2 inches with gaps separated by at least 18 inches. Continuous contact between the primary seal and the secondary seal is desired.
6. Provide a hermetically sealed and dehydrated space. Lites shall be separated by an aluminum spacer with three bent corners and one keyed-soldered corner or four bent corners and one straight butyl injected zinc plated steel straight key joint.

C. Coated Vision Glass:
2. Coated products shall be magnetically sputtered vacuum deposition (MSVD).
3. Edge Deletion: When Low-E coatings are used within an insulating unit, coating shall be edge deleted to completely seal the coating within the unit.
   a. The edge deletion should be uniform in appearance (visually straight) and remove at least 95 percent of the coating.

D. Ceramic Coated Glass Products:
2. Silk-screen pattern should be no more than 0.0625 inch off parallel from locating glass edge and no more than 0.0125 inch from edges other than locating glass edge.
3. There shall be a maximum of a 0.03125 inch variation in dot, hole or line location.
PART 3  EXECUTION

3.1  EXAMINATION

A. Verify prepared openings for adequacy to receive glass.
B. Verify that openings for glazing are correctly sized and within tolerance.
C. Verify that surfaces of glazing channels or recesses are clean, free of obstructions, and ready to receive glazing.
D. Report in writing any conditions that may be detrimental to the Work.

3.2  PREPARATION

A. Clean contact surfaces with solvent and wipe dry.
B. Seal porous glazing channels or recesses with substrate compatible primer or sealer.
C. Check that glass is free of edge damage or face imperfections.

3.3  INSTALLATION

A. General: Install glazing types at locations indicated on Drawings, according to glazing manufacturer's recommendations and as specified herein.

B. Glass Glazing:
   1. Positioning Glass: Orient pattern and draw of glass pieces in same direction. Set all sheet glass so that any waves, etc. are horizontal.
   2. Do not cut, nip or abrade tempered glass.
   3. Watershed: Gunnable sealants, when applied as a cap head, shall form a bevel or watershed away from the glass. When tape is used to the sightline, it shall form a watershed when compressed. Do not undercut a sealant, compound, or tape below the sightline. Tool and finish sealant as required. Used toothing solution recommended by the sealant manufacturer.
   4. Positive Contact:
      a. When applying a heel bead, lap onto the glass a minimum of 3/16 inch.
      b. When applying a toe bead, whether continuous or a corner seal, make certain it is large enough to contact both the glass and sash. Install the sealant prior to glass placement.
   5. Setting blocks shall be 1/16 inch less than the full rabbet width, minimum length of 4 inches and high enough to provide the recommended minimum bite and edge clearance for the glass. Center blocks at 1/4 points unless otherwise recommended by the glass manufacturer.
   6. Provide spacer-shims at a maximum of 24 inches on center.
   7. Clearances: Observe minimum face clearances, edge clearance and glass bite as recommended by the glass and sealant manufacturers.
8. Tape Installation: Do not install glazing tapes more than one day ahead of glass placement. Remove the paper backing from the tape only when the lite is ready to be installed. Do not stretch the tape to make it fit. Do not overlap the ends of the tape. Instead, butt ends together, and when corners are butted together, daub with sealant to assure a positive seal.

9. Glazing tapes must be kept under proper compression.

10. Glazing stops shall be installed so that stop or frame does not bear directly against glass.

3.4 CLEANING

A. Clean work under provisions of Division 01.

B. Remove glazing materials from finish surfaces.

C. Remove temporary labels after work is complete.

D. Clean glass.

3.5 PROTECTION OF FINISHED WORK

A. Protect finished Work under provisions of Division 01.

B. Replacement: At completion of building construction and prior to its acceptance, all broken, cracked, excessively scratched, or otherwise imperfect glazing materials included under this Section shall be replaced with new glazing materials of the type specified, as directed by the Architect, and at no additional cost to the Owner.

END OF SECTION
SECTION 08 81 50
VIEW CONTROL DECORATIVE GLAZING FILM

PART 1  GENERAL

1.1  SECTION INCLUDES
A.  View control and decorative film applied to glass.

1.2  RELATED SECTIONS
A.  Section 08 81 00 – Glass Glazing: Mirrors.

1.3  REFERENCES
A.  The publications listed below form a part of this Section to the extent referenced. The publications are referred to in the text by the basic designation only. Refer to Division 01 for definitions, acronyms, and abbreviations.

B.  Standards, manuals, and codes refer to the latest edition of such standards, manuals, and codes in effect as of the date of issue of this Project Manual, unless indicated otherwise in CBC Chapter 35 and CFC Chapter 80.

C.  Referenced Standards:
   1.  IWFA – International Window Film Association.

1.4  SUBMITTALS
A.  Submit under provisions of Division 01.

B.  Product Data:
   1.  Provide for each glazing film type. Provide physical and environmental characteristics, size limitations, handling, and installation requirements.

C.  Samples:
   1.  Glazing Film, Patterns, and Designs: Submit two samples, 12 inches by 12 inches in size, illustrating each type of glazing film, pattern, and design for Architect’s review and acceptance.

1.5  QUALITY ASSURANCE
A.  Manufacturer Qualifications: Glazing film manufacturer specializing in manufacture of safety glazing films with minimum ten years successful experience.

B.  Installer Qualifications: Documented experience in the application of self-adhesive window films with at least ten applications of similar size and complexity, and approved by film manufacturer.

C.  Mock-Up:  Provide a mock-up for evaluation of surface preparation techniques and application workmanship.
   1.  Finish areas designated by Architect.
2. Do not proceed with remaining work until workmanship, color, and sheen are accepted by Architect.
3. Refinish mock-up area as required to produce acceptable work.
4. Accepted mock-ups shall be comparison standard for remaining Work.

1.6 JOB AND ENVIRONMENTAL CONDITIONS
A. Do not install glazing film when ambient temperature is less than 40 degrees F.
B. Maintain minimum ambient temperature before, during and 48 hours after installation of glazing film.

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

1.8 COORDINATION
A. Coordinate Work with glazing frames, wall openings, and adjacent Work.

1.9 DELIVERY, STORAGE, AND HANDLING
A. Store products in manufacturer's unopened packaging until ready for installation.

1.10 WARRANTY
A. Special Warranty for Glazing Films: Manufacturer's standard form in which glazing film manufacturer agrees to replace film that deteriorate within specified warranty period. Defects include peeling, cracking, discoloration, and deterioration of film.
   1. Warranty Period: Ten years from date of Project Completion.

PART 2 PRODUCTS

2.1 MANUFACTURERS AND PRODUCTS
A. Acceptable Manufacturers and Products:
   1. 3M Window Film, Saint Paul, MN; 866-499-8857, www.3m.com/windowfilm. Product: Scotchcal Clear View Graphic Film.
B. Substitutions: Under provisions of Division 01.
2.2 VIEW CONTROL DECORATIVE FILM

A. General: Film shall be manufactured from highly transparent cast PVC printing film and shall be finished to achieve the desired performance and aesthetic characteristics. Finished film shall be self adhesive and include a coating to reduce the effects of scratching and abrasions that occur in normal daily activity. Film shall be applied to interior side of glass surfaces.

B. Film shall consist of (listed from outboard surface to inboard surface):
   1. Removable release liner.
   2. Pressure sensitive adhesive with integral ultraviolet absorbers.
   3. Clear, dyed, or printed pattern layer of polyester film.
   4. Layer of metalized or sputtered polyester film.
   5. Scratch resistant coating.

C. Film Patterns and Designs: As selected by Architect. Provide pattern and design samples for Architect’s review and acceptance.

PART 3 EXECUTION

3.1 EXAMINATION

A. Verify that existing conditions are adequate for proper application and performance of film.

B. Verify glass is not cracked, chipped, broken, or damaged.

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

D. Report in writing any conditions that may be detrimental to Work.

3.2 PREPARATION

A. Clean surfaces thoroughly prior to installation.

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

C. Verify that glass is free of damage or face imperfections.

3.3 INSTALLATION

A. Install in accordance with manufacturer’s printed instructions. Installation shall be accomplished by a recognized professional installer of film for energy control purposes. Completed work shall meet IWFA visual acceptance standard.

B. Decorative Film Overlay: Apply squarely aligned to glass edges, uniformly smooth, free from wrinkles and rough edges, in patterns indicated, to the back face of clean glass, unless otherwise indicated on Drawings.

C. Verify the direction of obscurity for directional films prior to installation.

D. Install without bubbles, ripples, drips, dirt, cuts, tears or gaps between film and frame.
3.4 CLEANING
   A. Clean work under provisions of Division 01.
   B. Clean installed film per manufacturer’s instructions.
   C. Clean newly installed film and window frames after installation.
   D. Clean up cleaning solutions, run-off cleaning water and adhesive mounting solution.

3.5 PROTECTION OF FINISHED WORK
   A. Protect installed products until completion of the project.
   B. Where installed film could be damaged by subsequent construction provide tape warning strips or barricades to prevent contact.
   C. Touch-up, repair or replace damaged products before Project Completion.
   D. At completion of building construction and prior to its acceptance, all cracked, scratched, damaged, or otherwise imperfect glazing film shall be replaced with new glazing film of the type specified, as directed by Architect, and at no cost to Owner.

END OF SECTION
SECTION 08 88 13
FIRE RATED GLAZING

PART 1 GENERAL

1.1 SECTION INCLUDES
A. Fire rated glass and glazing for windows and doors.

1.2 RELATED SECTIONS
A. Section 08 11 13 – Hollow Metal Doors and Frames: Glazed doors and windows.
B. Section 08 14 00 – Wood Doors: Glazed doors.
C. Section 08 81 00 – Glass Glazing.

1.3 REFERENCES
A. The publications listed below form a part of this Section to the extent referenced. The publications are referred to in the text by the basic designation only. Refer to Division 01 for definitions, acronyms, and abbreviations.

B. Standards, manuals, and codes refer to the latest edition of such standards, manuals, and codes in effect as of the date of issue of this Project Manual, unless indicated otherwise in CBC Chapter 35 and CFC Chapter 80.

C. Referenced Standards:
15. UL 9 – Fire Tests of Window Assemblies.
16. UL 10B – Fire Tests of Door Assemblies.
17. UL 10C – Positive Pressure Fire Tests of Door Assemblies.

1.4 SUBMITTALS

A. Submit under provisions of Division 01.
B. Product Data on Glass Types Specified: Provide structural, physical and environmental characteristics, size limitations, and special handling or installation requirements.
C. Product Data on Glazing Compounds: Provide chemical, functional, and environmental characteristics, limitations, and special handling or installation requirements.
D. Samples:
   1. Glass: Submit two samples, 12 inches x 12 inches in size, illustrating each type of glazing.
   2. Glazing Sealant: Submit 3 inch long bead of glazing sealant, color as selected.

1.5 QUALITY ASSURANCE

B. Installer's Qualifications: The installation shall be performed only by an installation firm normally engaged in this business. All work shall be performed by qualified mechanics that specialize in glazing and glass installation.
C. Safety glazing shall meet the requirements of 2016 CBC Section 2406 and shall be identified in accordance with 2016 CBC Sections 2403.1 and 2406.3, with identification etched in glass.
D. Fire Protective Rated Glass:
   1. Fire rated glazing shall be under current follow-up service by a nationally recognized independent testing laboratory and maintain a current listing or certification. Assemblies shall be labeled in accordance with limits of listings.
      a. Each lute shall bear permanent, non-removable label certifying it for use in tested and rated fire protective assemblies.
   2. Fire Protective Glazing Products for Door Assemblies: Products identical to those tested per ASTM E2074 and UL 10B, labeled and listed by UL.
1.6 DEFINITIONS

A. Fire-Rated Glazing Assembly Identification Markings per CBC Sections 703.6 and 716.3:

<table>
<thead>
<tr>
<th>Fire Test Standard</th>
<th>Marking</th>
<th>Definition of Marking</th>
</tr>
</thead>
<tbody>
<tr>
<td>ASTM E119 or UL 263</td>
<td>W</td>
<td>Meets wall assembly criteria.</td>
</tr>
<tr>
<td>NFPA 257 or UL 9</td>
<td>OH</td>
<td>Meets fire window assembly criteria including the hose stream test.</td>
</tr>
<tr>
<td>NFPA 252 or UL 10B or UL 10C</td>
<td>D</td>
<td>Meets fire door assembly criteria</td>
</tr>
<tr>
<td></td>
<td>H</td>
<td>Meets fire door assembly hose stream test.</td>
</tr>
<tr>
<td></td>
<td>T</td>
<td>Meets 450 degree F temperature rise criteria for 30 minutes.</td>
</tr>
<tr>
<td></td>
<td>XXX</td>
<td>The time in minutes of the fire resistance or fire protection rating of the glazing assembly.</td>
</tr>
</tbody>
</table>

1.7 JOB AND ENVIRONMENTAL CONDITIONS

A. Do not install glazing when ambient temperature is less than 40 degrees F.

B. Maintain minimum ambient temperature before, during and 48 hours after installation of glazing compounds.

1.8 FIELD MEASUREMENTS

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

1.9 COORDINATION

A. Coordinate Work with glazing frames, wall openings, and adjacent Work.

PART 2 PRODUCTS

2.1 GENERAL

A. All glass shall be graded and meet requirements of ASTM C1036 and ASTM C1048, Type I, quality q3. Each light of glass delivered and installed shall have affixed thereto the manufacturer's grade label.

B. Glazing material installed in Hazardous Locations, subject to human impact, shall be certified and permanently labeled as meeting applicable requirements referenced in NFPA 80.
   1. CPSC 16 CFR 1201, Category I and II.
   2. Glazing in multipurpose gymnasiums, basketball courts, and similar athletic facilities in areas subject to human impact load shall meet CPSC 16 CFR 1201, Category II or Class A of ANSI Z97.1 per CBC Section 2408.
C. Each piece of fire-rated glazing material shall be labeled with a permanent logo including name of product, manufacturer, testing laboratory, fire rating period, and safety glazing standards.

2.2 GLASS TYPES

A. Fire Protective Rated Glass in 20 minute assemblies:
   1. Acceptable Manufacturers:
      b. Technical Glass Products (TGP).
      c. Pilkington.
      d. Vetrotech Saint-Gobain.
      e. Substitutions: Under provisions of Division 01.

B. Fire Protective Rated Glass in 45 minute assemblies:
   1. Acceptable Manufacturers:
      b. Technical Glass Products (TGP).
      c. Pilkington.
      d. Vetrotech Saint-Gobain.
      e. Substitutions: Under provisions of Division 01.
   2. Material: 3/4 inch thick, 45-minute rated assembly consisting of inboard and outboard sheets of clear tempered glass with a fire resistive interlayer marked in accordance with CBC Sections 703.6 and 716.3. Product shall meet the requirements of ANSI Z97.1, CPSC 16 CFR 1201 Category I and II, and UL 10C.

2.3 GLAZING SEALANT

A. Fire-Rated Glazing Tape: UL 10B and UL 10C compliant, high performance fire-rated glazing tape; Pemko FG3000 or accepted equal. Glazing tape shall be installed on both sides of frame at all vision lites in fire-rated doors. Tape shall be compatible with and acceptable for use with the type of glazing and window frame to which they are applied.

2.4 GLAZING ACCESSORIES

A. Setting Blocks: Fire-Rated: Calcium silicate blocks, chemically compatible with sealant used.

B. Spacer Shims: Neoprene, 50-60 Shore A durometer hardness, minimum 3 inches long by one half the height of the glazing stop by thickness to suit application.

C. Glazing Tape: Preformed butyl compound with integral resilient tube spacing device; 10-15 Shore A durometer hardness; coiled on release paper; black color; Tremco No. 440 tape or accepted equal.

D. Glazing Splines: Resilient polyvinyl chloride extruded shape to suit glazing channel retaining slot; black color.
E. Miscellaneous: Furnish all primers-sealers, setting blocks, shims, spacers, compression seals, etc., as required for a first class workmanlike job.

PART 3 EXECUTION

3.1 EXAMINATION

A. Verify prepared openings for adequacy to receive glass.

B. Verify that openings for glazing are correctly sized and within tolerance.

C. Verify that surfaces of glazing channels or recesses are clean, free of obstructions, and ready to receive glazing.

D. Report in writing any conditions that may be detrimental to the Work.

3.2 PREPARATION

A. Clean contact surfaces with solvent and wipe dry.

B. Seal porous glazing channels or recesses with substrate compatible primer or sealer.

C. Check that glass is free of edge damage or face imperfections.

3.3 INSTALLATION

A. General: Install glazing types at locations indicated on Drawings, according to glazing manufacturer's recommendations and as specified herein.

B. Glass Glazing:
   1. Positioning Glass: Orient pattern and draw of glass pieces in same direction. Set all sheet glass so that any waves, etc. are horizontal.
   2. Do not cut, nip or abrade tempered glass.
   3. Watershed: Gunnable sealants, when applied as a cap head, shall form a bevel or watershed away from the glass. When tape is used to the sightline, it shall form a watershed when compressed. Do not undercut a sealant, compound, or tape below the sightline. Tool and finish sealant as required. Used tooling solution recommended by the sealant manufacturer.
   4. Positive Contact:
      a. When applying a heel bead, lap onto the glass a minimum of 3/16 inch.
      b. When applying a toe bead, whether continuous or a corner seal, make certain it is large enough to contact both the glass and sash. Install the sealant prior to glass placement.
   5. Setting blocks shall be 1/16 inch less than the full rabbet width, minimum length of 4 inches and high enough to provide the recommended minimum bite and edge clearance for the glass. Center blocks at 1/4 points unless otherwise recommended by the glass manufacturer.
   6. Provide spacer-shims at a maximum of 24 inches on center.
   7. Clearances: Observe minimum face clearances, edge clearance and glass bite as recommended by the glass and sealant manufacturers.
8. Tape Installation: Do not install glazing tapes more than one day ahead of glass placement. Remove the paper backing from the tape only when the lite is ready to be installed. Do not stretch the tape to make it fit. Do not overlap the ends of the tape. Instead, butt ends together, and when corners are butted together, daub with sealant to assure a positive seal.

9. Glazing tapes must be kept under proper compression.

10. Glazing stops shall be installed so that stop or frame does not bear directly against glass.

11. Install glazing in fire-rated assemblies to requirements of NFPA 80.
    a. Install so that appropriate UL markings remain permanently visible.

3.4 CLEANING

A. Clean work under provisions of Division 01.

B. Remove glazing materials from finish surfaces.

C. Remove temporary labels after work is complete.

D. Clean glass.

3.5 PROTECTION OF FINISHED WORK

A. Protect finished Work under provisions of Division 01.

B. Replacement: At completion of building construction and prior to its acceptance, all broken, cracked, excessively scratched, or otherwise imperfect glazing materials included under this Section shall be replaced with new glazing materials of the type specified, as directed by the Architect, and at no additional cost to the Owner.

END OF SECTION
DIVISION 09
FINISHES
SECTION 09 22 16
NON-STRUCTURAL METAL FRAMING

PART 1  GENERAL

1.1  SECTION INCLUDES

A. Section includes metal stud and joist framing and accessories at interior locations.

1.2  RELATED SECTIONS

A. Section 01 81 13 – Sustainable Design Requirements; for additional LEED requirements.
B. Section 05 40 00 – Cold-Formed Metal Framing.
C. Section 05 50 00 – Metal Fabrications: Metal fabrications attached to stud framing.
D. Section 06 10 00 – Rough Carpentry: Rough wood blocking within stud framing.
E. Section 07 92 00 – Joint Sealants.
F. Section 08 11 13 – Hollow Metal Doors and Frames.
G. Section 09 29 00 – Gypsum Board.
H. Section 09 81 00 – Acoustic Insulation.

1.3  REFERENCES

A. The publications listed below form a part of this Section to the extent referenced. The publications are referred to in the text by the basic designation only. Refer to Division 01 for definitions, acronyms, and abbreviations.

B. Standards, manuals, and codes refer to the latest edition of such standards, manuals, and codes in effect as of the date of issue of this Project Manual, unless indicated otherwise in CBC Chapter 35 and CFC Chapter 80.

C. Referenced Standards:

1. ASTM A653/A653M – Standard Specification for Steel Sheet, Zinc-Coated (Galvanized) or Zinc-Iron Alloy-Coated (Galvannealed) by the Hot-Dip Process.
5. ASTM C1513 – Standard Specification for Steel Tapping Screws for Cold-Formed Steel Framing Connections.
1.4 SUBMITTALS

A. Submit under provisions of Division 01.

B. Shop Drawings:
   1. Indicate component details, stud layout, framed openings, anchorage to structure, type and location of fasteners and accessories or items required of other related work.
   2. Describe method for securing studs to tracks, splicing and for blocking and reinforcement to framing connections.

C. Product Data: Submit data describing standard framing member materials and finish, product criteria, load charts and limitations.

D. Manufacturer's Installation Instructions: Submit special procedures, perimeter conditions requiring special attention.

E. LEED Submittals:
   1. Product Data for MR Credit 3: For products having recycled content, documentation indicating percentages by weight of postconsumer and preconsumer recycled content. Include statement indicating cost for each product having recycled content.
   2. Product Data for MR Credit 3: For products where product manufacturing is within a 100 mile radius of the jobsite and the point of extraction of the raw materials. Include a statement indicating the location and distances for the manufacturing plant and the point of extraction of raw materials in relation to the jobsite location.

F. Evaluation Reports: For products not covered in SSMA standards, submit manufacturer's current ICC report reviewed per the applicable building code.

1.5 SYSTEM DESCRIPTION

A. Interior Walls: Metal stud framing system with batt type acoustic insulation specified in Section 09 81 00 and interior gypsum board specified in Section 09 29 00.

B. Maximum Allowable Deflection:
   1. 1:120 span at gypsum board finish.
   2. 1:240 span at ceramic tile finishes.

C. Wall and Ceiling Systems:
   1. Design to provide for movement of components without damage, failure of joint seals, undue stress on fasteners, or other detrimental effects when subject to seasonal or cyclic day/night temperature ranges.

1.6 QUALITY ASSURANCE

A. All products shall be manufactured by a current member of the SSMA.

B. Perform Work in accordance with ASTM C754.

C. Comply with 2016 CBC, Chapter 22A, Section 2211A.

D. Form, fabricate, install, and connect components in accordance with ML/SFA 540.
1.7 QUALIFICATIONS
   A. Manufacturer: Company specializing in manufacturing products specified in this Section.
   B. Installer: Company specializing in performing Work of this Section.

1.8 DELIVERY, STORAGE, AND HANDLING
   A. Notify manufacturer of damaged materials received. Do not install damaged materials.
   B. Deliver materials in manufacturer’s original, unopened, undamaged containers with identification labels intact.
   C. Protect cold-formed metal framing products from corrosion, deformation, and other damage during delivery, storage, and handling as required by AISI’s “Code of Standard Practice”.

1.9 PRE-INSTALLATION MEETING
   A. Convene minimum one week prior to commencing Work of this Section under provisions of Division 01.

1.10 COORDINATION
   A. Coordinate placement of components within stud framing system.

PART 2 PRODUCTS

2.1 LEED™ REQUIREMENTS
   A. Recycled Content: Provide products with recycled content such that post-consumer recycled content plus one-half of pre-consumer recycled content, calculated as percentages of total product weight, shall contribute to the LEED Credit requirement for recycled content.

2.2 METAL FRAMING SYSTEM
   A. Acceptable Manufacturers:
   B. Substitutions: Under provisions of Division 01.

2.3 COMPONENTS
   A. Framing System Components:
      1. 20 Gauge and Thinner: Manufactured per ASTM C645 with material meeting the requirements of ASTM A1003, Non-structural Grade 33 (NS33).
      2. 18 Gauge: Manufactured with material meeting the requirements of ASTM A1003, Structural Grade 33, Type H (ST33H).
      3. 16 Gauge and Thicker: Manufactured with material meeting the requirements of ASTM A1003, Structural Grade 50, Type H (ST50H).
B. Studs and Joists: ASTM A653/A653M non-load bearing rolled steel, channel shaped, punched for utility access, depths, gauges, and spacing as indicated on the Drawings.

C. Tracks and Headers: Same material and thickness as studs, bent leg retainer notched to receive studs. Top track shall have extended leg retainers.

D. Slotted Track: Slotted track system for positive attachment of metal studs to track, for Head of Wall expansion joint movement (cyclic) and static Joint System in fire-rated construction, as detailed and required on Drawings, in compliance with UL 2079 cyclical movement ± 1/2 inch overall 1 inch movement. Products: BlazeFrame DSL at rated assemblies and MaxTrak at non-rated assemblies as manufactured by ClarkDietrich Building Systems or accepted equal.

1. Forming steel shall conform to ASTM A1003, Structural Grade 33, Type H (ST33H).
2. Formed steel shall be galvanized in accordance with ASTM A653 for a Class G-40 by the hot dip process.
3. Slotted track shall be provided in standard widths and gauges, as required and indicated on Drawings. Down standing legs shall be nominally 2-1/2 inches and shall be provided with 1-1/2 inch slots at 1 inch on center.
4. Fasteners:
   a. For attachment of studs to slotted track, minimum No. 8 corrosion resistant by 1/2 inch waferhead screws.
   b. For attachment of slotted track to overhead structural element, as provided for the structural details affecting the work.

E. Furring and Bracing Members: Of same material as studs; thickness to suit purpose.

F. Sheet Metal Backing: 16 gauge, unless noted otherwise on Drawings.


H. Headers and Jambs: Manufacturer's proprietary shape used to form header beams and jambs, columns, or posts of web depths indicated, unpunched, with stiffened flanges.

I. Fasteners: ASTM C1513, self-drilling, self-tapping corrosion resistant screws.

J. Anchorage Devices: As indicated on Drawings.

K. Touch-Up Primer for Galvanized Surfaces: SSPC-Paint 20 Type II organic zinc rich.

2.4 FINISHES

A. Studs and Joists: Provide galvanized finish as follows:
   1. Coating Class: G-60 per ASTM A653.

B. Tracks and Headers: Provide galvanized finish as follows:
   1. Coating Class: G-60 per ASTM A653.

C. Bracing, Furring, Bridging: ASTM C645, hot dip galvanized to Coating Class G-60 per ASTM A653.

D. Plates, Gussets, Clips: ASTM C645, hot dip galvanized to Coating Class G-60 per ASTM A653.

E. No equivalent coatings allowed.
PART 3  EXECUTION

3.1  EXAMINATION

A. Verify rough-in utilities are in proper location.

3.2  INSTALLATION

A. Install metal framing per ASTM C754 and as indicated on Drawings.
B. Align and secure top and bottom runners as indicated on Drawings.
C. Place two beads of acoustic sealant between tracks and substrate, studs and adjacent construction, to achieve acoustic seal.
D. Place two beads of acoustic sealant between studs and adjacent vertical surfaces to achieve acoustic seal.
E. Framing at openings shall be as shown on Drawings. Install intermediate studs at same spacing as wall studs.
F. Install studs vertically at 16 inches on center unless otherwise noted on Drawings.
G. Install joists horizontally at 16 inches on center unless otherwise noted on Drawings.
H. Align stud web openings horizontally.
I. Secure studs to tracks as indicated on Drawings.
J. Stud splicing not permissible.
K. Fabricate corners using minimum of three studs.
L. Double stud at wall openings and door and window jambs, not more than 2 inches from each side of openings.
M. Brace stud framing system rigid.
N. Coordinate erection of studs with requirements of door frames and window frames; install supports and attachments.
O. Backing/Blocking: Shall be provided for all wall and ceiling finishes and for the supporting and anchorage of products, fixtures and equipment for all trades, including, but not limited to, toilet partitions, toilet room accessories, casework, mirrors, trim, applied wall finishes, artwork, wall bumpers, plumbing and electrical fixtures, etc. Coordinate size, type, and location of backing and supports with manufacturer or supplier of items requiring backing/blocking.
P. Refer to Drawings for indication of partitions extending stud framing through ceiling to structure above. Maintain clearance under structural building members to avoid deflection transfer to studs. Install extended leg top track for slip connection.
Q. Refer to Drawings for indication of partitions through ceiling, but not to structure above. Install diagonal stud bracing staggered at 48 inches on center to structure above. Stud bracing width and gauge shall match that of the stud framing below.
R. Coordinate placement of insulation in stud spaces after stud frame erection.
3.3 ERECTION TOLERANCES

A. Maximum Variation From Indicated Position: 1/8 inch in 10 feet (non-cumulative).

B. Maximum Variation From Plumb: 1/8 inch in 10 feet (non-cumulative).

END OF SECTION
SECTION 09 24 00
PORTLAND CEMENT PLASTERING

PART 1  GENERAL

1.1  SECTION INCLUDES

A. Metal furring and lathing.
B. Building wrap (weather-resistant barrier) under metal lath, and over rigid insulation sheathing.
   1. Provide a two-layer building wrap system as follows:
      a. One layer of kraft building paper over one layer of HDPE product.
      b. Flashing as recommended by building wrap manufacturer.
C. Two-coat (scratch and brown) Portland cement plaster system as base for surface-bonded brick masonry.
D. Three-coat Portland cement plaster system with integral color acrylic finish coat.

1.2  RELATED SECTIONS

A. Section 04 21 13.23 – Surface-Bonded Brick Masonry.
B. Section 05 40 00 – Cold-Formed Metal Framing.
C. Section 06 10 00 – Rough Carpentry.
D. Section 07 21 00 – Thermal Insulation.
E. Section 07 25 00 – Weather Barriers.
F. Section 07 92 00 – Joint Sealants.

1.3  REFERENCES

A. The publications listed below form a part of this Section to the extent referenced. The publications are referred to in the text by the basic designation only. Refer to Division 01 for definitions, acronyms, and abbreviations.

B. Standards, manuals, and codes refer to the latest edition of such standards, manuals, and codes in effect as of the date of issue of this Project Manual, unless indicated otherwise in CBC Chapter 35 and CFC Chapter 80.

C. Referenced Standards:
   2. ASTM A653/A653M – Standard Specification for Steel Sheet, Zinc-Coated (Galvanized) or Zinc-Iron Alloy-Coated (Galvannealed) by the Hot-Dip Process.


11. ASTM C954 – Standard Specification for Steel Drill Screws for the Application of Gypsum Panel Products or Metal Plaster Bases to Steel Studs From 0.033 in. (0.84 mm) to 0.112 in. (2.84 mm) in Thickness.

12. ASTM C1002 – Standard Specification for Steel Self-Piercing Tapping Screws for the Application of Gypsum Panel Products or Metal Plaster Bases to Wood Studs or Steel Studs.


24. FS TT-C-555 – Coating, Textured (for Interior and Exterior Masonry Surfaces).

1.4 SUBMITTALS

A. Submit product data under provisions of Division 01.
B. Provide product data on building wrap, furring and lathing components, plaster materials, characteristics and limitations of products specified, and plastering accessories.
C. Submit manufacturer's installation instructions under provisions of Division 01.
D. Provide two 12 inch x 12 inch samples of plaster system for each type of color and texture scheduled for installation.

1.5 QUALITY ASSURANCE

A. Applicator: Company specializing in cement plaster work sufficient documented experience.
B. Apply cement plaster system in accordance with ASTM C926.

1.6 DELIVERY, STORAGE AND HANDLING

A. Delivery, storage, and handling in accordance with provisions of Division 01.
   1. Deliver manufactured products to job site in their original unopened containers with labels intact and legible at the time of use.
   2. Do not permit scattering of materials or equipment but use necessary means to ensure neatness of the site and structure at all times.
   3. Perform cleaning of tools and equipment only in the area designated for that purpose.
B. Protection: Use means necessary to protect lath and plaster materials before, during and after installation and to protect the installed work and materials of other trades.
C. Replacements: In the event of damage, immediately make repairs and replacements necessary to the approval of the Architect and at no additional cost to Owner.

1.7 ENVIRONMENTAL REQUIREMENTS

A. Do not apply plaster when substrate or ambient air temperature is less than 35 degrees F nor more than 90 degrees F. If freezing is expected within the next twelve hours, do not apply plaster.
B. Maintain minimum ambient temperature of 35 degrees F during and after installation of plaster.
C. Protect plaster from uneven and excessive evaporation during any weather conditions.

PART 2 PRODUCTS

2.1 PLASTER MATERIALS

A. Cement: ASTM C150, Normal – Type I or Type II, low alkali; gray color; Portland Cement.
B. Lime:
   1. ASTM C206, Type S.

C. Aggregate: In accordance with ANSI/ASTM C897, except that gradation shall meet the following requirements:

<table>
<thead>
<tr>
<th>Sieve Size</th>
<th>Percent Retained on each sieve (by weight)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Maximum</td>
</tr>
<tr>
<td>No. 4</td>
<td>0</td>
</tr>
<tr>
<td>No. 8</td>
<td>10</td>
</tr>
<tr>
<td>No. 16</td>
<td>40</td>
</tr>
<tr>
<td>No. 30</td>
<td>65</td>
</tr>
<tr>
<td>No. 50</td>
<td>90</td>
</tr>
<tr>
<td>No. 100</td>
<td>100</td>
</tr>
</tbody>
</table>

The sand shall have more than 50 percent retained between any two consecutive sieves nor more than 25 percent between Nos. 50 and 100 sieves.

D. Water: Clean, fresh, potable and free of mineral or organic matter that can affect plaster system components.

E. Acrylic Finish Coat: Vapor permeable, 100 percent acrylic polymer finish coat with crushed mineral aggregates, meeting the following performance criteria:

<table>
<thead>
<tr>
<th>Property</th>
<th>Test Method</th>
<th>Results</th>
</tr>
</thead>
<tbody>
<tr>
<td>Adhesion to concrete</td>
<td>ASTM D4541</td>
<td>100 psi</td>
</tr>
<tr>
<td>Vapor permeability</td>
<td>ASTM D1653 Method A</td>
<td>3.0 dry perms</td>
</tr>
<tr>
<td></td>
<td>ASTM D1653 Method B</td>
<td>9.7 wet perms</td>
</tr>
<tr>
<td>Abrasion resistant (1000 cy)</td>
<td>ASTM D4060</td>
<td>6.8 percent weight loss</td>
</tr>
<tr>
<td>Tensile strength</td>
<td>ASTM D412</td>
<td>200 psi</td>
</tr>
<tr>
<td>Nontextured film</td>
<td></td>
<td>20 psi</td>
</tr>
<tr>
<td>Textured film</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Elongation Nontextured film</td>
<td>ASTM D412</td>
<td>30 percent</td>
</tr>
<tr>
<td>Wind driven rain</td>
<td>Federal Spec TT-C-555B</td>
<td>Pass</td>
</tr>
<tr>
<td>Accelerated weathering 2000 hours</td>
<td>ASTM G155</td>
<td>No cracking, blistering, checking or adhesion loss</td>
</tr>
<tr>
<td>Freeze-thaw resistance of dry film (25 cy)</td>
<td>Lab method</td>
<td>Pass</td>
</tr>
<tr>
<td>Dirt pickup</td>
<td>Lab method</td>
<td>None</td>
</tr>
<tr>
<td>Chemical resistance</td>
<td>ASTM D1308</td>
<td>Good resistance to mild acids, alkalis and salts</td>
</tr>
<tr>
<td>Flame Spread</td>
<td>ASTM E84</td>
<td>15 maximum</td>
</tr>
<tr>
<td>Smoke Developed</td>
<td>ASTM E84</td>
<td>10 maximum</td>
</tr>
</tbody>
</table>
1. Acceptable manufacturers:
   a. Dryvit Weatherlastic.
   b. Omega Akroflex.
   c. ParexLaHabra DPR Finish.
   d. Substitutions: Under provisions of Division 01.

2. Color and Texture: As selected by Architect.

3. Accessories: Leveler and primer as manufactured by the finish coat manufacturer.

2.2 LATH AND LATH ACCESSORIES

A. General: Conforming to ASTM C1063; fabricated from ASTM A924/A924M G60 galvanized steel, 26 gage minimum or ASTM A641/A641M Class 1 hot-dipped steel wire, unless noted otherwise.

B. Metal Lath: Self furred, grooved, galvanized expanded metal flat diamond mesh; weighing 3.4 pounds per square yard; continuous horizontal grooves 1/4 inch deep at 6-3/16 inches on center as manufactured by ClarkDietrich Building Systems, Cemco, Amico or accepted equal.

