

DOCUMENT 00 01 01

PROJECT MANUAL

FOR THE

**CAÑADA COLLEGE BUILDING 5/6 MODERNIZATION
PROJECT**

**Volume 2 Division 02-32 Specifications
Bid Number 86593**

SAN MATEO COUNTY COMMUNITY COLLEGE DISTRICT

**3401 CSM DRIVE
SAN MATEO, CALIFORNIA 94402**

Architect:
BCA Architects
210 Hammond Ave.
Fremont, CA 94539

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SEALS PAGE

CANADA COLLEGE BUILDING 5/6 MODERNIZATION PROJECT
SAN MATEO COUNTY COMMUNITY COLLEGE DISTRICT

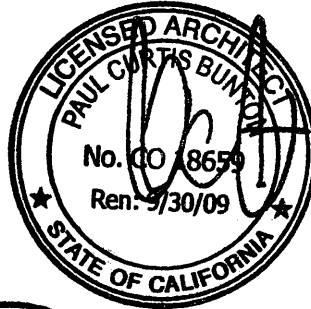
OWNER:

San Mateo Community College District
3401 CSM Drive
San Mateo, CA 94402
(650) 574-6512 Fax: (650) 574-6574

ARCHITECT:

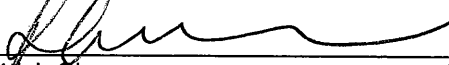
Bunton Clifford Associates
210 Hammond Avenue
Fremont, CA 94539
(510) 445-1000 Fax: (510) 445-1005

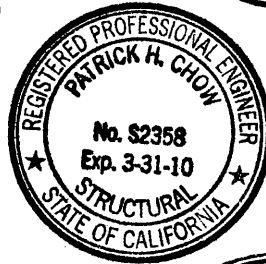
BY: 
Paul C. Burton, AIA C018659



STRUCTURAL ENGINEER:

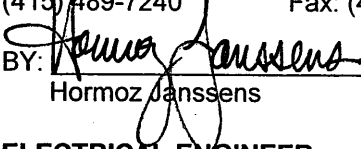
Rinne & Peterson
1121 San Antonio Road, Suite C200
Palo Alto, CA 94303
(650) 428-2860 Fax: (650) 428-2861

BY: 
Patrick Chow S2358



MECHANICAL ENGINEER:

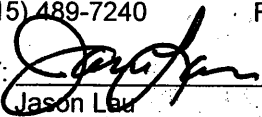
Interface Engineering
717 Market Street, 5th Floor
San Francisco, CA 94103
(415) 489-7240 Fax: (415) 489-7289

BY: 
Hormoz Janssens M30802



ELECTRICAL ENGINEER:

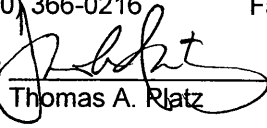
Interface Engineering
717 Market Street, 5th Floor
San Francisco, CA 94103
(415) 489-7240 Fax: (415) 489-7289

BY: 
Jason Lau E16806



CIVIL ENGINEER:

Thomas A. Platz
Triad Holmes Associates
777 Woodside Road, #24
Redwood City, CA 94061
(650) 366-0216 Fax: (650) 366-0298

BY: 
Thomas A. Platz

C41039



STATE OF CALIFORNIA – DIVISION OF STATE ARCHITECT

**IDENTIFICATION STAMP
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APPL 01 110074

ACKNOWLEDGMENTS 
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END OF DOCUMENT

SECTION 02 41 19

SELECTIVE STRUCTURE DEMOLITION

PART 1 - GENERAL

1.1 SUMMARY

- A. Section Includes:
 - 1. Demolishing designated building equipment and fixtures.
 - 2. Demolishing designated construction.
 - 3. Cutting and alterations for completion of the Work.
 - 4. Removing designated items for Owner's retention.
 - 5. Protecting items designated to remain.
 - 6. Removing demolished materials.

1.2 SUBMITTALS

- A. Section 01 32 19 - Submittal Procedures: Requirements for submittals.
- B. Demolition Schedule: Indicate overall schedule and interruptions required for utility and building services.
- C. Shop Drawings:
 - 1. Indicate demolition and removal sequence.
 - 2. Indicate location of items designated for Owner's retention.
 - 3. Indicate location and construction of temporary work.

1.3 CLOSEOUT SUBMITTALS

- A. Section 01 77 00 – Contract Closeout: Requirements for submittals.
- B. Project Record Documents: Accurately record actual locations of capped utilities, concealed utilities discovered during demolition, and subsurface obstructions.
- C. Operation and Maintenance Data: Submit description of system, inspection data, and parts lists.

1.4 QUALITY ASSURANCE

- A. Conform to applicable local code for demolition work, dust control, and products requiring electrical disconnection and re-connection.
- B. Conform to applicable local code for procedures when hazardous or contaminated materials are discovered.
- C. Obtain required permits from authorities having jurisdiction.

1.5 PRE-INSTALLATION MEETINGS

- A. Section 01 31 19 – Project Meetings: Pre-installation meeting.
- B. Convene minimum one week prior to commencing work of this section.

1.6 SCHEDULING

- A. Section 01 32 16 - Progress Schedules and Report: Requirements for scheduling.
- B. Schedule Work to coincide with new construction.
- C. Cooperate with Owner in scheduling noisy operations and waste removal that may impact Owners operation and occupancy in adjoining spaces.
- D. Perform noisy, malodorous, or dusty, or work:
 - 1. Between hours as designated by Owner's representative. [to be determined].
- E. Coordinate utility and building service interruptions with Owner.
 - 1. Do not disable or disrupt building fire or life safety systems without three days prior written notice to Owner.
 - 2. Schedule tie-ins to existing systems to minimize disruption.
 - 3. Coordinate Work to ensure fire sprinklers, fire alarms, smoke detectors, emergency lighting, exit signs and other life safety systems remain in full operation in occupied areas.

1.7 PROJECT CONDITIONS

- A. Conduct demolition to minimize interference with adjacent and occupied building areas.
- B. Cease operations immediately if structure appears to be in danger and notify Architect/Engineer. Do not resume operations until directed.

PART 2 - PRODUCTS

Not Used.

PART 3 - EXECUTION**3.1 PREPARATION**

- A. Notify affected utility companies before starting work and comply with their requirements.
- B. Mark location and termination of utilities.
- C. Erect, and maintain temporary barriers and security devices, including warning signs and lights, and similar measures, for protection of the public, Owner, and existing improvements indicated to remain.
- D. Layout cuts in post tensioned concrete elements to avoid cutting concrete within 12 inches of any stressing tendon. Notify Architect/Engineer three days in advance of cutting post-tensioned concrete.
- E. Erect and maintain weatherproof closures for exterior openings.
- F. Erect and maintain temporary partitions to prevent spread of dust, odors, and noise to permit continued Owner occupancy of adjacent Building 8.
- G. Prevent movement of structure; provide temporary bracing and shoring required to ensure safety of existing structure.

- H. Provide appropriate temporary signage including signage for exit or building egress.
- I. Do not close or obstruct building egress path.
- J. Do not disable or disrupt building fire or life safety systems without 3 days prior written notice to Owner.

3.2 SALVAGE REQUIREMENTS

- A. Coordinate with Owner to identify building components and equipment required to be removed and delivered to Owner.
- B. Tag components and equipment Owner designates for salvage.
- C. Protect designated salvage items from demolition operations until items can be removed.
- D. Carefully remove building components and equipment indicated to be salvaged.
- E. Disassemble as required to permit removal from building.
- F. Package small and loose parts to avoid loss.
- G. Mark equipment and packaged parts to permit identification and consolidation of components of each salvaged item.
- H. Prepare assembly instructions consistent with disassembled parts. Package assembly instructions in protective envelope and securely attach to each disassembled salvaged item.
- I. Deliver salvaged items to Owner. Obtain signed receipt from Owner.

3.3 DEMOLITION

- A. Conduct demolition to minimize interference with adjacent and occupied building areas.
- B. Maintain protected egress from and access to adjacent existing buildings at all times.
- C. Do not close or obstruct roadways or sidewalks without permits.
- D. Cease operations immediately when structure appears to be in danger and notify Architect/Engineer.
- E. Disconnect and remove designated utilities within demolition areas.
- F. Cap and identify abandoned utilities at termination points when utility is not completely removed. Annotate Record Drawings indicating location and type of service for capped utilities remaining after demolition.
- G. Demolish in orderly and careful manner. Protect existing improvements, supporting structural members and built-in items designated to remain.
- H. Carefully remove building components indicated to be reused.
 - 1. Disassemble components as required to permit removal.
 - 2. Package small and loose parts to avoid loss.
 - 3. Mark components and packaged parts to permit reinstallation.
 - 4. Store components, protected from construction operations, until reinstalled.

- I. Remove demolished materials from site except where specifically noted otherwise. Do not burn or bury materials on site.
- J. Remove materials as Work progresses. Upon completion of Work, leave areas in clean condition.
- K. Remove temporary Work.

3.4 SCHEDULES

- A. Remove, store and protect the following materials and equipment for reinstallation in the project:
 - 1. Designated (e) doors and door hardware.
 - 2. Designated (e) "hands free" sinks.
- B. Remove the following equipment and salvage for Owner's retention. Deliver to location designated by Owner's Representative:
 - 1. Designated (e) telecom/IT equipment.
 - 2. Designated (e) office partitions.
 - 3. Designated (e) "hands free" battery operated paper towel dispensers.
 - 4. Designated (e) wall mounted hand sanitizer dispenser and medical scope holders.
- C. Protect the following materials and equipment remaining:
 - 1. Designated (e) partitions to remain.
 - 2. Designated (e) elevator motor to remain.
 - 3. Designated (e) fire hose cabinets to remain.
 - 4. Designated (e) exposed structure to remain.
 - 5. Designated (e) ceiling and light fixtures to remain.
- D. Demolish the following materials and equipment:
 - 1. Designated (e) storefront assembly.
 - 2. Designated (e) wood bench seats.
 - 3. Designated (e) casework.
 - 4. Designated (e) restroom finishes.
 - 5. Designated (e) plumbing fixtures.
 - 6. Designated (e) stud-wall partitions.
 - 7. Designated (e) toilet accessories.
 - 8. Designated (e) stair nosings at concrete treads.
 - 9. Designated (e) rubber mat and associated automatic door opener equipment.
 - 10. Designated (e) asphalt paving and wood spacers.
 - 11. Designated (e) firehouse cabinet.
 - 12. Designated (e) sinks.
 - 13. Designated (e) elevator, guiderails, and equipment.
 - 14. Designated (e) elevator motor.
 - 15. Designated (e) windows and frames.
 - 16. Designated (e) doors and frames.
 - 17. Designated (e) floor finishes.
 - 18. Designated (e) exterior TV antenna and wire mold.
 - 19. Designated (e) partitions.
 - 20. Designated (e) interior doors, door frames, and hardware.
 - 21. Designated (e) concrete stairs and metal railings.
 - 22. Designated (e) concrete retaining wall.
 - 23. Designated (e) concrete seat wall.
 - 24. Designated (e) drinking fountains.
 - 25. Designated (e) deck drain and leader.
 - 26. Designated (e) 12x12 acoustical ceiling tile system.

27. Designated (e) recessed light fixtures.
28. Designated (e) ceiling registers.
29. Designated (e) surface mounted acoustical tiles and light fixtures.
30. Designated (e) suspended acoustical panel ceiling system, including recessed and surface mounted light fixtures and registers.
31. Designated (e) lath and plaster ceiling, including recessed and surface mounted light fixtures and registers.
32. Designated (e) suspended light fixtures.
33. Designated (e) ceiling mounted privacy curtain and track.
34. Designated (e) gypsum board ceiling and ceiling mounted light fixtures.
35. Designated (e) ceiling finishes.

END OF SECTION

SECTION 03 10 00**CONCRETE FORMING AND ACCESSORIES****PART 1 - GENERAL****1.1 DESCRIPTION**

- A. Work Includes: Provision of formwork for cast-in-place concrete and installation of embedded items.
- B. Related Sections:
 - 1. Section 03 20 00 - Concrete Reinforcing.
 - 2. Section 03 30 00 - Cast-In-Place Concrete.

1.2 REFERENCES

- A. Requirements of GENERAL CONDITIONS and DIVISION 01 apply to all Work in this Section.
- B. Published specification, standards, tests, or recommended methods of trade, industry, or governmental organizations apply to Work of this Section where cited by abbreviations noted below (latest editions apply).
 - 1. California Code of Regulations. Title 24, 2007 edition, also known as California Building Code (CBC).
 - 2. American Society for Testing and Materials (ASTM).
 - 3. Federal Specifications (FS).
 - 4. American Concrete Institute's "Recommended Practice for Concrete Formwork," (ACI 347).
 - 5. United States Voluntary Product Standard for Construction and Industrial Plywood (PS1).
 - 6. American Plywood Association's "Guide to Plywood Grades" (APA).
 - 7. West Coast Lumber Inspection Bureau's "Standard Grading Rules No. 16" (WCLIB).

1.3 SUBMITTALS

- A. Samples: Only as requested by the Architect.
- B. Waterstops:
 - 1. Product Data: Submit manufacturer's product data, with complete general and specific installation instructions, recommendations, and limitations.
 - 2. Samples: Submit two 6 samples, 6 inches in length, of each type of bentonite waterstop.
 - 3. Bentonite Content Certificate: Submit certificate signed by manufacturer certifying waterstop consists of 75 percent sodium bentonite and 25 percent butyl rubber compound and that the product is manufactured in the U.S.A.
 - 4. NSF Standard 61 Certification: Submit Official NSF Listing for waterstop confirming that the products conform to the requirements of NSF Standard 61 – Drinking Water System Components – Health Effects.

1.4 QUALITY ASSURANCE

- A. Design Criteria: Formwork shall conform to ACI 347 and CBC Section 1906.
 - 1. Formwork:
 - a. Shall prevent leakage or washing out of cement mortar.

- b. Shall resist spread, shifting, and settling.
 - c. Shall reproduce accurately required lines, grades, and surfaces within tolerances specified.
 2. Safety: The Contractor shall be responsible for adequate strength and safety of all formwork including falsework and shoring.
- B. Allowable Tolerances: Formwork shall produce concrete within tolerance limits recommended in ACI 347 and ACI 117, unless otherwise noted.
- C. Waterstops:
 1. Verification of Details: Contractor to notify the Architect immediately of any detail, note, or specification which does not comply with current manufacturer's installation requirements
 2. Adhesion: Waterstop-RX is not a self-adhering product. Volclay WB-Adhesive is required to secure Waterstop-RX. No other adhesive should be used. Mechanical fasteners can be used in conjunction with WB-Adhesive, but should not be used solely to secure the waterstop.
 3. Installation Instructions: Components and installation procedures shall be in accordance with current manufacturer's printed specifications and recommendations. Verify technical data submittals are the most current with manufacturer - (847)392-5800.
 4. Expansion Joints: WATERSTOP-RX is not designed, nor intended for waterproofing or sealing expansion joints. Responsibility of waterproofing expansion joints is of others.
 5. Concrete: Concrete shall be structural grade quality with a minimum 3000 psi tensile strength. For RX-101 a minimum thickness of 8 inches with two rows of reinforcing steel is required.

1.5 PRODUCT DELIVERY, STORAGE AND HANDLING

- A. Deliver and store packaged materials in original containers with seals unbroken and labels intact until time of use.
- B. Waterstops:
 1. Deliver materials in factory sealed and labeled packaging.
 2. Sequence deliveries to avoid delays, while minimizing on-site storage.
 3. Handle and store following manufacturer's instructions, recommendations and material safety data sheets.
 4. Protect from construction operation related damage, as well as, damage from weather, excessive temperatures and prolonged sunlight.
 5. Remove damaged material from site and dispose of in accordance with applicable regulations.