1. Acceptable Alternative Metal Lath: Structa Mega Lath as manufactured by Structa Wire Corporation with the following characteristics:
   a. Weight: 1.95 pounds per square yard.
   b. No. 17 gauge x No. 16 gauge galvanized cold-rolled steel wire welded to form 0.7 inch x 1.5 inch openings.
   c. Six secondary cold-rolled flat longitudinal wires spaced nominally every 5-3/8 inches to form a twin track.
   d. Furring:
      1) Width of Furring Leg: 1/4 inch.
      2) Furring Height: 1/4 inch to underside of cross wire.
      3) Furring Spacing: 2-1/8 inch on center.
      4) Every cross wire is furred.

C. Metal Lath corner reinforcement at exterior corners: Self furring expanded metal flat diamond mesh; weighing 3.4 pounds per square yard; galvanized finish as manufactured by ClarkDietrich Building Systems, Cemco, Amico or accepted equal.

D. Expanded Corner Bead: Formed steel, minimum 26 gauge thick, shaped to permit complete embedding in plaster; galvanized finish; No. 1A as manufactured by ClarkDietrich Building Systems, Cemco, Amico or accepted equal.

E. Casing Beads: Formed steel, minimum 26 gauge thick; of longest possible length; sized and profiled to suit application; galvanized finish; No. 66 casing bead as manufactured by ClarkDietrich Building Systems, Cemco, Amico, Brand X Metals Inc., or accepted equal.

F. Weep Screeds: Formed steel, minimum 26 gauge thick; square flange, 3-1/2 inch high leg, of longest possible length; sized and profiled to suit application; galvanized finish; No. 7 foundation sill screed as manufactured by ClarkDietrich Building Systems, Cemco, Amico, Brand X Metals Inc., or accepted equal.
G. Control Joints: Formed steel; minimum 26 gauge accordion profile, expanded metal flanges each side; of longest possible length; sized and profiled to suit application; galvanized finish; No. XJ 15, as manufactured by ClarkDietrich Building Systems, Cemco, Amico, Brand X Metals Inc., or accepted equal.

H. Strip Mesh at horizontal surfaces and corners of openings: Expanded metal flat diamond; weighing 3.4 pounds per square yard; galvanized finish; 4 inches wide as manufactured by ClarkDietrich Building Systems, Cemco, Amico or accepted equal.

I. Substitutions: Under provisions of Division 01.

2.3 LATH ANCHORAGE

A. Anchorages at metal framing: Install galvanized # 8 wafer head screws at 6 inches on center vertically at each stud x length as required for 3/8 inch penetration into framing members.

1. ASTM C954, self-drilling and self tapping screws for heavy gauge steel framing (0.033 inch to 0.112 inch thick). Minimum 500 hour corrosion resistant finish per ASTM B117.

2. ASTM C1002, self drilling and self tapping screws for light gauge steel framing (less than 0.033 inch thick). Minimum 500 hour corrosion resistant finish per ASTM B117.

B. Anchorages at wood framing: Install ASTM C1002 galvanized # 8 wafer head screws at 6 inches on center vertically at each stud with minimum 3/4 inch embedment into framing members. Minimum 500 hour corrosion resistant finish per ASTM B117.

2.4 BUILDING WRAP (WEATHER RESISTIVE BARRIER)

A. Building wrap shall consist of two layers: one layer of kraft building paper installed over one layer of HDPE product.

B. HDPE and Flexible Flashing Products: Refer to Section 07 25 00.

C. Kraft Building Paper: Grade D water-vapor-permeable, asphalt-saturated kraft building paper.

1. Manufacturer and Product: Jumbo Tex Classic as manufactured by Fortifiber Building Systems Group or accepted equal.

2. Properties:
   a. Water Holdout: 20 minutes per ASTM D779.
   b. Vapor Permeability: 29 perms/200 grams per ASTM E96.
   c. Tensile Strength: Tested in accordance with ASTM D882.
      1) Cross Machine Direction: 29 lbf per inch.
      2) Machine Direction: 70 lbf per inch.
   d. Surface Burning Characteristics: Class I (NFPA Class A) per ASTM E84.
      1) Flame Spread: 30 per ASTM E84.
      2) Smoke Developed: 60 per ASTM E84.

2.5 CEMENT PLASTER MIXES

A. Mix and proportion cement plaster in accordance with ASTM C926 and PCA Portland Cement/Stucco Manual. Mix plasticity agents (lime replacement admixtures) in accordance with manufacturer’s written instructions and ICC-ES Report.
B. Mix and proportion cement plaster as follows:
   1. Scratch Coat Proportions: One part Portland cement, four parts aggregate and three ounces PRF admixture.
   3. Finish Coat Proportions: Per manufacturer's recommendations.

C. Mix only as much plaster as can be used in one hour.

D. Mix materials dry, to uniform color and consistency, before adding water.

E. Protect mixtures from frost, contamination, and evaporation.

F. Do not retemper mixes after initial set has occurred.

2.6 SEALANTS
   A. Sealants used in conjunction with the scratch, brown, and finish coats shall only be the type recommended by the product manufacturer(s).

PART 3 EXECUTION

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

   B. Inspect the installed work of other trades and verify that such work is complete to the point work of this Section may begin.

   C. Verify that substrate is plumb, level, square and aligned.

   D. Report in writing conditions which might adversely affect the performance of installed lath and plaster to the Architect.

   E. Beginning of installation means acceptance of existing conditions.

3.2 PREPARATION
   A. Protect surfaces near the work of this Section from damage or disfiguration.

3.3 BUILDING WRAP (WEATHER RESISTIVE BARRIER) INSTALLATION
   A. At all areas of Portland cement plaster system, apply two-layers of building wrap (weather resistant barrier). Install one layer of kraft building paper over one layer of HDPE product.

   B. HDPE and Flexible Flashing Product Installation: Refer to Section 07 25 00.

   C. Kraft Building Paper Installation: Apply kraft building paper over HDPE product, horizontally with a 3-inch overlap and a 6-inch end lap and fasten in place. Joints shall be staggered over HDPE product joints.

      1. Extend into jambs of openings and seal corners with tape.
      2. Seal fasteners and penetrations with compatible sealing tape.
3.4 LATH AND LATH ACCESSORIES INSTALLATION

A. Install metal plaster bases and accessories in conformance with ASTM C1063. All vertically placed accessories shall be installed continuously; breaks shall occur only at horizontally placed accessories where they intersect vertically placed accessories.

B. Lath shall be installed as specified in CBC Sections 2507.3 and 2510 and CBC Table 2507.2 for wire fabric lath. The lath shall be installed with the cross wires parallel to the framing and shall be attached with fasteners at the furring crimps.

C. Apply metal lath with the long dimension across the supports with true, even surfaces, and without sags or buckles in accordance with ASTM C841. Orient metal lath on vertical surfaces to provide maximum mechanical bond with plaster. Apply upper sheets to overlap lower sheets.

D. Attach metal lath to framing members at maximum 6 inches on center.

E. Lath shall stand off substrate immediately behind the lath a minimum of 1/4 inch.

F. Continuously reinforce internal angles with additional layer of lath, 6 inches wide minimum, except where the metal lath returns 3 inches from corner to form the angle reinforcement. Fasten at perimeter edges only.

G. Place corned bead with mesh at corners. Attach with fasteners as recommended by manufacturer, spaced not more than 18 inches on center. Fasten at outer edges only.

H. Place minimum 4 inch wide strip mesh diagonally at corners of lathed openings. Secure rigidly in place. Extend minimum 8 inches diagonally each direction from point of corner.

I. Place casing beads at terminations of plaster finish. Butt and align ends. Secure rigidly in place.

J. Install accessories to lines and levels.

3.5 CONTROL JOINTS

A. At stud framing, locate exterior control joints every twelve feet in each direction, or as indicated on the Drawings. Vertical control joints shall be continuous; terminate horizontal control joints at vertical control joints. Install on top of metal lath and attach by wiring to metal lath.

3.6 PLASTERING

A. Apply plaster in accordance with CBC Section 2512 and ASTM C926.

B. Control plaster thickness and surface evenness using grounds or screeds. Use temporary screeds or plaster screeds within plastered areas to supplement fixed grounds and screeds.

C. Apply scratch coat to a nominal thickness of 3/8 inch over metal reinforcement. Use sufficient material to form good keys, to completely embed the lath, and to allow for scoring of cement plaster surface.

1. After application, lightly score scratch coat horizontally.

2. If brown coat cannot be applied within four hours, keep scratch coat moist for a minimum of 48 hours before applying brown coat.
D. Apply brown coat to a nominal thickness of 3/8 inch over scratch coat. Use sufficient material and pressure to ensure a tight, uniform bond to scratch coat. Rod brown coat straight and true in all directions.

E. Moist cure brown coat for a minimum of seven days before applying finish coat.

3.7 CURING OF BASE COAT (SCRATCH AND BROWN COATS)

A. Moist cure base coat when ambient temperature is 77 degrees F or higher and/or when relative humidity is below 70 percent and conditions are windy.

B. Moist cure base coat as follows:
   1. Only when base coat has set and is hard,
   2. In the morning and late afternoon for at least two days,
   3. With a fine mist of clean water; do not saturate,
   4. Cover with polyethylene sheets to retard evaporation during extreme weather conditions,
   5. Do not cure base coat that is subject to freezing.

3.8 ACRYLIC FINISH COAT

A. Surface Preparation:
   1. Surfaces to receive acrylic finishes must be structurally sound, clean and dry. Cement plaster base coats must be properly cured and free of all grease, mildew, fungus, efflorescence, and any other contaminant.
   2. Contaminants must be removed by wire brush, pressure washing or sandblasting. Efflorescence shall be removed by a diluted acid wash and rinse.
   3. Loose deteriorated stucco must be removed and repaired. Soft, dry dusty surfaces must be properly treated to insure adhesion of acrylic finish.
   4. Verify that basecoat pH level is below 10.
   5. Verify that ambient temperature is at least 40 degrees F and rising during application and for at least 24 hours after application.
   6. Apply sealant as recommended by finish coat manufacturer where appropriate at terminations and the junctions of dissimilar materials.
   7. Apply a leveler as necessary to achieve a flat surface prior to the application of the finish coat. The leveler shall be manufactured by the same manufacturer as the finish coat and shall be compatible for use with the plaster brown coat, the primer and the acrylic finish coat.

B. Priming:
   1. Apply primer to all repaired, patched or chalking surfaces. An existing coating totally free of chalking does not require priming.
   2. For improved finish coverage and workability, apply primer over Portland cement base coats.
   3. Allow 24 hours for primer to dry before application of acrylic finish coats.
   4. Primer shall be from the same manufacturer as the finish coat manufacturer.
C. Application:
   1. Refer to manufacturer's instructions for application of leveler, primer and acrylic finish.
   2. The finish coat shall be applied and leveled to the minimum required thickness in the same application.
      a. The finish coat shall be applied and textured continually over the wall surface in order to maintain a wet edge and provide a uniform appearance.
      b. Work to corners or joints and do not allow the partially applied material to set up within a distinct wall area.
      c. Achieve the final texture by using trowels or floats with a variety of motions to create the specified texture and to match approved samples.
      d. At exterior corners, the finish coat shall be applied so that the nose wire is covered with a minimum of 1/8 inch of plaster.

3.9 TOLERANCES
   A. Maximum Variation from True Flatness: 1/8 inch in 8 feet, properly meeting adjacent surfaces and materials.

3.10 CLEAN UP
   A. Promptly remove and clean plaster from all surfaces not scheduled to receive this finish. Verify cleaning recommendations from each substrate manufacturer prior to proceeding with any cleaning operations.
   B. Clean up and remove from the site all excess and waste materials generated by the installation of the plaster system.

END OF SECTION
PART 1  GENERAL

1.1  SECTION INCLUDES

A. Gypsum board:
   1. Type X gypsum board.
   2. Sustainable Type X gypsum board.
   3. Moisture resistant gypsum board.

B. Cementitious backer board.

C. Accessories.

1.2  RELATED SECTIONS

A. Section 01 81 13 – Sustainable Design Requirements; for additional LEED requirements.

B. Section 05 40 00 – Cold-Formed Metal Framing.

C. Section 06 10 00 – Rough Carpentry.

D. Section 07 21 00 – Thermal Insulation.

E. Section 07 84 00 – Firestopping.

F. Section 07 92 00 – Joint Sealants.

G. Section 08 11 13 – Hollow Metal Doors and Frames.

H. Section 09 22 16 – Non-Structural Metal Framing.

I. Section 09 30 00 – Tiling.

J. Section 09 65 00 – Resilient Flooring.

K. Section 09 68 13 – Tile Carpeting.

L. Section 09 72 26 – Digital Wall Coverings.

M. Section 09 81 00 – Acoustic Insulation.

N. Section 09 91 00 – Painting.

1.3  REFERENCES

A. The publications listed below form a part of this Section to the extent referenced. The publications are referred to in the text by the basic designation only. Refer to Division 01 for definitions, acronyms, and abbreviations.
B. Standards, manuals, and codes refer to the latest edition of such standards, manuals, and codes in effect as of the date of issue of this Project Manual, unless indicated otherwise in CBC Chapter 35 and CFC Chapter 80.

C. Referenced Standards:
   1. ANSI A108.11 – Interior Installation of Cementitious Backer Units.
   2. ANSI A118.1 – Dry-Set Portland Cement Mortar.
   3. ANSI A118.4 – Latex-Portland Cement Mortar.
   4. ANSI A118.9 – Test Methods and Specifications for Cementitious Backer Units.
   9. ASTM C954 – Standard Specification for Steel Drill Screws for the Application of Gypsum Panel Products or Metal Plaster Bases to Steel Studs From 0.033 in. (0.84 mm) to 0.112 in. (2.84 mm) in Thickness.
   10. ASTM C1002 – Standard Specification for Steel Self-Piercing Tapping Screws for the Application of Gypsum Panel Products or Metal Plaster Bases to Wood Studs or Steel Studs.
   16. GA-216 – Application and Finishing of Gypsum Board.

1.4 SUBMITTALS
   A. General: Submit in accordance with Division 01.
   B. Product Data: Submit manufacturer’s descriptive literature and product specification for each product.
   C. Sustainable Building Design Submittals: Submit per Division 01.
       1. Location of manufacturer’s facility.
       2. Regional materials.
       3. Recycled content.
1.5 QUALITY ASSURANCE

A. Qualifications:
   1. Manufacturer Qualifications: Firm specializing in manufacturing products specified in this Section with a minimum five years experience.
   2. Installer Qualifications: Firm specializing in installing work specified in this Section acceptable to manufacturer with experience on at least five projects of similar nature in past three years.

B. Regulatory Requirements: Comply with requirements of CBC Chapter 25.

C. Coordinate work in this Section with work in related Sections.

1.6 DELIVERY, STORAGE, AND HANDLING

A. Comply with requirements of Division 01.

B. Deliver products in manufacturer's original containers, dry and undamaged, with seals and labels intact.

C. Storage and Protection: Store materials in a dry secure place; neatly stacked to prevent sagging or damage to edges, ends, and surfaces. Protect from weather, surface contaminants, corrosion, construction traffic, and other potential damage.

1.7 ENVIRONMENTAL REQUIREMENTS

A. Interior Environmental Requirements:
   1. Maintain room temperature at not less than 40 degrees F during application of gypsum board. Maintain room temperature at not less than 50 degrees F for joint treatment, and decoration for 48 hours prior to and continuously thereafter until completely dry.
   2. Provide adequate ventilation during installation and curing period.
   3. Prevent exposure to excessive or continuous moisture before, during, and continuously after installation. Eliminate sources of moisture immediately.
   4. Protect gypsum board from direct exposure to rain, snow, sunlight, or excessive weather conditions.

PART 2 PRODUCTS

2.1 SUSTAINABLE BUILDING DESIGN REQUIREMENTS

A. Comply with Division 01.

B. Provide sealants that meet VOC requirements of South Coast Air Quality Management District (SCAQMD) Rule 1168. Information is available at [www.agmd.gov](http://www.agmd.gov).

2.2 MANUFACTURERS

A. Acceptable Manufacturers:

B. Substitutions: Under provisions of Division 01.

2.3 GYPSUM BOARD

A. Type X Gypsum Board: ASTM C1396/1396M; 5/8-inch thick; 2.2 pounds per square foot; fire resistant core; maximum permissible length; ends square cut, tapered edges.
   1. Acceptable Products:
      a. Sheetrock Brand Firecode Core manufactured by USG,
      b. Gold Bond Brand XP Fire-Shield Gypsum Board manufactured by National Gypsum,
      c. ToughRock Fireguard manufactured by G-P Gypsum,
      d. or accepted equal.

B. Sustainable Gypsum Board: ASTM C1396/1396M; 5/8-inch thick; 1.8 pounds per square foot; fire resistant core; maximum permissible length; ends square cut, tapered edges.
   1. Acceptable Products:
      a. Sheetrock Brand Ecosmart Panels Firecode X manufactured by USG.
      b. or accepted equal.

C. Moisture Resistant Gypsum Board: ASTM C1396/C1396M; 5/8 inch thick Type X, moisture and mold resistant core, encased in moisture resistant paper facers; maximum permissible length; ends square cut, tapered edges.
   1. Average water absorption after two-hour immersion per ASTM C473: 5 percent or less.
   3. Acceptable Products:
      a. Sheetrock Brand Mold Tough Gypsum Panels manufactured by USG,
      b. Gold Bond Brand XP Gypsum Board manufactured by National Gypsum,
      c. ToughRock Mold Guard manufactured by G-P Gypsum,
      d. or accepted equal.

2.4 ACCESSORIES

A. Corner Bead, Edge Trim, and Decorative Dividers: ASTM C1047; zinc-coated sheet steel.

B. Control Joints: ASTM C1047; roll-formed zinc joint with removable protected opening; provided in accordance with UL fire rated assemblies. Acceptable product: Zinc Control Joint No. 093 manufactured by USG, or accepted equal.
C. Screws:
   1. ASTM C1002, Type S or Type A; bugle head; self drilling and self tapping screws for light gauge steel framing (less than 0.033 inch thick).
   2. ASTM C954; bugle head; self-drilling and self tapping screws for heavy gauge steel framing (0.033 inch to 0.112 inch thick).
   3. ASTM C1002 Type W or Type A; bugle head; provide sufficient length to provide a minimum 3/4 inch penetration into wood framing members.

D. Jointing Tape: ASTM C475/C475M; 2 inch wide heavy duty paper joint tape.

E. Joint Compound: ASTM C475/C475M.

F. Primer-Surfacer (used in lieu of skim coat in a Level 5 finish): High-build interior coating finish applied with an airless sprayer. Products: Sheetrock Brand Primer-Surfacer Tuff-Hide manufactured by USG, ProForm Brand Surfacer/Primer manufactured by National Gypsum, or accepted equal. Note: walls applied with primer-surfacer do not require drywall paint primer prior to application of finish coats.

G. Acoustical Sealant: Refer to Section 07 92 00.


2.5 CEMENTITIOUS BACKER BOARD

A. Cement Board: ANSI A118.9 and ASTM C1325; polymer-modified cementitious board, with alkali-resistant fiberglass mesh reinforcing facers (front and back); long edges wrapped.
   1. Thickness: 5/8 inch.
   2. Acceptable Products:
      a. Durock Brand Cement Board by United States Gypsum Co.,
      b. PermaBase Brand Cement Board by National Gypsum Co.,
      c. or accepted equal.

B. Accessories:
   1. Screws: No. 6 gauge by sufficient length to penetrate 3/4 inch into wood framing and 3/8 inch into steel framing, self-drilling, ribbed wafer head screws or ribbedbugle head screws; minimum 500 hour corrosion resistant finish per ASTM B117.
   2. Jointing Tape: Alkali-resistant fiberglass mesh tape; 2 inches wide.

PART 3 EXECUTION

3.1 EXAMINATION

A. Examine job site conditions and verify field dimensions.

B. Verify framing for acceptable placement, spacing, and tolerance (alignment and plumb).
C. Verify that framing and furring are securely attached.

D. Verify that all blocking, headers, and supports are in place to support plumbing fixtures, casework, grab bars, towel racks, shelves, and similar items.

E. Verify that insulation is secured.

F. Report unacceptable conditions to the Architect. Begin installation only when unacceptable conditions have been corrected.

3.2 FIRESTOPPING AND SEALANTS

A. Install intumescent moldable pads over backs and sides of all electrical junction and utility boxes at fire rated walls.

B. Apply acoustical sealant at partitions per sealant manufacturer’s instructions. Refer to Section 07 92 00.

3.3 GYPSUM BOARD INSTALLATION

A. Install gypsum board to framing and furring members in accordance with manufacturer’s recommendations, GA-216 or ASTM C840, and as specified in this Section.

B. Install gypsum board with separate panels in moderate contact, do not force in place. Stagger end joints of adjoining panels. Neatly fit abutting end and edge joints.

C. Install gypsum board in most economical direction, using maximum practical lengths, with edges occurring over firm bearing. Install 1/4 inch (nominal) above rough floor or curb. Cut out gypsum board as required to make neat close joints around openings.

D. In vertical applications, provide lengths required to reach full height of vertical surfaces in one continuous piece.

E. Where gypsum board is carried full height to structure above, provide for deflection of structure by undercutting board 3/8 inch (nominal) and sealing top edge of board to substrate with a continuous bead of sealant to form an elastic closure.

F. Use screws to fasten gypsum board to framing.

G. Treat cut edges and holes in moisture resistant gypsum board per manufacturer’s recommendations.

H. Place corner beads at all exterior corners. Use longest practical length. Place edge trims where gypsum board abuts dissimilar materials.

I. Control Joints: Install control joints where indicated on the Drawings. Where not specifically indicated, install consistent with lines of building spaces as directed by Architect; and as a minimum, install as follows:
   1. Where a partition, wall, or ceiling traverses a construction joint (expansion, seismic, or building control element) in the base building structure.
   2. Where a wall or partition runs in an uninterrupted straight plane exceeding 30 linear feet.
   3. In interior ceilings without perimeter relief so that linear dimensions between control joints do not exceed 30 feet and total area between control joints does not exceed 900 square feet.
4. Where ceiling framing members change direction.

5. Where a partition transitions from floor-supported framing to overhead hung framing.

J. Attach metal corner beads, edge trim, decorative dividers, and control joints to the supporting construction at 9 inches on center maximum spacing using same fasteners used to attach gypsum board panels.

3.4 FIRE-RESISTANT ASSEMBLIES

A. Install fire rated assemblies using materials, application methods including gypsum panel orientation, types and spacing of fasteners, and framing in accordance with the specified UL Fire Resistive Design Number, GA-600 File Number, or CBC Table 721.1.

B. Completely seal joints of fire-rated gypsum board enclosures in accordance with UL or GA listed assembly requirements. Seal penetrations through rated partitions and ceilings in accordance with tested systems. Refer to Section 07 84 00.

3.5 CEMENTITIOUS BACKER BOARD INSTALLATION

A. Install cementitious backer boards in accordance with ANSI A108.11 and manufacturer's instructions.

B. Place and fasten boards per manufacturer's instructions.

C. Apply boards with ends and edges closely butted but not forced together. Center end or edge joints on framing and stagger joints in adjacent rows.

D. Fasten boards to framing using specified fasteners. Drive fasteners into field of board first, working toward ends and edges. Hold boards in firm contact with framing while driving fasteners. Space fasteners maximum 8 inches on center with perimeter fasteners at least 3/8 inch from ends and 5/8 inch from edges.

E. Drive screws so bottoms of heads are flush with surface of boards to provide firm panel contact with framing. Do not overdrive screws and replace any screws that are stripped.

F. Provide additional blocking where required to permit proper attachment. Edges or ends of unit parallel to framing shall be continuously supported.

3.6 JOINT TREATMENT AND FINISH

A. Finish gypsum board surfaces in accordance with ASTM C840, GA-214, and GA-216.

B. Remove dirt, oil, and other materials that may cause lack of bond from all surfaces to receive joint compound.

C. Set mechanical fasteners below the plane of the board.

D. Tape, fill, and sand all joints, edges and corners to produce smooth surface ready to receive finishes. Fill all dents, gouges, recesses, or other depressions with joint compound to produce a monolithic surface.

E. Feather coats onto adjoining surfaces so that camber is maximum 1/32-inch.
F. Levels of Finish: Finish gypsum board surfaces in accordance with GA-214 as follows:

<table>
<thead>
<tr>
<th>Area</th>
<th>Finish</th>
</tr>
</thead>
<tbody>
<tr>
<td>Plenum areas above ceilings.</td>
<td>Level 1 finish, no texture.</td>
</tr>
<tr>
<td>Standard and moisture resistant gypsum backing board (substrate for adhesive applied finish material).</td>
<td>Level 2 finish, no texture.</td>
</tr>
<tr>
<td>Sheet wall covering.</td>
<td>Level 5 finish, no texture.</td>
</tr>
<tr>
<td>Smooth finish; satin/eggshell paint finish.</td>
<td>Level 4 finish.</td>
</tr>
<tr>
<td></td>
<td>Level 5 finish where critical (severe) lighting condition occurs (refer to GA-214 for description of critical lighting).</td>
</tr>
<tr>
<td>Smooth finish; semi-gloss paint finish.</td>
<td>Level 5 finish.</td>
</tr>
</tbody>
</table>

3.7 TOLERANCES

A. Maximum variation from true flatness: 1/4 inch in 10 feet in any direction.

B. Maximum surface variation of substrate for walls to receive ceramic tile: Refer to Section 09 30 00.

3.8 CLEANING AND PROTECTION

A. Cleaning and Repair: Clean surfaces that have been spotted or soiled during wallboard application.

B. Defective Work: Remove and replace defective work that cannot be satisfactorily repaired, at the direction of the Architect, with no additional cost to the Owner.

C. Protection: Protect installed work against damage from other construction work.

D. Upon completion of the work under this Section, remove all surplus material, rubbish and debris from the premises and leave floors broom clean.

END OF SECTION
SECTION 09 30 00

TILING

PART 1 GENERAL

1.1 SECTION INCLUDES

A. Ceramic tile.

B. Setting materials including adhesives and mortar.

C. Tile grout.

D. Sealants.

E. Membranes:
   1. Crack isolation.
   2. Waterproofing.

F. Accessories.

1.2 RELATED SECTIONS

A. Section 01 81 13 – Sustainable Design Requirements; for additional LEED requirements.

B. Section 03 30 00 – Cast-In-Place Concrete.

C. Section 07 92 00 – Joint Sealants.

D. Section 09 29 00 – Gypsum Board.

E. Section 10 21 13.19 – Plastic Toilet Compartments.

F. Section 10 28 13 – Toilet Accessories.

1.3 REFERENCES

A. The publications listed below form a part of this Section to the extent referenced. The publications are referred to in the text by the basic designation only. Refer to Division 01 for definitions, acronyms, and abbreviations.

B. Standards, manuals, and codes refer to the latest edition of such standards, manuals, and codes in effect as of the date of issue of this Project Manual, unless indicated otherwise in CBC Chapter 35 and CFC Chapter 80.

C. Referenced Standards and Manuals:


2. ANSI A108.5 – Installation of Ceramic Tile with Dry-Set Portland Cement Mortar or Latex-Portland Cement Mortar.

3. ANSI A108.6 – Installation of Ceramic Tile with Chemical Resistant, Water Cleanable Tile-Setting and Grouting Epoxy.
5. ANSI A108.11 – Interior Installation of Cementitious Backer Units.
7. ANSI A108.16 – Installation of Paper-Faced, Back Mounted, Edge Mounted, or Clear Film Face-Mounted Glass Mosaic Tile.
10. ANSI A118.4 – Latex-Portland Cement Mortar.
11. ANSI A118.9 – Cementitious Backer Units.
12. ANSI A118.10 – Load Bearing, Bonded, Waterproof Membranes for Thin-Set Ceramic Tile and Dimension Stone Installations.
14. ANSI A137.1 – Ceramic Tile.
15. ASTM A82 – Standard Specifications for Steel Wire, Plain, for Concrete Reinforcement.


1.4 SUBMITTALS

A. General: Submit in accordance with Division 01.

B. LEED Submittal:

1. Product Data for EQ Credit 2: For adhesives, including printed statement of VOC content.
C. Submit product data indicating material specifications, characteristics and instructions for using adhesives and grouts.

D. Samples: Submit two samples of each type and color of ceramic tile and trim.

E. Closeout Submittals: Cleaning and maintenance data.

1.5 QUALITY ASSURANCE

A. Qualifications:
   1. Manufacturer Qualifications: Firm specializing in manufacturing products specified in this Section with a minimum ten years experience.
   2. Installer Qualifications: Firm specializing in installing work specified in this Section acceptable to manufacturer with experience on at least five projects of similar nature in past three years.


C. Pre-Installation Meetings:
   1. Conduct pre-installation meeting in accordance with Division 01.
   2. Convene pre-installation meeting prior to commencing work of this Section.
   3. Coordinate work in this Section with work in related Sections.

1.6 DELIVERY, STORAGE, AND HANDLING

A. Comply with requirements of Division 01.

B. Deliver products in manufacturer's original containers, dry and undamaged, with seals and labels intact.

C. Storage and Protection: Store materials in a dry secure place. Protect from weather, surface contaminants, corrosion, construction traffic, and other potential damage. Protect adhesives from freezing or overheating in accordance with manufacturer's instructions.

1.7 ENVIRONMENTAL REQUIREMENTS

A. Perform ceramic tile work when the ambient temperature is at least 50 degrees F and rising. Maintain temperature above 50 degrees F while the work is being performed for at least seven days after completion of the work.

B. Do not install adhesives in a closed, unventilated environment.

1.8 WARRANTY

A. Comply with provisions of Division 01.

B. Provide manufacturer's standard performance warranties that extend beyond a one-year period.
1.9 MAINTENANCE

A. Extra Materials: Provide five percent extra of the total square footage of each type and color of tile installed. Comply with provisions of Division 01.

B. Operation and Maintenance Data: Submit cleaning and maintenance data in accordance with Division 01.

PART 2 PRODUCTS

2.1 MANUFACTURERS

A. Acceptable Manufacturers - Tile:

B. Acceptable Manufacturers - Setting Materials:

C. Acceptable Manufacturers - Grout:
   1. Custom Building Products.
   2. Laticrete International, Inc.
   3. Mapei Corp.

D. Acceptable Manufacturers - Sealants:
   1. Custom Building Products.
   2. Laticrete International, Inc.
   3. Mapei Corp.
   4. Color Caulk, Inc.

E. Acceptable Manufacturers - Crack Isolation and Waterproofing Membranes:
   1. Custom Building Products.
   2. Laticrete International, Inc.
3. Mapei Corp.

F. Acceptable Manufacturers - Accessories:

G. Single Source Responsibility: Provide setting, grouting, and membrane materials from a single manufacturer to ensure system compatibility and quality, and to comply with manufacturer’s warranty requirements.

H. Substitutions: Under provisions of Division 01.

2.2 CERAMIC TILE

A. General: ANSI A137.1, Standard Grade. Packaging shall be grade sealed. Seals shall be marked to correspond with the marks on the signed master grade certificate.

B. Properties:
   1. Impact resistant with a minimum breaking strength of 90 pounds for wall tiles and 250 pounds for floor tiles in accordance with ASTM C648.
   2. Water absorption shall be 0.50 percent maximum in accordance with ASTM C373.
   3. Tile flooring shall be stable, firm, and slip resistant per CBC Section 11B-302.1. Floor tiles shall have a minimum dynamic coefficient of friction of 0.42 wet in accordance with the DCOF AcuTest.
   4. Floor tiles shall be minimum Class IV – Heavy Traffic durability when tested in accordance with ASTM C1027 for abrasion resistance as related to foot traffic.

C. Products:
   1. Porcelain Floor Tiles: Provenza, Q-Stone Series. (CT1)
      a. Nominal Size: 12 inches by 24 inches.
      b. Thickness: 10 mm.
      c. Surface Finish: Natural.
      d. Color: As indicated on Drawings.
   2. Porcelain Wall and Floor Tiles: Florim USA., Basaltine Series. (CT2)
      a. Nominal Size: 12 inches by 24 inches.
      b. Thickness: 10 mm.
      c. Surface Finish: Natural.
      d. Color: As indicated on Drawings.
   3. Ceramic Accent Wall Tiles: Daltile Corp., Multitude Series. (CT3)
      a. Nominal Size: 12 inches by 24 inches.
      b. Thickness: 5/16 inch.
      c. Surface Finish: Glazed.
      d. Color: As indicated on Drawings.
4. Glass Wall Tiles: Bedrosians, Verve Series. (CT4 - CT6)
   b. Thickness: 1/4 inch.
   c. Surface Finish: Textured gloss.
   d. Colors: As indicated on Drawings.

5. Porcelain Wall and Floor Tiles: Florim USA., Basaltine Series. (CT7)
   a. Nominal Size: 2 inches by 2 inches.
   b. Thickness: 10 mm.
   c. Surface Finish: Natural.
   d. Color: As indicated on Drawings.

D. Special Shapes (trimmers, angles, bases, caps, stops, and returns): Same nominal size as field tile; rounded concave and convex surfaces; same properties as field tile (moisture absorption, surface finish, and color). Provide radius at all outside vertical and horizontal corner tile. Provide base at wall tile.

E. Wall Base: Unless otherwise indicated, wall base shall be 6 inches high with 3/8 inch minimum cove radius.

2.3 SETTING MATERIALS

A. Latex Portland Cement Mortar for Large Format Tile: Prepackaged, one-part, high performance, latex polymer modified dry-set, thin-set mortar. Meets or exceeds ANSI A118.4
   1. Products:
      a. Custom Building Products ProLite Tile & Stone Mortar.
      b. Laticrete 4-XLT.
      c. Mapei Ultraflex LFT.
      d. Or accepted equal.

B. Latex Modified Crack Isolation Mortar for Glass Tile: Prepackaged, one-part, high performance, lightweight latex polymer modified dry-set, thin-set mortar. Meets or exceeds ANSI A118.4.
   1. Products:
      a. Custom Building Products MegaLite Crack Prevention Mortar.
      b. Laticrete 255 MultiMax.
      c. Mapei UltraLite Mortar.
      d. Or accepted equal.

C. Mortar Bed:
   1. Materials:
      b. Aggregate: ASTM C144, clean, graded, and passes a 16-mesh screen.
      c. Hydrated Lime: ASTM C206, Type S or ASTM C207, Type S.
d. Water: Clean and potable.

2. Mortar Mix: Comply with ANSI A108.1A Section A-4.1a.2.

2.4 GROUTING MATERIALS

A. Epoxy Grout: 100 percent solids epoxy grout; stainless, non-sagging, water cleanable; conforming to ANSI A118.3.
   1. Products:
      a. Custom Building Products CEGLite Commercial Epoxy Grout.
      b. Laticrete Spectralock Pro Premium.
      c. Mapei Kerapoxy IEG.
      d. Or accepted equal.
   2. Colors as selected by Architect.

2.5 SEALANTS

A. Latex siliconized sealant, non-sanded, in conformance with ASTM C920, Type S, Grade NS, Class 25. Uses NT, M and G, with a VOC content of 250 g/L or less when calculated according to 40 CFR 59, Subpart D (EPA Method 24). Color to match grout color.
   1. Products:
      a. Custom Building Products 100% Silicone Commercial Caulk.
      b. Laticrete Latasil.
      c. Mapei Keracaulk.
      d. Color Caulk, Inc. Latex Siliconized Sealant.
      e. Or accepted equal.

2.6 MEMBRANES

A. Crack Isolation Membrane: Trowel applied or self-adhering sheet membrane; load bearing; bonded; conforming to ANSI A118.12.
   1. Products:
      a. Custom Building Products Fracture Free.
      b. Laticrete Blue 92.
      d. Or accepted equal.

B. Interior Waterproofing Membrane: Trowel applied, liquid, load bearing; bonded; conforming to ANSI A118.10.
   1. Products:
c. Mapei Mapelastic 400, premixed, flexible, thin, ultra fast-drying waterproofing membrane.

d. Or accepted equal.

2.7 ACCESSORIES

A. Mortar Bed Reinforcing Mesh: ASTM A82 and ASTM A185; galvanized welded wire fabric; 16 gauge wire; 2 inch by 2 inch mesh.

B. Expansion Joints: DILEX-AKWS surface joint profile with aluminum anchoring legs and 1/4 inch wide PVC movement zone manufactured by Schlüter-Systems L.P., Custom Building Products, or accepted equal. PVC color as selected by Architect from manufacturer's full range of standard colors.

C. Transitions: SCHIENE AE satin anodized aluminum L-shaped profile with 1/8 inch wide top section and vertical wall section that together form the visible surface, integrated trapezoid-perforated anchoring leg, and integrated grout joint spacer.