1.6 JOB CONDITIONS

- A. Sequencing Schedule:
 1. Ensure timely delivery of embedded items. Be responsible for cutting and patching necessitated by failure to place embedded items.
 2. Plan erection and removal to permit proper sequence of concrete placing without damage to concrete.

PART 2 - PRODUCTS

2.1 MATERIALS

- A. Forming Materials:
 1. Panel or board forms at the Contractor's option.

- a. Panel Forms: Minimum 5/8-inch thick exterior grade plywood with sealed edges, PS 1 grade Plyform Class I and II B-B Exterior or HDO Exterior.
 - b. Board Forms: Shiplap or tongue and groove lined with PS 1 grade Plyform Class I and II Exterior 1/2-inch or HDO Exterior 1/2-inch or 3/16-inch thick fiberboard conforming to FS LLL-B-810a(1), type I.
2. Forms for Exposed Finish Concrete: Plywood, metal, metal-framed plywood faced, or other acceptable panel-type materials, to provide continuous, straight, smooth, exposed surfaces. Furnish in largest practicable sizes to minimize number of joints and to conform to joint system shown on Drawings.
 - a. Use Plywood complying with U.S. Product Standard PS-1 "B-B (Concrete Form) Plywood," Class I, Exterior Grade or better, with each piece bearing legible inspection trademark. Panels to receive specified form sealer to ensure uniform finish of exposed surfaces.
 - b. Designated "Architectural Concrete" Surfaces: Use overlaid plywood complying with U.S. Product Standard PS-1 "A-C or B-B High Density Overlaid Concrete Form," Class 1.
 3. Pan Joist forms: Provide removable forms, Ceco Corporation or equal. Forms shall have adequate strength to maintain their shape during placing of concrete and shall permit easy removal without damage to concrete surfaces. Forms shall be true to shape, free from bulges, tears or other damage, and shall be free from oil, grease, paint, dirt or other deleterious coatings. Forms shall fit close, tight and straight. Forms shall be cleaned up before reuse.
 4. Chamfer Strips: Burke Concrete Accessories' PVC type CSF 1/2-inch, all exposed corners.
 5. Columns Forms: SONOTUBE or equal product substituted per Section 01 60 00, and as required for other configurations.
- B. Wood Framing: WCLIB standard grade or better Douglas Fir.
- C. Form Ties and Spreaders: Metal type acting as spreaders, leaving no metal within one inch of concrete face and no fractures, spalls, depressions or other surface disfigurements greater than 3/4-inch in diameter.
- D. Expansion Joint Filler:
1. Fiber Type: Premolded asphalt-impregnated fiber, ASTM D1751, 1/4-inch thick unless otherwise noted. Same as W. R. Meadows, Inc.'s "Sealtight Fiber Expansion Joint"; Grace Construction Materials "Serviced Fiber Expansion Joint Filler, Code 1390"; National Expansion Joint Co.'s "Fiber Joint Filler No. 12"; Burke Concrete Accessories, Inc.'s "Burke Fiber Expansion Joint"; or equal product substituted per Section 01 60 00.
 2. Cork Type: Preformed cork, ASTM D1752, Type II, 1/4-inch size unless otherwise noted. Same as W. R. Meadows, Inc.'s "Sealtight Cork Expansion Joint"; Sonneborn-Contech's "Sonoflex Cork"; Grace Construction Materials' "Serviced Standard Cork Expansion Joint Filler, Code 4323; or equal product substituted per Section 01 60 00.
- E. Form Sealer: Same as Grace Construction Material's "Formfilm"; or equal product substituted per Section 01 60 00.
- F. Release Agent: Must not stain or otherwise adversely affect architectural concrete surfaces. Same as The Nox-Crete Co.'s "Nox-Crete Form Coating"; Industrial Synthetics Corp.'s "Synthex;" or equal product substituted per Section 01 60 00.
- G. Foam Board: Extruded close cell polystyrene foam, channeled for drainage, with a minimum compressive strength of 60 psi at 0.1-inch deformation when tested in accordance with ASTM D1621-73, and meeting requirements of FS-HH-I-524b, Type II, Class B. Same as The Dow Chemical Co.'s "Styroform PD Brand" or equal product substituted per Section 01 60 00.

2.2 WATERSTOPS

- A. Manufacturer: Provide Waterstop-RX bentonite waterstop and water-based adhesive as manufactured by Colloid Environmental Technologies Company (CETCO), 1500 West Shure Drive, Arlington Heights, Illinois 60004-1440, USA. Phone: (847)392-5800; Fax: (847)506-6195; Web-site: <http://www.cetco.com>.
- B. Materials:
1. Waterstop shall consist of 75 percent sodium bentonite and 25 percent butyl rubber compound formed into uniform coils.
 2. NSF Certified: Bentonite waterstop shall be certified by NSF International to conform to the requirements of NSF Standard 61 – Drinking Water System Components – Health Effects.
 3. Bentonite Waterstops:
 - a. WATERSTOP-RX 101: 1 inch x 3/4 inch x 16'-8" rolls of a flexible strip of bentonite and butyl rubber compound for use in concrete construction joints - not designed for expansion joints.
- C. Adhesive:
1. Volclay WB- ADHESIVE: Gray, non-flammable, latex and water based adhesive used to secure all Volclay Waterstop-RX products to concrete, metal and PVC horizontal and vertical surfaces. Keep from freezing. Application rate: 400-600 linear feet per gallon.

2.3 SOURCE QUALITY CONTROL

- A. Plywood shall bear APA grade-trademark.

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Examine areas where formwork will be constructed and verify that:
1. Excavations are sufficient to permit placement, inspection and removal of forms.
 2. Excavations for earth forms have been neatly and accurately cut.
 3. Conditions are otherwise proper for formwork construction.
- B. Do not start work until unsatisfactory conditions have been corrected.
- C. Installation of waterstops shall not proceed when work areas are flooded or wet to the extent that would cause bentonite waterstop to hydrate prior to concrete encapsulation.

3.2 PREPARATION

- A. Obtain necessary information for coordination of formwork with items to be embedded in concrete and other related work.
- B. Waterstops: Remove dirt, debris, oil, grease, cement laitance, or other foreign matter which will impair or negatively affect the installation of the waterstop. Protect adjacent material surfaces from damage or contamination from during installation operations.

3.3 CONSTRUCTION

- A. General:
1. Design, erect, support, brace and maintain formwork to support vertical and lateral, static, and dynamic loads that might be applied until concrete structure can support such loads. Construct formwork so concrete members and

structures are of correct size, shape, alignment, elevation and position. Maintain formwork construction tolerances complying with ACI 347.

2. Construct forms to sizes, shapes, lines and dimensions shown, and to obtain accurate alignment, location, grades, level and plumb Work in finished structures. Provide for openings, offsets, sinkages, keyways, recesses, moldings, rustications, reglets, chamfers, blocking, screeds, bulkheads, anchorages and inserts, and other features required in Work. Use selected materials to obtain required finishes. Solidly butt joints and provide back-up at joints to prevent leakage of cement paste.
3. Frame openings where indicated on Architectural, Structural, Mechanical, Plumbing and Electrical drawings.

B. Earth Forms:

1. Construct wood edge strips at top sides of excavations.
2. Provide forms for footings wherever concrete cannot be placed against solid earth excavation.
3. Remove loose dirt and debris prior to concrete pours.
4. Foundation concrete may be placed directly into neat excavations provided the foundation trench walls are stable as determined by the Architect (Structural Engineer), subject to the approval of DSA.
 - a. The horizontal dimensions of unformed concrete footings shall be increased 1 inch at every surface at which concrete is placed directly against the soil.
 - b. The minimum formwork shown on the drawings is mandatory to ensure clean excavations immediately prior to and during the placing of concrete.

C. Walls and Other Formed Elements:

1. Erect outside forms for exposed exterior walls first and obtain the Architect's approval before reinforcement is placed. Obtain Architect's approval of the reinforcement before interior form is erected.
2. Carefully align inside and outside forms before tightening ties.
3. Plywood Forms: Insure vertical joints are plumb and horizontal joints are level; arrange joints and ties in geometrical pattern as approved by the Architect.
4. Form inside corners at exposed conditions with mitered boards or plywood so that no concrete is placed against form ends.
5. After erection, seal all cracks, holes, slits, gaps, and apertures in forms so that they will withstand the pressure and will remain completely watertight.
6. Provide a means to seal the bottom of forms at construction joints such as foam tape or other gasket devices.
7. Apply a coating of release agent prior to the erection of formwork. Follow approved manufacturer's recommendations.

D. Slab Forms:

1. Establish levels and set screeds.
2. Depress slabs where required to receive special floor finishes.

E. Beam or Joist Forms:

1. Provide cambers as noted on Contract Drawings.

F. Cleanouts and Openings: Provide on interior face of wall forms as required for effective removal of loose dirt, debris and waste material, for inspection of reinforcing and for introduction of vibrators where the Architect deems necessary.

G. Expansion Joints:

1. Provide in exterior concrete paving on grade at maximum 24-feet on center or as noted and at intersections with vertical surfaces, curbs, manholes or other penetrations through paving.

2. Use fiber type expansion joint fillers typically and depress 1/4-inch unless otherwise noted.
 3. Use cork type expansion joint fillers at conditions with non-bituminous waterproofing, liquid waterproofing or sealant systems.
- H. Construction Joints:
1. Provide where shown on the drawings as directed by the Architect and per CBC Section 1906A.4.
 2. Provide key indentations at all joints.
 3. Provide pour strips on inside face of forms at horizontal joints, but remove strips and thoroughly clean out reglets before placing subsequent portions of wall.
 4. Prevent formations of shoulders and ledges.
 5. Provide means for drawing forms into firm contact with concrete before placing additional concrete over previous pours where shrinking and warping has separated concrete from forms.
- I. Embedded Items:
1. Properly locate, unless locating is specified elsewhere, and place inserts and embedded items required by other trades prior to casting concrete.
- J. Shoring:
1. Adequately brace and maintain shoring to safely support vertical, lateral, and asymmetrical loads until completed structure has attained design strength.
 2. Distribute shoring loads over area where shoring is erected and protect against undermining or settlement.
 3. Provide means for making vertical adjustments to compensate for settlement either before or during placing of concrete.
 4. Construct shores for soffits of beams to permit removal of forms without removing shores.
 5. Reshoring will be permitted. Shores and reshores shall be designed by a Civil Engineer registered in the State of California and installed under his/her direction. This Civil Engineer shall be employed by the Contractor.

3.4 GENERAL INSTALLATION GUIDELINES – WATERSTOPS

- A. Install WATERSTOP-RX in all applicable vertical and horizontal cast-in-place concrete construction joints; and around applicable penetrations and structural members. Place WATERSTOP-RX to allow for minimum 3 inch concrete coverage on all sides.
- B. Apply WB-ADHESIVE by brush 1 inch to 1-1/4 inch wide, to dry, smooth concrete surface maintaining a minimum 3 inch depth within the concrete joint. Allow adhesive to dry until the adhesive cures black (5-10 minutes in warm weather; cold weather will extend drying time).
- C. Remove release paper from coil of WATERSTOP-RX. Firmly press the entire length of WATERSTOP-RX against the cured (black) adhesive. Verify 3 inch minimum concrete coverage will be maintained over entire placement of waterstop. Place in maximum practical lengths to minimize coil end joints.
- D. Tightly butt coil ends together to form continuous waterstop. Do not overlap coil ends. Where required, cut coils with sharp knife or utility blade to fit coil ends together without overlapping.
- E. Following Steps B, C, D above, install waterstop around all applicable through-wall pipes and mechanical penetrations; and around all applicable structural elements like metal H-Piles through the slab.

- F. Protect installed waterstop from prehydration prior to concrete placement and product encapsulation. Replace any waterstop material that exhibit significant expansion prior to concrete encapsulation.

3.5 REMOVAL

- A. Secure the Architect's approval for time and sequence of form removal.
- B. Form Removal: Forms shall be removed without damage to the concrete, and in no case shall they be removed prior to the concrete member attaining the specified strength.

<u>MEMBER</u>	<u>STRENGTH</u>	<u>MINIMUM TIME*</u>
Vertical surfaces of walls, columns, beams, girders	0.60 f'c	7 days
Beams, soffits, slab, girder	0.75 f'c	14 days

*Estimated curing time required to obtain desired strength. Results of the 7-day test cylinder break shall be presented to the Architect to demonstrate compliance with above specified strength requirements prior to form removal. If a 7-day test cylinder break demonstrates strength that is less than that specified, the Contractor may elect to take additional cylinders at the time of next pour to demonstrate strength requirements. The Contractor shall bear the cost of taking and testing the additional samples.

- C. Forms:
 - 1. Remove forms carefully to avoid damaging corners and edges of exposed concrete.
 - 2. Reuse:
 - a. The Architect will approve reuse of forms provided they are straight, clean, free from nails, dirt, hardened concrete, or other injurious matter and edges and surfaces are in good condition.
 - b. Clean and repair any damage caused by placing, removal, or storage. Reuse of formwork with repairs or patches which would result in adverse effects to architectural concrete finish will not be permitted.
 - c. Store formwork in manner to prevent damage or distortion.
 - d. Reseal as required to achieve concrete of specified quality.
- D. Shoring and Reshoring
 - 1. Two levels of shoring or one level of shores over one level of reshores shall be maintained below any newly cast level until it has attained design strength and is at least 28-days old.

END OF SECTION

SECTION 03 20 00**CONCRETE REINFORCING****PART 1 - GENERAL****1.1 SUMMARY**

- A. Section Includes: Provision of reinforcement for all concrete unless specifically noted otherwise.
- B. Related Sections:
 - 1. Section 03 10 00 - Concrete Forming and Accessories.
 - 2. Section 03 30 00 - Cast-In-Place Concrete.

1.2 REFERENCES

- A. Requirements of the GENERAL CONDITIONS and DIVISION 01 apply to all Work in this Section.
- B. Published specifications, standards, tests, or recommended methods of trade, industry, or governmental organizations apply to Work of this Section where cited by abbreviations noted below (latest editions apply).
 - 1. California Code of Regulations. Title 24, 2007 edition, also known as California Building Code (CBC).
 - 2. American Concrete Institute:
 - a. ACI 315 - Manual of Standard Practice for Detailing Reinforced Concrete Structures.
 - b. ACI 318 - Building Code Requirements for Structural Concrete.
 - 3. American Welding Society:
 - a. AWS A5.1 - Mild Steel Covered Arc-Welding Electrodes.
 - b. AWS D1.4 - Structural Welding Code - Reinforcing Steel.
 - 4. ASTM International:
 - a. ASTM A82 - Standard Specification for Steel Wire, Plain, for Concrete.
 - b. ASTM A185 - Standard Specification for Steel Welded Wire Reinforcement, Plain, for Concrete.
 - c. ASTM A615 - Standard Specification for Deformed and Plain Billet-Steel Bars for Concrete Reinforcement.
 - 5. Concrete Reinforcing Steel Institute:
 - a. CRSI - Manual of Standard Practice.
 - b. CRSI - Recommended Practice for Placing Reinforcing Bars.

1.3 QUALITY ASSURANCE

- A. Welders' Qualifications: Welders shall be qualified in accordance with AWS D1.4.
- B. Reinforcing steel shall not be permitted to rust where there is danger of staining exposed surfaces of adjacent concrete. The Contractor shall replace rust-stained concrete at his expense.
- C. Allowable Tolerances: Reinforcing steel shall be placed within tolerances permitted by CBC, Section 1907A.5 unless otherwise approved by the Architect.
- D. Owner's Testing Agency will provide tests in accordance with CBC Section 1929A.2.
 - 1. Collect mill test reports for reinforcement.
 - 2. Take samples from bundles at fabricators.