PART 3 EXECUTION

3.1 EXAMINATION

A. Examine job site conditions and verify field dimensions. Verify substrate is plumb, level, true to line and square.

B. Substrate surface conditions shall conform to the requirements of ANSI A108 for the type of substrate specified and for workmanship.

C. Maximum surface variation of substrate shall not exceed maximum limits as specified in specific TCNA Methods or as follows, whichever is more stringent.

<table>
<thead>
<tr>
<th>Type</th>
<th>Walls</th>
<th>Floors</th>
</tr>
</thead>
<tbody>
<tr>
<td>Latex Portland Cement Mortar</td>
<td>1/8 inch in 8 feet</td>
<td>1/8 inch in 10 feet</td>
</tr>
<tr>
<td>Mortar Bed</td>
<td>Not Applicable</td>
<td>1/4 inch in 10 feet</td>
</tr>
</tbody>
</table>

D. Tile work shall not be started until roughing in for mechanical and electrical work has been completed and tested, and built-in items requiring waterproofing membrane have been installed and tested.

E. Report unacceptable conditions to Architect. Begin installation only when unacceptable conditions have been corrected.

3.2 INSTALLATION

A. General:
   1. Install in accordance with TCNA Handbook for Ceramic Tile Installation and ANSI A108.
   2. Do not interrupt tile pattern through openings.
   3. In areas requiring floor and wall tiles, floor tile installation shall not begin until after wall tiles have been installed.
4. Where ceramic tiles and glass tiles are installed adjacent to each other in the same plane, the finished faces shall be flush with each other.

5. Allow waterproofing membrane to cure before flood testing.

6. Cut and fit tile tight to penetrations through tile. Form corners and bases neatly. Align floor, base and wall joints.

7. Place tile joints uniform in width, subject to variance in tolerance allowed in tile size. Make joints watertight, without voids, cracks, excess mortar or excess grout.

8. Provide grout joint spacing in accordance with tile manufacturer’s recommendations.

9. Install movement joints where indicated on Drawings and as specified in this Section.

10. Install accessories per manufacturer’s recommendations and as detailed on Drawings.

11. Sound tile after setting. Replace hollow sounding units.

12. Allow tile to set prior to grouting: Minimum of 48 hours for thin-set methods and 78 hours for mortar bed methods.

B. Installation Methods – Interior Walls:

<table>
<thead>
<tr>
<th>Method</th>
<th>Substrate/Application</th>
<th>Setting Material</th>
</tr>
</thead>
</table>

C. Installation Methods – Interior Floors:

<table>
<thead>
<tr>
<th>Method</th>
<th>Substrate/Application</th>
<th>Setting Material</th>
</tr>
</thead>
<tbody>
<tr>
<td>TCNA Method F125-Full; ANSI A108.5, A108.6, and A108.17.</td>
<td>Concrete slab-on-grade; crack isolation membrane; thin set application; epoxy grout.</td>
<td>Latex Portland cement mortar.</td>
</tr>
</tbody>
</table>

D. Installation Methods – Shower Receptors:

<table>
<thead>
<tr>
<th>Method</th>
<th>Substrate/Application</th>
<th>Setting Material</th>
</tr>
</thead>
<tbody>
<tr>
<td>TCNA Method B415 with W244C, ANSI A108.5, A108.6, A108.11, and A108.13.</td>
<td>Wall – Cementitious backer board; bonded waterproofing membrane; thinset application; epoxy grout. Floor – Concrete slab-on-grade and mortar bed with bonded waterproofing membrane; thinset application; epoxy grout.</td>
<td>Wall and Floor: Latex Portland cement mortar.</td>
</tr>
</tbody>
</table>

3.3 JOINTS

A. Joint Widths at Walls and Floors: Install tile on walls and floors in the joint widths recommended by the tile manufacturer.
B. Expansion Joints:
   1. Provide expansion joints at locations shown on the Drawings or where Drawings do not indicate location, provide in the following locations as a minimum requirement:
      a. Provide and install expansion joints per TCNA EJ171.
      b. At control joints and expansion joints in substrate material,
      c. Where substrate material changes to separate different materials,
      d. Over construction joints,
      e. Where tile abuts restraining surfaces, such as perimeter walls, curbs, and columns and at intervals of 24 to 36 feet each way in interior floor areas.
   2. Expansion joints shall extend through setting-beds and fill.

3.4 INSTALLATION - GROUT

   A. Epoxy Grout: Install in accordance with manufacturer’s printed instructions and ANSI A108.6.
      1. Before grouting, ensure all tiles are firmly in place. Clean tile surfaces; remove paper and glue from face of mounted tiles. Remove spacers, strings, ropes, and pegs.
      2. Clean open tile joints. Remove excess setting materials present in the open grout joints.
      3. Mix grout in accordance with manufacturer’s instructions.
      4. Apply grout firmly into open joints using a hard rubber float.
      5. Remove all excess epoxy grout from the tile surface with a rubber squeegee or rubber trowel before it loses plasticity and begins to set.
      6. Immediately perform final clean up in accordance with manufacturer’s instructions.

3.5 CLEANING AND PROTECTING

   A. Clean as recommended by manufacturer. Do not use materials or methods which may damage finish surface or surrounding construction.

   B. Provide protective covering as recommended by tile manufacturer and as required to ensure installed tile finish will not be damaged by work of other trades. Protect installed tile finish surfaces from damage until Project Completion.

END OF SECTION
SECTION 09 51 13
ACOUSTICAL PANEL CEILINGS

PART 1 GENERAL

1.1 SECTION INCLUDES
A. Suspended metal grid ceiling system.
B. Lay-in acoustical panels.
C. Specialty ceilings.
D. Accessories.

1.2 RELATED SECTIONS
A. Section 05 12 00 – Structural Steel Framing.
B. Section 05 31 00 – Steel Decking.
C. Section 06 10 00 – Rough Carpentry.
D. Section 09 29 00 – Gypsum Board.
E. Section 09 51 23 – Acoustical Tile Ceilings.
F. Divisions 21 – 23 – Mechanical.

1.3 REFERENCES
A. The publications listed below form a part of this Section to the extent referenced. The publications are referred to in the text by the basic designation only. Refer to Division 01 for definitions, acronyms, and abbreviations.

B. Standards, manuals, and codes refer to the latest edition of such standards, manuals, and codes in effect as of the date of issue of this Project Manual, unless indicated otherwise in CBC Chapter 35 and CFC Chapter 80.

C. Referenced Standards:


1.4 SUBMITTALS

A. General: Submit in accordance with Division 01.

B. Product Data: Provide data on metal grid system components, compression struts, and acoustical units.

C. Samples:
   1. Submit two samples, 6 inch by 12 inch in size, illustrating material and finish of each type of acoustical panel specified.
   2. Submit two samples each, 12 inch long, of suspension system main runner, cross runner and edge trim in specified colors for each type of suspension system specified.

D. Manufacturer's Installation Instructions: Indicate special procedures and perimeter conditions requiring special attention.

1.5 SYSTEM DESCRIPTION

A. Performance Requirements: Rigidly secure suspended acoustical ceiling system, including integral mechanical and electrical components with maximum deflection of 1/360.

1.6 QUALITY ASSURANCE

A. Qualifications:
   1. Metal Suspension Grid Manufacturer Qualifications: Firm specializing in manufacturing products specified in this Section with a minimum ten years experience.
   2. Lay-in Acoustical Tile Manufacturer Qualifications: Firm specializing in manufacturing products specified in this Section with a minimum ten years experience.

1.7 DELIVERY, STORAGE, AND HANDLING

A. Comply with requirements of Division 01.

B. Deliver products in manufacturer's original containers, dry and undamaged, with seals and labels intact.

C. Storage and Protection: Store materials in a dry secure place. Protect from weather, surface contaminants, construction traffic, and other potential damage.

1.8 ENVIRONMENTAL REQUIREMENTS

A. Maintain 60 degrees F minimum uniform temperature and 20 percent to 40 percent relative humidity prior to, during, and after installation of acoustical lay-in tiles.
1.9 SEQUENCING

A. Sequence work to ensure acoustical ceilings are not installed until building is enclosed, sufficient heat is provided, dust-generating activities have terminated and overhead work is completed, tested and approved.

B. Install acoustical units after interior wet work is dry.

1.10 MAINTENANCE

A. Extra Materials:
   1. Furnish in accordance with Division 01.
   2. Provide ten percent extra of each type of panel.

PART 2 PRODUCTS

2.1 MANUFACTURERS

A. Acceptable Manufacturers – Metal Suspension Systems:

B. Acceptable Manufacturers – Lay-in Acoustical Panels:
   1. USG Interiors, Inc.
   2. Armstrong World Industries, Inc.

C. Substitutions: Under provisions of Division 01.

2.2 METAL SUSPENSION SYSTEM

A. Metal Suspension Grid: ASTM C635, heavy duty classification in compliance with ASCE 7-10 13.5.6.2.2 (a); hot-dipped galvanized steel (minimum G40); 9/16 inch face; structural tee main and cross members; capped with steel, coated with factory applied baked-on white enamel paint.

B. Products, Suspension System:

<table>
<thead>
<tr>
<th></th>
<th>Main Runner</th>
<th>Cross Tees</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Armstrong Suprafine XL</td>
<td>7501</td>
<td>XL7540</td>
</tr>
<tr>
<td>2. USG Donn Centricitee DXT</td>
<td>DXT26</td>
<td>DXT424</td>
</tr>
<tr>
<td>3. Rockfon 4000 HRCmax Tempra 9/16&quot;</td>
<td>4040.01CZ</td>
<td>4014.01CZ</td>
</tr>
</tbody>
</table>
C. Products, Suspension System Accessories:

<table>
<thead>
<tr>
<th></th>
<th>Wall Angle</th>
<th>Seismic Clip at Wall Angle</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Armstrong</td>
<td>7800</td>
<td>BERC2</td>
</tr>
<tr>
<td>2. USG Donn</td>
<td>M9</td>
<td>ACM7</td>
</tr>
<tr>
<td>3. Rockfon</td>
<td>1420.01HRC</td>
<td>1496</td>
</tr>
</tbody>
</table>

2.3 ACCESSORIES – METAL SUSPENSION SYSTEM

A. Metal suspension system accessories as required for a complete system including but not limited to moldings, stabilizer bars, splices, hold down clips, and light fixture clips.

B. Wire Hangers: ASTM A641/A641M, zinc-coated wire, Class 1, soft temper, pre-stretched, with a yield stress of at least three times the design load; sizes and gauges as shown on the Drawings and as specified in this Section.

C. Support channels and hangers: Galvanized primed steel (minimum G30); size and type to suit application and to meet seismic requirements and as specified in this Section.

2.4 ACOUSTICAL LAY-IN PANELS

A. Panel Type CL1:

1. ASTM E1264, Type III, Form 2; Pattern C E.
3. Properties:
   b. Light Reflectance: Minimum 0.85.
   c. Fire Resistance: CBC Class A (NFPA Class A); Flame Spread: 25 or under; Smoke Developed: 50 or under per ASTM E84.

4. Products:

<table>
<thead>
<tr>
<th></th>
<th>Size (ft x ft x in thick)</th>
<th>Edge</th>
</tr>
</thead>
<tbody>
<tr>
<td>USG Radar</td>
<td>2 x 4 x 5/8</td>
<td>Beveled Tegular</td>
</tr>
<tr>
<td>Armstrong Fine Fissured</td>
<td>2 x 4 x 5/8</td>
<td>Beveled Tegular</td>
</tr>
</tbody>
</table>

B. Panel Type CL2:

1. ASTM E1264, Type III, Form 2; Pattern C E.
3. Properties:
   b. Light Reflectance: Minimum 0.84.
   c. NRC: Minimum 0.75.
   d. Fire Resistance: CBC Class A (NFPA Class A); Flame Spread: 25 or under; Smoke Developed: 50 or under per ASTM E84.
4. Products:

<table>
<thead>
<tr>
<th>Size (ft x ft x in thick)</th>
<th>Edge</th>
</tr>
</thead>
<tbody>
<tr>
<td>USG Radar, No. 22335</td>
<td>2 x 4 x 7/8 Beveled Tegular</td>
</tr>
<tr>
<td>Armstrong Fine Fissured, No. 1759</td>
<td>2 x 4 x 7/8 Beveled Tegular</td>
</tr>
</tbody>
</table>

C. Panel Type CL3:
1. ASTM E1264, Type IV, Form 2; Pattern E.
3. Properties:
   b. Light Reflectance: Minimum 0.87.
   c. NRC: Minimum 0.80.
   d. Fire Resistance: CBC Class A (NFPA Class A); Flame Spread: 25 or under; Smoke Developed: 50 or under per ASTM E84.

4. Products:

<table>
<thead>
<tr>
<th>Size (ft x ft x in thick)</th>
<th>Edge</th>
</tr>
</thead>
<tbody>
<tr>
<td>USG Radar, No. 89500</td>
<td>2 x 4 x 7/8 Beveled Tegular</td>
</tr>
<tr>
<td>Armstrong Ultima, No. 1945</td>
<td>2 x 4 x 7/8 Beveled Tegular</td>
</tr>
</tbody>
</table>

D. Panel Type CL5:
1. ASTM E1264, Type XII, Form 2; Pattern E.
3. Properties:
   b. Light Reflectance: Minimum 0.88.
   c. NRC: Minimum 1.00.
   d. Fire Resistance: CBC Class A (NFPA Class A); Flame Spread: 25 or under; Smoke Developed: 50 or under per ASTM E84.

4. Products:

<table>
<thead>
<tr>
<th>Size (ft x ft x in thick)</th>
<th>Edge</th>
</tr>
</thead>
<tbody>
<tr>
<td>USG Halcyon, No. 99225</td>
<td>2 x 2 x 1-1/2 Square Tegular</td>
</tr>
<tr>
<td>Armstrong Optima Tegular, No. 3254</td>
<td>2 x 2 x 1-1/2 Square Tegular</td>
</tr>
</tbody>
</table>

E. Accessories – Acoustical Lay-in Panels:
1. Touch-up Paint: Type and color to match acoustical and grid units.
2.5 SPECIALTY CEILING SYSTEMS

A. Building G Lobby Acoustical Clouds, Ceiling Type CL6:
   1. Acceptable Manufacturers:
      b. Armstrong World Industries, Inc.
      c. USG Interiors, Inc.
      d. Substitutions: Under provisions of Division 01.
   2. Cloud Shapes and Sizes: Custom sizes and shapes as indicated on Drawings.
   3. Description: The acoustic ceiling panels shall be Type ME/VATT mounted using the Ceilencia Custom system.
      a. Claro finished panels shall be type ME/VATT with coated extruded aluminum edges and a vapor barrier backing. The panel shall be constructed of 6 pounds per cubic foot to 7 pounds per cubic foot density acoustically absorptive core with a special high acoustic performance layer laminated to the face with 1-1/16 inch overall thickness. The core shall be free of surface defects and sanded as required to a uniform thickness, which will not vary by more than +/- 0.06 inch. The panels shall be fabricated to required sizes and shapes, determined by the field dimensions supplied by the installing contractor, using a CAD/CAM (CIM) Robotics cutting system to ensure accurate panel core dimensions to a tolerance of +/- 0.06 inch. Edges shall be coated, mill finish aluminum with adequate web thickness to withstand moderate impact during installation and ongoing maintenance. White coated aluminum edges shall be fused to the core, be straight and true, and must be in alignment with the panel face. Soft or non-framed edge treatments are not acceptable. Panel deflection, when installed, shall not exceed 1/360th of the span. The back of all panels shall be clearly text marked with the project I.D. number, panel number, location code, quantity of units per size, and correspond to the accepted shop drawings.
      b. The panels shall be installed into the extruded aluminum Decoustics Ceilencia Custom grid system, providing 100 percent downward accessibility. The grid system shall consist of heavy duty main tees and cross tees, which shall incorporate a continuous panel location fin to ensure correct panel alignment during installation and future access. The grid shall be site assembled using the factory supplied Butterflies and hardware. The suspension system shall be completely engineered and fabricated in the factory, to avoid any field cutting of the suspension components, and manufactured as shown on the Drawings and approved shop drawings. Provide 6 inch field-applied edge trim in color selected by Architect.
      c. Finish shall be CLARO acoustically transparent textured coating standard white (CSW-100).
         1) Claro finishes shall be applied over the panel face and edges.
      d. Installation shall be by use of torsion springs, field engaged into factory supplied spring retainers, and field installed on the back of the panel on the coated extruded aluminum panel edge. This panel assembly is then lifted into place, and the torsion springs are engaged into the factory supplied “butterflies” which have been field installed during the assembly of the suspended factory supplied grid. The panel is then gently lifted into place as the torsion springs take the load.
e. All grid suspension hardware, hanger wires, rods, anchors, mouldings, etc., shall be supplied by the installing contractor.

f. Installation shall be in accordance with CBC requirements, the requirements of this Section, manufacturers’ instructions, and as shown on accepted shop drawings. Installer shall provide for adjustments as required to maintain consistent alignment of panels and of finished panel faces, and to ensure unstressed clip locations.

g. Panels shall have noise reduction coefficient values of the following when tested in accordance with ASTM C423:

<table>
<thead>
<tr>
<th>Panel</th>
<th>Frequency (Hz)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Type</td>
<td>ME/VATT 1-1/16” Claro</td>
</tr>
<tr>
<td>Finish</td>
<td>125 250 500 1000 2000 4000 NRC SAA</td>
</tr>
<tr>
<td>0.39 0.63 0.83 1.05 1.05 1.00 0.90 0.87</td>
<td></td>
</tr>
</tbody>
</table>

PART 3 EXECUTION

3.1 EXAMINATION

A. Examine job site conditions and verify field dimensions. Verify hangers will not interfere with other work.

3.2 INSTALLATION – SUSPENDED CEILING METAL GRID

A. Install in accordance with manufacturer’s instructions, DSA IR 25-2.13, CBC Sections 808 and 1616.10.16, ASTM C635, ASTM C636, ASTM E580, approved shop drawings, and as specified in this Section.

B. Install ceiling metal suspension system after major above ceiling work is complete. Coordinate location of hangers with other work.

C. Hang suspension system independent of walls, columns, ducts, cable trays, pipes, and conduits.

D. Use minimum 12 gauge hanger wires for up to and including four foot by four foot grid spacing attached to main runners.

E. Provide 12 gauge hanger wires at the perimeter ends of all main and cross runners within 8 inches of the support or within 1/4 of the length of the end tee, whichever is least. End connections for runners which are designed and detailed to resist the applied vertical and horizontal forces may be used in lieu of the 12 gauge hanger wires, subject to DSA review and approval.

F. Provide trapeze or other supplementary support members at obstructions to typical hanger spacing. Provide additional hangers, struts or braces as required at all ceiling breaks, soffits, or discontinuous areas. Where hanger wires are more than one in six out of plumb, provide counter-sloping wires.

G. Ceiling grid members shall be attached to two adjacent walls, and at least 3/4 inch free of other walls. Where walls run diagonally to ceiling grid system runners, one end of main and cross runner should be free, and a minimum 3/4 inch clear of wall.
H. At ceiling perimeter area, where main or cross runners are not connected to adjacent walls, provide interconnection between runners at the free end to prevent lateral spreading. A metal strut or a 16 gauge wire with positive mechanical connection to the runner may be used. Interlock is not required where perpendicular distance from the wall to the first parallel runner is 8 inches or less.

I. Expansion joints shall be provided in the ceiling at the intersections of corridors and at junctions of corridors and lobbies or other similar areas.

J. Where ceiling areas exceed 2500 square feet, a seismic separation joint shall be provided to divide the ceiling into areas not exceeding 2500 square feet. Alternatively, comply with ASTM E580.

K. Penetrations through the ceiling for fire sprinkler heads and other similar devices that are not integrally tied to the ceiling system in the lateral direction shall have a 2 inch oversized ring, sleeve, or adapter through the ceiling panel to allow free movement of 1 inch in all directions. Alternatively, a flexible fire sprinkler hose fitting that can accommodate 1 inch of ceiling movement per ASTM E580 may be used.

L. Provide bracing assemblies consisting of a compression strut and four 12 gauge splayed bracing wires oriented 90 degrees from each other. Splayed bracing wires shall be taut and shall not exceed 45 degrees from the ceiling plane. Splices in bracing wires are not permitted. Space bracing assemblies as follows:
   1. Not more than 12 feet by 12 feet on center.
   2. Not more than 1/2 of the spacing given above from the perimeter wall and at the edge of vertical ceiling offsets.
   3. Suspended acoustical ceiling systems with a ceiling area of 144 square feet or less surrounded by walls which connect directly to the structure above, do not require bracing assemblies when attached to two adjacent walls.

M. Compression struts shall be adequate to resist the vertical component induced by the bracing wires, and shall not be more than one horizontal in six vertical out of plumb.

N. Fasten hanger wires with not less than three tight turns in 3 inches. Fasten bracing wires with four tight turns in 1-1/2 inches. Install hanger or bracing wire anchors to the structure in a manner that the direction of the wire aligns as closely as possible to the direction of the forces acting on the wire.

O. Separate all ceiling hanging and bracing wires at least 6 inches from all unbraced ducts, pipes, conduit, etc.

P. Attach all light fixtures, ceiling mounted air terminals or services, light-weight miscellaneous devices, such as strobe lights, speakers, etc., and all other devices to the ceiling grid runners to resist a horizontal force equal to the weight of the fixtures. Screw or approved fasteners are required. A minimum of two attachments are required per ASTM E580.
   1. Devices weighing more than ten pounds and twenty pounds or less shall have a 12 gauge slack safety wire anchored to the structure above.

Q. Flush or recessed light fixtures, air terminals or services, and flexible fire sprinkler hose fittings weighing more than 20 pounds and less than 56 pounds, shall be supported directly on the runners of a heavy duty grid system. In addition, provide two 12 gauge slack safety wires attached to the fixture at diagonal corners and anchored to the structure above. Four foot by four foot light fixtures shall have slack safety wires at each corner.
R. Flush or recessed light fixtures, air terminals or services, and flexible fire sprinkler hose fittings weighing 56 pounds or more shall be independently supported by not less than four taut 12 gauge wires attached to the fixture and to the structure above. The four taut 12 gauge wires, including their attachment to the structure above must be capable of supporting four times the weight of the unit.

S. Surface-mounted fixtures shall be attached to the main runner with at least two positive clamping devices made of minimum 14 gauge material. Rotational spring catches are not allowed. A 12 gauge suspension wire shall be attached to each clamping device and be attached to the structure above. Provide additional supports when light fixtures are eight feet or longer. Maximum spacing between supports shall not exceed eight feet.

T. Support pendant mounted light fixtures directly from structure above with hanger wires or cables passing through each pendant hanger and capable of supporting two times the weight of the fixture. A bracing assembly is required where the pendant hanger penetrates the ceiling. Attach pendant hanger to bracing assembly in a manner to transmit horizontal force. Where the pendant mounted light fixture is directly and independently braced below the ceiling, such as with aircraft cables to walls, the brace assembly is not required above the ceiling.

U. Do not eccentrically load suspended ceiling grid system or produce rotation of runners.

V. Install edge molding at intersection of ceiling and vertical surfaces, using longest practical lengths. Miter corners; provide edge moldings at junctions with other interruptions.

3.3 INSTALLATION – LAY-IN CEILING PANELS

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

B. Fit units in place, free from damaged edges or other defects detrimental to appearance and function.

C. Cut units to fit irregular grid and perimeter edge trim. Double cut and field paint exposed edges of regular units in matching color.

D. Lay directional patterned units one way with pattern parallel to longest room axis. Fit border trim neatly against abutting surfaces.

E. Install units after above ceiling work is complete.

F. Install units level, in uniform plane, and free from twist, warp and dents.

G. Install hold-down clips to retain units tight to grid system within ten feet of all exterior doors.

3.4 ERECTION TOLERANCES

A. Maximum variation from flat and level surface: 1/8 inch in 10 feet.

B. Variation from plumb of grid members caused by eccentric loads: Two degrees maximum.

3.5 CLEANING

A. Clean as recommended by manufacturer. Do not use materials or methods which may damage finish surface or surrounding construction.

END OF SECTION
SECTION 09 51 23
ACOUSTICAL TILE CEILINGS

PART 1  GENERAL

1.1  SECTION INCLUDES

A. Acoustical tile and perimeter trim.

1.2  RELATED SECTIONS

A. Section 09 29 00 – Gypsum Board.
B. Section 09 51 13 – Acoustical Panel Ceilings.
C. Divisions 21 – 23 – Mechanical.

1.3  REFERENCES

A. The publications listed below form a part of this Section to the extent referenced. The publications are referred to in the text by the basic designation only. Refer to Division 01 for definitions, acronyms, and abbreviations.

B. Standards, manuals, and codes refer to the latest edition of such standards, manuals, and codes in effect as of the date of issue of this Project Manual, unless indicated otherwise in CBC Chapter 35 and CFC Chapter 80.

C. Referenced Standards:

1.4  SUBMITTALS

A. Submit under provisions of Division 01.

B. Product Data: Provide data on acoustic units.

C. Samples: Submit two samples, 12 inches x 12 inches in size, illustrating material and finish of acoustic units.

1.5  QUALIFICATIONS

A. Acoustical Unit Manufacturer: Company specializing in manufacturing the Products specified in this section with minimum three years documented experience.

B. Applicator: Company specializing in performing the work of this section with documented experience.
1.6 ENVIRONMENTAL REQUIREMENTS
   A. Maintain uniform temperature of minimum 60 degrees F and maximum humidity of 40 percent prior to, during, and after installation.

1.7 SEQUENCING
   A. Sequence work to ensure acoustical ceilings are not installed until building is enclosed, sufficient heat is provided, dust-generating activities have terminated and overhead work is completed, tested and approved.
   B. Install acoustic units after interior wet work is dry.

1.8 EXTRA MATERIALS
   A. Furnish under provisions of Division 01.
   B. Provide fifty square feet of extra tile to Owner.

PART 2 PRODUCTS

2.1 MANUFACTURERS
   C. Substitutions: Under provisions of Division 01.

2.2 MATERIALS
   A. Acoustic Tile, Type CL4, conforming to the following:
      1. ASTM E1264, Type III, Form 2, Pattern C E.
      2. Size: 12 inches x 12 inches.
      3. Thickness: 1/2 inch minimum.
      4. Composition: Wet-formed mineral fiber with factory-applied latex paint finish.
      5. NRC: 0.45 minimum.
      6. Light Reflectance: 0.84 minimum.
     10. Surface Finish: Non-directional.
   B. Adhesive: ASTM D1779, waterproof, gun grade; type recommended by tile manufacturer.
   C. Edge Trim: Rolled aluminum profile, white color.
PART 3 EXECUTION

3.1 EXAMINATION

A. Verify that substrate conditions are ready to receive the work of this Section.

3.2 INSTALLATION

A. Install adhesive-applied system in accordance with manufacturer's instructions and as supplemented in this Section.

B. Install edge molding at intersection of ceiling and vertical surfaces, using maximum lengths. Miter corners. Provide edge moldings at junctions with other interruptions as indicated on drawings.

C. Center tile on room axis leaving equal border units.

D. Fit acoustic units in place, free from damaged edges or other defects detrimental to appearance and function.

E. Fit border units neatly against abutting surfaces.

F. Install acoustical units level, in uniform plane, and free from twist, warp or dents.

3.3 ERECTION TOLERANCES

A. Maximum Variation from Flat and Level Surface: 1/8 inch in 10 feet.

END OF SECTION
SECTION 09 64 63
WOOD DANCE FLOORING

PART 1  GENERAL

1.1  SECTION INCLUDES

A.  Wood dance flooring system.

1.2  RELATED SECTIONS

A.  Division 01 – Sustainable Design Requirements; for additional LEED requirements.

B.  Section 03 30 00 – Cast-In-Place Concrete: Concrete sub-floor construction and tolerances.

1.3  REFERENCES

A.  The publications listed below form a part of this Section to the extent referenced. The publications are referred to in the text by the basic designation only. Refer to Division 01 for definitions, acronyms, and abbreviations.

B.  Standards, manuals, and codes refer to the latest edition of such standards, manuals, and codes in effect as of the date of issue of this Project Manual, unless indicated otherwise in CBC Chapter 35 and CFC Chapter 80.

C.  Referenced Standards:

1.4  SUBMITTALS

A.  Submit under provisions of Division 01.

B.  LEED Submittals: Provide the following, and comply with applicable requirements and procedures of Division 01.
   1.  Product Data for EQ Credit 2: For adhesives and sealants, including printed statement of VOC content and chemical components.
   2.  Product Data for EQ Credit 2: For hard flooring materials, including printed statement that products meet the testing and product requirements of the California Department of Public Health Standard Practice for The Testing Of Volatile Organic Emissions From Various Sources Using Small-Scale Environmental Chambers, including 2004 Addenda.
   3.  Product Data for EQ Credit 3:
      a.  Manufacturer's product data for each composite wood or agrifiber product used indicating that the product contains no added urea formaldehyde resins.
      b.  Laminate adhesive manufacturer's product data for each adhesive used indicating that the adhesive contains no added urea formaldehyde resins.
4. Certificates for MR Credit 3: Chain-of-custody certificates certifying that products specified to be made from certified wood comply with forest certification requirements. Include evidence that mill is certified for chain of custody by an FSC-accredited certification body.
   a. Include statement indicating costs for each certified wood product.

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

D. Shop Drawings:
   1. Layout of flooring and details of installation.

E. Selection Samples: For each finish product specified, two complete sets of color samples representing manufacturer's full range of available colors and patterns.

F. Verification Samples: For each finish product specified, two samples, minimum size 6 inches square, representing actual product, color, and patterns.

1.5 LEED COMPLIANCE DOCUMENTATION

A. Provide the following, and comply with applicable requirements and procedures of Division 01, LEED Online Letter Templates, and LEED 2013 BD+C Reference Guide:
   1. Product Data for MR Credit 3: For products having recycled content, documentation indicating percentages by weight of post-consumer and pre-consumer recycled content.
      a. Include statement indicating costs for each product having recycled content.

1.6 QUALITY ASSURANCE

A. Installer Qualifications: Installer shall have at least three years experience in installing similar dance floor systems and shall be approved by the manufacturer.

B. Mock-Up: Provide a 48 inch by 96 inch mock-up for evaluation of surface preparation techniques and application workmanship.
   1. Finish areas designated by Architect.
   2. Do not proceed with remaining work until workmanship, color, and sheen are approved by Architect.
   3. Refinish mock-up area as required to produce acceptable work.

1.7 DELIVERY, STORAGE, AND HANDLING

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

1.8 PROJECT CONDITIONS

A. The flooring system shall not be delivered and installed until all wet work and all overhead mechanical and electrical trades are completed and building is enclosed and weather tight.

B. Permanent heat, light and ventilation shall be installed and operating during and after installation, maintaining a temperature range of 60 degrees F to 75 degrees F and a relative humidity range of 35 percent to 50 percent.
C. Maintain environmental conditions (temperature, humidity, and ventilation) within limits recommended by manufacturer for optimum results. Do not install products under environmental conditions outside manufacturer’s absolute limits.

1.9 WARRANTY

A. Manufacturer warrants sub floor construction materials to be free from manufacturing defects for two years and integrated vinyl surfaces to be free from manufacturing defects for five years.

PART 2 PRODUCTS

2.1 LEED REQUIREMENTS

A. Recycled Content:
   1. Provide products with post-consumer and pre-consumer recycled content, calculated as percentages of total product weight.
      a. Post-consumer recycled content plus one-half of pre-consumer recycled content shall constitute a part of applicable LEED Credit requirement for recycled content.

B. VOC of Adhesives and Sealants:
   1. For field applications that are inside the weatherproofing system, use adhesives and sealants that comply with the limits set forth in South Coast Air Quality Management District (SCAQMD) Rule 1168 for VOC in g/L, less water, when calculated according to 40 CFR 59, Subpart D. Refer to LEED 2013 BD+C Reference Guide for list of sealant and adhesive types that must comply with VOC limits.

C. Urea-Formaldehyde:
   1. Composite wood and agrifiber products used on the interior of the building shall contain no added urea-formaldehyde resins.
   2. Laminating adhesives used to fabricate on-site and shop-applied composite wood and agrifiber assemblies shall contain no added urea-formaldehyde resins.

2.2 MANUFACTURERS


B. Substitutions: Under provisions of Division 01.

2.3 SPRUNG FLOOR SYSTEM

A. Permanent panel floor system shall be comprised of multiple, fully pre-manufactured panels that are joined by means of a modified tongue and groove interconnection. Panel uniformity shall be achieved by utilization of raw materials and manufacturing techniques over which exacting quality control is exercised. The nature and specific placement pattern of the progressively resistant Dual-Durometer Suspension Towers adhered to the underside of the panel shall produce a safe suspension that is uniform and consistent across the entirety of the assembled floor surface. Panel size shall be 48 inches by 96 inches.
B. Performance:
   1. Maximum Static Load: 1200 pounds.
   3. Weight per panel (permanent installation): 83 pounds.
   4. Overall Thickness: 1-1/2 inches.

C. Finish:
   1. Vinyl Performance Surface: Harlequin Studio, thickness: 0.120 inch.
   2. Color as selected by Architect.

D. Panel: 3/4 inch thick, balanced construction, single piece.

E. Face: Maple face, engineered hardwood core compressed with water resistant phenolic resins yielding void free density of 41.3 pounds per cubic foot, cross band reinforced.

F. Suspension: Synthetic, closed cell, cellular urethane, 3/4 inch thick, (length, width, and pattern of placement as engineered by manufacturer), Dual-Durometer, combined low and high modulus. Flammability burn rate (inches per minute) = 0.

G. Finish: Clear, abrasion resistant, nonflammable, polyurethane.

H. Tongue: Dowel, hardwood, uniform concentricity, diameter 3/8 inch, length variable.

I. Bottom: Attached to suspension towers of stage panel model, 1/8 inch hardboard; tempered.

PART 3  EXECUTION

3.1  EXAMINATION

A. Do not begin installation until substrates have been properly prepared.
   1. Concrete slab shall be smooth and level to a tolerance of 1/4 inch in a 10 foot radius. High areas shall be ground down and low areas filled with appropriate leveling compounds.
   2. Concrete sub floors shall be cured and dry to industry standards. They shall have an adequate moisture barrier beneath and at the perimeter of the slab.

B. Notify Architect of unsatisfactory conditions. Such conditions shall be corrected prior to proceeding with flooring installation.

3.2  PREPARATION

A. Clean surfaces thoroughly prior to installation.

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

A. Install in accordance with manufacturer's instructions.
   1. Flooring shall be stored on the premises for 24 hours to 48 hours before installation
      commences, or as required for acclimation. The flooring installer shall make final
      determination of acclimation period.

B. Installation:
   1. Strike a chalk line parallel to the length wall 48-3/4 inches from wall; this line will serve
      as a guide to install the first row of panels.
   2. Locate and attach 2 inch by 2 inch by 3/4 inch solidification blocks on back of first full
      panel with 1-1/4 inch staples or #3 finish nails.
   3. Secure first panel to sub-floor (leaving 3/4 inch gap at all walls) with 1/4 inch by 2-3/4
      inch TapCon screws through indicated points (through center of 2 by 2 blocks). Drill 1/4
      inch hole through panel and 2 by 2 block. Counter-sink hole with 1/2 inch counter sink to
      achieve flush installation of TapCon. Drill pilot hole in sub-floor and attach panel
      precisely on guide line. Install second panel with joint tight and attach only at 96 inch
      edge with four screws. Continue to the end of the wall and attach last panel or cut panel
      with 3/4 inch gap at end wall, anchors at length and end wall.
   4. Proceed to the left of the room and start the second row with 48 inch by 48 inch panel;
      attach at wall with 3 anchors and install field panels securely with no anchors.
   5. Use pry bar to tighten last panel at end and length walls while attaching the sub-floor.
   6. Install panels with 1/32 inch gap at joints for flexing.

3.4 PROTECTION

A. Provide protective covering as recommended by flooring manufacturer and as required to
   ensure installed flooring finish will not be damaged by work of other trades. Protect installed
   flooring finish surfaces from damage until Project Completion.

B. Touch-up, repair or replace damaged products before Project Completion.

END OF SECTION
SECTION 09 64 66
WOOD ATHLETIC FLOORING

PART 1 GENERAL

1.1 SECTION INCLUDES
A. Free floating, low profile cushioned wood athletic flooring system.
B. Floor finish.
C. Game lines.

1.2 RELATED SECTIONS
A. Division 01 – Sustainable Design Requirements; for additional LEED requirements.
B. Section 03 30 00 – Cast-In-Place Concrete.