- a. When bundles are identified by heat number and accompanied by mill analysis, two specimens shall be taken from each ten (10) tons, or fraction thereof, of each size and grade.
 - b. When reinforcement is not positively identified by heat numbers or when random sampling is intended, two specimens shall be taken from each 2-1/2 tons, or fraction thereof, of each size and grade.
3. Test for tensile and bending strengths.
 4. Provide inspection of welding, including prior fit-up, welding equipment, weld quality and welder certification in accordance with AWS D1.4 and UBC Standard No.19-1. Chemical analysis sufficient to determine carbon equivalent and minimum preheat temperature shall be performed when reinforcement does not conform to low-alloy steel requirements of CBC Section 1903A.5.2.

1.4 SUBMITTALS

- A. Shop Drawings: Show bending and placing details, size and location of reinforcing steel. Include diagrammatic wall elevations at 1/4-inch equals one foot scale to clearly show position and erection marks of bars including marginal bars around openings with dowels, splices, etc.
- B. Certified mill test reports (tensile and bending) for each heat or melt of steel prior to delivery of material to the job site. Where reinforcing is to be welded, mill test reports shall verify the weldability of the steel.

1.5 PRODUCT DELIVERY, STORAGE AND HANDLING

- A. Deliver reinforcement and accessories to site not more than 48-hours before placement.
- B. Store in manner to prevent excessive rusting and fouling with grease, dirt, or other bond-weakening coatings.
- C. Take precautions to maintain identification after bundles are broken.

PART 2 - PRODUCTS

2.1 MATERIALS

- A. Bars: New billet steel, ASTM A615 Grade 60 or ASTM A706. Stirrups and ties #3 and smaller: Grade 40.
- B. Tie Wires and Spirals: ASTM A82.
- C. Welded Wire Fabric: ASTM A185.
- D. Welding Electrodes: Mild steel covered arc-welding types conforming to AWS A5.1.
- E. Bar Supports: As required for assembling and supporting reinforcement in place.
 1. CRSI Class 3: Where bar supports do not come in contact with exposed concrete surfaces.
 2. CRSI Class 1 plastic-protected; or Class 2 stainless steel wire: Interior and Exterior Soffits and Other Exposed Conditions:
 3. Precast Concrete Wired Block: At slabs-on-grade and as necessary at other locations.
- F. Threaded coupler: Lenton Standard coupler by ERICO or equal product substituted per Section 01 62 00. Coupler shall develop the tensile strength of the spliced reinforcement.

- G. Welded Deformed Bar Anchors: $f_y = 70,000$, flux filled deformed bar anchors. Same as Nelson D2L or equal product substituted per Section 01 62 00.

2.2 FABRICATION

- A. Shop-fabricate to comply with drawings.
- B. Conform to requirements of ACI 315 where specific details are not shown or where drawings and specifications are not more demanding.

PART 3 - EXECUTION

3.1 PLACEMENT

- A. General:
1. Contractor shall coordinate the placement of the reinforcing indicated on the drawings to avoid interference while maintaining minimum cover requirements.
 2. All reinforcement shall be continuous. See drawings for lap splice schedule. Stagger splices where possible. Contact lap splices shall be securely wired together to maintain alignment.
 3. Ensure placement will permit concrete protection in conformance with CRSI or to extent shown.
 4. Support and fasten bars securely with spacers, chairs or ties to permit their being walked upon without displacement or movement both before and during placement of concrete. Wire-tie bar intersections.
 5. Do not bend bars around openings or sleeves. Wherever conduits, piping, inserts, sleeves, etc. interfere with placing of reinforcement, obtain the Architect's approval of placing before concreting.
 6. Do not field bend bars unless expressly noted in the Contract Documents.
- B. Welding:
1. Employ shielded metal-arc method and conform to AWS D1.4.
 2. Ensure equipment supplies proper current and voltage and is adjustable to suit arrangement and thickness of items welded.
- C. Prior to placing concrete, verify reinforcement has been bent, positioned, and secured in accordance with drawings; ensure removal of oil, grease, dirt, or other bond-weakening coatings; replace severely rust-pitted reinforcing bars.
- D. Quality Assurance:
1. Project Inspector will inspect placement of reinforcement and mechanical splices and notify Structural Engineer of any discrepancies in placement.
 2. Owner's Testing Agency will inspect shop and field welding of reinforcing bars in accordance with CBC Section 1929A.12.

END OF SECTION

SECTION 03 30 00**CAST-IN-PLACE CONCRETE****PART 1 - GENERAL****1.1 DESCRIPTION**

- A. Section Includes: Provision of cast-in-place concrete.
- B. Related Sections:
 - 1. Section 03 10 00 - Concrete Forming and Accessories.
 - 2. Section 03 20 00 - Concrete Reinforcing.
 - 3. Section 05 12 00 - Structural Steel Framing.

1.2 REFERENCES

- A. Requirements of GENERAL CONDITIONS and DIVISION 01 apply to all Work in this Section.
- B. Published specifications, standards, tests, or recommended methods of trade, industry, or governmental organizations apply to Work of this Section where cited by abbreviations noted below (latest editions apply).
 - 1. California Code of Regulations. Title 24, 2007 edition, also known as California Building Code (CBC).
 - 2. ASTM International.
 - 3. American Concrete Institute:
 - a. ACI 117 - Standard Specifications for Tolerances for Concrete Construction and Materials.
 - b. ACI 301 - Specification for Structural Concrete for Buildings.
 - c. ACI 304 - Recommended Practice for Measuring, Mixing and Placing Concrete.
 - d. ACI 305 - Recommended Practice for Hot Weather Concreting.
 - e. ACI 306 - Recommended Practice for Cold Weather Concreting.
 - f. ACI 318 - Building Code Requirements for Reinforced Concrete.
 - 4. State of California, Business and Transportation Agency Division of Highways:
 - a. CMM - Materials Manual.

1.3 QUALITY ASSURANCE

- A. Contractor's Testing Laboratory Qualifications: The Contractor's Testing Laboratory shall be under direction of a Civil Engineer registered in the State of California, shall have operated successfully for four years prior to this work, and shall conform to requirements of ASTM E329.
- B. Requirements of ACI 301 shall govern work, materials and equipment related to this Section; specifications herein set minimum results required, and references to procedures are intended to establish minimal guides.
- C. Contractor shall be responsible for quality of concrete in place and shall bear burden of proof that concrete meets minimum requirements. Tolerances shall meet the requirements of ACI 117 except as modified in the Construction Documents.
- D. Placing of concrete by means of pumping will be an acceptable method of placement providing that the Contractor can demonstrate that:
 - 1. Specified concrete strengths will be met.

2. Equipment has a record of satisfactory performance under similar conditions and using a similar mix.
3. Trial batches have been made.

1.4 SUBMITTALS

- A. Contractor's Testing Laboratory's certificate of compliance per ASTM E329.
- B. Contractor shall submit:
 1. Certified copies of mix designs for each concrete class specified including compressive strength test reports.
 2. Certification that materials meet the requirements specified.
 3. Samples only as requested by the Architect.
 4. Certification from vendor that samples originate from and are representative of each lot proposed for use.
- C. The Owner's Testing Agency will submit reports on tests and inspections performed to the Owner, the Architect, the Contractor, and the DSA.
- D. Shop Drawings: Show construction and expansion and contraction joint locations and details.
- E. Schedule of placing for the Architect's review before starting work.

1.5 PRODUCT DELIVERY, STORAGE AND HANDLING

- A. Ensure storage facilities are weather tight and dry.
- B. Deliver and store packaged materials in original containers with seals unbroken and labels intact until time of use.
- C. Store bulk cement in bins capable of preventing exposure to moisture.
- D. Use sacked cement in chronological order of delivery. Store each shipment so that it may be readily distinguishable from other shipments.

PART 2 - PRODUCTS

2.1 CONCRETE

- A. Table 2-1: Concrete Properties

Location	28 -Day Strength	Aggregate Size	Weight	Slump	Water / Cement	% Flyash	Comments
All	3000	1	145	4	0.45	15-25	

- B. Strength refers to the compressive strength in psi after 28-days when tested in accordance with ASTM C39. All concrete shall develop compression strength specified in 28-days. To meet above requirements, mix shall be designed such that average compressive strength will exceed specified 28-day strength by an amount as specified by ACI 318.
- C. Aggregate size refers to the maximum size in inches.
- D. Weight refers to pounds per cubic foot, air dry.

- E. Slump is measured in inches and tested in accordance with ASTM C143.
- F. Water/Cement Ratio is the maximum ratio of water to cementitious material by weight.

2.2 MATERIALS

- A. General Requirements:
 - 1. Cement and aggregates shall have proven history of successful use with one another. Sources of cement and aggregate shall remain unchanged through-out work unless the Architect approves request for change made at least 10-days prior to anticipated date of casting.
 - 2. Ready-mixed concrete shall meet requirements of ASTM C94.
 - 3. Deviations in properties of materials tested by the Owner's Testing Agency shall be cause for their rejection pending additional test results and redesign of mix by the Contractor's Testing Laboratory.
 - 4. No frozen aggregates will be permitted.
- B. Cements: ASTM C150, Type II. Use one brand of cement throughout project unless otherwise directed by the Architect.
- C. Fly Ash: ASTM C618, Type F.
- D. Aggregates:
 - 1. Coarse: ASTM C33. Coarse aggregate shall consist of a clean, hard, fine grained, sound crushed rock, or washed gravel or a combination of both. It shall be free from oil, organic matter or other deleterious substances and shall not contain more than two percent by weight of shale or cherty material. "Cleanness value shall not be less than 75 when tested per MM Test Method, 227 and conforming to CBC Section 1903A.3.2.
 - 2. Fines: ASTM C33. Sand equivalent shall be not less than 75 when tested as per ASTM D2419.
 - 3. Light Weight Aggregates: ASTM C330; expanded shale type uniformly graded from 3/4-inch to No. 200 Mesh. Cleanliness value and sand equivalent not less than 75.
 - 4. Provide aggregates from a single source for exposed concrete.
- E. Water: Clean and potable, free from impurities detrimental to concrete.
- F. Admixtures:
 - 1. Water-Reducing Admixture: ASTM C494, Type A, non-lignini sulfonate. Same as:
 - a. Grace Construction Materials: "WRDA with Hycol";
 - b. Master Builders: "Pozzolith 322N";
 - c. Sika Corp.: "Plastocrete 161";
 - d. Equal product substituted per Section 01 60 00.
 - 2. Air Entraining Admixture: ASTM C260, certified by manufacturer to be compatible with other products. Same as:
 - a. W.R. Grace: "Daravair,"
 - b. Master Builders: "Micro-Air,"
 - c. Sika Corp.: "Sika Aer,"
 - d. Equal product substituted per Section 01 60 00.
 - 3. High-Range Water-Reducing Admixture (Super Plasticizer): ASTM C494, Type F or Type G. Same as:
 - a. W.R. Grace: "Daracem 19,"
 - b. Master Builders: "Rheobuild,"
 - c. Sika Corp.: "Sikament,"
 - d. Equal product substituted per Section 01 60 00.

4. Water Reducing, Accelerator Admixture: ASTM C494, Type E. Same as:
 - a. W.R. Grace: "Daracel,"
 - b. Master Builders: "Pozzutec 20,"
 - c. Sika Corp.: "Sikaset NC,"
 - d. Equal product substituted per Section 01 60 00.
 5. Water Reducing, Retarding Admixture: ASTM C494, Type D. Same as:
 - a. W.R. Grace: "Daratard-17,"
 - b. Master Builders: "Pozzoliith R,"
 - c. Sika Corp.: "Plastiment,"
 - d. Equal product substituted per Section 01 60 00.
 6. Other Admixtures: Only as approved by the Architect.
- G. Wax Sealer: Heavy penetrating type as manufactured by approved manufacturer of clear hardener.
- H. Abrasive Grains: Aluminum oxide type. Same as Sonneborn-Contech's "Frictex NS"; General Abrasive Co., Inc.'s "Fut-Sure"; The Exolon Co.'s "Exolon Anti-Slip"; or equal product substituted per Section 01 60 00.
- I. Non-Shrink Grout: Premixed high strength grout requiring only addition of water at the site. Same as:
 1. Master Builders: "Masterflow 928 Grout";
 2. Burke: "Non-Ferrous, Non-Shrink Grout,"
 3. Equal product substituted per Section 01 62 00.
- J. Curing Materials:
 1. Waterproof Paper: ASTM C171, Type 1, regular. Same as:
 - a. Sisalkraft Division of St. Regis Paper Co.: "Orange Label";
 - b. Equal product substituted per Section 01 62 00.
 2. Sheet Plastic: Polyethylene, four mils thick, fungus-resistant.
 3. Curing Compound: ASTM C309. Same as:
 - a. Curecrete Chemical Company: "Ashford Formula,"
 - b. Master Builders: "Masterkure N-Seal-W,"
 - c. Equal product substituted per Section 01 60 00.
- K. Concrete Sealer: Clear water repellent treatment, blend of six resins containing no silicones or stearates, no darkening or change of color. Same as:
 1. Sonneborn-Contech's "White Rox M-6-50-8";
 2. Tamms Industries: "Chemstop"
 3. Equal product substituted per Section 01 60 00.
- L. Hardener, Clear Liquid Type: Same as:
 1. Grace Construction Materials: "Hornstone Crystal Chemical Hardener";
 2. Master Builder's: "Mastercron";
 3. Sonneborn-Contech: "Lapidolith";
 4. Upco Co.: "Vitrox 4701";
 5. Equal product substituted per Section 01 60 00.
- M. Epoxy Adhesive: Two component material suitable for anchoring rebar into dry or damp concrete. Same as:
 1. Covert's "CIA-Gel 7000,"
 2. Hilti: "HIT HY-150 MAX,"
 3. Hilti: "RE 500,"
 4. Simpson Strong-Tie: "Set"
 5. Equal product substituted per Section 01 60 00.
- N. Sleeves through concrete: ASTM A53 galvanized per ASTM A153.

2.3 MIXES

- A. General Requirements:
1. Contractor shall perform tests or assemble the necessary data indicating conformance with specifications.
 2. For each mix submit data showing that proposed mix will attain the required strength in accordance with requirements of CBC Section 1905A.3, Method "B."
 3. If sufficient test results for Method "B" are not available, contractor shall produce trial mixes in accordance with requirements of CBC Section 1905A.3, Method "C."
 4. Contractor shall instruct Laboratory to base mix design on use of materials tested and approved by Owner's Testing Agency.
 5. Mix design shall include compression strength test reports per CBC Section 1905A.3.1.
 6. Mix shall be designed, tested, and adjusted if necessary in ample time before first concrete is scheduled to be placed. Laboratory data and strength test results for revised mix design shall be submitted to Architect prior to using in project.
 7. Ensure mix designs will produce concrete to strengths specified and of uniform density without segregation.
 8. If mix yield exceeds 1-cubic yard, modify mix design to no more than one cubic yard without changing cement content.
 9. Contractor's mix designs shall be subject to review by the Architect and by the Owner's Testing Agency.
 10. Introduction of calcium chloride will not be permitted.
 11. Unspecified admixtures will not be permitted unless the Architect reviews, the Contractor modifies mix designs as necessary, and modifications are accepted by the Owner's Testing Agency.
- B. Slab-on-Grade Mix requirements: Use of Water-Reducing admixture is required. High Range Water-Reducing admixture (super plasticizer) shall be used when required to maintain workability and pumpability.
- C. Patching Mortar: Mix in proportions by volume of one part cement to two parts fine sand.
- D. Non-Shrink Grout: Follow approved manufacturer's printed instructions and recommendations.