1.3 REFERENCES
A. The publications listed below form a part of this Section to the extent referenced. The
publications are referred to in the text by the basic designation only. Refer to Division 01 for
definitions, acronyms, and abbreviations.
B. Standards, manuals, and codes refer to the latest edition of such standards, manuals, and
codes in effect as of the date of issue of this Project Manual, unless indicated otherwise in
CBC Chapter 35 and CFC Chapter 80.
C. Referenced Standards:
   1. ASTM F710 – Standard Practice for Preparing Concrete Floors to Receive Resilient
      Flooring.
   2. MFMA – Maple Flooring Manufacturers Association.

1.4 SUBMITTALS
A. Material List: Submit six copies of material list proposed for use on this project including
manufacturer’s materials descriptions and installation instructions, flooring finish products, and
game line paint and primer products.
B. LEED Submittals: Provide the following, and comply with applicable requirements and
   procedures of Division 01.
   1. Product Data for EQ Credit 2: For adhesives and sealants, including printed statement of
      VOC content and chemical components.
   2. Product Data for EQ Credit 2: For hard flooring materials, including printed statement
      that products meet the testing and product requirements of the California Department of
      Public Health Standard Practice for The Testing Of Volatile Organic Emissions From
      Various Sources Using Small-Scale Environmental Chambers, including 2004 Addenda.
   3. Product Data for EQ Credit 3:
      a. Manufacturer’s product data for each composite wood or agrifiber product used
         indicating that the product contains no added urea formaldehyde resins.
b. Laminate adhesive manufacturer's product data for each adhesive used indicating that the adhesive contains no added urea formaldehyde resins.

4. Certificates for MR Credit 3: Chain-of-custody certificates certifying that products specified to be made from certified wood comply with forest certification requirements. Include evidence that mill is certified for chain of custody by an FSC-accredited certification body.
   a. Include statement indicating costs for each certified wood product.

C. Samples: Submit two 24 inch long strips of wood flooring of type proposed for use including sample of rubber base and pneumatic natural rubber pad.

D. Maintenance Data and Instruction: Upon completion of the floor installation work, prior to acceptance of the work, furnish two copies of list of recommended maintenance products, methods and procedures.

1.5 LEED COMPLIANCE DOCUMENTATION

A. Provide the following, and comply with applicable requirements and procedures of Division 01, LEED Online Letter Templates, and LEED 2013 BD+C Reference Guide:
   1. Product Data for MR Credit 3: For products having recycled content, documentation indicating percentages by weight of post-consumer and pre-consumer recycled content.
      a. Include statement indicating costs for each product having recycled content.

1.6 QUALITY ASSURANCE

A. Acceptable Manufacturers: Manufacturer shall be one regularly engaged in the manufacture of wood flooring systems for gymnasium floors.

B. All system component parts must be supplied by the same manufacturer.

C. Installer's Qualifications: Installation shall be done only by a flooring manufacturer approved installation firm normally engaged in this type of installation and one who has sufficient documented experience in installing gymnasium wood floor systems on verifiable comparable projects. All work shall be performed by qualified installed working under an experienced supervisor.

D. Manufacturer's Qualifications: Company continuously and regularly employed in the manufacture of the similar materials for a period of at least ten consecutive years.

E. Requirements of Regulatory Agencies: Installation shall conform to the requirements of Title 24, Part 2, Chapter 8, Section 804, California Code of Regulations and California State Fire Marshal.

F. Hardware Flooring: Flooring shall have the Maple Flooring Manufacturers Association (MFMA) grademark.

1.7 DELIVERY, STORAGE AND HANDLING

A. Handle and store materials as packaged by the manufacturer with grade marks, seals and labels intact.

B. All materials shall be protected against damage and water.
C. Store materials in the area of installation for a minimum of 72 hours prior to start of installation rework. No materials shall be installed that are colder than room temperature under any circumstances.

1.8 JOB AND ENVIRONMENTAL CONDITIONS

A. Dryness: The building shall be dry and closed in. During cold weather, room temperature shall be maintained at a minimum level of 65 degrees F. Room dampness shall not exceed an Equilibrium Moisture Content reading of eight percent as tested daily with a sling psychrometer by the installing contractor, both prior to and during the course of installation of flooring. Reduction of room dampness, if required, shall be the responsibility of the Contractor who shall use heat, ventilation and fans as required. Moisture content of flooring itself shall also be checked by instrument daily during installation by the installing contractor and shall at no time exceed eight percent.

B. Minimum Temperature: Maintain a minimum room temperature of 50 degrees F with area of installation until final acceptance of the building.

C. Flooring materials must be allowed to acclimate to building conditions on the job site in a dry, well-ventilated area, not in contact with masonry, and shall be installed at a moisture content not to exceed eight percent except in areas of constant high humidity where the moisture content of the flooring shall not exceed ten percent.

1.9 WARRANTY

A. General: Floor system manufacturing defects shall be warrantied by the manufacturer for a period of one year. Guarantee shall include materials and workmanship, guarantee against buckling and a positive guarantee against the occurrence of dead spots in the floor.

PART 2  PRODUCTS

2.1 LEED REQUIREMENTS

A. Recycled Content:
   1. Provide products with post-consumer and pre-consumer recycled content, calculated as percentages of total product weight.
      a. Post-consumer recycled content plus one-half of pre-consumer recycled content shall constitute a part of applicable LEED Credit requirement for recycled content.

B. VOC of Adhesives and Sealants:
   1. For field applications that are inside the weatherproofing system, use adhesives and sealants that comply with the limits set forth in South Coast Air Quality Management District (SCAQMD) Rule 1168 for VOC in g/L, less water, when calculated according to 40 CFR 59, Subpart D. Refer to LEED 2013 BD+C Reference Guide for list of sealant and adhesive types that must comply with VOC limits.

C. Urea-Formaldehyde:
   1. Composite wood and agrifiber products used on the interior of the building shall contain no added urea-formaldehyde resins.
   2. Laminating adhesives used to fabricate on-site and shop-applied composite wood and agrifiber assemblies shall contain no added urea-formaldehyde resins.
2.2 MANUFACTURERS


D. Substitutions under provisions of Division 01.

2.3 MATERIALS

A. Vapor Barrier: 6-mil polyethylene sheet.

B. Resilient Pads: 1/2 inch x 4-5/8 inch x 1-1/2 inch Rezill resilient pads.

C. Quick-Level Adjustment Blocks:
   1. Quick-Level tapered blocks with resilient pad attached by manufacturer.
   2. Support plates shall be attached to underside of resilient pads to accommodate profile height and /or provide additional resilient pad support.

D. Sleepers: 1-3/8 inch x 2-1/2 inch x 8 feet LVL plywood with Quick-Level slots provided for placement of Quick-Level blocks.

E. Subfloor:

F. Flooring (Laylite Maple):
   1. 25/32 inch x 2-1/4 inch Second & Better Grade, Northern Hard Maple Flooring, TGEM, MFMA Grade marked and stamped.
   2. SMARTWOOD: Hard maple flooring shall be certified as harvested from managed forest in compliance with the SmartWoodcm program of the Rainforest Alliance.

G. Fasteners:
   1. Flooring Fasteners: 2 inch barbed cleats or coated staples.
   2. Subfloor Fasteners: 1-1/2 inch subfloor staples or screws, and PL400 adhesive or accepted equal.

H. Finish Materials: Connor oil modified polyurethane seal and finish or accepted equal.

I. Game Lines and Logo: Game line and logo paint and primer shall be type recommended by flooring manufacturer and compatible with floor finish. Colors as selected by Architect.

J. Wall Base: 3 inches x 4 inches, heavy duty, molded, vented cove base with pre-molded outside corners.
PART 3 EXECUTION

3.1 INSPECTION

A. Inspect concrete slab for proper tolerance and dryness. Immediately report any discrepancies to the Architect.

B. The concrete slab shall be cleaned of all debris so flooring contractor will have adequate access to work surface. Do not install wood flooring system until conditions are satisfactory.

3.2 EXAMINATION

A. Examine substrates, areas, and conditions and identify conditions detrimental to proper or timely completion.

B. Wood flooring shall not be installed when the atmospheric relative humidity exceeds sixty percent. Contractor shall provide dehumidifiers as required to maintain sixty percent maximum atmospheric relative humidity for the duration of the wood flooring installation.

C. Beginning of installation means acceptance of existing substrate and site conditions.

3.3 WORKING CONDITIONS

A. The wood flooring shall not be installed until all masonry, tile, plastering and other similar works are completed, and overhead mechanical trades and painters have finished in wood floor area. The building must be reasonably dry; all openings must be closed in; permanent heating, ventilating and air conditioning installed and working before, during, and after installation.

B. The concrete slab shall be dry, free of foreign materials, and turned over to the wood flooring contractor broom clean. Moderate room temperature of 65 degrees F or more shall be maintained a week preceding and throughout the duration of the work. Humidity conditions within the building shall approximate humidity conditions which will prevail when the building is occupied. If prior experience indicates relative humidity during sustained heating periods will fall below 35 percent, building engineering shall introduce moisture into the area when required. Conversely, if relative humidity increases to 50 percent or higher, measures should be taken to bring the relative humidity back under control. This may require turning on the heat.

3.4 PREPARATION

A. Prepare substrate in accordance with ASTM F710 and flooring manufacturer’s recommendations.

B. Remove sub-floor ridges and bumps. Fill low spots, cracks, joints, holes, and other defects with subfloor filler.

C. Apply, trowel, and float filler to leave a smooth, flat, hard surface.

D. Prohibit traffic from area until filler is cured.

E. Vacuum clean substrate.
3.5 INSTALLATION

A. Subfloor:
   1. Cover concrete slab with polyethylene sheet lapping edges 6 inches and sealed with adhesive tape.
   2. Sleepers:
      a. Place sleepers 16 inches on center at right angle to finished flooring, staggering end joints by 48 inches in adjacent rows. Provide 1-1/2 inch expansion void at perimeter and at all vertical obstructions. Install solid blocking under bleachers in the stacked position and below portable goals.
   3. Adjust Quick-Level blocks to provide proper flatness tolerance of sleeper surface. Apply adhesive to top of blocks prior to block adjustment. Fasten staples through top of sleepers allowing significant penetration into blocks.
   4. Attach plywood subfloor with 8 foot edges parallel to and resting on sleepers. Set plywood in staggered brick pattern and offset plywood ends by 24 inches from sleeper end joints with 1/4 inch spacing along all edges. Fasten plywood to sleeper using a single ribbon of Connor 400 adhesive and staples fastened 12 inches on center. Provide 1-1/2 inch expansion voids at perimeter and at all vertical obstructions.

B. Maple Flooring:
   1. Install maple flooring parallel to main playing court by power nailing or stapling at all sleeper locations and approximately 12 inches on center with end joints properly driven up.
   2. If required, size joints between flooring strips to allow for intermediate expansion in accordance with local humidity conditions.
   3. Provided 1-1/2 inch expansion voids at perimeter and at all vertical obstructions.

3.6 FLOOR SANDING

A. Machine sand using coarse, medium, and fine grade sandpaper.

B. After sanding with drum sander, buff entire floor using 100 grit screenback or equal grit sandpaper, with a heavy-duty buffing machine.

C. Remove sanding dust continuously from the entire surface and cracks by vacuum or tack surface. Vacuum or tack floor before first coat of seal.

D. Floor shall present a smooth, even, and uniform surface without drum stop marks, gouges, streaks or Shiners.

3.7 FINISHING

A. Inspect entire area of floor to ensure that the surface is acceptable for finishing, completely free from sanding dust and perfectly clean.

B. Apply two coats of approved seal and two coats of approved finish per manufacturer’s instructions.

C. Screenback or steel wool and clean by vacuum or tack between each coat after it dries.
D. Game lines and logo shall be installed by installers specializing in the application of game lines on wood flooring. Apply game lines accurately after the seal coats and before the finish coats, after buffing and vacuuming. For game lines, use current rules of association having jurisdiction. Lines shall be straight with sharp edges. Game line paint shall be compatible with finish.

1. Layout lines and graphics in the configurations and sizes indicated on Drawings.

2. Apply two coats of alkyd paint in accordance with manufacturer’s recommendations in colors indicated on Drawings. Lines and graphics shall be crisp, true, clean, and without bleeding. Paint shall be compatible with product used for sealer. Product: Hillyard Gym Line Marking Paint or accepted equal.

3. After paint has dried, buff lines and graphics with buffer and prep pad. Clean floor in preparation for finish.

3.8 BASE INSTALLATION

A. Affix rubber vent cove base to wall with recommended screws. Miter all inside corners carefully. Use premolded outside corners.

3.9 CLEAN-UP

A. Upon completion of the work of this Section, remove all surplus materials, rubbish, debris, and tack cloths from the premises.

3.10 PROTECTION

A. Immediately after the finishing work is completed and the floor finish is dry, cover the finished hardwood floor with clean, heavy-duty building paper in all areas used as passageways by workmen and areas subject to floor damage because of subsequent construction operations.

B. Provide protective covering as recommended by flooring manufacturer and as required to ensure installed flooring finish will not be damaged by work of other trades. Protect installed flooring finish surfaces from damage until Project Completion.

3.11 MAINTENANCE

A. Upon completion of floor installation, the owners, attendants or individuals in charge and responsible for the upkeep of the building shall be instructed to follow the care and maintenance instructions of the Maple Flooring Manufacturers Association.

END OF SECTION
SECTION 09 65 00
RESILIENT FLOORING

PART 1  GENERAL

1.1  SECTION INCLUDES

A.  Linoleum tile flooring.
B.  Rubber tile flooring.
C.  Luxury vinyl plank flooring.
D.  Resilient athletic rubber sheet flooring.
E.  Rubber stair treads, risers, and stringers.
F.  Resilient wall base, rubber.
G.  Resilient molding accessories.
H.  Painted game line striping and graphics.

1.2  RELATED SECTIONS

A.  Section 01 81 13 – Sustainable Design Requirements; for additional LEED requirements.
B.  Section 03 30 00 – Cast-In-Place Concrete; for concrete substrate.
C.  Section 07 26 50 – Vapor Emission Control System.
D.  Section 09 29 00 – Gypsum Board; for wall materials to receive resilient base.

1.3  REFERENCES

A.  The publications listed below form a part of this Section to the extent referenced. The publications are referred to in the text by the basic designation only. Refer to Division 01 for definitions, acronyms, and abbreviations.

B.  Standards, manuals, and codes refer to the latest edition of such standards, manuals, and codes in effect as of the date of issue of this Project Manual, unless indicated otherwise in CBC Chapter 35 and CFC Chapter 80.

C.  Referenced Standards:
8. ASTM F710 – Standard Practice for Preparing Concrete Floors to Receive Resilient Flooring.

1.4 SUBMITTALS

A. Submit shop drawings and product data under provisions of Division 01.
B. Submit seaming layouts for all sheet flooring products specified.
C. Submit game line and graphics layouts, including colors.
D. LEED Submittals:
   1. Product Data for MR Credit 3: For products having recycled content, documentation indicating percentages by weight of post-consumer and pre-consumer recycled content.
      a. Include statement indicating costs for each product having recycled content.
   2. Product Data for EQ Credit 2:
      a. For resilient flooring, documentation indicating certification and compliance with testing and product requirements of the FloorScore standard by an independent third-party.
      b. For installation adhesive, including printed statement of VOC content.
E. Provide product data on specified products, describing physical and performance characteristics, sizes, patterns, and colors.
F. Submit samples under provisions of Division 01.
G. Submit two samples, 6 inches by 12 inches in size, illustrating color and pattern for each flooring material specified.
H. Submit two heat-welded seam samples for each sheet or material type, 6 inches by 12 inches, with seam running lengthwise in the center.

I. Submit two 4-inch long samples of wall base material of each color specified; include preformed or job-formed corners, as applicable.

J. Submit manufacturer's installation instructions under provisions of Division 01.

1.5 OPERATION AND MAINTENANCE DATA

A. Submit cleaning and maintenance data under provisions of Division 01.

B. Include maintenance procedures, recommended maintenance materials, and suggested schedule for cleaning, sealing and re-finishing.

1.6 JOB AND ENVIRONMENTAL CONDITIONS

A. Store materials for three days prior to installation in area of installation to achieve temperature stability.

B. Maintain ambient temperature required by adhesive manufacturer three days prior to, during and 24 hours after installation of materials.

1.7 EXTRA MATERIALS

A. Provide 40 square feet of flooring and 20 lineal feet of non-integral wall base of each material and color specified, under provisions of Division 01.

1.8 QUALITY ASSURANCE

A. Resilient flooring shall comply with the requirements of CBC Section 804.

B. Concrete slabs to receive resilient flooring shall conform to applicable requirements of ASTM F710.

C. Installer Qualifications: Installer to have at least three years experience of installing flooring products in similar facilities.

   1. Special Installer Qualifications, Forbo Products:
      a. Installer to be a certified Forbo "Master Mechanic."
      b. Provide proof of certification.
      c. "Master Mechanic" installer to be present during entire installation period.

1.9 SLIP RESISTANCE

A. Resilient flooring shall be stable, firm, and slip resistant per CBC Section 11B-302.1. The static coefficient of friction (COF) shall not be less than 0.5 for level surfaces and 0.8 for ramps, per ASTM D2047.
PART 2  PRODUCTS

2.1  LEED™ REQUIREMENTS

A. Recycled Content: Provide resilient flooring products with recycled content such that post-consumer recycled content plus one-half of pre-consumer recycled content, calculated as percentages of total product weight, shall contribute to the LEED Credit requirement for recycled content.

B. Adhesive VOC Limits: Provide adhesives with VOC content not more than fifty g/L when calculated according to 40 CFR 59, Subpart D (EPA method 24).

2.2  MANUFACTURERS AND PRODUCTS, LINOLEUM TILE FLOORING (RT1 and RT2)

A. Acceptable Manufacturers:
   2. Armstrong World Industries, Inc.
   3. Tarkett Inc.

B. Linoleum Tile Materials:
   1. Linoleum Tile: Conforming to ASTM F2195, Type I.
   2. Size: 9.8 inches by 39.37 inches by 0.100 inch (25 cm by 100 cm by 2.5 mm).
   4. Slip Resistance: greater than 0.5 per ASTM D2047.
   5. Static Load Limit: 1,500 psi per ASTM F970.
   6. Fire-Test-Response Characteristics:
      a. Smoke Density: 450 or less, ASTM E662 or NFPA 258.
      b. Critical Radiant Flux Classification: Class 1; ASTM E648 or NFPA 253.
   7. Finish:
      a. Factory-Applied Finish: Soil-resistant, colorless top coat over cross-linked primer; “Topshield2” finish by Forbo or accepted equal.
   8. Colors: As indicated on Drawings.
   9. Adhesive: Water-based type, as recommended by flooring manufacturer for substrates indicated.

2.3  MANUFACTURERS AND PRODUCTS, RUBBER TILE FLOORING (RT3)

A. Acceptable Manufacturers:
   2. Mondo.
B. Rubber Flooring Materials:
   1. Rubber Tile Material: ASTM F1344, extra heavy duty rubber with natural fillers; free of asbestos and PVC.
   2. Tile Size: 24 inches by 24 inches (610 mm by 610 mm)
   3. Thickness: 0.12 inch (3 mm).
   6. Slip Resistance: ASTM D2047, 0.8 or greater.
   9. Static Load Limit: 800 psi, 0.005 inch or less residual compression per ASTM F970.
   10. Fire-Test-Response Characteristics:
      a. Smoke Developed: 450 or less, ASTM E662.
      b. Critical Radiant Flux Classification: Class 1, 0.45 watts per square centimeter or greater, ASTM E648.
   11. Colors: As indicated on Drawings.
   13. Environmental Requirements: Product shall meet GreenGuard indoor air quality certification requirements.
   14. Adhesive: Solvent-free, non-flammable, high strength, as recommended by flooring manufacturer for substrates indicated.

2.4 MANUFACTURERS AND PRODUCTS, LUXURY VINYL PLANK FLOORING (RT4)

A. Acceptable Manufacturers:
   1. Gerflor. Product: Creation LVT.
   2. Patcraft. Product: Adesa #1424V.

B. Luxury Vinyl Plank Material:
   1. Material: Vinyl tile product in conformance with ASTM F1700 Class III, Type B; plank format with a printed design protected by a 28 mil thick transparent wear layer, including manufacturer’s UV-cured polyurethane surface treatment for ease of maintenance.
   2. Size: Commensurate with color selected.
   3. Overall Thickness: 0.100 inch (2.5 mm).
   4. Wear Layer Thickness: 0.028 inch (0.70 mm).
   5. Backing: 100 percent recycled material.
   6. Static Load Limit: ≤0.005 inch indentation at 250 psi per ASTM F970.
7. Maximum Static Load Limit: 850 psi per ASTM F970.
8. Coefficient of Friction: 0.65 dry per ASTM D2047.
9. Fire-Test-Response Characteristics:
   a. Smoke Developed: 450 or less, ASTM E662.
   b. Critical Radiant Flux Classification: Class 1, 0.45 watts per square centimeter or greater, ASTM E648.
10. Color and Pattern: As indicated on Drawings.
11. Adhesive: Water-resistant type, as recommended by flooring manufacturer for substrates indicated.

2.5 MANUFACTURERS AND PRODUCTS, RESILIENT ATHLETIC RUBBER SHEET FLOORING

A. Acceptable Manufacturers:
   a. Encore ECOSurfaces Classic 700 Series (SF1 and SF2).
   b. Encore Athletic Stacked Performance Motivate Rolls (SF3).
5. Substitutions: Under provisions of Division 01.

B. Materials (SF1 and SF2)
1. Non-laminated, single-ply, rubber surface made from a formulation of high quality post-consumer recycled rubber granules encapsulated in a wear and water-resistant elastomeric network with multiple colored reprocessed EPDM rubber. Material surface shall contain a water-based protective polyurethane clear coat.
2. Roll Size: 4 feet - 0 inches wide by 25 feet - 0 inches long.
3. Thickness: 8 mm.
5. Coefficient of Friction: 0.9 or greater per ASTM D2047.
6. Static Load Limit: 400 psi per ASTM F970.
7. Fire-Test-Response Characteristics:
   a. Smoke Developed: 450 or less, ASTM E662.
   b. Critical Radiant Flux Classification: Class 1, 0.45 watts per square centimeter or greater, per ASTM E648.
8. Colors: As indicated on Drawings.
9. Warranty: Ten years for material defects and surface wear-through.
10. Environmental Requirements: Product to meet GreenGuard indoor air quality certification requirements.
11. Adhesive: One-part urethane adhesive, solvent-free, non-flammable, high strength, as recommended by flooring manufacturer for substrates indicated.
12. Graphics: In-laid logo graphics by flooring manufacturer. Logo graphic to be provided by Architect.

C. Materials (SF3):
   1. Prefabricated resilient rubber athletic flooring meeting ASTM F2772 made from a formulation of high quality post-consumer recycled rubber granules encapsulated in a wear and water-resistant elastomeric network with a fusion bonded reprocessed EPDM surface wear layer.
   2. Roll Size: 4 feet - 0 inches wide by custom length.
   3. Underlayment Thickness: 5 mm.
   4. Wear Layer Thickness: 2.5 mm.
   5. Total Thickness: 7.5 mm.
   7. Coefficient of Friction: 0.9 or greater per ASTM D2047.
   8. Static Load Limit: 250 psi per ASTM F970.
   9. Fire-Test-Response Characteristics:
      a. Smoke Developed: 450 or less, ASTM E662.
      b. Critical Radiant Flux Classification: Class 1, 0.45 watts per square centimeter or greater per ASTM F648.
   10. Color: As indicated on Drawings.
   11. Warranty: Ten years for material defects and surface wear-through.
   12. Environmental Requirements: Product to meet GreenGuard indoor air quality certification requirements.
   13. Adhesive: One-part urethane adhesive, solvent-free, non-flammable, high strength, as recommended by flooring manufacturer for substrates indicated.

2.6 MANUFACTURERS AND PRODUCTS, RUBBERSTAIR TREADS, RISERS, AND STRINGERS

A. Acceptable Manufacturers:
   2. Roppe.

B. Stair Tread Materials:
   1. ASTM F2169, Type TS (rubber, vulcanized thermoset), Class 1 and 2, Group 1 and 2, manufactured from a homogeneous composition of 100 percent synthetic rubber, high quality additives, and colorants.
   2. Nosing: Hinged, square, with visually impaired insert strips.
   3. Size: As indicated on Drawings.
   4. Thickness: 0.210 inch tapering to 0.153 inch.
   5. Tensile Strength: 1200 psi per ASTM D412.
6. Hardness: Not less than 85 Shore A per ASTM D2240.
7. Abrasion Resistance: Less than one gram weight loss per ASTM D3389.
8. Slip Resistance: Minimum 0.8 coefficient of friction per ASTM D2047.
9. Fire-Test-Response Classification:
   a. Smoke Developed: 450 or less, ASTM E662 (NFPA 258).
   b. Critical Radiant Flux: Class 1, 0.45 watts per square centimeter or greater, ASTM E648 (NFPA 253).
10. Color: As indicated on Drawings.
11. Provide 2-inch wide solid rubber contrasting color insert strips complying with CBC requirements for the visually impaired. Color as indicated on Drawings.
12. Adhesive: Solvent-free, non-flammable, high strength, as recommended by stair tread manufacturer for substrates indicated.

C. Stair Riser Materials:
   1. Smooth, flat; material same as treads, produced by same manufacturer as treads.
   2. Height: As indicated on Drawings.
   3. Size: As indicated on Drawings.
   4. Color: As indicated on Drawings.
   5. Adhesive: Solvent-free, non-flammable, high strength, as recommended by riser manufacturer for substrates indicated.

D. Stair Stringer Materials:
   1. ASTM F1861, Type TP (rubber, thermoplastic), Group 1, manufactured from a thermoplastic rubber formulation.
   2. Smooth, flat; material, produced by same manufacturer as treads.
   3. Thickness: 0.080 inch (2 mm).
   4. Height: As indicated on Drawings.
   5. Size: As indicated on Drawings.
   6. Color: As indicated on Drawings.
   7. Adhesive: Solvent-free, non-flammable, high strength, as recommended by stringer manufacturer for substrates indicated.

2.7 MANUFACTURERS AND PRODUCTS, RESILIENT WALL BASE
A. Acceptable Manufacturers:
   1. Johnsonite.
   2. Burke Flooring.
   3. Roppe Corporation.

B. Wall Base Materials:
   1. Wall Base: ASTM F1861, Type TS, (rubber, vulcanized, thermoset).
   2. Style: Cove (base with toe), top set; or straight (flat or toeless), as indicated on Drawings.
3. Height: 4 inches, unless otherwise indicated.
4. Thickness: 1/8 inch, minimum.
5. Lengths: Coils in manufacturer's standard length.
6. Color: As indicated on Drawings.

C. Wall Base Accessories:
   1. Preformed end stops, and outside corners, of the same material, manufacturer, size, and color as wall base.
   2. Adhesive: Water-based type, as recommended by base manufacturer for substrates indicated.

2.8 MANUFACTURERS AND PRODUCTS, ACCESSORIES

A. Subfloor Filler: Portland cement type at concrete substrate as recommended by flooring material manufacturer.
   1. Acceptable Manufacturer and Products: UZIN products provided by UFLOOR Systems, Inc. or accepted equal.

B. Primers and Adhesives: Water-resistant type, as recommended by flooring, tread/riser, and wall base manufacturers. Flooring adhesives shall be compatible for use over the vapor emission control system installed under Section 07 26 50.

C. Resilient Molding Accessories:
   1. Molding Accessories: Rubber, unless otherwise indicated on Drawings. Provide where required or indicated.
      a. Carpet edge or nosing.
      b. Nosing for resilient flooring.
      c. Joiner for tile and carpet.
      d. Transition strips.
      e. Reducer strip for resilient flooring.
   2. Acceptable Manufacturers:
      a. Johnsonite.
      b. Burke Flooring.
      b. Roppe Corporation.
      c. Substitutions: Under provisions of Division 01.

2. Colors: As selected by Architect.

C. Seamless-Installation Accessories:

D. Cleaners, Sealers and Finishes: All cleaners, sealers and finishes to be products of one manufacturer. Use products approved by flooring manufacturers in writing.
   1. Acceptable Manufacturers:
      a. Linoleum Flooring: Johnson Diversey, products as listed below; or accepted equal.
b. Rubber Treads and Risers: Spartan Chemical Co., Inc., Maumee, OH, 800-537-8990
   www.spartanchemical.com. Use Spartan products for Roppe products. For other tread/riser
   products comply with manufacturer’s printed instructions.

2. Products for Linoleum Tile Flooring:
   a. Cleaner: Stride neutral cleaner; use for post-installation and routine maintenance.
   c. Finish Coating: Two coats of “Carefree” matte floor finish; apply as recommended by
      flooring manufacturer.
      1) Finish coating is not required for Forbo products at the time of installation. Furnish
         “Carefree” matte floor finish for routine maintenance of Forbo products; quantity as
         required.

3. Products for Rubber Tile Flooring: Wash polish as recommended by flooring
   manufacturer.

4. Products for Luxury Vinyl Plank Flooring:
   a. Cleaner: Kiehl Pro-floor.
   b. Finish Coating: None required for first three years to five years.

5. Products for Resilient Athletic Rubber Sheet Flooring:
   a. Cleaner: Encore Low Foam E-Cleaner.

6. Products for Rubber Stair Treads, Risers, and Stringers:
   a. Cleaner: Spartan Chemical TriBase.
   b. Finish Coating: XL North Rubber Floor Finish.

7. Substitutions: Under provisions of Division 01.

PART 3 EXECUTION

3.1 EXAMINATION

A. Verify that surfaces are smooth and flat with maximum variation of 3/16 inch in 10 feet, and
   are ready to receive Work.

B. Examine substrates, areas, and conditions, with Installer present, for compliance with
   requirements for concrete relative humidity and alkalinity range, installation tolerances, and
   other conditions affecting resilient flooring performance. Examine resilient flooring products
   for type, color, pattern, and potential defects.

C. New Concrete Slabs:
   1. Contractor shall verify that concrete floors are dry and exhibit negative alkalinity,
      carbonization or dusting. The concrete relative humidity and alkalinity tests required in
      Section 07 26 50 shall be performed and documented prior to installation of resilient
      flooring.
   2. Install vapor emission control system per Section 07 26 50, when concrete relative
      humidity and alkalinity test results exceed the values specified in Section 07 26 50.
D. Existing Concrete Slabs:
   1. Contractor shall verify that concrete floors are dry and exhibit negative alkalinity, carbonization or dusting. The concrete relative humidity and alkalinity tests shall be performed per ASTM F2170 and ASTM D1308 respectively, and shall be documented prior to installation of resilient flooring.
      a. Maximum Relative Humidity of Concrete: 75 percent.
   2. When concrete relative humidity and alkalinity test results exceed the values specified above, contact Architect for direction.

E. Resilient flooring shall not be installed when the atmospheric relative humidity exceeds sixty percent. Contractor shall provide dehumidifiers as required to maintain sixty percent maximum relative humidity for the duration of the resilient flooring installation.

F. Beginning of installation means acceptance of existing substrate and site conditions.

3.2 PREPARATION

A. Prepare substrate in accordance with ASTM F710 and flooring manufacturer’s recommendations.

B. Remove sub-floor ridges and bumps. Fill low spots, cracks, joints, holes, and other defects with subfloor filler.

C. Apply, trowel, and float filler to leave a smooth, flat, hard surface. Repair all floor irregularities.

D. Fill or level cracks, holes and depressions 1/8 inch wide or wider, and protrusions more than 1/32 inch, unless more stringent requirements are required by manufacturer's written instructions.

E. Prohibit traffic from area until filler is cured.

F. Broom and vacuum clean substrates to be covered immediately before installing resilient flooring.

G. When required by manufacturer, apply primer to concrete surfaces.

3.3 INSTALLATION

A. General:
   1. Install all resilient flooring products and accessories under this Section in accordance with manufacturers' printed instructions.
   2. Terminate flooring at centerline of door openings where adjacent floor finish is dissimilar.
   3. Install edge strips at unprotected or exposed edges of flooring including terminations at thresholds and where flooring abuts a dissimilar finished floor material.
   4. Scribe flooring to walls, columns, cabinets, floor outlets, and other appurtenances to produce tight joints.

B. Linoleum Tile Flooring:
   1. Lay out floor tiles from center of room so that floor tiles at opposite edges of room are of equal width.
2. Install tile to square grid pattern with all joints aligned. Allow minimum half full-size tile width at room or area perimeter.

3. Match floor tiles for color and pattern by selecting tiles from the cartons in the same sequence as manufactured and packaged.

C. Rubber Tile Flooring:
   1. Lay out floor tiles from center of room so that floor tiles at opposite edges of room are of equal width.
   2. Mix tile from container to ensure shade variations are consistent. Discard broken, cracked, chipped, or deformed tiles.
   3. Adhere floor tiles to substrate using a full spread of adhesive applied to substrate to produce a uniform installation without voids, joint deformation, telegraphing of adhesive spreader marks, and other surface imperfections.

D. Luxury Vinyl Plank Flooring:
   1. Straight lay planks starting from center of room.
   2. Lay out planks such that:
      a. Width of planks at walls shall not be less than one half of full plank width.
      b. Length of planks shall not be less than nine inches.
   3. Do not place cut edges against beveled edges.
   4. Mix tile from container to ensure shade variations are consistent. Discard broken, cracked, chipped, or deformed tiles.
   5. Adhere floor tiles to substrate using a full spread of adhesive applied to substrate to produce a uniform installation without voids, joint deformation, telegraphing of adhesive spreader marks, and other surface imperfections.

E. Resilient Athletic Rubber Sheet Flooring:
   1. Install flooring per manufacturer’s published installation instructions.

F. Rubber Stair Treads, Risers, and Stringers:
   1. Stair shape shall conform closely to stair tread contour, especially where flat part of tread joins the nosing.
   2. Apply epoxy caulkung nose filler to ensure a tight fit and eliminate any open spaces between the step edge and stair tread nosing.
   3. Stair treads shall be trimmed to within 1/16 inch of the riser and stringer to allow for expansion.
   4. Apply adhesive per manufacturer’s instructions. The stair tread and nosing shall be bonded directly to the step surface.
   5. Do not overlap the nosing over the resilient riser material.
   6. Stair treads shall be rolled with a J-hand roller after installation to ensure proper bonding. Immediately remove any excess adhesive.
G. Resilient Wall Base:
   1. Install resilient wall base on entire wall perimeter including toe spaces and open ends of cabinets. Set all bases in adhesive as recommended by the manufacturer. All joints in bases, including those at any preformed corners, shall be plumb, flush, tight and inconspicuous. Seat top edge and back of base firmly against the wall.
   2. Fit joints tight and vertical. Maintain minimum measurement of 18 inches between joints.
   3. Corners and Ends:
      a. At external corners, use preformed units. Install preformed corners before installing straight pieces.
      b. Interior corners shall be mitered and tightly fitted. Use straight pieces of maximum lengths possible.
   4. At exposed ends use preformed units.
   5. Install base on solid backing. Bond tight to wall and floor surfaces.
   6. Scribe and fit to door frames and other interruptions.
   7. Do not stretch resilient base during installation.

H. Resilient Molding Accessories: Butt to adjacent materials and tightly adhere to substrates throughout length of each piece. Install reducer strips at edges of floor covering that would otherwise be exposed.

3.4 CLEANING, SEALING, AND POLISHING

A. Remove excess adhesive from floor, base, and wall surfaces without damage. Sweep and vacuum surfaces thoroughly.

B. Clean, seal, and finish floor and wall base surfaces in accordance with manufacturer’s written instructions.
   1. Linoleum Tile Flooring:
      a. Cleaner: One coat application, unless otherwise recommended by flooring manufacturer.
      b. Sealer: Two medium thickness coats. Sealer is not required for Forbo products.
      c. Finish: Two medium thickness coats, unless otherwise recommended by flooring manufacturer. Finish coating is not required for Forbo products at the time of installation. Furnish “Carefree” matte floor finish for routine maintenance of Forbo products; quantity as required.
   2. Rubber Tile Flooring: Use products in accordance with flooring manufacturer’s recommendations. Coordinate disinfectant application with flooring manufacturer to prevent staining of flooring.
   3. Luxury Vinyl Plank Flooring:
      a. Cleaner: Number of coats and application procedures as recommended by flooring manufacturer.
      b. Finish Coating: None required for first three years to five years.
   4. Resilient Athletic Rubber Sheet Flooring:
      a. Cleaner and Finish Coating: Number of coats and application procedures as recommended by flooring manufacturer.
5. Rubber Stair Treads, Risers, and Stringers:
   a. Cleaner and Finish Coating: Number of coats and application procedures as recommended by flooring manufacturer.