2.4 MIXING

- A. Batching Plant Conditions:
1. Batch plant shall be certified to comply with the requirements of the National Concrete Ready Mix Association.
 2. Ensure equipment and plant will afford accurate weighing, minimize segregation and will efficiently handle all materials to satisfaction of the Architect and the Owner's Testing Agency.
 3. Replace at no additional expense equipment the Architect and the Owner's Testing Agency deem inadequate or unsuitable.
 4. Use approved moisture meter capable of determining moisture content of sand.
- B. General Requirements:
1. Thoroughly clean concrete equipment before use for architectural concrete mixes to avoid contamination.
 2. Mix cement, fine and coarse aggregates, admixtures and water to exact proportions of mix designs. Method of mixing shall comply with CBC Section 1905A.8.

3. Measure fine and coarse aggregates separately according to approved method that provides accurate control and easy checking.
 4. Adjust grading to improve workability; do not add water unless otherwise directed.
 5. Maintain proportions, values, or factors of approved mixes throughout work.
 6. Mix concrete in transit mixers five minutes immediately prior to discharge in addition to mixing as called for by ACI 304 and ASTM C94.
- C. Admixtures: Use automatic metering dispenser to introduce admixture into mix. Dispenser shall be recommended and calibrated by admixture manufacturer.

2.5 SOURCE QUALITY CONTROL

- A. Owner's Testing Agency will:
1. Review mix designs, certificates of compliance, and samples of materials the Contractor proposes to use.
 2. Test and inspect materials, as necessary, in accordance with ACI 318 and CBC Sections 1903A, 1905A and 1929A for compliance with requirements.
 3. Take samples as required from the Contractor's designated sources.
 4. Take one grab sample for each 100 tons of Portland cement except that, when used in bulk loading ready-mix plants where separate bins for pretested cement are not available, take grab samples for each shipment of cement placed in bin with not less than one sample being taken for each day's pour and subsequently test such samples if required by the Architect who may be so advised by DSA.
 5. Test both coarse and fine aggregate by use of solution of sodium or magnesium sulfate, or both whenever in the judgment of the Architect such tests are necessary to determine quality of material. Perform such tests in accordance with ASTM C88. Loss shall not exceed 6-percent of either fine or coarse aggregate. Aggregate failing to comply with this requirement may be used in the Work provided it contains less than 2- percent of shale and other deleterious particles and shows a loss in soundness test of not more than 10-percent when tested in the sodium sulphate solution. Test aggregates as required by CBC Section 1903A.3.
 6. Test for sand equivalent of fine aggregate in accordance with California Test 217.
 7. Test for cleanness value of coarse aggregate in accordance with California Test 227.
 8. Inspect plant prior to any work to verify following:
 - a. Plant is equipped with approved metering devices for determining moisture content of fine aggregate.
 - b. Other plant quality controls are adequate.
 9. Continuously inspect quality and quantity of materials used in transit mixed concrete, in batched aggregates and ready-mixed concrete at mixing plant or other location per CBC Section 1929A.4 where other materials are measured.
- B. Waiver of Batch Plant Inspection:
1. Continuous batch plant inspection may be waived in accordance with CBC Section 1929A.5 if the plant complies with ASTM C94 and has been certified by an agency acceptable to DSA to comply with the requirements of the National Ready Mix Concrete Association.
 2. When batch plant inspection is waived, the following requirements shall apply:
 - a. Testing Agency shall check the first batching at the start of work and furnish mix proportions to the licensed Weighmaster.
 - b. Licensed Weighmaster shall identify material quantities and certify each load by a ticket.
 - c. Project Inspector shall collect truck mix tickets with load identification and maintain a daily record of placement. Trucks without a load ticket

identifying the mix shall be rejected. Copies of daily placement record shall be submitted to DSA.

- d. At the end of the project, the Weighmaster shall submit an affidavit to DSA certifying that all concrete supplied conforms to proportions established by mix designs.

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Examine units of work to be cast and verify that:
 1. Construction of formwork is complete.
 2. Required reinforcement, inserts, and embedded items are in place.
 3. Form ties at construction joints are tight.
 4. Concrete-receiving places are free of debris.
 5. Dampen subgrade or sand course for slabs-on-grade. Do not saturate.
 6. Depths of depressed slab conditions are correct for delayed finish noted and for its proper bonding to concrete.
 7. Conveying equipment is clean and properly operating.
 8. The Architect has reviewed formwork and reinforcing steel and that preparations have been checked with the Project Inspector.
- B. Do not begin casting before unsatisfactory conditions have been corrected.

3.2 PREPARATION

- A. Ensure availability of sufficient labor, equipment and materials to place concrete correctly in accordance with scheduled casting.
- B. Protect finished surfaces adjacent to concrete-receiving places.
- C. Clean transportation and handling equipment at frequent intervals and flush thoroughly with water before each day's run. Do not discharge wash water into concrete form.

3.3 PLACING

- A. The Inspector of Record, Architect, Structural Engineer, Testing Laboratory and DSA shall be notified at least 48 hours before placing concrete.
- B. Place concrete in accordance with CBC Section 1905A.
- C. Place concrete in cycles as a continuous operation to permit proper and thorough integration and to complete scheduled placement. Place no concrete where sun, wind, heat, or facilities prevent proper finishing and curing.
- D. Convey concrete as rapidly and directly as practicable to preserve quality and to prevent separation from rehandling and flowing; do not deposit concrete initially set. Complete placement of concrete within ninety (90) minutes after adding water unless otherwise noted. Retempering of concrete which has partially set will not be permitted.
- E. Take precautions to avoid damage to under-slab moisture barrier and displacement of reinforcement and formwork.
- F. Deposit concrete vertically in its final position. Avoid free falls in excess of six feet where reinforcement will cause segregation and in typical conditions unless the Architect approves otherwise.

- G. Keep forms and reinforcement clean above pour line by removing clinging concrete with wire brush before casting next lift. Also remove leakage through forms.
- H. Interruption in casting longer than 60-minutes shall be cause for discontinuing casting for remainder of day. In this event, cut back concrete and provide construction joints as the Architect directs; clean forms and reinforcement as necessary to receive concrete at a later time.
- I. Hot Weather Concreting: Conform to ACI 305 and following requirements when mean daily temperature rises above 75 degrees Fahrenheit.
1. An upper temperature limit of concrete mixes shall be established by the Contractor for each class of concrete. Concrete temperature during placing shall not be so high as to cause difficulty from loss of slump, flash set, or cold joints, and shall not exceed 90°F. Other project climatic conditions detrimental to concrete quality such as relative humidity, wind velocity, and solar radiation shall also be considered.
 2. Trial batches of concrete for each mix design shall be made at the limiting mix temperature selected. In lieu of trial batches, compression strength test reports (20 minimum) at the limiting temperature for each proposed mix shall be submitted to the Owner's testing laboratory for review.
 3. Practices to maintain concrete below maximum limiting temperature shall be in accordance with ACI 305. Concrete ingredients may be cooled before mixing, or flake ice or well-crushed ice of a size that will melt completely during mixing may be substituted for part of the mixing water.
 4. Practices to avoid the potential problems of hot weather concreting shall be employed by the Contractor in accordance with ACI 305.
 5. When the temperature of the reinforcing steel or steel deck forms is greater than 120°F, reinforcing and forms shall be sprayed with water just prior to placing the concrete.
- J. Cold Weather Concreting:
1. No placement of concrete will be allowed at temperatures below 20 degrees Fahrenheit or if mean daily temperature for curing period is anticipated to be below 20 degrees Fahrenheit.
 2. No concrete placement will be allowed on frozen subgrade.
 3. Conform to ACI 306 and following requirements when mean daily temperature falls below 40 degrees Fahrenheit.
 - a. Reinforcement, forms or ground to receive concrete shall be completely free from frost.
 - b. Concrete at time of placement for footings shall have temperature no lower than 50 degrees Fahrenheit, for all other concrete this minimum temperature at time of placement shall be 60 degrees Fahrenheit. Maximum temperature shall be 90 degrees Fahrenheit.
 - c. Concrete shall be maintained at temperature no lower than 50 degrees Fahrenheit for minimum 7-day period after placement by means of blanket insulation, heaters, or other methods as approved by the Architect.
 - d. Use of calcium chloride or admixtures containing calcium chloride as accelerators will not be permitted.
 - e. The Contractor shall keep a record of concrete surface temperature for first 7-days after each pour. This record shall be open to inspection by the Architect.
- K. Consolidating:
1. Use vibrators for thorough consolidation of concrete (including, but not limited to, mat slabs and structural slabs).

2. Provide vibrators for each location during simultaneous placing to ensure timely consolidation around reinforcement, embedded items and into corners of forms; ensure availability of spare vibrators in case of failures. Vibrate through full depth of freshly placed concrete.
 3. Do not place vibrators against reinforcement, attach to forms, or use to spread concrete.
 4. Exposed Concrete: Vibrate with rubber type heads and, in addition, spade along forms with flat strap or plate.
- L. Construction Joints:
1. Verify location and conformance with typical details; provide only where designated or approved by the Architect. Comply with CBC Section 1906A.4. Construction joints require keys and additional reinforcement unless otherwise noted; consult architect for details.
 2. All horizontal and vertical construction joints to be thoroughly sandblasted to clean and roughen entire surface to minimum 1/4-inch relief exposing clean coarse aggregate solidly embedded in mortar matrix.
 3. Just prior to depositing concrete, the surface of the construction joint shall be thoroughly wetted.
- M. Contraction (Control) Joints in Slabs-on-Grade:
1. Construct contraction joints in slabs-on-ground to form panels of patterns indicated on Shop Drawings. Use saw cuts 1/8" x 1/4 slab depth, unless otherwise indicated.
 2. Time saw cutting to allow sufficient curing of concrete to prevent raveled or broken edges.
 3. Contraction joints in unexposed floor slabs may be formed by saw cuts as soon as possible after slab finishing as may be safely done without dislodging aggregate.
 4. If joint pattern not shown, provide joints not exceeding 15' in either direction and located to conform to bay spacing wherever possible (at column centerlines, half bays, third-bays).
- N. Walls and Other Formed Elements:
1. Space points of deposit to eliminate need for lateral flow. Placing procedures of concrete in forms permitting escape of mortar, or flow of concrete itself, will not be permitted.
 2. Level top surface upon stopping work.
 3. Take special care to fill each part of the forms by depositing concrete directly as near final position as possible, and to force concrete under and around reinforcement, embedded items, without displacement.
 4. After concrete has taken its initial set, care shall be exercised to avoid jarring forms or placing any strain on ends of projecting reinforcement.
 5. Where backfill is placed against a wall, it shall be adequately shored until it has attained design strength.
- O. Penetrations Through Concrete:
1. Penetrations through structural concrete for conduit, piping or other items must be approved by the Architect.
 2. Where such penetrations are approved, provide steel galvanized pipe sleeves as follows:
 - a. Reinforcement must not be displaced. Provide minimum 3/4" clearance between reinforcement and sleeve.
 - b. Sleeves shall be Schedule 40, 60, 80, or 160 as follows based on pipe diameter "D" per Table 3-1.
 - c. Spacing and edge distances shall conform to Table 3-1.

P. Table 3-1: Pipe Sleeves at Penetrations

Pipe Diameter "D"	A53 Pipe Thickness	Minimum Center-to-Center Spacing	Minimum Edge Distance
≤ 2"	Schedule 40	6"	4"
>2" ≤ 4"	Schedule 60	3D	6"
>4" ≤ 8"	Schedule 80	3½ D	1½ D
>8" ≤ 12"	Schedule 120	4D	2D
> 12"	Not Permitted		

3.4 CURING

A. General Requirements:

1. Take curing measures immediately after casting and for measures other than application of curing compound, extend for seven days. The Architect may recommend longer periods based upon prevailing temperature, wind and relative humidity. Comply with CBC Section 1905A.11.
2. Avoid alternate wetting and drying and fluctuations of concrete temperature.
3. Protect fresh concrete from direct rays of sun, rain, freezing, drying winds, soiling, and damage.
4. Do not permit curing method to affect adversely finishes or treatments applied to finish concrete.

B. Curing Method, Typical: Obtain the Architect's approval of alternate measures.

1. Keep forms and concrete surfaces moist during period forms are required to remain in place.
2. Apply curing compound per manufacturers' recommendations, except at slabs-on-grade apply curing compound at 150% of manufacturer's recommended application coverage rate.

3.5 CLEANING, PATCHING AND DEFECTIVE WORK

- A. Where concrete is under strength, out of line, level or plumb, or shows objectionable cracks, honeycombing, rock pockets, voids, spalling, exposed reinforcement, signs of freezing or is otherwise defective, and, in the Architect's judgment, these defects impair proper strength or appearance of the work, the Architect will require its removal and replacement at the Contractor's expense.
- B. Immediately after stripping and before concrete is thoroughly dry, patch minor defects, form-tie holes, honeycombed areas, etc., with patching mortar. Patch shall match finish of adjacent surface unless otherwise noted. Remove ledges and bulges.
- C. Compact mortar into place and neatly file defective surfaces to produce level, true planes. After initial set, dress surfaces of patches mechanically or manually to obtain same texture as surrounding surfaces.
- D. Rock Pockets:
 1. Cut out to full solid surface and form key.
 2. Thoroughly wet before casting mortar.

3. Where the Architect deems rock pocket too large for satisfactory mortar patching as described, cut out defective section to solid surface, key and pack solid with concrete to produce firm bond and match adjacent surface.
- E. Cleaning:
1. Insure removal of bituminous materials, form release agents, bond breakers, curing compounds if permitted and other materials employed in work of concreting which would otherwise prevent proper application of sealants, liquid waterproofing, and other delayed finishes and treatments.
 2. Where cleaning is required, take care not to damage surrounding surfaces or leave residue from cleaning agents.
 3. Remove all exposed, loose fibers from slabs to the satisfaction of the architect.

3.6 PROTECTION

- A. Protect concrete from injurious action of the elements and defacement of any nature during construction operations.
- B. Protect exposed corners of concrete from traffic or use which will damage them in any way.
- C. Make provisions to keep all exposed concrete free from laitance caused by spillage or leaking forms or other contaminants. Do not allow laitances to penetrate, stain, or harden on surfaces which have been textured.

3.7 FIELD QUALITY CONTROL

- A. Owner's Testing Agency will:
1. Perform testing in accordance with ACI 318 and CBC Section 1903A and 1905A.
 2. Review concrete mix designs.
 3. Inspect concrete and grout placement continuously.
 4. Test concrete to control slumps according to ASTM C143.
 5. Continuously monitor concrete temperature as it arrives on the site.
 6. Test concrete for required compressive strength in accordance with CBC Section 1905A.6:
 - a. Make and cure four specimen cylinders according to ASTM C31 for not more than each 50 cubic yards, or 2000 square ft for of surface areas of slab or walls poured each day.
 - b. Retain one cylinder for 7-day test, two for the 28-day test and hold one cylinder for additional testing as required.
 - c. Number each cylinder 1A, 1B, 1C, 1D, 2A, 2B, 2C, 2D etc; date each set; and keep accurate record of pour each set represents.
 - d. Transport specimen cylinders from job to laboratory after cylinders have cured for 24-hours on site. Cylinders shall be covered and kept at air temperatures between 60 and 80 degrees Fahrenheit.
 - e. Test specimen cylinders at age 7-days and age 28-days for specified strength according to ASTM C39.
 - f. Base strength value on average of two cylinders taken for 28-day test.
 7. Test and inspect materials, as necessary, in accordance with ACI 318, MM Test Method 227 (Coarse Aggregates) and MM Test Method 217 (Fine Aggregates), for compliance with requirements specified in this section.
- B. Contractor shall:
1. Submit ticket for each batch of concrete delivered to job site. Ticket shall bear the following information:
 - a. Design mix number.
 - b. Signature or initials of ready mix representative.

- c. Time of batching.
 - d. Weight of cement, aggregates, water and admixtures in each batch with maximum aggregate size.
 - e. Total volume of concrete in each batch.
 - f. Notation to indicate equipment was checked for contaminants prior to batching.
2. Pay the Owner's Testing Agency for taking core specimens of hardened structure and testing specimen according to ASTM C88 and C42 when laboratory tests of specimen cylinders show compressive strengths below specified minimum.
 3. Submit Concrete Weighmaster affidavit per section 2.05 (B) 2.d.