6. Wall Base, Rubber: Clean by wiping with soft cloth dampened with warm water.

3.5 PROTECTION

A. Comply with manufacturer's written instructions for protection of resilient flooring.

B. Protect flooring from damage during construction operations for the remainder construction period. After allowing drying film to disappear, cover flooring until Project Completion.

END OF SECTION
SECTION 09 68 13
TILE CARPETING

PART 1  GENERAL

1.1  SECTION INCLUDES

    A. Modular carpet tile.
    B. Accessories.

1.2  RELATED SECTIONS

    A. Section 01 81 13 – Sustainable Design Requirements; for additional LEED requirements.
    B. Section 03 30 00 – Cast-In-Place Concrete.
    C. Section 09 29 00 – Gypsum Board: Walls to receive resilient carpet base.
    D. Section 09 65 00 – Resilient Flooring: Resilient wall base and transition strips.

1.3  REFERENCES

    A. The publications listed below form a part of this Section to the extent referenced. The publications are referred to in the text by the basic designation only. Refer to Division 01 for definitions, acronyms, and abbreviations.
    B. Standards, manuals, and codes refer to the latest edition of such standards, manuals, and codes in effect as of the date of issue of this Project Manual, unless indicated otherwise in CBC Chapter 35 and CFC Chapter 80.
    C. Referenced Standards:

        1. AATCC 134  – Electrostatic Propensity of Carpets.
        5. ASTM F710  – Standard Practice for Preparing Concrete Floors to Receive Resilient Flooring.

1.4  SUBMITTALS

    A. Submit shop drawings and product data under provisions of Division 01.
B. LEED Submittals:
1. Product Data for MR Credit 3: For products having recycled content, documentation indicating percentages by weight of post-consumer and pre-consumer recycled content.
   a. Include statement indicating costs for each product having recycled content.
2. Product Data for EQ Credit 2:
   a. For carpet tile, documentation indicating compliance with testing and product requirements of Carpet and Rug Institute's "Green Label Plus" program.
   b. For installation adhesive, including printed statement of VOC content.

C. Provide product data on specified products, describing physical and performance characteristics; sizes, patterns, colors available and method of installation.

D. Submit samples for review prior to beginning installation.

E. Submit three full size samples illustrating color and pattern for each carpet material specified. Samples shall be labeled to indicate product name, weight, thickness, weave, and manufacturer's name.

F. Submit manufacturer's installation instructions for review.

G. Submit manufacturer's written Warranty, as described in Article 1.10 of this Section, under provisions of Division 01.

1.5 QUALITY ASSURANCE

A. Concrete slabs to receive tile carpeting shall conform to applicable requirements of ASTM F710.

B. Manufacturer: Company specializing in commercial carpet tile with sufficient documented experience.

C. Installer: Company with sufficient documented experience, approved by manufacturer. All work shall be performed by qualified and experienced mechanics working under the supervision of an experienced supervisor.

D. A certification provided by carpet tile manufacturer shall be furnished to Owner stating that register numbers on carpet tile furnished was manufactured in accordance with these specifications.

1.6 MAINTENANCE DATA

A. Submit three copies of manufacturer's maintenance data for commercial installation to Owner in an 8-1/2 by 11 inch hard cover binder.

B. Include maintenance procedures, recommended maintenance materials, and suggested schedule for cleaning, vacuum cleaning, shampooing and recommended type of furniture casters and glides for use with specified carpet tile products.

1.7 REGULATORY REQUIREMENTS

A. Carpet tile work shall conform to applicable requirements of Americans with Disabilities Act (ADA), Article 4.5.
B. Carpet work shall comply with 2016 California Building Code, Chapter 11B, Accessibility to Public Buildings, Public Accommodations, Commercial Buildings and Public Housing, Section 11B-302 "Floor or Ground Surfaces", Section 11B-303, "Changes in Level", and Section 11B-302.2, "Carpet" requirements.

1. Carpet tile edges and trim shall conform to CBC Section 11B-302.2 and Section 11B-303 requirements.

2. Fasten exposed edges to floor surfaces with trim along that edge.

3. Carpet tile shall have a level loop, textured loop, level cut pile, or level cut/uncut pile; height (measured from bottom of tuft) not to exceed 1/2 inch.

4. Carpet tile with a pile height exceeding 1/2 inch above adjoining floor surface, shall have a transition ramp between the surfaces.

C. Carpet shall meet testing requirements of ASTM E648 and ASTM E662.

1. Fire-Test-Response Characteristics: Provide products with the critical radiant flux classification indicated in Part 2, as determined by testing identical products per ASTM E648 and ASTM E662 by an independent testing and inspecting agency acceptable to authorities having jurisdiction.

1.8 JOB AND ENVIRONMENTAL CONDITIONS

A. Comply with CRI 104, Section 7.2, "Site Conditions; Temperature and Humidity" and Section 7.12, "Ventilation."

B. Store materials for three days prior to installation in area of installation to achieve temperature stability.

C. Environmental Limitations: Do not install carpet until wet work in spaces is complete and dry, and ambient temperature and humidity conditions are maintained at the levels indicated for Project when occupied for its intended use.

1. Maintain minimum 70 degree F ambient temperature at floor level three days prior to, during, and 24 hours after installation of materials.

D. Carpet tiles shall be delivered to job site in original mill wrappings, with each box having register number and tags attached, or register number intact.

1.9 EXTRA MATERIALS

A. Furnish extra materials described below, before installation begins, that match products installed and that are packaged with protective covering for storage and identified with labels describing contents.

B. Provide full size units equal to five percent of the total area of carpeting, but not less than ten square yards, of each type and color specified. Extra materials shall be packaged, identified, and delivered to Owner under provisions of Division 01.

1.10 WARRANTY

A. Special Warranty for Carpet Tiles: Manufacturer's standard form in which manufacturer agrees to repair or replace components of carpet tile installation that fail in materials or workmanship within specified warranty period.

1. Warranty does not include deterioration or failure of carpet tile due to unusual traffic, failure of substrate, vandalism, or abuse.
2. Failures include, but are not limited to, more than ten percent loss of face fiber, edge raveling, snags, runs, loss of tuft bind strength, dimensional stability, excess static discharge, and delamination.

3. Warranty Period: Manufacturer's limited lifetime warranty.

B. Provide installer's two year warranty commencing from the date of Project Completion.

C. Submit warranty to Architect, under provisions of Division 01.

PART 2 PRODUCTS

2.1 LEED REQUIREMENTS

A. Recycled Content: Provide carpet tile products with recycled content such that post-consumer recycled content plus one-half of pre-consumer recycled content, calculated as percentages of total product weight, shall contribute to the LEED Credit requirement for recycled content.

B. Adhesive VOC Limits: Provide adhesives with VOC content not more than fifty g/L when calculated according to 40 CFR 59, Subpart D (EPA method 24).

2.2 MANUFACTURERS AND PRODUCTS

A. Acceptable Manufacturers:

B. Substitutions: Under provisions of Division 01.

2.3 MATERIALS

A. Carpet Tile: Conforming to the following criteria:
   1. Size: 19.7 inches by 19.7 inches (50 cm x 50 cm).
   2. Construction: Tufted, textured loop.
   3. Gauge: 1/12 inch.
   4. Stitches per Inch: 9.16.
   5. Tufts: 110 per square inch.
   6. Finished Pile Height: 0.110 inch.
   7. Finished Pile Thickness: 0.080 inch.
   8. Nominal Total Thickness: 0.290 inch.
   9. Nominal Total Weight: 94.8 ounces per square yard.
   10. Average Density: 5,746.
11. Yarn Type: Universal fibers nylon type 6,6.
15. Flammability: Class 1 (CRF: 0.45 watts per square centimeter or higher), per ASTM E648.
17. Static Propensity: AATCC-134, 3.5 KV or lower; permanent conductive fiber.
18. Colors: As indicated on Drawings.

2.4 ACCESSORIES

A. Subfloor Filler: Portland cement type at concrete substrate as recommended by flooring material manufacturer.
   1. Acceptable Manufacturer and Products: UZIN products provided by UFLOOR Systems, Inc. or accepted equal.

B. Primers and Adhesives:
   1. Primers: As recommended by carpet tile and adhesive manufacturer.
   2. Adhesives: Water-resistant, mildew-resistant, non-staining, pressure-sensitive type to suit products and subfloor conditions indicated, that complies with flammability requirements for installed carpet tile and is recommended by carpet tile manufacturer for releasable installation.

C. Resilient Wall Base and Transition Strips: Refer to Section 09 65 00 for resilient wall base and transition strips.

PART 3 EXECUTION

3.1 EXAMINATION

A. Verify that substrate surfaces are smooth and flat with maximum variation of 3/16 inch in 10 feet and are ready to receive work.

B. Examine substrates, areas, and conditions, with Installer present, for compliance with requirements for concrete relative humidity and alkalinity range, installation tolerances, and other conditions affecting carpet tile performance. Examine carpet tile for type, color, pattern, and potential defects.

C. Contractor shall verify that concrete floors are dry and exhibit negative alkalinity, carbonization or dusting. The concrete relative humidity and alkalinity tests shall be performed per ASTM F2170 and ASTM D1308 respectively, and shall be documented prior to installation of resilient flooring.
   1. Maximum Relative Humidity of Concrete: 75 percent.

D. When concrete relative humidity and alkalinity test results exceed the values specified above, contact Architect for direction.
E. Carpet tile shall not be installed when the atmospheric relative humidity exceeds sixty percent. Contractor shall provide dehumidifiers as required to maintain sixty percent maximum relative humidity for the duration of the carpet tile installation.

F. Beginning of installation means acceptance of existing substrate and site conditions.

3.2 PREPARATION

A. General: Comply with ASTM F710, CRI 104, and with carpet manufacturer's written installation instructions for preparing substrates.

B. Remove sub-floor ridges and bumps. Fill low spots, cracks, joints, holes and other defects with sub-floor filler.

C. Apply, trowel and float filler to leave smooth, flat, hard surface. Repair all floor irregularities.

D. Fill or level cracks, holes and depressions 1/8 inch wide or wider, and protrusions more than 1/32 inch, unless more stringent requirements are required by manufacturer's written instructions.

E. Prohibit traffic until filler is cured.

F. Broom and vacuum clean substrates to be covered immediately before installing carpet.

G. When required by manufacturer, apply primer to concrete surfaces.

H. Allow carpet to acclimate at installation location for at least 72 hours prior to beginning installation.

3.3 INSTALLATION

A. Comply with CRI 104 and with carpet tile manufacturer's written installation instructions.

B. Installation Pattern: Install modular tile using vertical ashlar technique.

C. Installation Method: As recommended in writing by carpet tile manufacturer.

D. Maintain dye lot integrity. Do not mix dye lots in the same area.

E. Cut and fit carpet tile to butt tightly to vertical surfaces, permanent fixtures, and built-in furniture including cabinets, pipes, outlets, edgings, thresholds, and nosings. Bind or seal cut edges as recommended by carpet tile manufacturer.

F. Extend carpet tile into toe spaces, door reveals, closets, open-bottomed obstructions, removable flanges, alcoves, and similar openings.

G. Maintain reference markers, holes, and openings that are in place or marked for future cutting by repeating on finish flooring as marked on subfloor. Use nonpermanent, non-staining marking device.

H. Install pattern parallel to walls and borders, unless otherwise indicated on Drawings.

I. Install edge strips at unprotected or exposed edges of carpet tile including terminations at thresholds and where carpet tile abuts a dissimilar finished floor material. Carpet tile edges and trim shall comply with CBC Section 11B-302.2 and Section 11B-303 requirements.
3.4 CLEANING

A. Remove excess adhesive from floor, base and wall surfaces without damage. Remove and dispose of all scraps, cartons and rubbish upon completion of the work. Remove all loose yarn with sharp scissors.

B. Clean carpet tiles of all spots with proper spot remover and vacuum clean carpet tile surfaces.

3.5 PROTECTION

A. Prohibit traffic from carpet tile areas for 24 hours after installation. Installer shall take necessary steps to protect carpet tile work and the work of other trades during carpet tile installation, and shall be responsible for restoration of work or property damaged by carpet tile installer.

B. Protect installed carpet tile to comply with CRI 104, Section 16, "Protection of Indoor Installations".

C. Protect carpet tile from damage during construction operations for the remainder construction period. Cover carpet tile until Project Completion.

END OF SECTION
PART 1 GENERAL

1.1 SECTION INCLUDES

A. Surface preparation.

B. Wall covering, non-PVC, with mural.

C. Adhesives and accessories.

1.2 RELATED SECTIONS

A. Section 09 29 00 – Gypsum Board Systems: Wall substrate.

B. Section 09 91 00 – Painting: Preparation and priming of substrate surfaces.

1.3 REFERENCES

A. The publications listed below form a part of this Section to the extent referenced. The publications are referred to in the text by the basic designation only. Refer to Division 01 for definitions, acronyms, and abbreviations.

B. Standards, manuals, and codes refer to the latest edition of such standards, manuals, and codes in effect as of the date of issue of this Project Manual, unless indicated otherwise in CBC Chapter 35 and CFC Chapter 80.

C. Referenced Standards:


6. UL 723 – Test for Surface Burning characteristics of Building Materials.


1.4 SUBMITTALS

A. Product Data:

1. Submit product data under provisions of Division 01.

2. Provide product data on each type and color of wall covering and adhesive.

B. Samples:

1. Submit samples under provisions of Division 01.
2. Submit one full linear yard sample of each type of wall covering selected to illustrate quality, weight, color range and pattern variation. Supply samples from actual production.

C. Sample Panels: Provide paper proof of image and layout for review. When paper proof has been accepted, provide vinyl strike-off of image and layout.

D. Submittals other than the specified material shall match the appearance and color of the selected material and equal or exceed the quality, total weight, fabric backing, tensile and tear strength, UL fire ratings and mildew resistance of the specified product(s).

E. Submit written evidence that all materials proposed for use conform to recommendations of the wall covering manufacturer for warranted installations.

F. Manufacturer’s Certifications:
   1. Submit manufacturer’s written certification that the material shipped to the job site meets all specified physical and performance requirements. Certification from the dealer or distributor will not be acceptable.
   2. Copies of test reports and corresponding literature shall accompany the quality level the Contractor proposes to use.

G. Submit manufacturer’s installation instructions under provisions of Division 01, including procedures and perimeter conditions requiring special attention.

1.5 QUALITY ASSURANCE

A. Manufacturer: Company specializing in manufacturing commercial wall fabrics with sufficient documented experience, whose published product literature indicates compliance of wall coverings specified.

B. Applicator: Company specializing in installation of commercial fabric wall covering performed by skilled applicators with sufficient documented experience.

C. Materials Standards: UL rating and labeling, Smoke Toxicity, Fire Detection Characteristics Composition, Physical properties.

D. Imperfections such as engraving roller die marks, roller repeat marks, glossy surface appearance, or other features deemed not in conformance with the specified materials will be cause for rejection if evidenced in either the submitted samples or the manufactured material delivered to the job.

E. Each roll of material delivered to the job site shall have UL labels with specified fire-resistance rating.

F. Mockups: Build mockups to verify selections made under sample submittals and to demonstrate aesthetic effects and set quality standards for fabrication and installation.
   1. Build mockups for each type of wall covering on each substratge required. Comply with requirements in ASTM F1141.
   2. Accepted mockups may become part of the completed Work if undisturbed at time of Project Completion.
1.6 REGULATORY REQUIREMENTS

A. Conform to California Building Code, 2016 Edition, Chapter 8 “Interior Finishes” requirements for flame spread and smoke density ratings for wall coverings, when tested to ASTM E84; and NFPA 255.

B. Fire-Test-Response Characteristics: As determined by testing identical wall coverings applied with identical adhesives to substrates according to test method indicated below by a qualified testing agency. Identify products with appropriate markings of applicable testing agency.
   1. Surface-Burning Characteristics: As follows, per ASTM E84:
      a. Flame-Spread Index: 25 or less.
      b. Smoke-Developed Index: 450 or less.

1.7 DELIVERY, STORAGE AND HANDLING

A. Deliver products to site under provisions of Division 01.
B. Store and protect products under provisions of Division 01.
C. Inspect roll materials on site to verify acceptance.
D. Protect packaged adhesive from temperature cycling and cold temperatures.
E. Do not store roll goods on end.

1.8 ENVIRONMENTAL REQUIREMENTS

A. Provide continuous ventilation and heating facilities to maintain substrate surface and ambient temperatures above 65 degrees F, unless required otherwise by manufacturer's instructions.
B. Do not apply adhesive when substrate surface temperature or ambient temperature is below 65 degrees F or relative humidity is above forty percent.
C. Maintain these conditions 72 hours before, during and continuously after installation of wall covering.
D. Lighting: Do not install wall covering until a permanent level of lighting is provided on the surfaces to receive wall covering.
   1. Provide lighting level of eighty foot candles measured mid-height at substrate surfaces to receive wall coverings.
E. Protect adjoining surfaces against damage and soiling.

1.9 WARRANTY

A. Submit warranties in accordance with Division 01 requirements.
B. Wall Coverings: Submit manufacturer’s written warranty against manufacturing defects for a period of five years, from the date of Project Completion.
C. Primer and Adhesive: Submit manufacturer’s written warranty against loss of adhesion and staining for a period of five years, from the date of Project Completion.
PART 2    PRODUCTS

2.1 MANUFACTURERS AND PRODUCTS

A. Acceptable Manufacturers:

B. Substitutions: Under provisions of Division 01.

2.2 NON-PVC WALL COVERING

A. Materials: Type II PVC-free wall covering material with the following properties:
   1. Fabric: Polyester/natural fiber technology.
   2. Total Weight: 9.3 ounces per square yard.
   3. Roll Width: 54 inches.
   4. Fire Hazard Classification: Class A; as tested in accordance with ASTM E84; flame spread less than 25, smoke developed less than 450.
   6. Design: Custom design as provided by Architect.

B. Primers: Provide products by Roman Decorating Products, Calumet City, IL; 708-891-0770, www.romandecoratingproducts.com; unless otherwise recommended by wall covering manufacturer.
   1. R-35\textsuperscript{®} Adhesion Promoting Primer PRO-935 by Roman Decorating Products.
   2. ULTRA-PRIME\textsuperscript{®} PRO-777 Primer by Roman Decorating Products.
   3. ULTRA\textsuperscript{®} PLUS Permeable Wallcovering Primer PRO-990 with Mildew Guard\textsuperscript{™} by Roman Decorating Products.
      a. Mold and mildew-resistant.
      b. VOC: Less than 20 g/L.
      c. Vapor Permeance: 32 perms.
   4. ULTRA\textsuperscript{®} PLUS PRO-988 Primer with Mildew Guard\textsuperscript{™} by Roman Decorating Products.
      a. VOC: Less than 15 g/L.

C. Adhesives: Provide products by Roman Decorating Products, Calumet City, IL; 708-891-0770, www.romandecoratingproducts.com; unless otherwise recommended by wall covering manufacturer.
   1. ULTRA\textsuperscript{®} PLUS Clay Adhesive PRO-788 with Mildew Guard\textsuperscript{™} by Roman Decorating Products.
      a. Mold and mildew-proof adhesive.
      b. VOC: 20 g/L, maximum.
2. ULTRA® PLUS PRO-888 Clear Adhesive with Mildew Guard™ by Roman Decorating Products.
   a. Clear, mold and mildew-resistant adhesive.
   b. VOC: 15 g/L, maximum.
3. ULTRA® PLUS Permeable Wallcovering Adhesive PRO-550 with Mildew Guard™ by Roman Decorating Products.
   a. Mold and mildew-resistant.
   b. VOC: 20 g/L, maximum.
   c. Vapor Permeance: 25 perms.
4. EXTRA STRENGTH™ Clay Adhesive PRO-732 by Roman Decorating Products.
   a. VOC: 20 g/L, maximum.
5. Primer and Adhesive Warranty: Manufacturer’s Five-year warranty against loss of adhesion.

2.3 ACCESSORIES

A. Adhesive: Type recommended by wall covering manufacturer in writing, for use with specific wall covering and substrate.
   1. Mildew resistant, non-staining adhesive, water-based type.
   2. VOC Content: 50 g/L or less, when calculated according to 40 CFR 59 (EPA Method 24).

B. Substrate Filler: As recommended by adhesive and wall covering manufacturers, compatible with substrate.

C. Substrate Primer and Sealer: Mildew-resistant, type as recommended in writing by wall covering manufacturer.

D. Seam Tape: As recommended in writing by wall covering manufacturer.

PART 3 EXECUTION

3.1 INSPECTION

A. Verify that substrate surfaces are dry and ready to receive work, and conform to requirements of the wall covering manufacturer.

B. Verify flatness tolerance of surfaces does not vary more than 1/8 inch in 10 feet nor vary at a rate greater than 1/16 inch per foot.

C. Measure moisture content of substrates using an electronic moisture meter. Do not apply wall coverings unless moisture content of surface is below twelve percent.

D. Beginning of installation means acceptance of existing surfaces.

3.2 PREPARATION

A. Comply with manufacturer’s written instructions for surface preparation.
B. Clean substrates of substances that could impair bond of wall covering, including dirt, oil, grease, mold, mildew, and incompatible primers.

C. Correct defects, fill cracks, and smooth irregularities with filler; sand smooth.

D. Gypsum Board: Prime with primer as recommended in writing by primer/sealer manufacturer and wall-covering manufacturer.

E. Apply primer paint to substrate surfaces as recommended by manufacturer. Allow to dry. Lightly sand smooth.

F. Sand glossy surfaces to remove gloss.

G. Remove electrical, telephone and miscellaneous wall plates and covers and surface-mounted fixtures.

H. Vacuum clean surfaces free of loose particles.

I. Acclimatize wall-covering materials by removing them from packaging in the installation areas not less than 24 hours before installation.

3.3 INSTALLATION

A. General: Comply with wall-covering manufacturers' written installation instructions applicable to products and applications indicated, except where more stringent requirements apply.

B. Cut wall covering materials in manufacture's consecutive numerical bolt sequence starting with highest number bolt and working to the lowest number bolt.

C. Install strips in same order as cut from roll.

D. Apply adhesive and wall covering in accordance with manufacturer's written instructions.

E. Apply adhesive to wall fabric surface immediately prior to application of wall covering.

F. Razor trim edges on flat worktable. Do not razor cut on gypsum board surfaces.

G. Apply wall covering smoothly, without wrinkles, gaps or overlaps. Eliminate air pockets and ensure full bond to substrate surface. Butt edges tight.

H. Horizontal seams are not acceptable.

I. Do not seam within 6 inches of internal or external corners.

J. Install wall covering before installation of bases, cabinets, hardware or items attached to or spaced slightly away from wall surface. Do not install wall covering more than 1/4 inch below top of resilient base.

K. Cover spaces above and below windows and above doors in pattern sequence from roll.

L. Remove excess wet adhesive from seam before proceeding to next wall covering sheet. Wipe clean with dry cloth.

M. Vertical seams of wall coverings shall be plumb and true.

N. The wall covering shall be smoothed to the hanging surface using a stiff bristled sweep brush or a flexible board-knife to eliminate air bubbles.
3.4 CLEANING
   A. Clean wall coverings of excess adhesive, dust, dirt and other contaminants.
   B. Remove excessive adhesive from adjacent surfaces as work progresses.
   C. Replace wall plates and accessories removed prior to work of this Section.

3.5 PROTECTION
   A. Protect finished installation under provisions of Division 01.

END OF SECTION
SECTION 09 81 00

ACOUSTIC INSULATION

PART 1 GENERAL

1.1 SECTION INCLUDES

A. Acoustic insulation in interior wall construction.

1.2 RELATED SECTIONS

A. Division 01 – Sustainable Design Requirements; for additional LEED requirements.
B. Section 06 10 00 – Rough Carpentry.
C. Section 07 21 00 – Thermal Insulation.
D. Section 09 22 16 – Non-Structural Metal Framing.
E. Section 09 29 00 – Gypsum Board.

1.3 REFERENCES

A. The publications listed below form a part of this Section to the extent referenced. The publications are referred to in the text by the basic designation only. Refer to Division 01 for definitions, acronyms, and abbreviations.

B. Standards, manuals, and codes refer to the latest edition of such standards, manuals, and codes in effect as of the date of issue of this Project Manual, unless indicated otherwise in CBC Chapter 35 and CFC Chapter 80.

C. Referenced Standards:


1.4 SUBMITTALS

A. Submit under provisions of Division 01.
B. Product Data: Provide data on product characteristics, performance criteria and limitations.
C. Manufacturer's Certificate: Certify that products meet or exceed California Quality Standards.

1.5 SYSTEM DESCRIPTION

A. Materials of this Section: Provide continuity of acoustic barriers and separations at building interior elements.

1.6 COORDINATION

A. Coordinate work with other trades under provisions of Division 01.
PART 2 PRODUCTS

2.1 GLASS FIBER INSULATION

A. Acceptable Manufacturers:
   7. Substitutions: Comply with requirements of Division 01. Basis of Design product is critical to achievement of LEED credits. Proposed substitutions not meeting LEED criteria will not be considered.

B. Batt Insulation: ASTM C665 Type I; preformed glass fiber batt; conforming to the following:
   1. Facing: Acoustic insulation shall be unfaced.
   2. Flame Spread and Smoke Density Properties: 25/450 maximum in accordance with 2016 CBC Section 720, ASTM E84, and UL 723.
   3. Provide formaldehyde-free thermal insulation products.
   4. Recycled Content: Minimum thirty percent post-consumer.

PART 3 EXECUTION

3.1 EXAMINATION

A. Verify existing site conditions.

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

3.2 INSTALLATION – BATT INSULATION.

A. Install insulation in accordance with insulation manufacturer's instructions and with the flame spread rating and smoke density requirements of CBC Section 720, ASTM E84, and UL 723.

B. Install in interior walls full width, depth, and height of cavity, without gaps or voids. Do not compress insulation.

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

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

E. Securely fasten and anchor insulation in place to prevent displacement or sagging of material in all areas.
   1. At metal studs and wood stud walls, the insulation shall be wired in place with two #14 spring steel wires, one within 12 inches of the top and one at the mid-point of each stud bay.

END OF SECTION
SECTION 09 84 13
FIXED SOUND - ABSORPTIVE PANELS

PART 1 GENERAL

1.1 SECTION INCLUDES
   A. Fabric faced acoustical wall panels.
   B. Installation accessories.

1.2 RELATED SECTIONS
   A. Section 03 30 00 – Cast-in-Place Concrete.

1.3 REFERENCES
   A. The publications listed below form a part of this Section to the extent referenced. The publications are referred to in the text by the basic designation only. Refer to Division 01 for definitions, acronyms, and abbreviations.

   B. Standards, manuals, and codes refer to the latest edition of such standards, manuals, and codes in effect as of the date of issue of this Project Manual, unless indicated otherwise in CBC Chapter 35 and CFC Chapter 80.

   C. Referenced Standards:

1.4 SUBMITTALS
   A. Submit shop drawings, product data, samples, and installation instructions under provisions of Division 01.

   B. Shop Drawings: Indicate wall elevations, dimensions, joint locations, penetrations, and anchorage details.

   C. Product Data: Indicate specific products and related accessories to be provided for this Project.

   D. Submit test data to show compliance with requirements for acoustical and flammability ratings.

   E. Submit two samples, 12 inches x 12 inches in size, illustrating materials and finish, color, and texture of surface, core material, edge, corner details, and wall mounting hardware.

   F. Submit manufacturer's installation instructions specific to mounting conditions on this project.

   G. Maintenance Data: Provide recommended procedures for cleaning and removal of stains. Include precautions in use of cleaning materials that may be detrimental to surfaces.
1.5 REGULATORY REQUIREMENTS

A. Conform to California Building Code for Class “A” rating for fabric covered acoustic panels in accordance with ASTM E84.

1.6 QUALITY ASSURANCE

A. Single Source Responsibility:
   1. Obtain acoustical panel materials from a single manufacturer. Provide acoustical panels and fabrics of each type required from one manufacturer, of uniform texture and color.

B. Experience:
   1. Provide products for this Section that are designed and furnished by one manufacturer, factory-assembled and shipped as a unit. Manufacturer shall have been engaged in the manufactures of sound absorbing panels for at least five years immediately prior to the start of this work.
   2. Contractor shall have sufficient documented experience in the purchase and installation of acoustical wall panels and baffles. Contractor shall submit proof of previous experience and list a minimum three previous jobs of similar or larger size.

C. Materials:
   1. The fabric used for the fabric faced acoustical wall panels shall all be from the same batch of material with sufficient extra material available for patching. Submit manufacturer's certificate of compliance.
   3. Comply with Underwriter’s Laboratories, Inc. (UL) requirements for fire rated systems. Furnish listed and labeled products.

1.7 DELIVERY, STORAGE AND HANDLING

A. Deliver, store and protect products under provisions of Division 01.

B. Deliver materials to the job site in manufacturer’s original, unopened containers and packaging, with labels clearly indicating manufacturer and material.
   1. Do not deliver materials to the building until the completion of wet work, such as concrete, plastering, and painting has been completed and the building is completely enclosed.

C. Protect products against damage during delivery and handling.

D. Store all items in a clean, dry indoor storage area, protected from damage, and in accordance with manufacturer’s instructions.

E. Maintain temperature in storage area above 40 degrees F, without excessive humidity.

F. Do not install damaged material.

1.8 ENVIRONMENTAL CONDITIONS

A. Do not install acoustical panels until the building space is enclosed and weather-tight, work above ceilings completed, and until ambient conditions of temperature and humidity will be continuously maintained at values near final occupancy.
B. Remove material from packaging and allow to acclimatize in area of installation 24 hours before application.

C. Install under same temperature, humidity conditions that will normally exist when building is occupied.

D. Maintain temperature of all areas to receive acoustical wall panels at 60 degrees F to 85 degrees F and relative humidity not greater than seventy percent for 72 hours before, during, and 48 hours minimum after application.

1.9 EXTRA MATERIALS

A. Deliver extra materials equal to five percent of each type of acoustical panel provided under provisions of Division 01.

B. All cartons shall be new, unopened, packaged with protective covering for storage, and identified with appropriate labels.

1.10 WARRANTY

A. Submit under provisions of Division 01.

B. Materials shall be warranted against defects and workmanship for a period of five years from the date of Project Completion.

PART 2 PRODUCTS

2.1 ACCEPTABLE MANUFACTURERS AND PRODUCTS


E. Substitutions: Under provisions of Division 01.

2.2 MATERIALS

A. Fabricate panels to sizes and configurations indicated on Drawings; attach facing materials to cores to produce installed panels with visible surfaces fully covered and free of wrinkles, sags, blisters, seams, adhesive or other foreign matter and wrapped 2 inches to the back.

1. Fabricate panels in factory to exact sizes required to fit wall surfaces based on field measurements of completed substrates indicated to receive wall panels.

2. Where square corners are indicated, tailor corners.

3. Dimensional tolerances of finished units: ±1/16 inch.
B. Acoustical wall panels: Facing material laminated to front face, edges and back border of dimensionally stable, rigid glass fiber board core; with edges chemically hardened to reinforce panel perimeter against warpage and damage.

C. Panel Characteristics:

1. Thicknesses: 2-1/8 inches.
2. Acoustical Core: 6 pound to 7 pound density, rigid fiberglass.
3. Core Facing: Perforated co-polymer plastic, 1/16-inch thick, 3/32-inch diameter holes on 5/32 inch staggered centers with 33 percent open area.
4. Edge Detail: Square; chemically hardened edges to reinforce panel perimeter against warping and damage.
5. Panel Sizes: As indicated on Drawings.
6. Finishes: Fabric shall be bonded directly to panel face with all edges wrapped a minimum of 2 inches to the back of the panel to ensure a flat, wrinkle-free surface with tailored corners.
   a. Manufacturer and Product: Carnegie Fabrics, Xorel Fractal Emboss #6261, or accepted equal, with the following characteristics:
      1) Content: 100 percent IFR Xorel.
      2) Width: 52 inches.
      3) Weight: 14.4 ounces per linear yard.
      4) Backing: X-Protec.
      5) Repeat: 5.75 inches length; 4.25 inches width.
      6) Flammability: Class A per ASTM E84:
         a) Flame Spread: Less than 25.
         b) Smoke Developed: Less than 450.
      7) Color: As indicated on Drawings.
   b. Manufacturer and Product: Vervia Inc., ezoBord, or accepted equal, with the following characteristics:
      1) Content: 100 percent polyester with minimum 50 percent recycled PET fibre.
      2) Thickness: 3/8 inch.
      3) Weight: 8.5 pounds.
      4) Flammability: Class A per ASTM E84:
         a) Flame Spread: Less than 25.
         b) Smoke Developed: Less than 450.
      5) Color and Custom Graphics: As indicated on Drawings.
8. NRC: 1.00 per ASTM C423.
PART 3 EXECUTION

3.1 INSPECTION

A. Verify that surfaces and internal wall blocking are ready to receive work, and dimensions are as indicated on shop drawings.

B. Examine surfaces scheduled to receive acoustical units for unevenness, irregularities, and dampness that would affect quality and execution of work. Do not proceed with work until unsatisfactory conditions have been corrected.

C. Beginning of installation means acceptance of substrate construction.

3.2 INSTALLATION

A. Install acoustical wall panels in locations indicated with vertical surfaces and edges plumb, top edges level and in alignment with other panels, and scribed to fit adjoining work accurately at borders and penetrations.

B. Comply with panel manufacturer's written instructions for installation of panels using type of mounting accessories indicated or, if not indicated, as recommended by manufacturer.

C. All fastening devices shall be concealed in completed installation.

D. Wall panels shall be securely affixed by Mechanical Z-Clip/Rail method of attachment.

E. Clips shall engage vertical kerfs on the edges of the wall panels. Apply adhesive where necessary.

F. Field cut edges shall be covered by means of on-site fabric wrapping.

G. Cut and fit around equipment on walls such as electrical switches, receptacles, fire alarm components, grilles, etc. Where field cutting occurs, make cuts true and plumb and wrap cut edges to match factory wrapped edges.

H. Prior to final inspection and/or occupancy of the building by the Owner, review installation and replace all damaged panels, leaving installation complete and ready for occupancy by the Owner without further work.

3.3 CLEANING

A. Clip any loose threads; remove pulls and extraneous materials.

B. Clean exposed surfaces of acoustical wall panels to remove dust and any other foreign materials and trim edge moldings to comply with manufacturer's instruction for cleaning and touch-up of minor finish damage.

C. Remove surplus materials, rubbish and debris resulting from installation on completion of work, and leave the area of installation in a neat clean condition.

D. Replace work which cannot be successfully cleaned and repaired to permanently eliminate evidence of damage, as directed by Architect.
3.4 PROTECTION

A. Provide required protection for the acoustical wall panels, including temperature, humidity limitations and dust control so that the work will be without damage and deterioration at the time of Project Completion.

END OF SECTION
SECTION 09 91 00

PAINTING

PART 1 GENERAL

1.1 SECTION INCLUDES

A. Surface preparation.

B. Painting schedules, including painting of exposed surfaces, interior and exterior, except as otherwise specified or indicated.

1.2 RELATED SECTIONS

A. Section 01 81 13 – Sustainable Design Requirements; for additional LEED requirements.

B. Section 05 12 00 – Structural Steel Framing.

C. Section 05 31 00 – Steel Decking.

D. Section 05 50 00 – Metal Fabrications.

E. Section 07 62 00 – Sheet Metal Flashing and Trim.

F. Section 08 11 13 – Hollow Metal Doors and Frames.

G. Section 08 31 00 – Access Doors and Panels.

H. Section 09 29 00 – Gypsum Board.

I. Divisions 21 – 23 – Mechanical.


1.3 REFERENCES

A. The publications listed below form a part of this Section to the extent referenced. The publications are referred to in the text by the basic designation only. Refer to Division 01 for definitions, acronyms, and abbreviations.

B. Standards, manuals, and codes refer to the latest edition of such standards, manuals, and codes in effect as of the date of issue of this Project Manual, unless indicated otherwise in CBC Chapter 35 and CFC Chapter 80.