3.8 FINISH OF FORMED SURFACES

- A. Rough Form Finish: For formed concrete surfaces not exposed-to-view in the finish Work or by other construction. Concrete surface shall have texture imparted by form facing material used, with tie holes and defective areas repaired and patched and fins and other projections exceeding 1/4 inch in height rubbed down or chipped off.
- B. Smooth Form Finish: For formed concrete surfaces exposed-to-view, or to be covered with a coating material applied directly to concrete, or a covering material applied directly to concrete, such as waterproofing, dampproofing, painting or other similar system. This is as-cast concrete surface obtained with selected form facing material, arranged orderly and symmetrically with a minimum of seams. Repair and patch defective areas with fins or other projections completely removed and smoothed.
- C. Related Unformed Surfaces: At tops of walls, horizontal offsets and similar unformed surfaces occurring adjacent to formed surfaces, strike-off smooth and finish with a texture matching adjacent formed surfaces. Continue final surface treatment of formed surfaces uniformly across adjacent unformed surfaces, unless otherwise indicated.

3.9 SLAB FINISHES

- A. Scratch Finish: Apply scratch finish to monolithic slab surfaces that are to receive concrete floor topping or mortar setting beds for tile, portland cement terrazzo, and other bonded applied cementitious finish flooring material, and as otherwise indicated.
 1. After placing slabs, plane surface to tolerances for floor flatness FF of 20 and floor levelness FL of 15. Slope surfaces uniformly to drains where required. After leveling, roughen surface before final set, with stiff brushes, brooms or rakes.
- B. Float Finish: Apply float finish to monolithic slab surfaces to receive trowel finish and other finishes as hereinafter specified, and slab surfaces which are to be covered with membrane or elastic waterproofing, membrane or elastic roofing, or sand-bed terrazzo, and as otherwise indicated.
 1. After screeding, consolidating, and leveling concrete slabs, do not work surface until ready for floating. Begin floating when surface water has disappeared or when concrete has stiffened sufficiently to permit operation of power-driven floats, or both. Consolidate surface with power-driven floats, or by hand-floating if area is small or inaccessible to power units. Check and level surface plane to tolerances for flatness FF of 25 and levelness FL of 20. Cut down high spots and fill low spots. Uniformly slope surfaces to drains. Immediately after leveling, refloat surface to a uniform, smooth, granular texture.
- C. Trowel Finish: Apply trowel finish to monolithic slab surfaces to be exposed-to-view, and slab surfaces to be covered with resilient flooring, carpet, ceramic or quarry tile, paint, or other thin film finish coating system.

1. After floating, begin first trowel finish operation using a power-driven trowel. Begin final troweling when surface produces a ringing sound as trowel is moved over surface. Consolidate concrete surface by final hand-troweling operation, free of trowel marks, uniform in texture and appearance. Check and level surface plane to tolerances flatness FF of 35 and levelness FL of 25. Grind smooth surface defects which would telegraph through applied floor covering system.
 2. Floors to receive traffic topping shall have steel trowel finish.
- D. Trowel and Fine Broom Finish: Where ceramic or quarry tile is to be installed with thin-set mortar, apply trowel finish as specified, then immediately follow with slightly scarifying surface by fine brooming.
- E. Non-Slip Broom Finish: Apply non-slip broom finish to exterior concrete platforms, steps and ramps, and elsewhere as indicated.
1. Immediately after float finishing, slightly roughen concrete surface by brooming with fiber bristle broom perpendicular to main traffic route. Coordinate required final finish with Architect before application.
 2. Slopes \leq 6 percent: Medium broom finish.
 3. Slopes $>$ 6 percent: Heavy broom finish.

3.10 CLEAN UP

- A. Perform Work under this Section to keep affected portions of building site neat, clean, and orderly. Remove, immediately upon completion of Work under this Section, surplus materials, rubbish, and equipment associated with or used in performance. Be aware that failure to perform clean-up operations within 24 hours of notice by Architect will be considered adequate grounds for having work done by others at no added expense to the Owner.

END OF SECTION

SECTION 03 45 00**PRECAST ARCHITECTURAL CONCRETE****PART 1 - GENERAL****1.1 SUMMARY**

- A. Section includes architectural precast concrete for:
 - 1. Wall caps.
 - 2. Supports, devices, anchorage and attachments.
 - 3. Perimeter joint seals.
 - 4. Intermediate joint seals.
 - 5. Grouting under wall caps.

- B. Related Sections:
 - 1. Section 07 90 00 - Joint Protection: Perimeter joints with sealant and backing.

1.2 REFERENCES

- A. American Concrete Institute:
 - 1. ACI 318 – Building Code Requirements for Structural Concrete.

- B. ASTM International:
 - 1. ASTM A185 - Standard Specification for Steel Welded Wire Fabric, Plain, for Concrete Reinforcement.
 - 2. ASTM A615/A615M - Standard Specification for Deformed and Plain Billet-Steel Bars for Concrete Reinforcement.
 - 3. ASTM A767/A767M - Standard Specification for Zinc-Coated (Galvanized) Steel Bars for Concrete Reinforcement.
 - 4. ASTM C33 - Standard Specification for Concrete Aggregates.
 - 5. ASTM C150 - Standard Specification for Portland Cement.
 - 6. ASTM C260 - Standard Specification for Air-Entraining Admixtures for Concrete.

- C. American Welding Society:
 - 1. AWS D1.1 - Structural Welding Code - Steel.
 - 2. AWS D1.4 - Structural Welding Code - Reinforcing Steel.

- D. Precast/Prestressed Concrete Institute:
 - 1. PCI MNL-117 - Manual for Quality Control for Plants and Production of Architectural Precast Concrete Products.
 - 2. PCI MNL-120 - PCI Design Handbook - Precast and Prestressed Concrete.
 - 3. PCI MNL-122 - Architectural Precast Concrete.
 - 4. PCI MNL-123 - Design and Typical Details of Connections for Precast and Prestressed Concrete.

1.3 SUBMITTALS

- A. Section 01 32 19 - Submittal Procedures: Submittals procedures.

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

- C. Samples:

1. Submit precast finish samples for Architect's preliminary selection, minimum 8 inch x 8 inch in size.
 2. Submit two pieces, typical ornament profile x 12 inches in length, illustrating surface finish, color and texture, for Architects verification.
- D. Mix Design: Submit proposed mix design before starting work.
- E. Submit Material Safety Data Sheets (MSDS Sheets) indicating health risks, flammability, handling and storage precautions for items required under this Section.

1.4 CLOSEOUT SUBMITTALS

- A. Section 01 77 00 – Contract Closeout: Closeout procedures.
- B. Operation and Maintenance Data: Procedures for Project closeout submittals. Indicate surface cleaning instructions.

1.5 QUALITY ASSURANCE

- A. Perform Work of this section in accordance with:
1. PCI MNL-117.
 2. PCI MNL-120.
 3. PCI MNL-122.
 4. PCI MNL-123.
 4. PCI Manual for Structural Design of Architectural Precast Concrete.
 5. ACI 318.
- B. Welding: AWS D1.1 and AWS D1.4.

1.6 QUALIFICATIONS

- A. Fabricator: Company specializing in performing Work of this section with minimum ten years documented experience in projects of similar scope and complexity.
- B. Precast Fabricator and Erector: Qualified in accordance with PCI MNL-117 Group A1 - Architectural Precast Concrete.
- C. Design units under direct supervision of Professional Engineer experienced in design of this Work and licensed in State of California.
- D. Welder: Qualified within previous 12 months in accordance with AWS D1.1 and AWS D1.4.

1.7 MOCK-UP

- A. Section 01 32 19 – Submittal Procedures: Requirements for mockup.
- B. Fabricate and erect at site one 4 feet long, typical full size wall cap, illustrating shape and finish in accordance with approved sample.
- C. Locate where directed by Architect.
- D. Incorporate accepted mockup as part of Work.

1.8 PRE-INSTALLATION MEETINGS

- A. Section 01 31 19 – Project Meetings: Pre-installation meeting.
- B. Convene minimum one week prior to commencing work of this section.

1.9 DELIVERY, STORAGE, AND HANDLING

- A. Section 01 60 00 - Product Requirement: Product storage and handling requirements.
- B. Package products to protect the finish during transport.
- C. Deliver precast concrete units to project site in such quantities and at such times to assure continuity of installation.
- D. Handle precast units to position, consistent with their shape and design. Lift and support only from support points.
- E. Protect units to prevent staining, chipping, or spalling of concrete.
- F. Mark units with date of production in location not visible to view when in final position in structure.

PART 2 - PRODUCTS**2.1 MANUFACTURERS**

- A. Precast Architectural Concrete:
 - 1. Any manufacturer holding a PCI Group A Plant Certification for the types of products specified; see www.pci.org.
 - 2. Concrete Designs Inc.; www.concrete-designs.com
 - 3. Dura Art Stone; www.duraartstone.com

2.2 MATERIALS

- A. Cement: ASTM C150, Types I, II or III, Portland type; Lehigh white color. Use only one brand, type and source of supply of cement throughout the project.
- B. Concrete Materials: ASTM C33; and sand; clean washed. Size, type and color to match Architect's control samples. Aggregates for concrete shall conform to the ASTM C-33 with a maximum size of 3/4 inch.
- C. Reinforcing Steel: ASTM A615/A615M, deformed steel bars; ASTM A185, welded steel wire fabric; galvanized to ASTM A767/A767M Class 2, strength and size commensurate with precast unit design.
- D. Air Entrainment Admixture: ASTM C260. Utilize standard mix designs incorporating admixtures which facilitate the workability, curing and strength of the mix.
- E. Pigments: Nonfading, resistant to lime and other alkalis.
- F. Grout: Non-shrink, minimum 10,000 psi, 28 day strength.
- G. Water: Potable, free from foreign materials in amounts harmful to concrete and embedded steel.

2.3 MOLDS

- A. Accurately construct molds mortar-tight and of sufficient strength to withstand pressures due to concrete placing operations and temperature changes.
- B. Maintain mold work to provide completed precast concrete units of shapes, lines and dimensions indicated, within specified fabrication tolerances.

2.4 ACCESSORIES

- A. Sealant: Elastomeric type specified in Section 07 90 00.

2.5 MIX

- A. Compressive Strength: 3500-5000 psi minimum at 28 days, in accordance with ACI 301. Absorption shall not exceed 5 percent.

2.6 FABRICATION

- A. General: Fabricate precast concrete units complying with manufacturing and testing procedures, quality control recommendations, and following dimensional tolerances, unless otherwise indicated.
- B. Fabricate in conformance with PCI MNL-117 and ACI 318.
- C. Maintain plant records and quality control program during production of precast units. Make records available upon request.
- D. Use rigid molds, constructed to maintain precast unit uniform in shape, size, and finish.
- E. Maintain consistent quality during manufacture.
- F. Fabricate connecting devices, plates, angles, inserts, bolts, and accessories. Fabricate to permit initial placement and final attachment.
- G. Weld steel fabrications in accordance with AWS D1.1. Weld reinforcing steel in accordance with AWS D1.4. Do not tack weld reinforcing.
- H. Embed reinforcing steel, anchors, inserts plates, angles, and other cast-in items.
- I. Cure units to develop concrete quality, and to minimize appearance blemishes including non-uniformity, staining, or surface cracking.

2.7 FINISH - PRECAST UNITS

- A. Surface Finish: Fabricate precast units and provide exposed surface finished as follows:
 - 1. Modern: Less voids than traditional but not typically void free.

2.8 FABRICATION TOLERANCES

- A. Dimensional Tolerances of Finished Units: Ornamental architectural precast concrete, being tapered by design, is measured for length, width and thickness at the surface from which the mold is loaded maintaining plus or minus 1/16 of an inch tolerance. Overall height and width measured at face adjacent to mold at time of casting.
- B. Maximum Out of Square: 1/8 inch in 10 feet, non-cumulative.

- C. Variation From Dimensions Indicated on Shop Drawings: Plus or minus 1/8 inch.
- D. Maximum Misalignment of Anchors, Inserts, Openings: 1/8 inch.
- E. Maximum Bowing of Units: Length of bow/360.

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Verify building structure, anchors, devices, and site walls are ready to receive work of this Section.

3.2 PREPARATION

- A. Provide for erection procedures and induced loads during erection. Maintain temporary bracing in place until final support is provided.
- B. Provide necessary hoisting equipment.

3.3 ERECTION

- A. Install precast concrete members plumb, level and in alignment within allowable tolerances. Provide temporary supports and bracing as required to maintain position, stability and alignment as members are being permanently connected.
- B. Maintain horizontal and vertical joint alignment and uniform joint width as erection progresses. When units require adjustment beyond design or tolerance criteria, discontinue affected work; advise Architect.
- C. Accessories: Install clips, hangers and other accessories required for erection of precast units to supporting members and backup materials.
- D. Anchor units in final position by bolting, welding, grouting, or as otherwise indicated. Remove temporary shims, wedges and spacers as soon as possible after anchoring and grouting are completed.
- E. Exposed Joint Dimension: 1/2 inch.
- F. Seal perimeter and intermediate joints in accordance with Section 07 90 00 – Joint Protection , with elastomeric type sealant.

3.4 ERECTION TOLERANCES

- A. Maximum Variation from Plane of Location: 1/4 inch in 10 feet and 3/8 inch in 100 feet, non-cumulative.
- B. Maximum Offset from Indicated Alignment Between Two Connecting Units: 1/4 inch.
- C. Joint Tolerance: Plus or minus 1/4 inch.

3.5 CLEANING

- A. Clean exposed facings to remove dirt and stains on units after erection and completion of joint treatments.

- B. Protect other work from damage due to cleaning operations.
- C. Do not use cleaning materials or processes that could change the character of exposed concrete finishes.

3.6 ADJUSTING

- A. Adjust units so joint dimensions are within tolerances.

3.7 PROTECTION OF INSTALLED CONSTRUCTION

- A. Protect units from damage.

END OF SECTION

SECTION 04 20 19**SLATE VENEER****PART 1 - GENERAL****1.1 SUMMARY**

- A. Section includes slate veneer units; setting mortar, and accessories.
- B. Related Sections:
 - 1. Section 07 19 00 - Water Repellents.
 - 2. Section 07 62 00 - Sheet Metal Flashing and Trim.
 - 3. Section 07 90 00 - Joint Protection: Rod and sealant at control and expansion joints.
 - 4. Section 09 25 13 - Acrylic-Modified Portland Cement Plaster: Scratch coat substrate.

1.2 REFERENCES

- A. American Concrete Institute:
 - 1. ACI 530 - Building code Requirements for Masonry Structures.
- B. American National Standards Institute:
 - 1. ANSI A108.5 - Specifications for Ceramic Tile Installed with Dry-Set Portland Cement Mortar or Latex-Portland Cement Mortar.
 - 2. ANSI A118.4 - Latex-Portland Cement Mortar.
 - 3. ANSI A118.6 - Ceramic Tile Grouts.
- C. ASTM International:
 - 1. ASTM C67 - Standard Test Methods for Sampling and Testing Brick and Structural Clay Tile.
 - 2. ASTM C120 - Standard Test Methods of Flexure Testing of Slate (Breaking Load, Modulus of Rupture, Modulus of Elasticity).
 - 3. ASTM C121 - Standard Test Method for Water Absorption of Slate.
 - 4. ASTM C217 - Standard Test Methods for Weather Resistance of Slate.
 - 5. ASTM C1088 - Standard Specification for TBS Brick.
 - 6. ASTM E84 - Standard Test Method of Surface Burning Characteristics of Building Materials.
- D. CBC - 2007 California Building Code.
 - 1. Section 1403A.5 - Adhered Veneer.
- E. TCNA - Tile Council of North America, Inc.
 - 1. TCA - Handbook for Ceramic Tile Installation.