C. Referenced Standards, Manuals and Codes:
   2. The Master Painters Institute, MPI Gloss and Sheen Levels.

1.4 SUBMITTALS

A. Submit product data under provisions of Division 01.

B. Provide product data on all painting products and accessories.
C. Submit four brush-out samples 8 inches by 10 inches in size illustrating color selected for each surface finishing product scheduled.

D. During the Contract Closeout period, provide two copies of coating maintenance manual including, but not limited to, location of manufacturer's paint store closest to the project site, area summary with finish schedule, area detail designating where each product, color, and finish was used, product data sheets and material safety data sheets for each product used, color formulations for each color used, cleaning instructions, touch-up procedures, and color samples of each color and finish used.

1.5 QUALITY ASSURANCE

A. Product Manufacturer: Company specializing in manufacturing quality paint and finish products with sufficient documented experience.

B. Applicator: Company specializing in commercial painting and finishing with sufficient documented experience.

C. Gloss Levels: Per Master Painters Institute (MPI) gloss standards "MPI Gloss and Sheen Levels," measured in accordance with ASTM D523.

<table>
<thead>
<tr>
<th>GLOSS LEVEL</th>
<th>DESCRIPTION</th>
<th>GLOSS AT 60 DEGREES ASTM D523</th>
<th>SHEEN AT 85 DEGREES ASTM D523</th>
</tr>
</thead>
<tbody>
<tr>
<td>G1</td>
<td>A traditional matte finish – flat.</td>
<td>5 units, maximum</td>
<td>and 10 units, maximum</td>
</tr>
<tr>
<td>G2</td>
<td>A high side sheen flat - &quot;a velvet-like&quot; finish.</td>
<td>10 units, maximum</td>
<td>and 10 - 35 units</td>
</tr>
<tr>
<td>G3</td>
<td>A traditional &quot;eggshell-like&quot; finish.</td>
<td>10 - 25 units</td>
<td>and 10 - 35 units</td>
</tr>
<tr>
<td>G4</td>
<td>A &quot;satin-like&quot; finish.</td>
<td>20 - 35 units</td>
<td>and 35 units, minimum</td>
</tr>
<tr>
<td>G5</td>
<td>A traditional semi-gloss.</td>
<td>35 - 70 units</td>
<td>-</td>
</tr>
<tr>
<td>G6</td>
<td>A traditional gloss.</td>
<td>70 - 85 units</td>
<td>-</td>
</tr>
<tr>
<td>G7</td>
<td>A high gloss.</td>
<td>More than 85 units</td>
<td>-</td>
</tr>
</tbody>
</table>


1.6 REGULATORY REQUIREMENTS

A. Conform to California Building Code for flame spread and smoke density requirements for finishes.

B. Furnish certification that all paint coatings furnished for the location of the project comply with the EPA clean air act for permissible levels of volatile organic content for architectural coatings applied in California as designated by California Air Resources Board (CARB).

1.7 DELIVERY, STORAGE AND HANDLING

A. Deliver products to site in manufacturer's original unopened, labeled containers; inspect to verify acceptance.

B. Store and protect products from abuse and contamination.
C. Container labeling is to include manufacturer’s name, type of paint, brand name, brand code, coverage, surface preparation, drying time, cleanup, color designation and instructions for mixing and reducing.

D. Store paint materials at minimum ambient temperature of 50 degrees F and a maximum of 90 degrees F, in well-ventilated area, unless required otherwise by manufacturer’s instructions.

E. Take precautionary measures to prevent fire hazards and spontaneous combustion.

1.8 ENVIRONMENTAL REQUIREMENTS

A. Provide continuous ventilation and heating facilities to maintain surface and ambient temperatures above 50 degrees F for 24 hours before, during and 48 hours after application of finishes, unless required otherwise by manufacturer’s instructions.

B. Do not apply exterior coatings during rain or snow, or when relative humidity is above fifty percent, unless required otherwise by manufacturer’s instructions.

C. Minimum Application Temperatures for Latex Paints: 50 degrees F for interior work and exterior work, unless required otherwise by manufacturer’s instructions.

D. Provide lighting level of 80 foot candles measured mid-height at substrate surface.

1.9 EXTRA STOCK

A. Provide a new and unopened one-gallon container of each type, color and sheen to Owner.

B. Label each container with color, in addition to the manufacturer’s label.

PART 2 PRODUCTS

2.1 PAINT SYSTEMS, GENERAL

A. Material Compatibility:
   1. Provide materials for use within each paint system that are compatible with one another and substrates indicated, under conditions of service and application as demonstrated by manufacturer, based on testing and field experience.
   2. For each coat in a paint system, provide products recommended in writing by manufacturers of topcoat for use in paint system and on substrate indicated.

2.2 SUSTAINABLE DESIGN REQUIREMENTS

A. VOC Content of Field-Applied Interior Paints and Coatings: Provide products that comply with the following limits for VOC content, exclusive of colorants added to a tint base, when calculated according to 40 CFR 59, Subpart D (EPA Method 24); these requirements do not apply to paints and coatings that are applied in a fabrication or finishing shop:
   Note: First six paragraphs below apply to LEED-NC projects

   1. Flat Paints, Coatings, and Primers: VOC content not more than 50 g/L.
   2. Nonflat Paints, Coatings, and Primers: VOC content not more than 150 g/L.
3. Anti-Corrosive and Anti-Rust Paints Applied to Ferrous Metals: VOC content not more than 250 g/L.
4. Floor Coatings: VOC content not more than 100 g/L.
5. Shellacs, Clear: VOC content not more than 730 g/L.
6. Shellacs, Pigmented: VOC content not more than 550 g/L.
   Note: Ten subparagraphs below apply to LEED-CI projects
7. Flat Topcoat Paints: VOC content not more than 50 g/L.
8. Nonflat Topcoat Paints: VOC content not more than 150 g/L.
9. Anti-Corrosive and Anti-Rust Paints Applied to Ferrous Metals: VOC content not more than 250 g/L.
10. Floor Coatings: VOC content not more than 100 g/L.
11. Shellacs, Clear: VOC content not more than 730 g/L.
12. Shellacs, Pigmented: VOC content not more than 550 g/L.
13. Primers, Sealers, and Undercoaters: VOC content not more than 200 g/L.
14. Dry-Fog Coatings: VOC content not more than 400 g/L.
15. Zinc-Rich Industrial Maintenance Primers: VOC content not more than 340 g/L.
16. Pre-Treatment Wash Primers: VOC content not more than 420 g/L.

B. Chemical Components of Field-Applied Interior Paints and Coatings: Provide topcoat paints and anti-corrosive and anti-rust paints applied to ferrous metals that comply with the following chemical restrictions; these requirements do not apply to paints and coatings that are applied in a fabrication or finishing shop: Note: Retain below if low-emitting materials are required for LEED-CI projects

1. Aromatic Compounds: Paints and coatings shall not contain more than 1.0 percent by weight of total aromatic compounds (hydrocarbon compounds containing one or more benzene rings).

2. Restricted Components: Paints and coatings shall not contain any of the following:
   a. Acrolein.
   b. Acrylonitrile.
   c. Antimony.
   d. Benzene.
   e. Butyl benzyl phthalate.
   f. Cadmium.
   g. Di (2-ethylhexyl) phthalate.
   h. Di-n-butyl phthalate.
   i. Di-n-octyl phthalate.
   j. 1, 2-dichlorobenzene.
   k. Diethyl phthalate.
   l. Dimethyl phthalate.
   m. Ethylbenzene.
n. Formaldehyde.
o. Hexavalent chromium.
p. Isophorone.
q. Lead.
r. Mercury.
s. Methyl ethyl ketone.
t. Methyl isobutyl ketone.
u. Methylene chloride.
v. Naphthalene.
w. Toluene (methylbenzene).
x. 1,1,1-trichloroethane.
y. Vinyl chloride.

2.3 ACCEPTABLE MANUFACTURERS – PAINT

A. Refer to Table at the end of this Section.
B. Substitutions: Under provisions of Division 01.

2.4 ACCEPTABLE MANUFACTURERS – PRIMER SEALERS

A. Refer to Table at the end of this Section.
B. Substitutions: Under provisions of Division 01.

2.5 MATERIALS

A. All paint materials shall be provided from a single manufacturer unless noted otherwise in this Section.
B. Coatings:
   1. Ready mixed. Process pigments to a soft paste consistency capable of being readily and uniformly dispersed to a homogeneous coating.
   2. Good flow and brushing properties; capable of drying or curing free of streaks or sags.
C. All field-applied interior paints shall use zero VOC colorants.
D. Accessory Materials: All other materials not specifically indicated but required to achieve the finishes specified, of commercial quality.

2.6 FINISHES

A. Refer to schedule at end of Section for surface finish schedule. Refer to Drawings for color schedule.
PART 3    EXECUTION

3.1   INSPECTION

A. Verify that surfaces are ready to receive work as instructed by the product manufacturer.

B. Examine surfaces scheduled to be finished prior to commencement of work. Report any condition that may potentially affect proper application.

C. Measure moisture content of surfaces using an electronic moisture meter. Do not apply finishes unless moisture content of surfaces are below the following maximums:
   1. Gypsum Wallboard: 18 percent.
   2. Exterior Located Wood: 7 percent.

D. Beginning of application constitutes acceptance of existing surfaces.

3.2   PREPARATION

A. Remove electrical plates, hardware, light fixture trim, and fittings prior to preparing surfaces for painting.

B. Correct minor defects and clean surfaces that affect work of this Section.

C. Seal marks that may bleed through surface finishes.

D. Impervious Surfaces: Remove mildew by scrubbing with solution of tri-sodium phosphate and bleach. Rinse with clean water and allow surface to dry.


F. Galvanized Surfaces: Remove passivators, oil, grease, acid residue, and surface contamination; wash with solvent. Apply coat of etching primer, unless otherwise recommended by finish coating system manufacturer.

G. Shop-Primed Steel Surfaces: Sand and scrape to remove loose primer and rust. Feather edges to make touch-up patches inconspicuous. Clean surfaces as recommended by primer manufacturer. Prime shop-primed steel items with steel primers specified in this Section.


3.3   PROTECTION

A. Protect elements surrounding the work of this Section from damage or disfiguration.

B. Repair damage to other surfaces caused by work of this Section.

C. Furnish drop cloths, shields and protective methods to prevent spray or droppings from disfiguring other surfaces.

D. Remove empty paint containers from site.
3.4 APPLICATION

A. Apply products in accordance with manufacturer's instructions.
   1. Paint mil thicknesses shall not be less than the minimums recommended by the paint manufacturers.

B. Do not apply finishes to surfaces that are not dry.

C. Apply each coat to uniform finish.

D. Apply each coat of paint slightly darker than preceding coat unless otherwise approved.

E. Sand lightly between coats to achieve required finish.

F. Allow applied coat to dry before next coat is applied.

G. All shop-primed items shall be fully re-primed in the field.

H. Previously Painted Surfaces: Priming shall conform to applicable requirements of MPI Maintenance Repainting Manual.

3.5 FINISHING MECHANICAL AND ELECTRICAL EQUIPMENT

A. See Divisions 21 – 23 and 25 – 28 for other items requiring painting.

B. Paint interior surfaces of air ducts and convector heating cabinets that are visible through grilles and louvers with one) coat of flat black paint, to limit of sight line. Paint dampers exposed behind grilles to match face panels. Paint all interior and exterior exposed ductwork and ductwork supports. Paint all conduit, pipes and conduit/pipe supports in exposed interior and exterior locations.

C. Reinstall electrical plates, hardware, light fixture trim, and fittings removed for surface preparation or painting.

D. Do not paint factory-finished mechanical and electrical equipment.

3.6 CLEANING

A. As Work proceeds, promptly remove paint where spilled, splashed, or spattered.

B. During progress of Work, maintain premises free of unnecessary accumulation of tools, equipment, surplus materials and debris.

C. Collect cotton waste, cloths, and material which may constitute a fire hazard, place in closed metal containers and remove from site daily.

3.7 PAINTING SCHEDULE – EXTERIOR SURFACES: Descriptions in schedule apply to new and previously painted surfaces, except surface preparation and priming of previously painted surfaces shall be in accordance with applicable requirements of MPI maintenance repainting manual.

A. Wood:
   1. 1st coat – Acrylic Flat Primer
   2. 2nd and 3rd coats – 100 percent Acrylic Satin
B. Wood:
   1. 1st coat – Acrylic Flat Primer
   2. 2nd and 3rd coats – 100 percent Acrylic Semi-Gloss

C. Ferrous Metal:
   1. 1st coat – Acrylic Flat Primer
   2. 2nd and 3rd coats – 100 percent Acrylic Semi-Gloss

D. Ferrous Metal (Industrial) – For use at exterior metal architectural features/exposed structure:
   1. 1st coat – Epoxy Flat Primer
   2. 2nd and 3rd coats – Aliphatic Urethane Gloss Enamel

E. Galvanized Metal and Aluminum:
   1. 1st coat – Etch Prep
   2. 2nd coat – Acrylic Flat Primer
   3. 3rd and 4th coats – 100 percent Acrylic Semi-Gloss

F. Cement Plaster and Concrete:
   1. 1st coat – Acrylic Flat Primer
   2. 2nd and 3rd coats – 100 percent Acrylic Flat

3.8 PAINTING SCHEDULE – INTERIOR SURFACES: Descriptions in schedule apply to new and previously painted surfaces, except surface preparation and priming of previously painted surfaces shall be in accordance with applicable requirements of MPI maintenance repainting manual.

A. Gypsum Board:
   1. 1st coat – PVA Primer Sealer
   2. 2nd and 3rd coats – Latex Semi-Gloss Enamel

B. Gypsum Board:
   1. 1st coat – PVA Primer Sealer
   2. 2nd and 3rd coats – Latex Eggshell Enamel

C. Gypsum Board:
   1. 1st coat – PVA Primer Sealer
   2. 2nd and 3rd coats – Waterborne Epoxy

D. Ferrous Metal:
   1. 1st coat – Acrylic Flat Primer
   2. 2nd and 3rd coats – Latex Eggshell Enamel

E. Ferrous Metal:
   1. 1st coat – Acrylic Flat Primer
   2. 2nd and 3rd coats – Latex Semi-Gloss Enamel
### F. Galvanized Metal, Zinc Alloy Metal, and Aluminum:
1. 1st coat – Etch Prep
2. 2nd coat – Acrylic Flat Primer
3. 3rd and 4th coats – Latex Eggshell Enamel

### G. Galvanized Metal, Zinc Alloy Metal, and Aluminum:
1. 1st coat – Etch Prep
2. 2nd coat – Acrylic Flat Primer
3. 3rd and 4th coats – Latex Semi-Gloss Enamel

### H. Concrete:
1. 1st coat – Acrylic Flat Primer
2. 2nd and 3rd coats – Latex Semi-Gloss Enamel

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END OF SECTION
DIVISION 10
SPECIALTIES
SECTION 10 14 00
SIGNAGE

PART 1 GENERAL

1.1 SECTION INCLUDES

A. Exterior Signages:
   1. Accessibility Signage.
   2. Metal Dimensional Characters.

B. Interior Signages:
   1. Accessibility Signage.
   2. Room Capacity Signage.

C. Life Safety Signages.

1.2 RELATED SECTIONS

A. Section 03 30 00 – Cast-In-Place Concrete.

B. Section 08 11 13 – Hollow Metal Doors and Frames.

C. Section 08 14 00 – Wood Doors.

D. Section 09 29 00 – Gypsum Board.

1.3 REFERENCES

A. The publications listed below form a part of this Section to the extent referenced. The publications are referred to in the text by the basic designation only. Refer to Division 01 for definitions, acronyms, and abbreviations.

B. Standards, manuals, and codes refer to the latest edition of such standards, manuals, and codes in effect as of the date of issue of this Project Manual, unless indicated otherwise in CBC Chapter 35 and CFC Chapter 80.

C. Referenced Standards:
   1. ADA – Americans with Disabilities Act - 2010 Standards for Accessible Design.
   5. ASTM A500/A500M – Standard Specification for Cold-Formed Welded and Seamless Carbon Steel Structural Tubing in Rounds and Shapes.
11. AWS D1.2 – Structural Welding Code – Aluminum.
15. UL Building Materials Directory.

1.4 SUBMITTALS

A. General: Submit in accordance with Division 01.

B. LEED Submittals:
   1. Product Data for MR Credit 3: For products having recycled content, documentation indicating percentages by weight of post-consumer and pre-consumer recycled content. Include statement indicating costs for each product having recycled content.

C. Product Data: Submit manufacturer’s descriptive literature and product specification for each product.

D. Shop Drawings: Submit shop drawing for each sign and plaque to show construction, sections, text, character spacing, and mounting details.

E. Samples: Submit sign and plaque colors, designs and sizes as specified in this Section and as shown on the Drawings for review.

1.5 QUALITY ASSURANCE

A. Manufacturer Qualifications: Firm specializing in manufacturing products specified in this Section with a minimum five years’ experience.

B. Regulatory Requirements:
      a. Finish, Color, and Contrast: Characters, pictograms, symbols and their backgrounds shall have a non-glare finish. Characters shall contrast with their background with either light characters on a dark background or dark characters on a light background.
      b. Depth: Raised characters shall be 1/32 inch minimum above their background.
      c. Case:
         1) Raised Characters: Characters shall be uppercase.
2) Visual Characters: Characters shall be uppercase or lowercase or a combination of both.

d. Style: Characters shall be conventional in form. Characters shall not be italic, oblique, script, highly decorative, or of other unusual forms. Raised characters shall be sans serif.

e. Proportions: Visual characters on signs shall be selected from fonts where the width of the uppercase letter "O" is 60 percent minimum and 110 percent maximum of the height of the uppercase letter "I". Stroke thickness of the uppercase letter "I" shall be 10 percent minimum and 20 percent maximum of the height of the character.

f. Character Height:

1) Raised Characters: Character height measured vertically from the baseline of the character shall be 5/8 inch minimum and 2 inches maximum based on the height of the uppercase letter "I". Stroke thickness of tactile characters shall be 15 percent maximum of the height of the character.

2) Visual Characters: Minimum character height shall comply with CBC Table 11B-703.5.5. Viewing distance shall be measured as the horizontal distance between the character and an obstruction preventing further approach towards the sign. Character height shall be based on the uppercase letter "I".

h. Character Spacing:

1) Raised Characters: Character spacing shall be measured between the two closest points of adjacent raised characters within a message, excluding word spaces. Where characters have rectangular cross sections, spacing between individual raised characters shall be 1/8 inch minimum and four times the raised character stroke width maximum, Where characters have other cross sections, spacing between individual raised characters shall be 1/16 inch minimum and four times the raised character stroke width maximum at the base of the cross sections, and 1/8 inch minimum and four times the raised character stroke width maximum at the top of the cross sections. Characters shall be separated from raised borders and decorative elements 3/8 inch minimum. Spacing between individual tactile characters shall comply with CBC Section 11B-703.2.7 and Section 11B-703.2.8.

2) Visual Characters: Character spacing shall be measured between the two closest points of adjacent characters, excluding word spaces. Spacing between individual characters shall be 10 percent minimum and 35 percent maximum of character height.

h. Line Spacing: Spacing between the baselines of separate lines of characters within a message shall be 135 percent minimum and 170 percent maximum of the character height.

i. Format: Text shall be in horizontal format.

j. Braille: Comply with CBC Section 11B-703.3, contracted Grade 2 Braille.

1) Dimensions and Capitalization: Braille dots shall have a domed or rounded shape and shall comply with CBC Table 11B-703.3.1. The indication of an uppercase letter or letters shall only be used before the first word of sentences, proper nouns and names, individual letters of the alphabet, initials, and acronyms.
2) Position: Braille shall be positioned below the corresponding text in a horizontal format, flush left or centered. If text is multi-lined, Braille shall be placed below the entire text. Braille shall be separated 3/8 inch minimum and 1/2 inch maximum from any other tactile characters and 3/8 inch minimum from raised borders and decorative elements.

k. Pictograms: Comply with CBC Section 11B-703.6.

1) Pictogram Field: Pictograms shall have a field height of six inches minimum. Characters and Braille shall not be located in the pictogram field.

2) Text Descriptors; Pictograms shall have text descriptors located directly below the pictogram field. Text descriptors shall comply with CBC Sections 11B-703.2, 11B-703.3, and 11B-703.4.

l. Symbols of Accessibility: Symbols of accessibility shall comply with CBC Section 11B-703.7.

2. Accessibility Signage:

a. Tactile Exit Signage: CBC Chapter 10 “Means of Egress,” Section 1013 “Exit Signs,” Section 1013.1 “Where Required,” and Section 1013.4 “Raised Character and Braille Exit Signs”.

1) Tactile signs required by CBC Section 1013.4 need not be provided with illumination per Section 1013.3.

2) Tactile Stairway Signs (DSA-AC and SFM Requirements): CBC Section 1023.9 “Stairway Identification Signs”.


1) Toilet Room and Bathing Room Signage: CBC Section 11B-216.8, "Toilet Rooms and Bathing Rooms" and CBC Section 11B-703.7.2.6, "Toilet and Bathing Facilities Geometric Symbols".

2) Detailed Requirements for Accessible Signage: CBC Chapter 11B, Division 7, Section 11B-703, “Signs”.

a) Sign Mounting Heights and Locations: CBC Sections 11B-703.4, 11B-703.5.6, and 11B-703.7.2.6.

b) Symbols of Accessibility: CBC Section 11B-703.7, “Symbols of Accessibility”.

c) International Symbol of Accessibility: CBC Section 11B-703.7.2.1, “International Symbol of Accessibility”.

d) Entrance Signs: CBC Section 11B-216.6, "Entrances".

e) Assistive Listening Symbol: CBC Section 11B-216.10, “Assistive Listening Systems” and Section 11B-703.7.2.4, “Assistive Listening Systems”.

3) Stairway Accessibility Signage:

a) Tactile Floor Level Designation Signage: CBC Section 11B-504.8 “Floor Identification”.


5) Accessible Parking Signage: CBC Section 11B-502.6 “Identification”.

6) Post or Pylon Mounted Signs: CBC Section 11B-307.3 “Post-Mounted Objects”.
c. Field Inspection: Signs and identification shall be field inspected after installation and approved by the enforcing agency, in accordance with CBC Section 11B-703.1.1, "Plan Review and Inspection".

   a. Illuminated Exit Signs: CBC Section 1013.1 "Where Required", Section 1013.3 "Illumination", Section 1013.5 "Internally Illuminated Exit Signs", and Section 1013.6 "Externally Illuminated Exit Signs".
   b. Floor Exit Signs (SFM Requirement): CBC Section 1013.7 "Floor-Level Exit Signs".
   c. Stairway Signs: CBC Section 1023.9 "Stairway Identification Signs".

4. Wind Load Requirements: Exterior signages shall be designed to resist wind loads in accordance with CBC.

C. Pre-Installation Meetings:
   1. Conduct pre-installation meeting in accordance with provisions of Division 01.
   2. Convene pre-installation meeting one week prior to commencing work of this Section.
   3. Coordinate work in this Section with work in related Sections.

1.6 DELIVERY, STORAGE, AND HANDLING

A. Comply with requirements of Division 01.

B. Deliver products in manufacturer's original containers, dry and undamaged, with seals and labels intact.

C. Storage and Protection: Store materials in a dry secure place. Protect from weather, surface contaminants, corrosion, construction traffic, and other potential damage.

PART 2 PRODUCTS

2.1 MANUFACTURERS

A. Acceptable Manufacturer:

B. Substitutions: Not allowed.

2.2 MATERIALS

A. Acrylic Plastic: Non-glare finish acrylic with integral color as manufactured by Romark or accepted equal. Thickness shall be 1/4 inch at door mounted restroom signs and 1/8 inch minimum at all other locations, unless noted otherwise. Colors as selected by Architect from manufacturer's full range of colors.

B. Aluminum: ASTM B209 for sheet or plate; ASTM B221 for extrusions, and ASTM B26/B26M for castings. Aluminum extrusions shall be 1/8 inch thick minimum. Wall and post mounted panels shall be 0.080 inch thick minimum. Aluminum panels shall have an acrylic polyurethane paint finish.
C. Steel Posts: ASTM A53/A53M, Type E or S, Grade B; galvanized 1-1/2 inch nominal pipe size (NPS), Schedule 40. Provide 1/8 inch thick steel cap (ASTM A283/A283M) welded to top of post. Galvanize post and cap to minimum G50 in accordance with ASTM A123/A123M.

D. Vinyl Sheet for Graphics: Precision cut with reflective surface; five year to seven year premium type; shall be in accordance with flammability requirements of ASTM E84; minimum 0.003 inch film thickness. Film shall include a precoated pressure sensitive adhesive backing or positionable pressure sensitive backing. Film shall be as manufactured 3M or accepted equal. Color as selected by Architect.

E. Anchors and Fasteners: Stainless steel conforming to ASTM F593.

2.3 EXTERIOR SIGNAGE

A. Accessible Signage: Provide the following signages in accordance with 2010 ADA Standards for Accessible Design and 2016 CBC where indicated on the Drawings.

1. Entrance to Parking Lot Sign: 17 inches wide by 22 inches high (minimum) metal panel, reflectorized sign mounted on a single post with text “UNAUTHORIZED VEHICLES PARKED IN DESIGNATED ACCESSIBLE SPACES NOT DISPLAYING DISTINGUISHING PLACARDS OR SPECIAL LICENSE PLATES ISSUED FOR PERSONS WITH DISABILITIES WILL BE TOWED AWAY AT OWNERS EXPENSE. TOWED VEHICLES MAY BE RECLAIMED AT _________ OR BY TELEPHONING ________.”


3. Van Accessible Parking Stall Sign: Provide a 12 inches wide by 18 inches high metal panel, reflectorized International Symbol of Accessibility sign, mounted on a single post for each van accessible parking stall as indicated on the drawings. Text shall occur below the symbol and read “RESERVED PARKING”. Mounted on the same post, below this sign, a sign of the same width and required height shall display the text “VAN ACCESSIBLE”. Refer to Drawings for additional sign information.

4. Sign for Parking Violation Fine: An additional sign or additional language below the symbol of accessibility shall state “Minimum Fine $250”.

5. Accessible Route Signage: Provide where accessible route of travel diverges from the regular circulation path along or leading to an accessible route of travel, entrance or facility. Sign shall display the International Symbol of Accessibility, shall indicate the direction to accessible entrances and facilities, and shall comply with the requirements of CBC Sections 11B-216 and 11B-703.


   a. Minimum 1/8 inch thick, non-glare finish acrylic with integral color and inlaid copy.

7. Functional Room Signage: Provide acrylic plastic room signage with inlaid characters raised 1/32-inch, upper case, sans serif type with corresponding contracted Grade 2 Braille. Raised characters shall be at least 5/8 inch high, but no higher than 2 inches. Color selections from manufacturer’s full range of colors. Characters and symbols shall contrast with their background per CBC Section 11B-703.
B. Exterior Metal Dimensional Characters:
   1. Material: ASTM B209 laser cut or water jet cut aluminum plate or ASTM B26/B26M #514 alloy cast aluminum.
   2. Height: 12 inches.
   3. Thickness: 1/2 inch.
   4. Font: Neutraface Display TT Medium, all capital letters, 1 inch thick, 5/8 inch thick strokes.
   5. Characters Required: Refer to Drawings.

2.4 INTERIOR SIGNAGE

A. Accessible Signage: Provide the following signages in accordance with 2010 ADA Standards for Accessible Design and 2016 CBC where indicated on Drawings:
   1. Material: 1/4-inch thick acrylic plastic, edges rounded, chamfered, or eased. Corners shall have minimum radius of 1/8 inch.
   2. Color: Characters, symbols, and pictograms on contrasting background per CBC Section 11B-703. Colors as selected by Architect from manufacturer’s full range of colors.
   3. Restroom Signage:
      a. Men’s Restroom Symbol (door mounted): Provide for each men’s restroom door an equilateral triangle, 1/4 inch thick with 12 inch long sides, vertex pointing upward. Provide an international symbol of accessibility centered on the triangle at accessible restrooms. The color of the triangle symbol shall contrast with the door color, either light on a dark background or dark on a light background.
      b. Men’s Restroom Sign (wall mounted): Provide for each men’s restroom a 6 inch wide by 10 inch high acrylic plaque with an international symbol of accessibility centered at the top of the sign; 5/8 inch high by 1/32 inch raised, inlaid characters below to read "MEN"; corresponding contracted Grade 2 Braille 3/8 inch minimum to 1/2 inch maximum below text.
      c. Women’s Restroom Symbol (door mounted): Provide for each women’s restroom door a circle, 1/4 inch thick and 12 inches in diameter. Provide an international symbol of accessibility centered on the circle at accessible restrooms. The color of the circle symbol shall contrast with the door color, either light on a dark background or dark on a light background.
      d. Women’s Restroom Sign (wall mounted): Provide for each women’s restroom a 6 inch wide by 10 inch high acrylic plaque with an international symbol of accessibility centered at the top of the sign; 5/8 inch high by 1/32 inch raised, inlaid characters below to read "WOMEN"; corresponding contracted Grade 2 Braille 3/8 inch minimum to 1/2 inch maximum below text.
      e. Unisex Restroom Symbol (door mounted): Provide for each unisex restroom door a circle, 1/4 inch thick and 12 inches in diameter with a 1/4 inch thick equilateral triangle with a vertex pointing upward superimposed on the circle and within the 12 inch diameter. Provide an international symbol of accessibility, centered on the triangle at restrooms equipped for the disabled. The triangle symbol shall contrast with the circle, either light on a dark background or dark on a light background. The circle symbol shall contrast with the door color, either light on a dark background or dark on a light background.
f. Unisex Restroom Sign (wall mounted): Provide for each unisex restroom a 6 inch wide by 10 inch high acrylic plaque, with an international symbol of accessibility centered at the top of the sign; 1 inch high by 1/32 inch raised text below to read “RESTROOM”; with corresponding contracted Grade 2 Braille 3/8 inch minimum to 1/2 inch maximum below text.

4. Functional Room Signage: Provide room signage with inlaid characters raised 1/32-inch, upper case, sans serif type with corresponding contracted Grade 2 Braille. Raised characters shall be at least 5/8 inch high, but no higher than 2 inches. Characters and symbols shall contrast with their background per CBC Section 11B-703.

5. Assistive Listening Signage: Provide sign notifying availability of assistive listening system, 13 inch wide by 8 inch high acrylic plaque with 1/32-inch raised international symbol of access for hearing loss in compliance with CBC Figure 11B-703.7.2.4 imprinted centered at the top of the sign and 1/32 inch raised characters below with text “ASSISTIVE LISTENING DEVICE AVAILABLE FROM SCHOOL PERSONNEL”.

6. Tactile Exit Signage:
   a. Provide tactile exit signs at doors in rooms or areas that require more than one exit or exit access per CBC Sections 1013.1 and 1013.4.
   b. Acrylic plaque tactile exit signs shall have text at least 5/8 inch high, but no higher than 2 inch high, and corresponding contracted Grade 2 Braille shall be placed a minimum of 3/8 inch and a maximum of 1/2 inch directly below the text as follows:
      1) Each grade-level exterior exit door that is required to comply with CBC Section 1013.1 shall be identified by a tactile exit sign with the word “EXIT”.
      2) Each exit door that is required to comply with CBC Section 1013.1, and that leads directly to a grade-level exterior exit by means of a stairway or ramp shall be identified by a tactile exit sign with the following words as appropriate: “EXIT STAIR DOWN”, “EXIT RAMP DOWN,” “EXIT STAIR UP,” or “EXIT RAMP UP.” At exit discharge level, door sign shall include a raised five-pointed star located to the left of the identifying floor level.
      3) Each exit door that is required to comply with CBC Section 1013.1, and that leads directly to a grade-level exterior exit by means of an exit enclosure or an exit passageway shall be identified by a tactile exit sign with the words “EXIT ROUTE”.
      4) Each exit access door from an interior room or area to a corridor or hallway that is required to comply with CBC Section 1013.1 shall be identified by a tactile exit sign with the words “EXIT ROUTE”.
      5) Each exit door through a horizontal exit that is required to comply with CBC Section 1013.1 shall be identified by a tactile exit sign with the words “TO EXIT”.

B. Room Capacity Signs: Provide room capacity sign. Text for sign "MAXIMUM OCCUPANT LOAD ____ BY ORDER OF THE STATE FIRE MARSHAL".


2.5 LIFE SAFETY SIGNAGE

A. Exit Signs: Internally illuminated exit signs conforming to NFPA 101, Section 7.10.7; UL listed in accordance with UL 924, with wording in legible characters not less than 4 inch high and text “EXIT".
2.6 FABRICATION

A. Work shall be assembled in the shop, as far as practical, ready for installation at the site. Work that cannot be shop assembled be trial fit in the shop to ensure proper field assembly.

B. Drill or punch holes for bolts and screws; produce clean, true lines and surfaces.

C. Acrylic signs shall have inlaid acrylic copy/characters and Braille symbols as described in this Section.

D. Aluminum welding shall be in accordance with AWS D1.2. Steel welding shall be in accordance with AWS D1.1. Welding shall be continuous along the entire area of contact. Grind smooth exposed welds.

E. Galvanized items shall be hot-dip process after fabrication if practical in accordance with ASTM A123/A123M.

F. Exposed work surfaces shall have a smooth finish and exposed riveting shall be flush. Fastenings shall be concealed where practical.

G. Joints exposed to the weather shall be formed to exclude water. Provide drainage and weep holes to prevent condensation buildup.

2.7 SHOP FINISHING

A. Surfaces of miscellaneous metal work, except nonferrous metal, corrosion resisting steel, and zinc-coated work, shall be given one coat of zinc-molybdate primer or an accepted rust-resisting treatment and metallic primer in accordance with manufacturer’s standard practice.

B. Surfaces to be embedded in concrete shall not be painted.

C. Upon completion of work, damaged surfaces shall be recoated.

PART 3 EXECUTION

3.1 INSTALLATION

A. Install signs and plaques level and plumb.

B. Mount sign posts directly into concrete foundation. Mount sign to post using tamper resistant mechanical fasteners as recommended by manufacturer and accepted by the Architect.

C. Accessible Sign Mounting Heights and Locations:

1. Site Signage:
   a. Parking Signage: Per CBC Section 11B-502.6, signs shall be 60 inches minimum above the finish floor or ground surface measured to the bottom of the sign.
   b. Accessible Route Signage: Per CBC Section 11B-502.6 (Exception), signs located within an accessible route shall be a minimum of 80 inches above the finish floor or ground surface measured to the bottom of the sign.
2. Mounting Height With Tactile Characters: Per CBC Section 11B-703.4.1, tactile characters on signs shall be located 48 inches minimum above the finished floor or ground surface, measured from the baseline of the lowest Braille cells and 60 inches maximum above the finished floor or ground surface, measured from the baseline of the highest line of raised characters.

3. Mounting Location with Tactile Characters: Per CBC Section 11B-703.4.2 as follows:
   a. Where a tactile sign is provided at a door, the sign shall be located alongside the door at the latch side.
   b. Where a tactile sign is provided at double doors with one active leaf, the sign shall be located on the inactive leaf.
   c. Where a tactile sign is provided at double doors with two active leaves, the sign shall be located to the right of the right hand door.
   d. Where there is no space at the latch side of a single door or at the right side of double doors, signs shall be located on the nearest adjacent wall.
   e. Signs containing tactile characters shall be located so that a clear floor space of 18 inches minimum by 18 inches minimum, centered on the tactile characters, is provided beyond the arc of any door swing between the closed position and 45 degree open position.
   f. Where permanent identification signage is provided for rooms and spaces, they shall be located on the approach side of the door as one enters the room or space. Signs that identify exits shall be located on the approach side of the door as one exits the room or space.

4. Mounting Height With Visual Characters: Per CBC Section 11B-703.5.6, visual characters shall be 40 inches minimum above the finished floor or ground.

5. Toilet and Bathing Facility Signage: Per CBC Section 11B-703.7.2.6, the geometric door symbol shall be mounted at 58 inches minimum and 60 inches maximum above the finished floor or ground surface measured from the centerline of the symbol. The symbol shall be mounted within 1 inch of the vertical centerline of the door.

D. Metal Dimensional Characters: Mount to substrate with concealed metal studs threaded into sign and silicone adhesive into metal wall receivers.

E. Exterior Accessible Building Entrance Signs, and Functional Room Signs: Mount to exterior door and wall surfaces using tamper proof stainless steel mechanical fasteners suitable for the mounting substrate as recommended by the manufacturer and accepted by the Architect.

   1. Glass Mounted Signs: Apply acrylic sign to exterior glass surfaces using double faced adhesive foam tape strips. Install same size, thickness, and color acrylic blank backer on opposite side of exterior sign using double faced adhesive foam tape strips.

F. Interior Restroom Signs, Functional Room Signs, Exit Signs, Assistive Listening Signs, and Room Capacity Signs: Mount to door and wall surfaces with double faced adhesive foam tape strips and silicone adhesive.

   1. Glass Mounted Signs: Apply acrylic sign to glass surfaces using double faced adhesive foam tape strips. Install same size, thickness, and color acrylic blank backer on opposite side of exterior sign using double faced adhesive foam tape strips.
3.2 ADJUST AND CLEAN

A. Clean and Touch-up: Remove all packing and protection blemishes and thoroughly clean and polish all finish surfaces. Restore any marred or abraded surfaces to their original condition by touching up in accordance with the manufacturer's recommendations. Touch-up shall not be obvious.

B. Defective Work: Remove and replace all defective work that cannot be properly repaired, cleaned or touched-up, as directed by the Architect, with no additional cost to the Owner.

C. Protect installed work during the construction period to prevent abuse and damage.

3.3 CLEAN-UP

A. Upon completion of the work of this Section, remove all surplus materials, rubbish and debris from the premises.

END OF SECTION
SECTION 10 21 13.19
PLASTIC SHOWER PARTITIONS

PART 1 GENERAL

1.1 SECTION INCLUDES
A. Solid plastic shower partitions, floor supported and overhead braced.

1.2 RELATED SECTIONS
A. Section 06 10 00 – Rough Carpentry.
B. Section 09 29 00 – Gypsum Board.
C. Section 09 30 00 – Tiling.

1.3 REFERENCES
A. The publications listed below form a part of this Section to the extent referenced. The publications are referred to in the text by the basic designation only. Refer to Division 01 for definitions, acronyms, and abbreviations.

B. Standards, manuals, and codes refer to the latest edition of such standards, manuals, and codes in effect as of the date of issue of this Project Manual, unless indicated otherwise in CBC Chapter 35 and CFC Chapter 80.

C. Referenced Standards:
5. ASTM D2843 – Standard Test Method for Density of Smoke From the Burning or Decomposition of Plastic.

1.4 SUBMITTALS
A. General: Submit under provisions of Division 01.

B. Samples:
1. Furnish a 1 inch x 4 inch sample of solid plastic partition material showing color face and finished edges.
2. Furnish one each of stainless steel fasteners, mounting hardware, and aluminum headrail.

C. Shop Drawings:
1. Provide four copies of all shop drawings.
2. Show fabrication, erection and anchorage of assemblies, to extent not fully described by manufacturer's data sheets.
3. Show anchorage, accessory items and finishes.
4. Show compartment layouts, with field verified dimensions.
5. Provide location drawings for bolt hole locations in supporting members for attachment of partitions.

D. Manufacturer's Data:
1. Provide four copies each of:
   a. Data sheets.
   b. Installation instructions.
   c. Maintenance procedures.
   d. Independent third party testing certifying that partitions pass NFPA 286 requirements.

1.5 REGULATORY REQUIREMENTS
A. Comply with CBC Chapter 11B and ANSI A117.1 accessibility requirements.
B. Flammability Test: Meet the requirements of CBC Chapter 8; passes NFPA 286 test requirements.

1.6 DELIVERY, STORAGE AND HANDLING
A. Deliver items in manufacturer's original unopened protective packaging.
B. Store materials in original protective packaging to prevent soiling, physical damage, or wetting.
C. Handle so as to prevent damage to finished surfaces.

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

1.8 COORDINATION
A. Coordinate placement of backing in walls. Backing by others.

1.9 WARRANTY
A. Twenty-five year warranty covering all plastic components against breakage, corrosion, and delamination.
B. Five year warranty for all hardware.

PART 2 PRODUCTS
2.1 MANUFACTURERS
A. Acceptable Manufacturers:
   1. Scranton Products.

B. Substitutions: Under provisions of Division 01.

2.2 MATERIALS

A. High-density polyethylene (HDPE) plastic shall meet the requirements of ASTM D1929 and ASTM D2843.

B. Pilasters and panels shall be fabricated from high-density polyethylene (HDPE) containing a minimum of ten percent recycled material manufactured under high pressure forming a single component section which is waterproof, nonabsorbent and that has a self-lubricating surface.
   1. Texture: Orange Peel.
   2. Color: As selected by Architect.

C. Pilaster shoes shall be 20 gauge Type 304 stainless steel with #4 satin brushed finish.

D. Headrail: ASTM B221; 6463-T5 alloy aluminum extrusion, with clear anodized finish.

2.3 FABRICATION

A. Pilasters and panels shall be 1 inch thick. All edges shall be machined to a radius of 0.250 inch. All exposed surfaces shall be free of saw marks.

B. Aluminum edging strips shall be fastened to the bottom edge of all doors and panels using tamper resistant stainless steel fasteners.

C. Panels shall be 55 inches high and mounted 14 inches above finished floor for toe clearance per CBC Section 11B-604.8.1.4.

D. Leveling devices shall be through-bolted to base of pilaster.

E. Pilaster shoes shall be one-piece, 3 inches high minimum. Top shall have 90 degree return to pilaster. Shoes shall be secured to pilasters with stainless steel tamper resistant torx head sex bolts.

F. Headrails and headrail returns shall have anti-grip profile, clamp over pilasters, and be secured to walls with 20 gauge stainless steel brackets.

2.4 HARDWARE

A. Miscellaneous Hardware:
   1. Provide full height Type 6463-T5 alloy aluminum wall brackets with bright dip anodized finish. Brackets shall be used for all panels to pilaster, pilasters to wall and panel to wall connections. Wall brackets shall be thru-bolted to panels and pilasters with stainless steel tamper resistant torx fasteners.
   2. Fasteners at locations connecting panels to pilasters shall utilize through-bolted, stainless steel, tamper resistant torx fasteners.
PART 3 EXECUTION

3.1 EXAMINATION

A. Verify that site conditions are ready to receive work and opening dimensions are as required.

B. Verify correct location of built-in framing, anchorage and bracing, where required.

C. Beginning of installation means acceptance of existing substrate.

3.2 INSTALLATION

A. Install partitions secure, plumb, and level in accordance with manufacturers' instructions.

B. Maintain 3/8 inch to 1/2 inch space between wall and panels and between wall and end pilasters.

C. Attach full length panel brackets securely to walls using anchor devices.

D. Attach panels and pilasters to bracket with tamper resistant bolts and nuts.

E. Secure all elements rigidly in place. Anchor to structure with anchors appropriate for use with type of adjacent construction. Fasteners shall securely fasten items to wall construction involved. Fasteners shall provide stiffness and rigidity to keep items square, in accurate position without twisting, buckling or warping. Fasteners to framing substrate shall be the following minimums; greater as required by the toilet partition manufacturer or as conditions warrant:
   1. Wood Framing: #14 tamper resistant stainless steel wood screws with 1-1/2 inch minimum penetration into the framing or backing member.

F. Provide adjustment for floor variations with screw jack through steel saddles integral with pilaster. Conceal floor fastenings with pilaster shoes.

3.3 CLEANING

A. Remove protective masking. Clean surfaces.

B. Field touch-up of scratches or damaged finish will not be permitted.

C. Replace damaged or scratched materials with new materials.

END OF SECTION
SECTION 10 21 13.33
SOLID PHENOLIC TOILET COMPARTMENTS

PART 1    GENERAL

1.1   SECTION INCLUDES

A. Solid phenolic core toilet compartments, floor supported and overhead braced.
B. Solid phenolic core urinal screens, wall mounted.

1.2   RELATED SECTIONS

A. Section 06 10 00 – Rough Carpentry.
B. Section 09 22 16 – Non-Structural Metal Framing.
C. Section 09 29 00 – Gypsum Board.
D. Section 09 30 00 – Tiling.
E. Section 10 28 13 – Toilet Accessories.

1.3   REFERENCES

A. The publications listed below form a part of this Section to the extent referenced. The publications are referred to in the text by the basic designation only. Refer to Division 01 for definitions, acronyms, and abbreviations.

B. Standards, manuals, and codes refer to the latest edition of such standards, manuals, and codes in effect as of the date of issue of this Project Manual, unless indicated otherwise in CBC Chapter 35 and CFC Chapter 80.

C. Referenced Standards:

1.4   SUBMITTALS

A. General: Submit under provisions of Division 01.
B. Samples:
   1. Furnish a 1 inch x 4 inch sample of solid phenolic partition material showing color face and finished edges.
   2. Furnish one each of stainless steel fasteners, door hardware, mounting hardware and aluminum headrail.
C. Shop Drawings:
   1. Provide four copies of all shop drawings.
   2. Show fabrication and erection of assemblies, to extent not fully described by manufacturer’s data sheets.
   3. Show anchorage, accessory items and finishes.
4. Show compartment layouts, with field verified dimensions.
5. Provide location drawings for bolt hole locations in supporting members for attachment of partitions.

D. Manufacturer's Data:
1. Provide four copies each of:
   a. Data sheets.
   b. Installation instructions.
   c. Maintenance procedures.

1.5 REGULATORY REQUIREMENTS
A. Comply with CBC Chapter 11B and ANSI A117.1 accessibility requirements.
B. Flammability Test: Meet the requirements of CBC Chapter 8; minimum Class B rating required.

1.6 DELIVERY, STORAGE AND HANDLING
A. Deliver items in manufacturer's original unopened protective packaging.
B. Store materials in original protective packaging to prevent soiling, physical damage, or wetting.
C. Handle so as to prevent damage to finished surfaces.

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

1.8 COORDINATION
A. Coordinate placement of backing in walls. Backing by others.

1.9 WARRANTY
A. Three year warranty against delamination of panels.
B. Lifetime warranty for stainless steel hardware; five year warranty for all other hardware.

PART 2 PRODUCTS

2.1 MANUFACTURERS
A. Acceptable Manufacturers:
   1. Bobrick, 1082 DuraLine Series floor mounted, overhead braced compartments.
   2. Knickerbocker Partition Corporation, Metropolitan Series.
B. Substitutions: Under provisions of Division 01.
2.2 MATERIALS

A. Doors, panels, pilasters, and urinal screens shall be solid one piece phenolic black, plastic core with high pressure matte melamine surface fused to the core. Finish color as selected by Architect.

B. Leveling devices shall be chromate treated and zinc plated steel.

C. Pilaster shoes shall be Type 304 stainless steel with #4 satin brushed finish.

D. Headrails shall be etched and anodized extruded aluminum.

2.3 FABRICATION

A. Pilasters, doors, and urinal screens shall be 3/4 inch thick. Door edges shall be machined and finished smooth with a fifteen degree beveled edge.

B. Divider panels shall be 1/2 inch thick. Panel edges shall be machined and finished smooth with a fifteen degree beveled edge.

C. Panels and doors shall be 58 inches high and mounted 12 inches above finished floor for toe clearance per CBC Section 11B-604.8.1.4.

D. Leveling Devices: An inverted stirrup with a jack bolt, for leveling during installation and permanent height adjustment, shall be welded within the base of each pilaster. “L” brackets shall be coupled to the stirrup bracket and floor for full range adjustment.

E. Pilaster shoes shall be one-piece, 3 inches high minimum. Top shall have 90 degree return to pilaster. Shoes shall be fastened to pilasters with concealed retainer clips.

F. Headrails and headrail returns shall have anti-grip profile, clamp over pilasters, and be secured to walls with stainless steel brackets.

2.4 HARDWARE

A. Door Hardware:
   1. Sliding door latch and keeper shall be stainless steel, surface mounted with emergency egress feature. Latch shall require less than five pound force to operate and top of latch shall be mounted at 44 inches above finished floor.
   2. Through-bolted, stainless steel, tamper resistant fasteners shall be used at latch keeper-to-pilaster connections.
   3. Hinges shall be continuous stainless steel spring-loaded type thru-bolted to doors and pilasters. Hinges shall be self-closing and adjustable to hold doors open at any angle up to 90 degrees, with emergency access by lifting door.
   4. Door shall be furnished with two 11 gauge stainless steel door stop plates with attached rubber bumpers to resist door from being kicked in/out beyond pilaster.
   5. Provide clothes hook on inside of each stall of door. Mount top of hook at 48 inches above the finished floor at all accessible stalls.
   6. Provide U-shaped door pulls and wall stop for outswinging doors. Equip accessible doors with inside and outside pulls. Pulls shall be located directly below the latch. Door hardware shall be mounted between 34 inches to 44 inches above finished floor.
7. Accessible water closet compartment shall be equipped with a door that has a self-closing device and shall have a clear, unobstructed opening width of 32 inches when located at the end and 34 inches when located at the side with the door positioned at an angle of 90 degrees from its closed position per CBC Section 11B-604.8.1.2.

B. Miscellaneous Hardware:
   1. U-channels at pilasters and walls, full height 18 gauge type 304 satin finish stainless steel.
   2. Angle brackets shall be furnished to secure pilasters to walls and panels to walls.
   3. Fasteners at locations connecting panels to pilasters shall utilize through-bolted, stainless steel, tamper resistant fasteners.
   4. Wall mounted urinal screen brackets shall be full length double ear heavy, clear anodized Type 6463-T5 alloy extruded aluminum.

PART 3  EXECUTION

3.1  EXAMINATION
   A. Verify that site conditions are ready to receive work and opening dimensions are as required.
   B. Verify correct spacing of plumbing fixtures.
   C. Verify correct location of built-in framing, anchorage, and bracing, where required.
   D. Beginning of installation means acceptance of existing substrate.

3.2  INSTALLATION
   A. Install partitions secure, plumb, and level in accordance with manufacturer’s instructions.
   B. Maintain 3/8 inch to 1/2 inch space between wall and panels and between wall and end pilasters.
   C. Attach panel brackets securely to walls using anchor devices.
   D. Attach panels and pilasters to bracket with through sleeve tamper resistant bolts and nuts.
   E. Anchor urinal screen panels to walls with full length panel brackets.
   F. Secure all elements rigidly in place. Anchor to structure with anchors appropriate for use with type of adjacent construction. Fasteners shall securely fasten items to wall construction involved. Fasteners shall provide stiffness and rigidity to keep items square, in accurate position without twisting, buckling or warping. Fasteners to framing substrate shall be the following minimums; greater as required by the toilet partition manufacturer or as conditions warrant:
      1. Wood Framing: #14 tamper resistant stainless steel wood screws with 1-1/2 inch minimum penetration into the framing or backing member.
      2. Metal Framing: #14 tamper resistant stainless steel self-tapping sheet metal screws by length as required to penetrate framing or backing member 1/4 inch minimum.
   G. Provide adjustment for floor variations with screw jack through steel saddles integral with pilaster. Conceal floor fastenings with pilaster shoes.
H. Install door strike and keeper with door bumper on each pilaster in alignment with door latch.

I. Adjust hinges to locate doors in partial opening position when unlatched. Hinges shall return outswinging doors to closed position.

3.3 ADJUSTING

A. Adjust and align hardware to uniform clearance at vertical edge of doors, not exceeding 3/16 inch.

B. Set hinge on in-swinging doors to hold door open when unlatched.

C. Set hinge on out-swinging doors and in-swinging doors to hold unlatched door in fully closed position.

3.4 CLEANING

A. Remove protective masking. Clean surfaces.

B. Field touch-up of scratches or damaged finish will not be permitted.

C. Replace damaged or scratched materials with new materials.

END OF SECTION
PART 1 GENERAL

1.1 SECTION INCLUDES

A. Toilet accessories.

B. Attachment hardware.

1.2 RELATED SECTIONS

A. Section 06 10 00 – Rough Carpentry.

B. Section 09 22 16 – Non-Structural Metal Framing.

C. Section 09 29 00 – Gypsum Board.

D. Section 09 30 00 – Tiling.

E. Section 10 21 13.33 – Solid Phenolic Toilet Compartments.

1.3 REFERENCES

A. The publications listed below form a part of this Section to the extent referenced. The publications are referred to in the text by the basic designation only. Refer to Division 01 for definitions, acronyms, and abbreviations.

B. Standards, manuals, and codes refer to the latest edition of such standards, manuals, and codes in effect as of the date of issue of this Project Manual, unless indicated otherwise in CBC Chapter 35 and CFC Chapter 80.

C. Referenced Standards:


1.4 SUBMITTALS

A. Submit under provisions of Division 01.

B. Product Data: Submit data on accessories describing size, finish, details of function, attachment methods.

C. Manufacturer's Installation Instructions: Submit installation instructions, special procedures, and conditions requiring special attention.
1.5 KEYING
   A. Master key all accessories.

1.6 REGULATORY REQUIREMENTS
   A. Conform to applicable code for installing work in conformance with Title 24 Accessibility Requirements.
      1. Toilet accessories required to be accessible shall be mounted at heights according to CBC Section 11B-603.5.
      2. Toilet accessories shall not be located closer than 1-1/2 inches clear of the bottom of the grab bar and 12 inches clear of the top of the grab bar per C3C Section 11B-609.3.
      3. Toilet tissue dispensers shall be continuous flow type per CEC Section 11B-604.7.

1.7 SEQUENCING AND SCHEDULING
   A. Coordinate the work of this Section with the placement of internal wall reinforcement and reinforcement of toilet partitions to receive anchor attachments.

PART 2 PRODUCTS

2.1 MANUFACTURERS
   A. Bobrick.
   B. Kimberly Clark.
   C. Paris Mirror.
   D. Gojo.
   E. American Specialties, Inc.
   F. Bradley.
   G. Paris Mirror.
   H. Substitutions: Under provisions of Division 01.

2.2 MATERIALS
   A. Stainless Steel Sheet: ASTM A167, Type 304.
   B. Tubing: ASTM A269, stainless steel.
   C. Fasteners, Screws, and Bolts: Hot dip galvanized, tamperproof.
   D. Expansion Shields: Fiber, lead, or rubber as recommended by accessory manufacturer for component and substrate.

2.3 FABRICATION
   A. Weld and grind smooth joints of fabricated components.
   B. Form exposed surfaces from single sheet of stock, free of joints.
C. Form surfaces flat without distortion. Maintain flat surfaces without scratches or dents.

D. Back paint components where contact is made with building finishes to prevent electrolysis.

E. Shop assemble components and package complete with anchors and fittings.

F. Provide steel anchor plates, adapters, and anchor components for installation.

G. Hot dip galvanize exposed and painted ferrous metal and fastening devices.

2.4 FACTORY FINISHING

A. Stainless Steel: No. 4 satin luster finish.

PART 3 EXECUTION

3.1 EXAMINATION

A. Verify that site conditions are ready to receive work and dimensions are as instructed by the manufacturer.

B. Beginning of installation means acceptance of existing conditions.

3.2 PREPARATION

A. Deliver inserts and rough-in frames to site at appropriate time for building-in.

B. Provide templates and rough-in measurements as required.

C. Verify exact location of accessories for installation.

3.3 INSTALLATION

A. Install fixtures, accessories and items in accordance with manufacturers' instructions.

B. Install all items plumb and level.

C. Secure all items rigidly in place. Anchor to structure with anchors appropriate for use with type of adjacent construction. Fasteners shall securely fasten items to wall construction involved. Fasteners shall provide stiffness and rigidity to keep items square, in accurate position without twisting, buckling or warping. Fasteners to framing substrate shall be the following minimums; greater as required by the toilet accessory manufacturer or as conditions warrant:

1. Wood Framing: #12 corrosion resistant pan head wood screws with 1-1/2 inches minimum embed into backing.

2. Metal Framing: #12 corrosion resistant self-drilling, self-tapping screws by length as required to penetrate backing 1/4 inch minimum.

3.4 SCHEDULE

A. Bobrick Washroom Equipment or other manufacturers' model numbers indicated on Drawings are listed to establish a quality standard. Refer to Drawings for items required.

END OF SECTION
SECTION 10 44 00
FIRE PROTECTION SPECIALTIES

PART 1  GENERAL

1.1  SECTION INCLUDES
   A. Fire extinguishers.
   B. Cabinets.
   C. Accessories.

1.2  RELATED SECTIONS
   A. Section 06 10 00 – Rough Carpentry: Blocking/backing for attachment.
   B. Section 09 22 16 – Non-Structural Metal Framing: Blocking/backing for attachment.
   C. Section 09 29 00 – Gypsum Board.

1.3  REFERENCES
   A. The publications listed below form a part of this Section to the extent referenced. The publications are referred to in the text by the basic designation only. Refer to Division 01 for definitions, acronyms, and abbreviations.
   B. Standards, manuals, and codes refer to the latest edition of such standards, manuals, and codes in effect as of the date of issue of this Project Manual, unless indicated otherwise in CBC Chapter 35 and CFC Chapter 80.
   C. Referenced Standards:
      2. California Code of Regulations (CCR), Title 19, Division 1, Chapter 3, Fire Extinguishers.
      3. UL 299 – Dry Chemical Fire Extinguishers.

1.4  SUBMITTALS
   A. Submit under provisions of Division 01.
   B. Shop Drawings: Indicate cabinet physical dimensions, rough-in measurements for recessed cabinets, and locations.
   C. Product Data: Provide extinguisher operational features, color and finish, and anchorage details.
   D. Manufacturer's Installation Instructions: Indicate special criteria and wall opening coordination requirements.
   E. Manufacturer's Certificate: Certify that Products meet or exceed specified requirements.
1.5 OPERATION AND MAINTENANCE DATA
A. Maintenance Data: Include test, refill or recharge schedules and re-certification requirements.

1.6 REGULATORY REQUIREMENTS
A. Conform to CFC Section 906 and CCR Title 19 for requirements for extinguishers.

B. Location and Operation: Fire extinguishers and fire extinguisher cabinets shall conform to CBC Sections 11B-307, 11B-308, 11B-309, and 11B-403.

PART 2 PRODUCTS
2.1 MANUFACTURERS
A. Acceptable Manufacturers and Products:
      a. Fire Extinguishers: Cosmic Series, Model No. 5E.

B. Substitutions: Under provisions of Division 01.

2.2 EXTINGUISHERS
A. Dry Chemical Type, UL 299, five pound capacity, enameled steel tank, with pressure gauge; minimum 3A-40B:C Rating.

2.3 CABINETS
A. Metal: Formed sheet steel, primed 18 gauge thick base metal, semi-recessed.
B. Door Glazing: 1/8 inch thick clear acrylic.
C. Cabinet Hardware: Cylinder lock with break-away handle at 48 inches maximum above finished floor. Handle shall be in compliance with CBC Section 11B-309.4 and shall not require more than five pounds force to operate.
D. Cabinet Mounting Hardware: Appropriate to cabinet.

2.4 FABRICATION
A. Form cabinet enclosure with right angle inside corners and seams. Form perimeter trim and door stiles.
B. Pre-drill for anchors.
C. Hinge doors for 180 degree opening with continuous piano hinge. Provide roller type catch.
D. Weld, fill and grind components smooth.
2.5 FINISHES

A. Extinguisher: Manufacturer's standard finish.

B. Cabinet Exterior Trim and Door: Manufacturer's standard finish. Provide vertical white lettering stating “FIRE EXTINGUISHER”.

C. Cabinet Interior: White baked enamel paint finish.

PART 3 EXECUTION

3.1 EXAMINATION

A. Verify rough openings for cabinet are correctly sized and located.

3.2 INSTALLATION

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

B. Mount cabinets such that the fire extinguisher handle is at 48 inches maximum above the finished floor.

C. Install cabinets plumb and level.

D. Secure cabinets rigidly in place. Anchor to structure with anchors appropriate for use with type of adjacent construction. Anchorage shall securely fasten items to wall construction involved. Fasteners shall provide stiffness and rigidity to keep items square, in accurate position without twisting, buckling or warping. Fasteners to framing substrate shall be the following minimums; greater as required by the cabinet manufacturer or as conditions warrant:

1. Wood Framing:
   a. Cabinets: Three-#10 wood screws each side of cabinet with 1-1/2 inch minimum penetration into the framing or backing member.

2. Metal Framing:
   a. Cabinets: Three-#10 self-tapping sheet metal screws each side of cabinet by length as required to penetrate framing or backing member 1/4 inch minimum.

E. Place extinguishers in cabinets.

END OF SECTION
SECTION 10 51 00
LOCKERS

PART 1 GENERAL

1.1 SECTION INCLUDES
A. Locker units with hinged doors.
B. Hardware.
C. Accessories.
D. Benches.

1.2 RELATED SECTIONS
A. Section 03 30 00 – Cast-In-Place Concrete.
B. Section 06 10 00 – Rough Carpentry: Wood blocking/backing.
C. Section 09 29 00 – Gypsum Board.

1.3 REFERENCES
A. The publications listed below form a part of this Section to the extent referenced. The publications are referred to in the text by the basic designation only. Refer to Division 01 for definitions, acronyms, and abbreviations.

B. Standards, manuals, and codes refer to the latest edition of such standards, manuals, and codes in effect as of the date of issue of this Project Manual, unless indicated otherwise in CBC Chapter 35 and CFC Chapter 80.

C. Referenced Standards:
   1. ADA – Americans with Disabilities Act - 2010 Standards for Accessible Design.
   2. ASTM A653/A653M – Standard Specification for Steel Sheet, Zinc-Coated (Galvanized) or Zinc-Iron Alloy-Coated (Galvannealed) by the Hot-Dip Process.
   3. CBC – 2016 California Building Code, Chapter 11B.

1.4 SUBMITTALS
A. Submit under provisions of Division 01.
B. Shop Drawings: Indicate locker and bench plan layout, locker elevations, numbering plan, and anchorage details.
C. Product Data: Provide data on locker and bench types, sizes, and accessories.
D. Samples: Submit two samples, 3 inches x 6 inches in size, of locker color selected; applied to specified base metal.
E. Manufacturer’s Installation Instructions: Indicate component installation.
1.5 SYSTEM DESCRIPTION

A. Type A Locker Units:
   Width: 18 inches
   Depth: 18 inches
   Height (standard lockers): 72 inches
   Configuration (standard lockers): Single tier
   Base: 6 inch high concrete base
   Locking (standard lockers): Equipped for padlocks
   Locking (accessible lockers): Equipped for button key locks

B. Type B Locker Units:
   Width: 15 inches
   Depth: 18 inches
   Height: 36 inches
   Configuration: Double tier
   Base: 6 inch high concrete base
   Locking (standard lockers): Equipped for padlocks
   Locking (accessible lockers): Equipped for button key locks

C. Type C1 Locker Units:
   Width: 18 inches
   Depth: 18 inches
   Height: 72 inches
   Configuration: Single tier
   Base: 6 inch high concrete base
   Locking (standard lockers): Equipped for padlocks
   Locking (accessible lockers): Equipped for button key locks

D. Type C2 Locker Units:
   Width: 24 inches
   Depth: 18 inches
   Height: 72 inches
   Configuration: Single tier
   Base: 6 inch high concrete base
   Locking (standard lockers): Equipped for padlocks
   Locking (accessible lockers): Equipped for button key locks

1.1 REGULATORY REQUIREMENTS

A. Accessible lockers and benches shall comply with the requirements of the Americans with Disabilities Act (ADA) and CBC Chapter 11B.

1.2 DELIVERY, STORAGE AND HANDLING

A. Deliver, store, protect, and handle products to site under provisions of Division 01.

B. Protect locker and bench finish and adjacent surfaces from damage.
1.3 FIELD MEASUREMENTS
   A. Verify that field measurements are as indicated on shop drawings.

PART 2 PRODUCTS

2.1 MANUFACTURERS
   A. Acceptable Manufacturers:
      1. Republic Storage Products, LLC. Products:
         a. Type A and Type B: Qwik-Ship Corridor Lockers.
         b. Type C1 and Type C2: Basic MVP Athletic Lockers.
         c. Locker Room Benches.
      2. Lyon Workspace Products.
      3. Penco Products, Inc.
   B. Substitutions: Under provisions of Division 01.

2.2 TYPE A AND TYPE B LOCKERS
   A. Material: All major steel parts shall be made of mild cold rolled steel, free from imperfections.
   B. Finish: Surfaces of the steel to be thoroughly cleaned, phosphatized, and prepared for baked enamel paint coat finish in accordance with paint manufacturer's instructions.
   C. Construction: Lockers shall be built on the unit principle. Each locker shall have an individual door and frame, an individual top, bottom, back, and shelves with common intermediate uprights separating units.
   D. Door Frames: Door frames shall be 16 gauge steel formed into 1 inch wide face channel shapes with a continuous vertical door strike, integral with the frame on both sides of the door opening. Double tier locker cross frame members shall be 16 gauge steel channel shaped securely welded to vertical framing members to ensure a square and rigid assembly.
   E. Doors: Doors shall be 16 gauge steel, formed with a full channels shape on the lock side to fully conceal the lock bar, channel formation on the hinges side, and right angle formation across the top and bottom. Single tier doors shall have a diagonal reinforcing angle welded to inner face. Doors shall be ventilated by louvers on the face of each door, top and bottom.
   F. Pre-Locking Device: All Tiered lockers shall be equipped with a positive automatic pre-locking device, whereby the locker may be locked while door is open and then closed without unlocking and without damaging the locking mechanism.
   G. Latching: Handles Hinges: Latching shall be a one-piece, pre-lubricated spring steel latch, completely contained within the lock bar under tension to provide rattle-free operation. The lock bar shall be of pre-coated, double-channel steel construction. The lock bar shall be securely contained in the door channel by self-lubricating polyethylene guides that isolate the lock bar from metal-to-metal contact with the door. There shall be three latching points for lockers over 42 inches in height and two latching points for tiered lockers. The lock bar travel shall be limited by contacting resilient high-quality elastomeric cushioning devices concealed inside the lock bar. Frame hooks to accept latching shall be of heavy gauge steel, set close in and welded to the door frame. Continuous vertical door strike shall protect frame
hooks from door slam and shall protect frame hooks from door slam damage. A soft rubber silencer shall be securely installed on each frame hook to absorb the impact caused by closing of the door. Box locker doors shall be equipped with a padlock hasp and a stainless steel strike plate with an integral handle pull.

H. Handles: A non-protruding 14 gauge lifting trigger and side plate shall transfer the the lifting force for actuating the lock bar when opening the door. The exposed portion of the lifting trigger shall be encased in a molded ABS thermoplastic cover that provides isolation from metal-to-metal contact and be contained in a formed 20 gauge stainless steel recessed pocket. The stainless steel pocket shall contain a recessed area for the lock and a mounting area for the number plate.

I. Hinges: Hinges shall be 2 inches high, five-knuckle, full loop, tight pin style, securely welded to frame and double riveted to the inside of the door flange. Locker doors 42 inches high and less shall have two hinges. Doors over 42 inches high shall have three hinges.

J. Body: The body of the locker shall consist of 24 gauge upright sheets, backs, tops, bottoms, and shelves. Tops, bottom, and shelves shall be flanged on all four sides; backs shall be flanged on two sides. Uprights shall be offset at the front and flanged at the rear to provide a double lapped rear corner. All bolts and nuts shall be zinc plated.

K. Interior Equipment: Single tier lockers over 42 inches high shall have one hat/book shelf. All single and double tier lockers one double prong rear hook and two single prong side hooks in each compartment. All hooks shall be made of steel, formed with ball points, zinc-plated and attached with two bolts or rivets.

L. Number Plates: Each locker shall have a polished aluminum number plate with black numerals not less than 1/2 inch high. Plates shall attached with rivets to the lower surface within the recessed handle pocket.

M. Color: As selected by Architect from manufacturer's full range of standard colors.

N. Assembly: Assembly of all locker units shall be accomplished by the use of zinc-plated, low round head, slotless, fin neck machine screws with hex nuts, producing a strong mechanical connection.

2.3 TYPE C1 AND TYPE C2 LOCKERS

A. Material: All major steel parts shall be made of mild cold rolled steel, free from imperfections.

B. Finish: Surfaces of the steel to be thoroughly cleaned, phosphatized, and prepared for baked enamel paint coat finish in accordance with paint manufacturer's instructions.

C. Construction: Lockers shall be built on the unit principle. Each locker shall have an individual door and frame, an individual top, bottom, back, and shelves with common intermediate uprights separating units. Assembly of all locker components shall be by riveting with a backup washer to provide shake-proof permanent fastening while still permitting fastener removal by drilling to allow future rearrangement of lockers or replacement of damaged parts.

D. Frames: Frames shall be 16 gauge steel formed into 1 inch wide face channel shapes with continuous stiffening members on both sides of the locker opening. Channel-shaped, 16 gauge top and bottom cross frame members shall be securely welded to vertical framing members to ensure a square and rigid assembly.
E. Body: Locker body components shall be made of cold rolled steel specially formed for added strength and rigidity and to ensure tight joints at fastening points. 16 gauge side uprights shall be perforated with diamond shaped openings 3/4 inch wide by 1-1/2 inches high for maximum ventilation. Diamond pattern shall be located between the foot locker and the clothes hooks. Locker backs shall be 18 gauge steel with right angle flanges on each vertical side for stiffness, ease of assembly and corner rigidity. Tops, bottoms, shelves, and compartment dividers shall be 16 gauge steel, fully flanged on all sides for added stiffness. Shelves shall have an additional return flange on the front edge creating a channel shape to rigidize the impact surface. All locker components shall be finished in the same color.

F. Interior Equipment: Lockers shall be equipped with one full width shelf located a nominal 12-3/4 inches down from the top of the locker and have a 13-3/4 inch nominal depth. The locker shall be equipped with four single-prong clothes hooks, one mounted on each side and two mounted on the locker back. In addition, a coat rod shall be provided for the full width of the locker.

G. Number Plates: Each locker shall have a polished aluminum number plate with black numerals not less than 1/2 inch high. Plates shall be riveted to the shelf face with two rivets.

H. Color: As selected by Architect from manufacturer’s full range of standard colors.

2.4 LOCKER ACCESSORIES

A. Accessible Lockers:
   1. Latch and locking hardware at accessible lockers shall not require twisting, pinching or grasping, or more than five pounds of force to operate per CBC Section 11B-309.4. Product: Model No. T-30 button key lock for use with vertical locking bars, and Power Jumper Unit as manufactured by Digilock or accepted equal.
   2. Provide ADA compliant bottom riser kit and ADA compliant signage at accessible lockers.

B. Provide sloping metal tops with hood ends. Finish system and color to match lockers.

C. Closures and Fillers:
   1. Top closures, closure strips, front expansion fillers, and corner fillers.
   2. Fill spaces between two lockers or between lockers and walls as required for proper fit.

D. End Panels:
   1. End Cover Panels: 14 gauge steel, construction bolt heads exposed at perimeter.
   2. End Finishing Panels: 16 gauge steel, no bolt heads exposed.

2.5 BENCHES

A. Locker Room benches with the following characteristics:
   1. Sizes:
      a. Standard: 9-1/2 inches deep x 17-1/2 inches high x lengths as indicated on Drawings, with a minimum of two pedestals per bench.
      b. Accessible: 48 inches long x 24 inches deep x 17-1/2 inches high, with four pedestals per bench. Freestanding benches shall have 48 inch long x 18 inch tall fixed backrests with steel support framing.
2. Benchtops and Backrests: 1-1/4 inch thick laminated hardwood with two coats of acrylic clear finish. All corners and edges shall be rounded and sanded.

3. Pedestals: 1-1/4 inch outside diameter tubing uprights with 10 gauge steel flanges welded to each end. Finish and Color: Same as lockers.

PART 3 EXECUTION

3.1 EXAMINATION

A. Verify that prepared bases are in correct position and configuration.

B. Verify bases are properly sized.

3.2 INSTALLATION

A. Install lockers and benches in accordance with manufacturer's instructions.

B. Fasten lockers to each other, to walls, and to curbs per manufacturer's recommendations to meet CBC seismic requirements.

C. Secure lockers and benches with anchor devices to suit substrate materials. Minimum pullout force per anchor: 100 pounds.

D. Install lockers plumb and square.

E. Place and secure on prepared base.

F. Bolt adjoining locker units together to provide rigid installation.

G. Install sloping tops and metal fillers using concealed fasteners. Provide flush hairline joints against adjacent surfaces.

H. Locker Benches: Install locker benches by fastening bench tops to pedestals and securely anchoring to floor using appropriate anchors.

3.3 ADJUSTING

A. Adjust doors, latches, locks, and operating hardware to function properly for smooth operation without binding. Verify that latches are operating satisfactorily.