1.3 SUBMITTALS

- A. Section 01 32 19 - Submittal Procedures: Submittal procedures.
- B. Coordination Drawings: Submit installer's coordination drawings indicating the work of this section with that of related work of other sections for proper interface of the completed work. Installer shall coordinate and obtain approvals from the work of other related sections prior to submitting to the Architect
- C. Product Data: Submit data for slate veneer units, setting mortar, flashings, and joint materials.

- D. Samples: Submit four samples of slate veneer units, to illustrate color, texture and extremes of color range. Submit two (2) samples of selected colored setting mortar.
- E. Manufacturer's Certificate: Certify products meet or exceed specified requirements.

1.4 QUALIFICATIONS

- A. Manufacturer: Company experienced in successfully producing/supplying products similar to that indicated for this Project, with sufficient production/supply capacity to produce/supply required units without causing delay in the work
- B. Installer: Company specializing in performing Work of this section with minimum three years documented experience, and certified in writing by the manufacturer listed herein as qualified to install product in accordance with manufacturer's warranty requirements.

1.5 REGULATORY REQUIREMENTS

- A. CARB Materials and equipment used for this Project shall comply with the current applicable regulations of the California Air Resources Board (CARB) and the Environmental Protection Agency (EPA). Regulatory changes may affect the formulation, availability, or use of the specified coatings. Confirm availability of coatings to be used prior to use, and notify the Architect of any recent changes that may have occurred after the preparation of this specification section.

1.6 MOCKUP

- A. Section 01 32 19 – Submittal Procedures: Mockup requirements.
- B. Construct slate veneer mockup, 4 feet long by 8 feet high, including masonry, mortar and accessories.
- C. Do not proceed until sample panel construction and Architect has approved appearance. Use as a standard for quality and workmanship.
- D. Mockup shall remain on the construction site for the duration of the construction and be protected and maintained until final completion of the project.

1.7 PRE-INSTALLATION MEETINGS

- A. Section 01 31 19 - Project Meetings: Pre-installation meeting.
- B. Convene thirty days prior to commencing work of this section.

1.8 DELIVERY, STORAGE, AND HANDLING

- A. Section 01 60 00 - Product Requirements: Product storage and handling requirements.
- B. Packing, shipping, handling, and unloading:
 - 1. Products shall be individually wrapped.
 - 2. Handle products in such a manner as to assure that they are free from dents, scratches and other damage. Damaged products will not be accepted at final inspection.
- C. Acceptance at Site:
 - 1. Products must be in manufacturer's original unopened containers with labels indicating brand name, model, and grade.

- D. Storage and protection:
 - 1. Store products above ground on level platforms, six inches above ground, allowing air circulation under stacked units.
 - a. Cover materials with protective waterproof covering providing for adequate air circulation and ventilation.

1.9 ENVIRONMENTAL REQUIREMENTS

- A. Section 01 60 00 - Product Requirements.
- B. Rain: Work under this section shall not be started or maintained under threat of rain unless the work is not affected by the rain.
- C. Cold and Hot Weather Requirements:
 - 1. Install mortar, set and grout slate veneer when surfaces and ambient temperature is above 50 degrees and below 90 degrees.
 - 2. Do not use frozen materials or materials coated with ice or frost.
 - 3. Do not lower freezing point of mortar by use of antifreeze agents or other admixtures.
 - 4. Do not use calcium chloride in mortar.
 - 5. Do not install mortar, set or grout slate veneer when inclement weather conditions are expected within 48 hours after work is completed unless properly protected.
 - 6. Protect adjacent work surfaces during brick work.
 - 7. Wet mortar board before loading and cover mortar to retard drying when not being used.
 - 8. Do not spread mortar beds more than 48 inches ahead of placing slate veneer units.
 - 9. Place slate veneer units within one minute of spreading mortar.

1.10 COORDINATION

- A. Coordinate masonry work with acrylic-modified Portland cement plaster substrate.

1.11 EXTRA MATERIALS

- A. Supply 10 units of each size, color, and type of slate veneer units.

1.12 WARRANTY

- A. Section 01 77 00 – Contract Closeout: Requirements for Warranties.
- B. Submit Lifetime Limited Warranty for Slate Veneer System installation. Custom Building Products offers a complete warranty system. Contact a representative for details.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

- A. Slate Veneer Manufacturers:
 - 1. American Slate Company; www.americanslate.com
 - 2. Substitutions: Section 01 60 00 – Product Requirements: Product Options and Substitutions.
- B. Mortar Manufacturers:
 - 1. Custom Building Products.
 - 2. Laticrete International, Inc.
 - 3. C-Cure.

4. Substitutions: Section 01 60 00 – Product Requirements: Product Options and Substitutions.
- C. Grout Manufacturers:
1. Custom Building Products.
 2. Substitutions: Section 01 60 00 – Product Requirements: Product Options and Substitutions.
- D. Waterproofing Membrane Manufacturers:
1. Custom Building Products.
 2. Substitutions: Section 01 60 00 – Product Requirements: Product Options and Substitutions.

2.2 COMPONENTS

- A. Slate Veneer:
1. Material: African Multicolor™ TMA131.
 2. Size: 8 inch x 8 inch.
 3. Thickness: 1/2 inch, machine gauged.
 4. Weight: 8 lbs per SF for freight purposes.
 5. Coloration: Variegated multicolor varying dramatically in color from black to orange, red, and golds.
- B. Performance:
1. ASTM C120 – Modulus of Rupture: 8493 psi.
 2. ASTM C121 – Water Absorption: 0.25 percent.
 3. ASTM C217 – Weather Resistance: 0.002 inches.

2.3 ACCESSORIES

- A. Mortar Materials:
1. Latex-Portland Cement Mortar:
 - a. MegaLite (single component latex-portland cement thin-set mortar), by Custom Building Products, or CustomCrete gauged with CreteMix at full strength (no dilution) by Custom Building Products, and meeting the following minimum requirements:
 - 1) Compressive Strength (ANSI 118.4): 5000 psi minimum.
 - 2) Bond Strength (ANSI 118.4): 500 psi minimum.
 - 3) Water Absorption (ANSI 118.4): 4 percent Maximum.
 - 4) Smoke Contribution Factor (ASTM E84 - MOD): 0.
 - 5) Flame Contribution Factor (ASTM E84 – MOD): 0.
- B. Grout Materials:
1. Polymer Modified Tile Grout for tile or brick:
 - a. PolyBlend Sanded Grout by Custom Building Products, meeting the following minimum requirements:
 - 1) Compressive Strength (ANSI 118.6): 3500 psi minimum.
 - 2) Water Absorption (ANSI 118.6): 5 percent maximum.
 - 3) Smoke Contribution Factor (ASTM E84 - MOD): 0.
 - 4) Flame Contribution Factor (ASTM ED84 – MOD): 0.
 - 5) Color: Natural Gray #9.
- C. Waterproofing Membrane:
1. Single Component, Cold Applied.
 - a. Topical membrane, spray roller, or trowel applied meeting the following requirement:
 - 1) Waterproofing (ANSI 118.10) 28-30 mils thickness when dry (60 mils wet). RedGard by Custom Building Products.

- D. Finished mortar and grout: Resistant to urine, dilute acid, dilute alkali, sugar, brine and food waste products.
- E. Expansion Joint Sealant: Polyurethane type complete with back-up rod and bond breaker materials as necessary. Conform to requirements of Section 07900.
 - 1. Product: MONO 555 by Tremco.

2.4 MIXES

- A. General: Follow manufacturer's recommended written instructions.

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Verify field conditions are acceptable and are ready to receive work. Prepare areas requiring fill, patching, or leveling by using portland cement/sand in accordance with manufacturer's instructions. Gypsum or asphalt based leveling compounds not permitted.
- B. Verify items provided by other sections of work are properly sized and located.
- C. Verify built-in items are in proper location, and ready for roughing into masonry work.
- D. Commencement of work signifies acceptance of substrate.

3.2 PREPARATION

- A. Coordination:
 - 1. Coordinate work under this specification section with work specified under other sections to ensure proper and adequate interface of work.
- B. Protection:
 - 1. Protect all adjacent surfaces from drips, spray, air pollution of surrounding environment and other damage from work under this specification section.
- C. Surface preparation:
 - 1. Prepare surface in accordance with manufacturers instructions and recommendations.
 - 2. Clean substrates of substances (oil, grease, rolling compounds, incompatible primers, loose mill scale, etc.) which could impair bond of materials specified within this section.

3.3 INSTALLATION

- A. General: Install in strict accordance with instructions of manufacturer of mortar additive and ANSI A108.5, CBC Section 1403A.5, and TCA Handbook requirements.
 - 1. Install in accordance with manufacturer's instructions and recommendations unless specifically noted otherwise.
 - 2. Install in accordance with regulatory requirements.
 - 3. Set units plumb, level, and square.
 - 4. Handle units in a manner to prevent chipping and breakage. Do not show chipped edges or corners on exposed faces of units for finished surfaces. Cut, patch, and repair slate veneer as required to accommodate work of other trades. Use motor driven carborundum saw designed to cut masonry with clean sharp corners. Cut units as required to, provide pattern shown and fit adjoining work neatly. Do not use units less than one half size at the corners, jambs and at other locations.

5. Fit units closely where trim, escutcheons or other similar devices will cover edges. Seal around pipe and conduits that go through backing.
- B. Layout:
1. Coursing of Slate Veneer: Running bond.
 2. Establish lines, levels, and coursing indicated. Protect from displacement. Lines shall be straight and true.
- C. Installation – Exterior Walls – Cement Mortar:
1. Over exterior concrete wall substrate, install slate veneer in accordance with TCA Handbook Method W201, unless otherwise directed.
 2. Over exterior metal stud walls with exterior gypsum sheathing, install slate veneer in accordance with TCA Handbook Method W241, unless otherwise directed.
 3. Provide for all slate veneer, minimum 3/8 inch thick scratch coat.
 - a. Tolerance: 1/8 inch in 10 feet measured in any direction.
 - b. Apply Waterproofing Membrane over Portland cement plaster scratch coat in accordance with manufacturer's written instructions.
 - 1) Minimum dried coating thickness: 28-30 mils.
 - 2) Minimum wet film thickness: 60 mils.
 - c. Metal Stud Walls with Exterior Gypsum Sheathing: Apply thin-set bond coat with 1/4-inch x 1/4-inch notched trowel, over waterproof membrane over Portland cement plaster scratch coat as specified in Section 09225 – Acrylic-Modified Portland Cement Plaster. Allow scratch coat to cure a minimum of 48 hours before applying waterproof membrane and setting bed. Allow longer mortar bed cure time of up to 10 days if influenced by environmental conditions at jobsite.
 - d. Apply bonding agent in accordance with manufacturers written instructions. If scratch coat surface is more than 1/8 inch in 10 feet out of plane in any direction, use leveling agent in lieu of bonding agent to bring surface to acceptable tolerance.
- D. Slate Veneer Installation: Allow thin-set bond coat setting bed to cure for a minimum of 21 days before application of slate veneer.
1. Immediately prior to applying mortar, saturate substrate surface evenly but without leaving surface water.
 2. Trowel (back-butter) 1/8 inch to 3/16-inch thick mortar on back of each veneer unit.
 3. Shove and press unit firmly into place onto freshly notched troweled thin-set bond coat.
 4. Apply sufficient pressure to veneer unit so mortar is exuded at all edges assuring complete bond.
- E. Control Joints:
1. Install control joints where slate abuts restraining surfaces such as perimeter walls, curbs, columns, and wall corners, and directly over cold joints and control joints in structural surfaces and conform to architectural details.
 2. Install control joints in exterior wall surfaces spaced a maximum of 20 ft by 20 ft, cut through the setting bed to the supporting structure.
 3. Refer to TCNA - Tile Council of North America – Method EJ171-06.
- F. Grout Joints: Mechanically grouting only; smear grouting not allowed.
1. Do not tool until mortar has taken initial set
 2. Finished grout shall be uniform in color, smooth without voids, pin holes or low spots.
 3. Keep damp for at least 72 hours.
 4. Width of joints: 1/4 inch to 3/8 inch.
 5. Tool joints concave with compact joint mortar using a concave jointer.

- G. Maintain masonry courses to uniform dimension. Form bed and head joints of uniform 1/4 inch thickness.

3.4 REPAIR / RESTORATION

- A. Remove and replace defective materials; correct defective workmanship.

3.5 ERECTION TOLERANCES

- A. Maximum Variation From Unit to Adjacent Unit: 1/16 inch.
- B. Maximum Variation from Plane of Wall: 1/4 inch in 10ft and 1/2 inch in 20 ft.
- C. Maximum Variation from Plumb: 1/4 inch per story non-cumulative.
- E. Maximum Variation from Level Coursing: 1/8 inch in 3 ft and 1/4 inch in 10ft; 1/2 inch in
- F. Maximum Variation of Joint Thickness: 1/8 inch in 3 ft.
- G. Maximum Variation from Cross Sectional Thickness of Walls: 1/4 inch.

3.6 FIELD QUALITY CONTROL

- A. Section 01 45 23 – Testing and Inspection: Inspections by Independent Testing and Inspection Agency.
- B. Bond Strength and Tests for Adhered Veneer: Veneer shall develop bond to the backing in accordance with CBC 1408.2.1 and ACI 530, Section 6.3.2.4.
 - 1. Perform no less than two shear tests for the adhered veneer between the units and the supporting element. Perform at least one shear test at each building for each 5,000 square feet of floor area of fraction thereof.
- C. Inspect veneer per CBC 1704A.5.1.

3.7 CLEANING

- A. Section 01 74 00 – Cleaning: Final cleaning.
- B. Pointings:
 - 1. Upon completion of work, point holes in joints; fill solid with joint mortar; tool properly.
- C. Cleaning: Keep work clean; remove excess materials and mortar droppings daily.
 - 1. Finished grout shall be uniform in color, smooth without voids, pinholes or low spots.
 - 2. Clean soiled surfaces with cleaning solution which will not harm brick, joint materials, or adjacent surfaces. Consult brick manufacturer for recommended type, such as Custom Masonry Cleaner by PoSoCo. Muriatic Acid Solution is not allowed.
 - 3. After joint has hardened, wet finished surfaces; clean by either bucket or brush hand cleaning, using approved brick cleaner, or low-pressure water blast immediately after cleanings, rinse surfaces with clean water
- D. Finished work: Leave clean and free of mortar stains and with tight mortar joints throughout.

SECTION 05 12 00**STRUCTURAL STEEL FRAMING****PART 1 - GENERAL****1.1 DESCRIPTION**

- A. Section Includes: Provision of structural steel as indicated on the Contract Drawings. Work includes but is not necessarily limited to the following:
1. Structural steel framing, including all structural steel shown on the structural drawings and all standard shapes, plates and rods shown on the Architectural, Mechanical and Electrical drawings that connect to the building structure.
 2. Welded stud connectors for composite construction, concrete engagement, and attachment of building components.
 3. Anchor rods.
 4. Shop painting.