B. Adjust built-in locks to prevent binding of dial or key and ensure smooth operation.

C. Touch-up with factory-supplied paint and repair or replace damaged products.

3.4 CLEANING

A. Clean work under provisions of Division 01.

B. Clean interior and exterior surfaces in accordance with manufacturer’s recommendations.

1. Do not use harsh cleaning products or methods that could damage finish.
3.5 PROTECTION

A. Protect installed products through completion of project.

END OF SECTION
SECTION 10 90 00
MISCELLANEOUS SPECIALTIES

PART 1 GENERAL

1.1 SECTION INCLUDES
A. Miscellaneous specialty items.
B. Accessory anchors, bolts, screws and braces.

1.2 SUBMITTALS
A. Submit under provisions of Division 01.
B. Shop Drawings:
   1. Indicate fabrication, materials, installation details, finishes, and any other required anchoring, fastenings, and hardware.
   2. Submit drawing layout for product configuration, support attachment and anchorage details.

1.3 PRODUCT DELIVERY, STORAGE AND HANDLING
A. Deliver products to site under provisions of Division 01.
B. Store in manufacturer’s original unopened containers and packaging. Protect and handle products to prevent damage to products or finishes.

PART 2 PRODUCTS

2.1 MAGNETIC MARKER BOARD LAMINATE
A. Acceptable Manufacturers:
B. Material:
   1. Composition: Melamine saturated decorative paper, bonded to a layer of iron foil, and several layers of phenolic impregnated Kraft paper. Front side shall have gloss finish; back side shall be sanded.
   2. Sheet Size: 4-foot x 8-foot x 1.0 mm thick.
   4. Adhesive: Type recommended by laminate manufacturer.
2.2 WALLCOVERING

A. Film (WC4): 3M Envision Print Wrap Film SV/LX 480Cv3 as manufactured by 3M or accepted equal, with the following characteristics:
   1. Material: Non-PVC polymer.
   2. Surface Finish: Gloss.
   3. Film Thickness: 0.05 mm.
   4. Adhesive Type: Solvent acrylic, pressure sensitive, repositionable.
   5. Liner: Double sided polyethylene coated paper.
   6. Protection: 3M Envision Lustre Wrap Overlaminate 8549L.

PART 3 EXECUTION

3.1 INSTALLATION

A. All products in this Section shall be installed according to manufacturer's instructions and as detailed on Drawings.

3.2 ADJUST AND CLEAN

A. Clean and Touch-up: Remove all packing and protection blemishes and thoroughly clean and polish all finish surfaces. Restore any marred or abraded surfaces to their original condition by touching up in accordance with the manufacturer's recommendations. Touch-up shall not be obvious.

B. Defective work: Remove and replace all defective work which cannot be properly repaired, cleaned or touched up, as directed by Architect, with no additional cost to the Owner.

C. Protect installed work during the construction period to prevent abuse and damage.

END OF SECTION
DIVISION 11
EQUIPMENT
SECTION 11 66 00

ATHLETIC EQUIPMENT

PART 1       GENERAL

1.1  SECTION INCLUDES

A. Athletic equipment.

1.2  RELATED SECTIONS

A. Section 03 30 00 – Cast-in-Place Concrete.
B. Section 06 10 00 – Rough Carpentry.
C. Section 09 64 66 – Wood Athletic Flooring.
D. Division 26 – Electrical.

1.3  SUBMITTALS

A. Submit shop drawings under provisions of Division 01.
B. Shop drawings shall include engineering design calculations and shall clearly show all pertinent dimensions, data, sizes and fastening requirements. Calculations shall be provided by a licensed California Structural Engineer. No fabrication or placing shall be started until the Architect has reviewed the shop drawings.
C. Submit Maintenance Manuals under provisions of Division 01.

1.4  QUALITY ASSURANCE

A. Installer’s Qualifications: Installation shall be by manufacturer’s authorized representative employing skilled mechanics thoroughly trained and experienced in this type of installation and who are completely familiar with the requirements of the work specified.
B. All material and equipment shall be furnished by manufacturers regularly engaged in production of these items. Manufacturer’s recommendations shall be followed in all cases for installation and conditions.
C. Comply with all local, State or Federal codes and regulations. Manufacturer and manufacturer’s representative shall have a minimum of prior ten successful jobs, similar in scope, with DSA approval.
D. The installer and/or manufacturer shall maintain a regular service facility within a 150 mile radius of the area in which the equipment installation is located.
E. For convenience in identifying equipment items, manufacturer’s catalog numbers are scheduled. Unless modified by Specifications or notation on Drawings, catalog description for indicated number shall constitute basic requirements for each item. Equipment shall incorporate all features set forth in catalog for standard item, except for such modifications thereto as may be indicated.
F. Provide Manufacturer's standard one year warranty. Backboards provided with center strut attachment shall have manufacturer's limited lifetime warranty. Ultra Flex Goals shall have manufacturer's limited two year warranty.

1.5 PRODUCT DELIVERY, STORAGE AND HANDLING

A. Deliver to project site in manufacturer's original, unopened and undamaged packaging. Store in original packaging under protective cover and protect from damage. Handle materials in such a manner as to prevent damage to products or finishes.

PART 2 PRODUCTS

2.1 MANUFACTURERS – ATHLETIC EQUIPMENT

A. Porter Athletic Equipment Co. Products:
   2. Model No. 00870-100 – Gymnasium Volleyball Floor Sleeves.

B. Draper, Inc.

C. Substitutions: Under provisions of Division 01.

2.2 MANUFACTURERS – SCOREBOARDS

A. Score Vision. Product:
   1. Model No. iB1710 scoreboard.
   2. Model No. iB1007 scoreboard.

B. Daktronics.

C. Substitutions: Under provisions of Division 01.

2.3 ELECTRIC BACKSTOP WINCHES

A. Electric Backstop Winches:
   1. Winch shall be worm gear type, designed to hold backstop at any position when raising or lowering. Winch housing, base, cable drum and bracket shall be machined from high strength aluminum alloy. The worm shall be machined from high strain tempered steel bar. All surfaces of the worm shaft shall be ground and the worm teeth and seal surfaces shall be polished after grinding for the utmost in efficiency and sealing capabilities. Worm shaft shall turn in sealed, precision thrust bearings. The shaft shall also be sealed by additional seal on the outside of the sealed bearings.

   2. Worm gear shall be machined from high strength forged bronze alloy for exceptional wearability and long life characteristics.

   3. The worm and gear shall be set to run in an oil bath within main shaft housing which shall be completely sealed by the worm shaft seal, and by a double lip seal around the polished cable drum shaft where it enters the housing. This unit shall be filled with oil at factory and sealed.
4. Winch shall be operated mechanically by means of a 3/4 horsepower, 13 amp capacitor type 60 cycle, 115 volt, single phase electric motor with automatic thermal overload protection manufactured to NEMA specifications. The motor shall drive the winch by means of a connecting V-belt and sprockets. The motor shall be controlled by special dual keyed, flush wall mounted momentary key switch which cannot be instantly reversed, providing a safety provision so as not to damage motor or winch.

5. Drum shall be mechanically interconnected to a special rotary counting Up-Down limit switch assembly that shall be mounted and pre-wired to motor as an integral part of the winch. Limit switch shall be furnished in a special, extruded aluminum housing with continuous slots for adjusting 20 amp micro switches to precisely limit the up and down operation of the winch. Winch shall be pre-wired with a neoprene covered cable with twist-lock grounded type plug attached. Matching flange type receptacle shall be mounted in 4 inch square box cover.

2.4 VOLLEYBALL FLOOR SLEEVES

A. Gymnasium Volleyball Floor Sleeve With Recessed Cover:
   1. Porter Model #00870-100 floor sleeve for 3-1/2 inch diameter post with 5 inch diameter recessed chrome cover.
   2. Sleeve assembly shall be 3-3/4 inch outside diameter heavy wall steel tubing extending 9 inches into concrete footing. Bottom of sleeve shall be capped with a 4 inch diameter steel disc to provide proper anchorage in footing. Sleeve assembly shall be finished in a rust-resistant enamel paint finish.
   3. Cover plate assembly shall be provided for use in either synthetic or wood floors. Cover plate shall consist of molded plastic recessed mounting flange, cork gasket, and a 5 inch diameter chrome plated cover. Cover shall be equipped with a swivel-type retainer pin to prevent theft. Provide special key for cover removal.
   4. Steel sleeve to be cast in concrete sub-floor before finished floor is installed. Top of sleeve shall be installed 1/2 inch below finished floor elevation.

2.5 SCOREBOARDS

A. Indoor Scoreboard Characteristics:
   1. Sizes:
      a. 16 feet – 6.375 inches long x 9 feet – 5.375 inches high.
      b. 9 feet – 5.375 inches long x 7 feet – 1 inch high.
   2. LED Specifications:
      a. 6 mm pixel pitch display.
      b. 240 mm x 240 mm modules.
      c. 40*40 dot module resolution.
      d. 120*120 dot panel resolution.
      e. ≥1200 Hz refresh rate.
      f. SMD2121 LED.
      g. Front maintain with magnetic modules.
      h. 140 degree horizontal / 140 degree vertical viewing angle.
3. Power Requirements:
   a. Total of four independent 20 amp, 110 V, single phase circuits.
   b. 12 gauge wire for hot, neutral, and ground.
4. Power Consumption:
   a. Average of 330 watts per square meter.
   b. Maximum of 990 watts per square meter.
6. Computer: Apple iPad Pro, 10.5 inch.
7. Rack and Software: Rack, servers, LED controllers, bridges, and software as standard with manufacturer.
8. Provide two shot clock displays and hardware.

PART 3  EXECUTION

3.1 CONDITION OF SURFACES

   A. Examine all framing, grounds, and blocking required to secure backstops. Coordinate work of this section with work of other Sections to assure proper location of all solid blocking. Do not proceed with the work of this Section until unsatisfactory conditions have been corrected.

3.2 INSTALLATION

   A. Install all products specified in this Section per the manufacturer's recommendations.

   B. Coordinate electrical connections for winches with the work of Division 26.

   C. Final Adjustment: Check backstop installation for correct rigidity of main frame installation. Any movement not permitted by the manufacturer shall be additionally braced to comply with the manufacturer's permitted tolerances.

   D. Defective Work: Remove and replace all defective work that cannot be properly repaired, cleaned or touched-up, as directed by the Architect, with no additional cost to the Owner.

   E. Protect the installed work against damage from other construction.

3.3 CLEAN UP

   A. Upon completion of the work of this Section, remove all surplus materials, rubbish and debris from the premises.

   B. Cleaning and Finishing: Upon completion, clean all exposed surface, removing any discoloration or foreign matter. Touch-up abraded or cut areas and exposed edges with finishing material recommended by the manufacturer. Touch-up shall not be obvious.

END OF SECTION
SECTION 12 24 13
ROLLER WINDOW SHADES

PART 1 GENERAL

1.1 SECTION INCLUDES

A. Manually Operated Roller Window Shades.
B. Electric Motor Operated Roller Window Shades.
   1. Local group and master control system for shade operation.

1.2 RELATED SECTIONS

A. Section 01 81 13 – Sustainable Design Requirements; for additional LEED requirements.
B. Section 08 41 13 – Aluminum Entrances and Storefronts.
C. Division 26 – Electrical.

1.3 REFERENCES

A. The publications listed below form a part of this Section to the extent referenced. The publications are referred to in the text by the basic designation only. Refer to Division 01 for definitions, acronyms, and abbreviations.

B. Standards, manuals, and codes refer to the latest edition of such standards, manuals, and codes in effect as of the date of issue of this Project Manual, unless indicated otherwise in CBC Chapter 35 and CFC Chapter 80.

C. Referenced Standards:
   2. CEC – California Electrical Code.

1.4 SUBMITTALS

A. General: Submit in accordance with Division 01.

B. Product Data: Submit manufacturer’s descriptive literature and product specification for each product.
   1. Preparation instructions and recommendations.
   2. Styles, material descriptions, dimensions of individual components, profiles, features, finishes, and operating instructions.
   3. Storage and handling requirements and recommendations.
   a. Environmental Certification: Submit written certification from the manufacturer, including third party evaluation, recycling characteristics, and perpetual use certification as specified below. Materials that are PVC-free without identifying their inputs shall not qualify as meeting the intent of this specification.
   b. Third Party Evaluation: Provide documentation stating the shade cloth has undergone third party evaluation for all chemical inputs, down to a scale of 100 parts per million, and have been evaluated for human and environmental safety. Identify any and all inputs which are known to be carcinogenic, mutagenic, teratogenic, reproductively toxic, or endocrine disrupting. Identify items that are toxic to aquatic systems, contain heavy metals, or organohalogens. The material shall contain no inputs that are known problems to human or environmental health per the above major criteria, except for an input that is required to meet applicable fire codes and regulations.
   c. Recycling Characteristics: Provide documentation that the shade cloth is part of a closed loop of perpetual use and not be required to be down-cycled, incinerated, or otherwise disposed of. Scrap material shall be capable of being sent back to the mill for reprocessing and recycling into the same quality yarn and woven into new material without down-cycling. Certify that this process is currently available and will be utilized for this project.
   d. Perpetual Use Certification: Certify that at the end of the useful life of the shade cloth that the material can be sent back to the manufacturer for recapture as part of a closed loop of perpetual use and that the material can and will be reconstituted into new yard for weaving into new shade cloth. Provide information on each shade band indicating that the shade band can be sent back to the manufacturer for this purpose.

C. Shop Drawings:
   1. Provide plans, elevations, sections, product details, installation details, operational clearances, and relationship to adjacent work.
   2. Provide window treatment schedule for all roller shades. Use same room designations as indicated on Drawings and include opening sizes and key to typical mounting details.
   3. Provide wiring diagrams including integration of motor controllers with applicable building control systems.

D. Samples:
   1. Submit complete roller shade assembly showing component parts.
   2. Selection of metal component finishes.
   3. Selection of shade fabric colors, weaves, and types.

E. Manufacturer’s Operation and Maintenance Instructions: Methods for maintaining roller shades, precautions regarding cleaning materials and methods, and instructions for operating hardware and controls.
1.5 QUALITY ASSURANCE

A. Qualifications
   1. Manufacturer Qualifications: Obtain roller shades through one source from a single manufacturer with a minimum of ten years experience in manufacturing products comparable to those specified in this Section.
   2. Supplier Qualifications: The manufacturer or its subsidiary or licensed agent approved to supply products of this Section and honor any claims against the product presented in accordance with the warranty.
   3. Installer Qualifications: Firm specializing in installing work specified in this Section acceptable to manufacturer with documented experience on at least five projects of similar nature in past three years.

B. Electrical components shall be labeled by UL, ETL, or other testing agency acceptable to Authority Having Jurisdiction, marked for intended use, and tested as a system.

C. Field Samples: Provide large size sample of selected fabric for final verification of color, weave, and density as directed by Architect.

D. Pre-Installation Meetings:
   1. Conduct pre-installation meeting in accordance with provisions of Division 01.
   2. Convene pre-installation meeting one week prior to commencing work of this Section.
   3. Coordinate work in this Section with work in related Sections.

1.6 DELIVERY, STORAGE, AND HANDLING

A. Comply with requirements of Division 01.

B. Deliver products when all concrete, masonry, plaster, painting, and other wet work has been completed and dried.

C. Deliver products in manufacturer's original containers, dry and undamaged, with seals and labels intact.

D. Deliver shades in factory-labeled packages, marked with manufacturer and product name, fire-test-response characteristics, and location of installation using same room designations indicated on Drawings.

E. Store materials in a dry secure place. Protect from weather, surface contaminants, corrosion, construction traffic, and other potential damage.

1.7 ENVIRONMENTAL REQUIREMENTS

A. Solar shade cloth fabric shall be PVC-free

B. Maintain ambient temperature between 60 degrees F and 85 degrees F and relative humidity between twenty percent and fifty percent 24 hours before installation and maintain until Owner's final acceptance.

C. Condition products at designated work areas 24 hours before installation.
1.8 WARRANTY

A. Comply with provisions of Division 01.

B. Warrant installed units to be free from defects in material and workmanship as follows:
   1. Manual Roller Shade Hardware at Window Shades, and Chain: Manufacturer's standard non-depreciating twenty-five year limited warranty
   2. TPO Solar Shadecloth: Manufacturer's standard non-depreciating ten year limited warranty.

C. In the event a warranted product or component fails, facilitate materials replacement at no cost to the Owner under the provisions of Division 01.

1.9 MAINTENANCE

A. Operations and Maintenance Data:
   1. Comply with requirements of Division 01.
   2. Include operation and cleaning information.

PART 2 PRODUCTS

2.1 MANUFACTURERS

A. Acceptable Manufacturers:

B. Substitutions: Under provisions of Division 01.

2.2 MANUALLY OPERATED WINDOW SHADES

A. Manufacturers and Products:

B. Manual operated tubular roller shades: Provide brackets for mounting conditions indicated on Drawings.

C. Roller Tube:
   1. Extruded aluminum alloy roller tube.
2. Diameter: Sufficient diameter and thickness to prevent excessive deflection.

D. Operator and Clutch/Brake Mechanism: Manual operated chain and sprocket system with a bi-directional clutch/brake mechanism designed to hold shade fabric at any position.

E. Chain: No. 10 stainless steel 90 pound test ball chain with connector and upper and lower ball stops. Provide wall mounted pulley wheel at bottom of chain to keep chain tracking straight and in-line during operation. Provide locking chain clips at each chain.

2.3 MOTOR OPERATED WINDOW SHADES

A. Manufacturers and Products:

B. Motor operated tubular roller shades: Provide brackets for mounting conditions indicated on Drawings.

C. Roller Tube:
   1. Extruded aluminum alloy roller tube.
   2. Diameter: Sufficient diameter and thickness to support shade fabric without excessive deflection. Minimum 2.50 inch diameter for widths up to 120 inches.

D. Motors:
   1. UL listed asynchronous capacitor start and run with built-in thermal overload protection and limit switch adjustments.
   2. Addressable 'intelligent' motors capable of up to eight group (zone) assignments without the need for additional outboard shade controllers.
   3. Quiet operation: Less than 46bd in 3 feet of open air, across all lift capacities necessary for project.
   4. 110/120 Volts, 60 Hz, single phase.
      a. Switches shall operate at 24 Volts.
   5. Motors shall be totally enclosed within the roller tube.
   6. Motors must include built-in dry-contact interface capabilities.
   7. Total hanging weight of shade fabric shall not exceed 80 percent of motor’s lifting capacity.

2.4 MOTOR CONTROLS

A. Group Control System: Microprocessor controlled, programmable for unlimited intermediate stop positions and navigable sub grouping capabilities without need for rewiring. This system must be network capable and able to operate from local switching alone.
2.5 SHADE FABRIC

A. Manufacturers and Products:
   1. MechoShade, Products:
      a. EcoVeil 1550 Series, 100 percent thermoplastic olefin, basketweave pattern with 3 percent openness factor.
      b. EcoVeil 1350 Series, 100 percent thermoplastic olefin, 1 x 1 basketweave pattern with 5 percent openness factor.
   2. Nysan, Product: Phifer Sheerweave Infinity 2 3% and 5%.
   3. Draper Inc., Product: Phifer SheerWeave Infinity2 3% and 5%.

B. Visually transparent non-raveling shade fabric.

C. Shade fabric shall be PVC-free. All fabrics shall be TPO based; 'PVC-free' alone will not qualify for consideration.

D. Characteristics:
   1. Meet or exceed requirements of NFPA 701 and Title 19 CCR Division 1, Chapter 8.
   2. Washable, colorfast and fade resistant.
   3. Color: As indicated on Drawings.

2.6 ACCESSORIES

A. Fascia:
   1. Continuous removable extruded aluminum fascia that attaches to shade mounting brackets without the use of adhesives, magnetic strips, or exposed fasteners.
   2. Fascia shall be able to be installed across two or more shade bands in one piece.
   3. Fascia shall fully conceal brackets, shade roller, and fabric on the tube.
   4. Provide bracket / fascia end caps where mounting conditions expose outside of roller shade brackets.
   5. Notching of fascia for manual chain will not be acceptable.

B. Room Darkening Side and / or Sill Channels:
   1. Extruded aluminum with polybond edge seals and snap lock mounting brackets with concealed fastening. Exposed fastening is not acceptable. Channels shall accept one-piece exposed blackout hembar with vinyl seal to assure side light control and sill light control.
   2. Manual shade side channels, 1-15/16 inches wide by 1-3/16 inches deep, two-band center channels, 2-5/8 inches wide by 1-3/16 inches deep. The 2-5/8-inch double-center channels may be installed at center-support positions of multi-band-shade for motorized shades. Manual shade side channels 2-5/8 inch may be used as center supports for motorized shade and shadebands up to eight feet high. For shadebands over eight feet high, provide motorized shade side channels.
3. Motorized shade side channels, 2-1/2 inches wide by 1-3/16 inches deep; two-band center channels 5 inches wide by 1-3/16 inches deep. The 2-5/8-inch double-center channels may be installed at center-support positions of multi-band-shade motorized shades.


C. Radius Center Support: Center support brackets to join groups of roller shades (from two to six shade bands in line over segmented windows) installed at an angle with a single motor drive. Provide to conform to segmented windows as shown on the Drawings.

2.7 FINISH

A. Extruded Aluminum (panels, fascias, covers, bars, and channels):

B. Shade Fabric: Type and color as selected by the Architect from samples submitted.

2.8 FABRICATION

A. Take accurate field measurements to verify required dimensions prior to fabrication.

B. Fabricate fabric to hang flat without buckling or distortion. Fabricate with heat-sealed trimmed edges to hang straight without curling or reveling.

C. Fabricate unguided fabric to roll true and straight without shifting sideways more than 1/8 inch in either direction for every eight feet of shade height due to warp distortion or weave design.

D. Fabricate with bottom hem weights as needed or exposed hem bar with light seal as applicable.

E. Railroading of solar fabrics will not be allowed, except by permission of the Architect during submittal phase.

F. Provide battens in standard shades as required to assure proper tracking and uniform rolling of fabric.

PART 3 EXECUTION

3.1 EXAMINATION

A. Examine substrate conditions and dimensions. Verify if substrate is ready and acceptable to receive window shade system.

B. Report unacceptable conditions to the Architect. Begin installation only when unacceptable conditions have been corrected.

3.2 INSTALLATION

A. Install in accordance with manufacturer's printed instructions and approved shop drawings.

B. Install units plumb, level, and square, and free from warp or twist while maintaining dimensional tolerances and alignment with adjacent surfaces.
C. Make low voltage electrical control connections as required. All line and low voltage wire runs and line voltage terminations shall be made by a licensed electrician and will be the responsibility of Division 26 contractors. Shade contractor shall provide all wiring diagrams.

D. Installation Tolerances:
   1. Maximum variation of gap at window opening perimeter: 1/4 inch per 8 feet of shade height.
   2. Maximum offset from level: 1/16 inch per 5 feet of shade width.

3.3 ADJUSTING
   A. Adjust parts for smooth, uniform operation.
   B. Adjust shade assembly and fabric to hang flat without buckling and distortion.
   C. Replace any units or components, which do not hang properly or operate smoothly at no additional cost to Owner.

3.4 CLEANING
   A. Clean exposed surfaces, including metal and fabric using non-abrasive materials and methods as recommended by manufacturer.
   B. Do not use materials or methods, which may damage finish or surrounding construction.
   C. Remove and replace work which cannot be satisfactorily cleaned at no additional cost to Owner.

END OF SECTION
SECTION 12 66 13.13
TELESCOPING BLEACHERS

PART 1   GENERAL

1.1   SECTION INCLUDES

A. The gym seat system shall be multiple tiered seating rows comprised of seat and deck components, risers, and supportive understructure.

1.2   RELATED SECTIONS

A. Section 09 64 66 – Wood Athletic Flooring.
B. Division 26 – Electrical.

1.3   SUBMITTALS

A. Submit under provisions of Division 01.
B. Submit shop drawings indicating all equipment, layout, connection details, dimensions and accessories.
C. Submit product data for materials and finishes.
D. Provide California Structural Engineer Calculations with submittals.
E. Submit list of ten past successful DSA installations. Submit installer’s manufacturer certifications and list of ten past successful DSA installations by installer. Submit manufacturer’s installer certification criteria.
F. Provide with submittals a copy of manufacturer’s DSA pre-certified bleacher submittals with a DSA-given PC number.
G. Submittals to match DSA approved project plans.

1.4   DESIGN CRITERIA

A. Telescopic bleachers shall be designed to support and resist, in addition to their own weight, the following forces:
   1. Live Load: 100 pounds per square foot gross horizontal projection.
   2. Lateral Sway Load: 24 pounds per lineal foot seat plank.
   3. Perpendicular Sway Load: 10 pounds per lineal foot seat plank.
   4. Live Load of Seat and Tread Plank: 120 pounds per lineal foot.
B. Basis for calculation of member sizes and connections shall be:
   1. American Institute of Steel Construction (AISC).
   3. Aluminum Association (AA).
C. It is the intent of these Specifications to establish a minimal acceptable quality standard for installed telescopic bleachers. The bidder shall be properly licensed in the State of California, fully insured, and bondable. A complete Compliance and Deviation Sheet listing variances with these Specifications must accompany the submittals. DSA (Division of the State Architect) approval is required on this product. To set a minimum level of quality and experience, the contractor must submit a list of ten existing installations by the manufacturer represented, with DSA approval. Five of the ten successful installations must have over five years of successful operation history. Projects that require more than one re-submittal to DSA for approval will not be acceptable. Approved projects listed must be from the local DSA office selected for reviewing this project. Deferred Approval plans and calculations for bleachers shall be submitted to DSA for review and approval, and shall be signed by the Structural Engineer and the Architect.

1.5 MAINTENANCE DATA
A. Submit maintenance instructions under provisions of Division 01.

1.6 QUALITY ASSURANCE
A. Perform work in accordance with 2016 CBC.

B. It will be the responsibility of the Contractor to furnish a list and clarification of deviations from the specifications, written or implied, to help insure that a fair and proper evaluation is possible. In the event that a list of deviations is not provided, the Contractor shall furnish as specified.

1.7 QUALIFICATIONS
A. Manufacturer: Company specializing in the manufacture of products specified in this Section with sufficient documented experience and successful local installations per Paragraph 1.5.C.

B. Installer: Company specializing in installing the work of this Section and certified by the manufacturer. Installer must have a minimum of ten past successful DSA installations. Installer shall maintain a regular service facility within 100 miles of installation.

C. Design bleachers under direct supervision of a professional structural engineer experienced in the design of this work and licensed in the State of California.

D. Contractor shall have a "B" classification California contractor's license.

1.8 WARRANTY
A. Provide manufacturer's standard limited five year warranty.

B. Warranty: Include coverage for any defects found in materials or workmanship, including moving parts.

PART 2 PRODUCTS
2.1 MANUFACTURERS
A. Hussey, MAXAM Courtside

B. Interkal, SSM 10 Series, subject to plans
C. Irwin 5000, subject to plans
D. Substitutions: Under provisions of Division 01.

2.2 MANUFACTURED UNIT

A. Number of Rows: 8.
B. Bank Lengths: Refer to Drawings.
D. Row Depth: 24 inches.
E. Seat height above its respective tread: 16 inches.
F. Provide power frame operation.
G. Closed depth from wall: 3 feet-8 inches plus column depth.
H. Open dimension from wall: 21 feet-3 inches.
I. Top seat height: 9 feet-5 5/16 inch.

2.3 FABRICATION

A. Framework:
   1. Telescopic bases: Fitted with 5 inch minimum diameter x 1-1/4 inch minimum width non-marring soft rubber face wheels under each moving row. Provide a flexible first row with recoverable ADA truncated seating 6 feet-0 inches and 7 feet-6 inches wide. The flexible row modules shall be easily retracted by a fascia mounted release lock and manually retracting first row and easily opened first row by manually each section. All first row flexible modules shall have safety edge closures to eliminate all sharp edges.
   2. Row Interlock: Each row structure shall be joined front to rear with interacting steel connections and automatic gravity locks on all rows in all sections. Continuous positive interglide system interlocks each adjacent CPI unit using an integral, continuous, anti-drift feature and through-bolted guide at front to prevent separation and misalignment.
   3. All welds shall be made at the factory by welders that are AWS certified within the previous twelve months on the equipment and process used. Welders who have not performed welding for period of three or more months shall be requalified.
   4. Formed Steel: Front and rear members shall fully support all transverse edges of the decking.
   5. Safety Systems: Provide spectator safety features as follows. Provide first row section modules with closures at front of all sections, eliminating sharp edges at sides. Provide intermediate aisle steps with side closures and no exposed sharp edges. Provide rounded edges for understructure parts as follows, X-bracing or diagonal bracing, column tubes, and deck supports. Systems manufactured with sharp right angle iron edges or sharp/pointed edges of any type shall be field modified to eased edges and field touched up to match adjacent members. Provide low profile tier catches to minimize tripping hazard and damage due to foot traffic under bleachers. Height not to exceed 2-1/2 inches above casterhorn.
B. Contoured Plastic Seats: Provide 18 inches wide x 10 inches deep contoured plastic seats. Provide a minimum of fifteen colors for architectural selection; three colors will be used. Seat brackets shall be fully enclosed with rear and side panels for enhanced safety and owner maintenance.

C. Decking: Shall be fabricated from 5/8 inch, C/C grade or better plywood, interior type with exterior glue, five ply, all plies Southern Pine with plugged crossbands, produced in conformance with PS-1-83 of the National Bureau of Standards. Plywood of lesser grade or mixed lumber species is not acceptable. Decking to run for and aft in transverse direction, optimizing ply strength. Decking shall be interlocked via tongue and groove. Deck support to be continuous at front and rear edge of deck.

2.4 FINISHES

1. All surfaces subject to normal wear by spectators shall have a finish that does not show a different color underneath.

2. Steel: Understructure abraded, cleaned and finished with low gloss black enamel. X-braces to be pre-galvanized with a minimum spangle of G-60 zinc plating.

3. Steel Risers: Shall be pre-galvanized with a minimum spangle of G-60 zinc plating. Painted steel shall be pre-galvanized and have same color beneath the paint.

4. Decking: Use surfaces to receive a seal coat and an additional coat of clear polyurethane finish. All exposed plywood ends to be capped with metal strips.

5. Aluminum: Corners and edges to be rounded, smoothed, and receive 0.7 mil thick anodic, clear hard coating.

2.5 ACCESSORIES

A. Aisles to be footrest level and to be provided in total width as required by CBC.

B. Provide auto rotating intermediate aisle rails DSA PC approved. Provide single pedestal mount handrails 34” high with terminating mid rail. Permanently attached handrail shall rotate in a permanently mounted socket for rail storage. Rail shall automatically rotate, lock in the use position, unlock and rotate back to the stowed position as the gym seats open and close. Ends of the handrail shall return to the post, and not extend away from it. At 2nd row only provide manually rotating aisle rails

C. Provide permanent mounted, telescoping closure panels at all exposed end locations. Panels to be manufactured with 14 ounce vinyl to precisely fit the contour of the bleachers. All edges to be double layered. Permanent closures to have lower enclosed chain to prevent access to underside of bleachers. Safety/Warning signs to be included. Vinyl to meet California Fire Marshal F102.4.

D. Provide end rails with black powder coat finish at all exposed ends of the seating bank. Rails shall meet all CBC requirements.

E. Accessible seating areas shall be supplied in quantity and location as required by CBC and as shown on Drawings.

F. Provide metal cover over motor chains and wheels to protect chains from debris and provide a safety switch that if cover is taken off the power system will not work.

G. Provide aisle nose fascias to cover space between row rise and aisle step. Fascia shall be DSA approved.
H. Provide an 8 foot-0 inch x 18 inch scorer’s table. Scorer’s table to have ability to be used at any location on the bleachers or on the floor. Scorer’s table to have folding legs allowing for storage within the bleachers when closed. Scorer’s tables without folding legs are not acceptable.

I. Provide three phase, power frame, motorization system. Integral Power and Control System shall be Underwriters Laboratories, Inc. (UL) approved and listed. Operation shall be with a removable pendant control unit which plugs into seating bank for operator management of stop, start, forward, and reverse control of the power operation. Each Powered Frame unit shall consist of output shaft gear reducer with 6 inch diameter x 4 inch wide wheels covered with non-marring 1/2 inch thick composite rubber. Reducers shall be fitted with induction motors which will provide an average operating speed of 46 feet per minute. Motors shall be minimum 1/2 horsepower.

J. CourtSide Graphic Logo:
   1. Decorative graphic logo that is applied to the integrally molded end cap recess area of the CourtSide 10 seat module.
   2. Logo is approximately 4.7 inch high x 3.5 inch wide with full color CMYK vector art output on FujiFlex crystal archive printing material.
   3. Color logo is laminated with a 5-mil Hard Guard Matte laminate.
   4. Laminated logo is bonded to a Flex-Con L – 606 laminating adhesive layer.
   5. Logo shall be trimmed to a precise custom cut shape with two mounting holes.

PART 3 EXECUTION

3.1 EXAMINATION
   A. Verify that areas to receive products are free of impediments interfering with installation.
   B. Do not begin work until conditions are satisfactory.

3.2 PREPARATION
   A. Seating contractor shall be responsible for field checking site conditions and dimensions.
   B. Where differences exist between job site and plans to require changes in product, it shall be the responsibility of the Contractor to arrange appropriate adjustments prior to shipment.

3.3 INSTALLATION
   A. Install products in accordance with manufacturer’s instructions and final submittal drawings.

3.4 ADJUSTMENT AND CLEANING
   A. All equipment to be adjusted for smooth and proper operation.
   B. Clean bleachers and work area and remove debris from site.

END OF SECTION
SECTION 12 93 00

SITE FURNISHINGS

PART 1 - GENERAL

1.01 RELATED DOCUMENTS

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

1.02 SUMMARY

A. The extent of work in this Section includes the provision and installation of the site furnishing equipment and structures with all miscellaneous hardware, foundations and appurtenances required for installation.

B. The general extent of work for this Section is shown on the drawings and includes, but is not limited to, the following:
   1. Bike Rack

C. Related Sections include the following:
   1. Specification section 32 16 13 "Concrete Curbs, Gutters, & Sidewalks" for concrete footings and bases.

1.03 QUALITY ASSURANCE

A. All manufactured items shall be inspected and approved upon delivery.

B. Unless otherwise specified, install all materials in accordance with manufacturer's recommendations.

1.04 SUBMITTALS

A. Product Data: Submit manufacturer's technical data and installation instructions for site furnishings conforming to requirements of Division 1, General Requirements for Submittal Procedures.

B. Product Warranty, spare or replacement parts, and/or care instructions shipped with components shall be delivered to Owner prior to substantial completion.

1.05 DELIVERY, STORAGE AND HANDLING:

A. Store and handle products so as not to impede work of others.

B. Protect products from damage or theft during delivery, handling, storage and installation.

C. Contractor shall schedule delivery and receive site furnishings contained within this Specification whether purchased as part of this project or purchased by Owner as part of this project. This shall include unloading site furnishings, taking inventory and accepting delivery.
PART 2 - PRODUCTS

2.01 MATERIALS

<table>
<thead>
<tr>
<th>Description</th>
<th>Manufacturer</th>
<th>Model #</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Bike Rack</td>
<td>Dero by Playcore</td>
<td>Round Rack</td>
</tr>
</tbody>
</table>

Contractor shall purchase touch-up paint for each color of powder coated products for use as needed after installation. Deliver un-used touch-up paint to Owner prior to substantial completion.

<table>
<thead>
<tr>
<th>Manufacturer - Local Representative</th>
<th>Website</th>
<th>Phone</th>
</tr>
</thead>
<tbody>
<tr>
<td>Dero by Playcore -</td>
<td><a href="http://www.dero.com">www.dero.com</a></td>
<td>(888) 337-6729</td>
</tr>
</tbody>
</table>

PART 3 - EXECUTION

3.01 SEQUENCING AND SCHEDULING:

A. Coordinate construction timing with installation of site furnishings in conformance with other pertinent Sections of the Specifications.

3.02 INSTALLATION

A. Site Furnishings: Install where shown on drawings, as detailed and per manufacturer instructions. All site furnishings shall be secured in a vandal resistant manner acceptable to the Architect.

B. Sports Equipment: Install where shown on drawings, as detailed and per manufacturer instructions.

C. Concrete Footings: Install footings with top of concrete sloped to drain at 1%. Install where shown on drawings and as detailed and per manufacturer's instructions.

D. Sleeves: Install site furnishings, standards and posts into sleeves embedded into concrete bases for removal and replacement where indicated or detailed on drawings.

END OF SECTION
DIVISIONS 13 – 20
NOT USED