1.2 REFERENCES

- A. Requirements of GENERAL CONDITIONS and DIVISION NO. 1 apply to all Work in this Section.
- B. Published specifications, standards, tests, or recommended methods of trade, industry, or governmental organizations apply to Work of this Section where cited by abbreviations noted below (latest editions apply).
1. California Code of Regulations, Title 24, Part 2, also known as the California Building Code (CBC), 2007 Edition.
 2. ASTM International:
 - a. ASTM A6 – Standard Specification for General Requirements for Rolled Structural Steel Bars, Plates, Shapes, and Sheet Piling.
 - b. ASTM A36 – Standard Specification for Carbon Structural Steel.
 - c. ASTM A108 – ASTM A108 - Standard Specification for Steel Bar, Carbon and Alloy, Cold-Finished.
 - d. ASTM A153 - ASTM A153/A153M - Standard Specification for Zinc Coating (Hot-Dip) on Iron and Steel Hardware.
 - e. ASTM A307 - ASTM A307 - Standard Specification for Carbon Steel Bolts and Studs, 60 000 PSI Tensile Strength.
 - f. ASTM A325 – ASTM A325 - Standard Specification for Structural Bolts, Steel, Heat Treated, 120/105 ksi Minimum Tensile Strength.
 - g. ASTM A563 - Standard Specification for Carbon and Alloy Steel Nuts.
 - h. ASMM A780 – Standard Practice for Repair of Damaged and Uncoated Areas of Hot-Dip Galvanized Coatings.
 - i. ASTM B695 – Standard Specification for Coatings of Zinc Mechanically Deposited on Iron and Steel.
 - j. ASTM C1035 – Standard Specification for Lead and Cadmium Extracted from Glazed Ceramic Cookware.
 - k. ASTM F436 - Standard Specification for Hardened Steel Washers.
 - l. ASTM F844 – Standard Specification for Washers, Steel, Plain (Flat) Unbonded for General Use.
 - m. ASTM F959 - Standard Specification for Compressible-Washer-Type Direct Tension Indicators for Use with Structural Fasteners.
 - n. ASTM F1554 – Standard Specification for Anchor Bolts, Steel, 36, 55, and 105-ksi Yield Strength.

- E. **Nondestructive Testing:** Nondestructive testing (NDT) includes magnetic particle testing (MT), penetrant testing (PT), radiographic testing (RT), and ultrasonic testing (UT). The terms nondestructive examination (NDE) and nondestructive testing (NDT) are synonymous.
- F. **Protected Zone:** The Protected Zone is defined as structural members, or portions thereof, to which connections of structural and non-structural elements are limited. The Protected Zone is designated on the structural drawings.
- G. **Quality Assurance Plan:** The Quality Assurance Plan is set of the written requirements containing the set of procedures that are to be followed by the Owner's Testing Laboratory to confirm compliance with these requirements.
- H. **Seismic-Load-Resisting System (SLRS):** The Seismic-Load-Resisting System (SLRS) is defined as all items designated "SLRS" on the Structural Drawings, including columns, beams, and braces, and their connections along grid lines denoted "SLRS" on the framing plans.

1.4 QUALIFICATIONS

- A. **Steel Fabricator's Qualifications:** Fabricator shall have had not less than 5 years' experience in fabrication of structural steel and be able to furnish evidence of his ability, facilities, proficiency of his personnel and completed projects.
- B. **Steel Erector's Qualifications:** Erector shall have had not less than 5 years' experience in erection of structural steel and be able to furnish evidence of his ability, facilities, proficiency of his personnel and completed projects.
- C. **Welder Qualifications:** Welders, welding operators, and tackers shall be qualified in accordance with AWS D1.1 and CBC Section 2231A.5.
 - 1. Welders shall have a valid Welding Performance Qualification Record (WPQR) for each welding procedure to be performed.
 - 2. Welders whose work fails to pass inspection shall be requalified before performing further welding.
 - 3. **Supplemental Welding Personnel Testing:** Welders and welding operators performing work on bottom-flange Demand-Critical Welds shall pass Supplemental Welder Qualification Testing, as prescribed in FEMA 353, Part I, Appendix B, using the process and highest deposition rate to be used in the work. FCAW-S and FCAW-G shall be considered separate processes for welding personnel qualification. Tack welders need not perform such Supplemental Testing.
 - 4. **Qualification Period:** Personnel who have not welded for a period of three or more months shall be requalified. Welding personnel required to be tested using the Supplemental Welding Personnel Testing shall be qualified by test within 12 months prior to beginning welding on the project.
 - 5. The Contractor shall pay costs of certifying qualifications and requalifications.

1.5 QUALITY ASSURANCE

- A. **Welding Inspector Qualifications:**
 - 1. All Welding Inspectors shall be trained and thoroughly experienced in inspecting welding operations, and qualified as Certified Welding Inspectors (CWI) in accordance with AWS D1.1 and AWS QC1.
 - 2. **NDT Personnel Qualifications**
 - a. NDT personnel shall be qualified under one of the ASNT documents referenced in this specification. NDT performed by NDT Level I personnel shall be under the close, direct supervision of an NDT Level II.
 - b. **Demand-Critical Welds:** UT may be performed only by UT technicians certified as Level II by their employer, or as ASNT Level III certified by examination by the ASNT. Ultrasonic testing technicians who perform flaw

detection or sizing shall be trained in applicable UT procedure and shall demonstrate their competence through testing as prescribed in FEMA 353, Part I, Appendix E.

- B. **Bolting Inspector Qualifications:** Competency shall be demonstrated through the administration of a written examination and through the hands-on demonstration by the Inspector of the methods to be used for bolt installation and inspection.
- C. **Submittals:** The Owner's Testing Laboratory will submit the following items:
1. **Quality Assurance Plan:** The Quality Assurance Plan shall contain the Quality Assurance and Inspection items contained in this Section.
 2. **Qualifications of Owner's Testing Laboratory management and personnel designated for the project.**
 3. **Qualification records for Owner's Testing Laboratory's Inspectors and NDT technicians designated for the project.**
 4. **Owner's Testing Laboratory's Quality Control Plan for the monitoring and control of the Agency's operations.**
 5. **Written Practice for Owner's Testing Agencies:** The Owner's Testing Laboratory shall maintain a Written Practice for the selection and administration of inspection personnel, describing the training, experience and examination requirements for qualification and certification of inspection personnel, including those of subcontracting agencies. The Written Practice shall also describe the Agency's procedures for determining the acceptability of the structure in accordance with the applicable codes, standards, and specifications. The Written Practice shall also describe the Agency's inspection procedures, including general inspection, material controls, visual welding inspection, and bolting inspection.
 - a. **Bolting Inspection Procedures:** Comply with RCSC Specification and the Quality Assurance Plan.
 - b. **Welding Inspection Procedures:** Meet the requirements of the AWS D1.1 and the Quality Assurance Plan.
 - c. **Nondestructive Testing Procedures:** The Written Practice shall describe the responsibility of each level of certification for determining the acceptability of material and welds in accordance with the applicable codes, standards, specifications and procedures.

1.6 SUBMITTALS

- A. The following items shall be submitted to the Architect for review. One reproducible copy will be returned. Do not fabricate material prior to obtaining final review of submittals.
1. **Manufacturer's test reports and literature describing products excluding those listed in Paragraph 1.6.B.**
 2. **Shop and Erection Drawings.** Prior to the start of fabrication and erection, submit detailed shop and erection drawings for all structural steel showing:
 - a. **Size and location of all structural members and connection material.**
 - b. **Type, size and location of bolts and welds.**
 - c. **Identification of high-strength bolted joints as snug-tight, pretensioned or slip-critical, as required by the Contract Documents.**
 - d. **Locations where the Construction Documents require backing bars to be removed.**
 - e. **Locations where the Construction Documents require supplemental fillet welds where backing is permitted to remain.**
 - f. **Locations where the Construction Documents require weld tabs to be removed.**
 - g. **Identification of members and connections of the Seismic-Load-Resisting System.**
 - h. **Location and dimensions of the Protected Zone.**
 - i. **Identification of welds in the Seismic-Load-Resisting System.**
 - j. **Identification of Demand-Critical Welds.**

- k. Identification of connections and members, or portions thereof, to be treated as AESS.
 - l. Shop and erection drawings shall clearly identify revisions and revision dates in accordance with AISC2.
 - m. Shop drawings shall include the following additional information:
 - 1) Complete information necessary for the fabrication of members including cuts, copes, holes, doubler plates, stiffeners, and camber.
 - 2) Surface preparation and finishes, including both painting and grinding.
 - 3) Material grades of all members, connection material, fasteners, and weld filler metal.
 - 4) Connection details drawn to scale for members of the Seismic-Load-Resisting System.
 - 5) With each set of shop drawings include corresponding erection drawings identifying pieces.
 - n. Erection drawings shall include the following additional information:
 - 1) Identification mark of members.
 - 2) Orientation and relation of members to appropriate grid lines.
 - 3) Setting elevations for column bases.
 - 4) Standard and special details for field connections.
 - 5) Identification of joints or groups of joints in which a specific assembly order, welding sequence, welding technique, or other special precautions are required.
- B. The following items shall be submitted to the Architect and Owner's Testing Laboratory. Submittal to the Architect is for record purposes only. No copies will be returned by the Architect.
- 1. Manufacturer's test reports and literature describing products:
 - a. Structural Steel: Material test reports (MTRs), also called mill test reports, for all structural steel. MTRs shall comply with the requirements of ASTM A6. MTRs shall be accompanied by a Certificate of Compliance from the fabricator. Structural steel shall be identified in accordance with CBC Section 2203A.
 - b. Fastening Material: Manufacturer's Certifications for fastener components, including bolts, nuts, washers, and direct tension indicators (if used), accompanied by a Certificate of Compliance from the Contractor. Manufacturer certifications shall contain:
 - 1) Heat analysis, heat number, and a statement certifying that prohibited elements were not added to produce the bolts.
 - 2) Results of hardness, tensile, and proof load tests, as required and performed.
 - 3) If galvanized, measured zinc coating weight or thickness, and the results of rotational capacity tests, including test method used (solid plate or tension measuring device) and lubricant present.
 - 4) Results of visual inspection for bursts.
 - 5) Statement of compliance with dimensional and thread fit requirements.
 - 6) Lot number and purchase order number.
 - c. Welding Consumables: Submit the following items:
 - 1) Manufacturer's Certifications for electrodes, fluxes and shielding gasses to be used. Certifications shall satisfy AWS A5 requirements. In addition submit a Certificate of Compliance from the Contractor supplying the materials. Submit certifications that the product meets any additional requirements of the project.
 - 2) Manufacturer's product data sheets for all welding material to be used. The data sheets shall describe the product, limitations of use, recommended welding parameters, and storage and exposure requirements, including baking and rebaking.

- d. **Welded Stud Connectors:** Submit the following items:
 - 1) Manufacturer's Certification that the studs, as supplied, meet the requirements of AWS D1.1.
 - 2) Certified copies of the stud manufacturer's test reports covering the last completed set of in-plant quality control mechanical tests for the diameter supplied.
 - 3) Certified material test reports from the manufacturer. The Manufacturer's Certification shall be accompanied by a Certificate of Compliance from the Contractor.
2. **Bolting and Welding Procedures:** Procedures shall assign responsibility to a person or position and shall contain enough detail to be useful to the workforce without reference to governing specifications. The procedures need not act as work instructions. Procedures shall be dated and indicate the person or position that has the authority to maintain the procedure.
 - a. **Fastener Installation Procedures:** Submit written procedures for the pre-installation testing, installation, snugging, pre-tensioning, and post-installation inspection of high strength fasteners.
 - b. **Welding Procedure Specifications (WPSs):** Welding Procedure Specifications (WPSs) shall conform to the requirements of AWS D1.1. Submit Welding Procedure Specifications (WPSs) and Procedure Qualification Records (PQR) as required by AWS D1.1, to be used on the project to the Owner's Testing Laboratory.
 - c. Use forms provided in Annex E of AWS D1.1 or equivalent.
 - d. **Weld Sequence Procedures:** Submit written procedures indicating field welding sequences for each type of connection with multiple field-welded joints, and the sequence of such connections to be field-welded at each level.
 - e. **Weld Shrinkage and Distortion Control Plan:** Where shrinkage is likely to cause distortion or other problems, submit a mitigation plan. The contractor is responsible for determining conditions requiring a Weld Shrinkage and Distortion Control Plan.
3. **Welding Performance Qualification Records (WPQRs):** Written Welding Performance Qualification Records (WPQRs), in accordance with AWS D1.1, for all welders on the project. Submit documentation that the welder has passed all designated supplemental welder qualification testing required for the types of welding to be performed. Submit documentation showing that the welder continued to use the applicable welding process on an ongoing basis since the WPQR test was conducted.
4. **Samples:** Material samples shall be provided as requested by the Structural Engineer or Owner's Testing Laboratory.

1.7 STRUCTURAL STEEL PRE-CONSTRUCTION CONFERENCE

- A. Prior to performing any fabrication or erection work, the Owner's Representative, Architect, Structural Engineer, and Owner's Testing Laboratory, together with Steel Fabricator personnel and Steel Erector personnel supervising the shop, field and Quality Control work shall hold a Pre-construction Conference to review submittal requirements, welding procedures, bolting procedures, fabrication and erection issues, and inspection requirements for all structural steel operations.

1.8 PRODUCT DELIVERY, STORAGE AND HANDLING

- A. Deliver, store, and handle packaged materials in original containers with seals unbroken and labels intact until time of use.
- B. Structural steel shall be stored and handled in a manner that prevents damage or distortion. Discharge materials carefully; do not dump onto ground.

- C. Do not store materials on the structure in a manner that might cause distortion or damage to members of the supporting structure.
- D. Store structural steel members, whether on or off site, above ground on platforms, skids, or other support; store other materials in weather-tight, dry place until use.
- E. Store materials to permit easy access for inspection and identification.
- F. Electrode Requirements:
 - 1. Packaging of weld filler metals shall conform to the requirements of AWS D.1.1. FCAW electrodes shall be received in undamaged moisture-resistant containers. They shall be protected against contamination and injury during shipment and storage. When removed from protective packaging and installed on machines, care shall be taken to protect the electrodes and coatings from deterioration or damage.
 - 2. Modification or lubrication of an electrode after manufacture is not permitted, except that drying shall be permitted when recommended by the manufacturer.
 - 3. Electrode Storage and Exposure Limits for Demand-Critical Welds: The exposure time limit for FCAW electrodes shall be based upon the results of tests as prescribed in FEMA 353 Part I, Appendix D. Spools shall be identified to facilitate monitoring of total atmospheric exposure time. FCAW electrodes that have been exposed for periods exceeding the allowable atmospheric exposure may be baked as per D1.1 if manufacturer's testing and recommendations show that baking is effective.
- G. Fasteners shall be stored in a protected place. Except for ASTM F1852 "twist-off" type assemblies, clean and relubricate bolts, nuts and washers that become dry or rusty before use. F1852 fastener components may be relubricated following the manufacturer's written instructions, and must be retested after relubrication and prior to use to verify suitability for installation.

1.9 JOB CONDITIONS

- A. Provide the Owner's Testing Laboratory with free access to places on and off job site where materials are stored or fabricated, to places where equipment is stored or serviced, and to job site.
- B. Sequencing, Scheduling:
 - 1. Notify the Architect and Owner's Testing Laboratory in sufficient time prior to shop or field fabrication and erection to permit testing and inspection without delaying Work.
 - 2. Ensure timely delivery of items to be embedded in work of other sections; furnish setting drawings and directions for installation
 - 3. Provide templates for setting of anchor rods.

PART 2 - PRODUCTS

2.1 MATERIALS

- A. Steel Shapes, Plates, Tube, Pipe, and other sections: As noted on drawings.
- B. Standard Threaded Fasteners:
 - 1. Machine Bolts and Nuts: ASTM A307, Grade A.
 - 2. Plain Washers: ASTM F844.
 - 3. Beveled Washers: ANSI B18.23.1.
- C. High Strength Bolts, Nuts, and Washers:
 - 1. ASTM A325-N, snug-tight, unless otherwise noted.
 - 2. Bolted joints in the Seismic-Load-Resisting System shall be Slip-Critical, with pretensioned high-strength bolts and a Class A faying surface or better.

3. Twist-off-Type Tension-Control Bolt Assemblies: ASTM F1852.
 4. Direct Tension Indicators: Load Indicator Washers: ASTM F959
 5. Nuts for High Strength Bolts: ASTM A563.
 6. Washers for High Strength Bolts: ASTM F436.
- D. Welding materials:
1. Comply with AWS D1.1 with a nominal 70 ksi tensile strength.
 2. Supplemental Requirements for the Seismic-Load-Resisting System:
 - a. Toughness and Elongation: Weld filler metals shall be capable of providing welds with the following minimum mechanical property requirements using AWS A5 classification test methods:
 - 1) CVN toughness of 20 ft-lb at -20 degrees Fahrenheit.
 - 2) Elongation: 22% minimum.
 - b. Weld filler metals shall be low-hydrogen per AWS D1.1.
 - c. Weld procedures shall conform to the Hydrogen Control Method in AWS D1.1 Annex XI.
 3. Demand-Critical Welds: In addition to the requirements for Seismic-Load-Resisting System welds, employ weld filler metals capable of providing welds with a minimum CVN toughness of 40 ft-lb at 70 degrees Fahrenheit, using AISC3, Appendix X test conditions and specimens in lieu of those in AWS A5.
- E. Welded Stud Connectors:
1. Headed Shear Studs: AWS D1.1 "Type B" automatic end-welded headed studs made from ASTM A108, Grade 1015 or 1020.
 2. Threaded Studs: Automatic end-welded threaded studs made from ASTM A108, Grades 1010 through 1020.
- F. Anchor Rods and Nuts: ASTM F1554; Grade as noted on drawings.
1. Grade 55 shall be weldable per supplement S1.
 2. Grade 55 shall have a minimum CVN toughness of 15 ft-lbs at 40 degrees Fahrenheit per supplement S4.
 3. Grade 105 shall have a minimum CVN toughness of 15 ft-lbs at -20 degrees Fahrenheit per supplement S4.
- G. Threaded Rods: ASTM A36.
- H. Clevises and Turnbuckles: AISI C-1035; in addition clevises and turnbuckles shall have design strengths corresponding to the AISC Manual of Steel Construction (LRFD) with ultimate capacities at least 200% of the tabulated values.
- I. Primer:
1. Interior steel: primer shall conform to SPC Paint Specification No. 13.
 2. Exterior steel: primer shall conform to SPC Paint Specification No. 20 (Zinc-Rich Primer)
 3. Primers shall contain no lead or chromates.
 4. Contractor shall verify compatibility with finish paint.
- J. Zinc-Rich Coating for Repair of Galvanized Surfaces: Zinc-rich coatings shall meet the requirements of ASTM A780.
- K. Steel shall conform to the requirements of CBC Section 2202A.1.

2.2 FABRICATION

- A. General Requirements:
1. Fabricate structural steel in accordance with AISC1 (Chapter M and the first paragraph of J2.), AISC2, and AWS D1.1 as applicable to Statically Loaded Structures, except as otherwise noted herein.

- a. Assume all thermally cut edges are subject to tension stresses.
 - b. Delete paragraphs M4.6 and M5.1 from Chapter M of AISC1.
 2. Fabricate and assemble work in shop to greatest extent possible.
 3. Where possible, use procedures that do not require Architect's approval. Such approval may not be given in some circumstances.
 4. Coordinate as required for attachment of other work to structural steel.
 5. Where required for passage of reinforcing steel shapes, sections, plates, or bars, drill or punch holes as indicated on Contract Drawings. Notify Architect of conditions not shown or noted.
 6. Allowable Tolerances: Comply with AISC1, Chapter M, and AISC2, Section 6. Where more restrictive tolerances are necessary to properly install other building systems and components then adopt the more restrictive tolerances.
 7. Architecturally Exposed Structural Steel (AESS): All structural steel denoted "AESS" on the drawings shall be fabricated in accordance with the requirements of Section 10 of the AISC2.
 8. Holes and attachments to structural steel in areas designated as the Protected Zone are not allowed except as explicitly shown or noted on structural drawings.
- B. Connections:
1. Shop Connections: Bolted or welded as noted.
 2. Field Connections: Locate splices only where noted or approved by Architect.
 3. To the extent possible, assemble structural steel in the shop prior to galvanization.
- C. Bolted Joints:
1. Punch or drill holes $1/16"$ larger than bolt size. Material having thickness in excess of connector diameter plus $1/8"$ shall be drilled rather than punched.
 2. Ream unfair holes, but only up to next larger bolt size and install a bolt corresponding to the new hole size. Where unfairness exceeds maximum, weld hole in base material solid and drill hole of proper size.
 3. Remove burrs that would prohibit solid seating of connected parts.
 4. Mark completely tightened bolts with identifying symbol.
 5. Provide hardened washers over slotted holes.
 6. Draw up tight, check threads with chisel or provide approved lock washers where bolts are not pretensioned.
 7. Assembly with Standard Threaded Fasteners: Provide beveled washers under bolt heads or nuts resting surfaces exceeding five percent slope with respect to head or nut
 8. Assembly of High-Strength Structural Bolted Joints:
 - a. Meet requirements of RCSC.
 - b. Seismic-Load Resisting System joints shall be slip-critical (friction-type) as defined in RCSC with Class A or better faying surfaces.
 - c. Provide hardened washers under provided under the element turned in the tightening procedure of high strength bolts.
 - d. Direct tension indicator washers, where used, shall be provided under the head of slip-critical high strength bolts.
- D. Welded Construction: (shop and field)
1. Weld in accordance with AISC1, AWS D1.1, and CBC Chapter 22A.
 2. Welding shall be performed in accordance with the WPS for the joint.
 3. Welds that will be permanently exposed to view shall have burrs, flux, welding oxide air spots, and discolorations removed. Surfaces of such welds shall be reasonably smooth and uniform.
 4. Exterior welds shall be watertight.
 5. Exposed welds in AESS shall be ground, dressed smooth, and flush with adjacent surfaces
 6. Each welder working on the project shall be assigned an identification symbol or mark. Each welder shall mark or stamp this identification symbol at each weld completed. Stamps, if used, shall be the low-stress type.

7. Before testing, all welds to be subjected to ultrasonic testing (UT) shall be given a visible mark, "for UT," accurately placed on the steel a distance of 4" away from the root of the edge preparation.
8. Groove welds shall be complete-joint-penetration welds, unless specifically designated otherwise.
9. WPSs shall be available to welders and inspectors prior to and during the welding process. Prior to welding, joint fit-up shall be verified by the welder for conformance with the WPS and AWS D1.1.
10. Supplemental Welding Requirements
 - a. Maximum Preheat and Interpass Temperature: The maximum preheat and maximum interpass temperature permitted is 550° F, measured at a distance of 1" from the point of arc initiation. This maximum temperature may not be increased by the WPS, regardless of qualification testing.
 - b. Nonfusible Backing: The use of nonfusible backing materials, including ceramic and copper, is permitted only with satisfactory welder qualification testing performed using the type of backing proposed for use and using the test plate shown in AWS D1.1, Figure 4.21, except that groove dimensions shall be as provided in the WPS and PQR. For nonfusible weld tabs and short segments of nonfusible backing bars used at the ends of welds between shear plates and column faces, or at the ends of continuity plate welds, special welding personnel and welding procedure qualification testing is not required.
 - c. Peening, Controlled Cooling, and Post-Weld Heat Treatment (PWHT): If peening, controlled cooling, or PWHT are used, they shall be performed in accordance with AWS D1.1 and a written procedure for their performance shall be incorporated into the appropriate WPS.
 - 1) If insulating blankets are used to control cooling a written procedure and temperature measurements are not required.
 - 2) The application of heat immediately following completion of a joint to maintain a nominal temperature at or below 550° F is not considered PWHT.
 - d. Intermix of Filler Metals: For Demand-Critical Welds in which different weld filler metals are used, supplemental toughness testing shall be conducted as prescribed in FEMA 353, Part I, Appendix C.
 - e. Wind Velocity Limits: In the Seismic-Load-Resisting-System, in lieu of the wind speed limitations in AWS D1.1, welds using GMAW, FCAW-G, GTAW and EGW methods shall not be performed when the wind velocity in the immediate vicinity of the weld exceeds three miles per hour. Welding performed within an enclosed area, and not subject to drafts may be deemed to satisfy this requirement. For SMAW, FCAW-S, and SAW processes wind shall not affect the appearance of the molten weld puddle.
11. Welded Joint Details:
 - a. Backing bars: The use of backing bars shall be in accordance with AWS D1.1, AISC3, and/or FEMA-353 as applicable. Backing bars shall be removed where required by the Contract Documents or AWS D1.1.
 - 1) Beam-Column Connection Joints Requiring Removal of Backing Bars: Following removal of backing, remove un-sound weld metal at the root area and any excessive weld discontinuities, and backweld. Minimize gouging and removal of base metal. A reinforcing fillet weld with a minimum leg size of 5/16" or the root opening plus 1/16", whichever is larger, shall be provided. Perform MT on the fillet weld and the immediately adjacent area.
 - 2) If groove weld backing is permitted to remain, the backing shall not exceed 3/8" thickness. For connections of the seismic-load-resisting system in which backing is not removed, backing shall be attached to the member or plate that does not have its surface prepared for the groove weld. Attachment shall be by either a 1/4" fillet or 1/8" groove weld along the complete bar length on the side

- of the bar opposite the groove weld.
- b. Weld dams are not allowed.
 - c. Weld Tabs:
 - 1) Use of Weld Tabs: Welds shall be terminated at the end of a joint in a manner that will ensure sound welds. Whenever necessary, this shall be done by use of weld tabs.
 - a) Weld tabs shall extend beyond the edge of the joint a distance equal to a minimum of the part thickness, but not less than 1".
 - b) Weld tabs shall be oriented parallel to the joint preparation and to the weld direction.
 - c) Nonfusible weld tabs may be used in applications and locations where qualified in accordance with AWS D1.1, Section 4.
 - 2) SLRS Beam-Column Connection Weld Tab Removal and Finish:
 - a) Weld tabs of SLRS connections shall be removed. Removal may be performed by air carbon arc cutting (CAC-A), grinding, chipping, or thermal cutting to within 1/8" of the base metal surface. For continuity plate weld tabs, removal within 1/4" of the plate edge is adequate. The process shall be controlled to minimize removal of base metal except for that material immediately adjacent to the weld. The edges where the weld tabs have been removed shall be finished Extra Smooth.
 - b) In SLRS connections, gouges deeper than 1/16" at locations of removal of weld tabs shall be repaired by welding according to the requirements of this Specification for Deep Gouges. Weld filler metal requirements for Demand-Critical Welds apply. The contour of the weld at the ends shall provide a smooth transition, free of gouges and sharp corners. A minimum radius at the corner need not be provided.
 - c) Following weld tab removal, finishing, and completion of any necessary repairs, the exposed ends of the weld shall be inspected using magnetic particle testing (MT) or Penetrant Testing (PT).
 - d. Weld toes: Weld toes, whether for groove welds or fillet welds, shall provide a smooth transition between the weld and base metal. The as-welded profile is adequate provided it satisfies the criteria of AWS D1.1, Section 5.24.
 - e. Weld access holes:
 - 1) Weld access holes shall meet the dimensional, surface finish, and testing requirements of AISC1 Chapter J1.6 and AWS D1.1, except as otherwise required by the Contract Documents.
 - 2) Where the height of the weld access hole exceeds the quantity $k+1\frac{1}{2}"$ or where the length of the weld access hole exceeds 4 t_f (where k and t_f are defined in AISC1), welded reinforcement is required. Notify the Architect for specific instruction.
 - 3) At welded flange joints that are part of the Seismic Load Resisting System, the weld access hole detail shown in Figure 11-1 of the AISC3 shall be used.
 - 4) The SLRS access hole shall be ground Extra Smooth. Gouges at SLRS access holes shall be repaired according to the requirements of this Specification. Weld filler metal requirements for the Demand-Critical Welds apply. Prior to acceptance,
 - 5) SLRS weld access holes shall be inspected using magnetic particle testing (MT) or liquid penetrant testing (PT) and shall be free of cracks. If a welded gouge repair has been performed, magnetic particle testing (MT) shall be performed.

- f. Web weld details: A minimum clear distance of 1/2" shall be provided between the weld access hole and fillet welds connecting the shear plate and beam web.
 - g. Welding for Moment Connection of Bottom Beam Flange shall be sequenced so as to minimize residual stresses in the joint.
 - h. Weave Passes: Weave passes are not permitted in groove welds in the SLRS.
 - i. Column continuity plate details:
 - 1) If backing bars are used and remain in place, they shall receive a reinforcing fillet weld between the backing bar and column flange. No fillet weld should be placed between backing bar and continuity plate.
 - 2) Weld terminations near the end of the column flange tips may be completed using weld tabs. Weld tabs shall be removed to within 1/4" of the continuity plate edge and the surface finished Extra Smooth. Following finishing, the edge shall be inspected using MT. For continuity plate welds, terminations near the internal radius of the member need not be made using weld tabs. Fillet weld terminations between the continuity plate and column web shall be approximately 1/4" from each end of the joint
 - j. Tack Welds in the SLRS Protected Zones: Tack welds in the SLRS Protected Zones are permitted only if they are incorporated into a required weld.
- E. Camber: Provide camber as indicated on contract drawings in accordance with AISC1 Chapter M2.1.
- F. Welded Connectors: Install in accordance with AWS D1.1 and manufacturer's recommendations. There shall be no porosity or evidence of lack of fusion between the end of the stud and the steel member.
- G. Repair of Discontinuities in Protected Zone of Seismic-Load-Resisting System.
- 1. Repair of Discontinuities: If erection aids within the Protected Zone cannot be avoided, the Structural Engineer's approval of the aid's placement, use, and the repair method is required. Air carbon arc gouging is permitted for the removal of welds to within 1/8" of the base metal surface. Any remaining weld deposits shall be removed by grinding to a depth 1/16" below the surface, faired to adjacent surfaces on a slope not to exceed 1:5.
 - 2. Air Carbon Arc Cutting and Thermal Cutting: Air carbon arc cutting (CAC-A) and thermal cutting is permitted in the Protected Zone with the prior approval of the Structural Engineer for the removal of backing bars and weld tabs, as specified in these documents.
 - 3. Gouges in members and connections in the Seismic-Load-Resisting System shall be repaired according to the requirements of this Specification. Weld filler metal requirements for the Seismic-Load-Resisting System apply, unless otherwise noted.
- H. Surface Finish:
- 1. Flush Surfaces: Welds in butt joints required to be flush shall be finished so as to not reduce the thickness of the thinner base metal or weld metal by more than 1/16", or 5% of the material thickness, whichever is less. Remaining reinforcement shall not exceed 1/32" in height. However, all reinforcement shall be removed where the weld forms part of a faying or contact surface. All reinforcement shall blend smoothly into the plate surfaces with the transition areas free from undercut.
 - 2. Finish Methods and Values: Chipping and gouging may be used, provided these methods are followed by grinding. Where surface finishing is required, surface shall be Extra Smooth, unless otherwise noted or specified in this document. Measurement of surface finish values by visual appearance or tactile comparison is acceptable.

- I. Repair of Gouges: Gouges are not permitted in areas requiring an Extra Smooth finish surface, or where specifically prohibited by AWS D1.1 or this Specification. Repair of gouges meet the following requirements, unless otherwise noted:
 1. Shallow Gouges: Gouges up to 3/16" deep shall be removed by grinding as per D1.1, or to a radius of not less than 3/8".
 2. Deep Gouges: Gouges deeper than 3/16" shall be repaired by welding. Prior to welding, gouges shall be ground to provide an Extra Smooth contour with a radius not less than 3/8". The repair area shall be preheated to a temperature between 400° F and 550° F, measured at the point of welding approximately one minute after removal of the heating source, or shall be preheated in accordance with AWS D1.1 Annex XI for high restraint. A written repair WPS for the application shall be followed. Following completion of welding, the area shall be ground Extra Smooth, with fairing of the welded surface to adjoining surfaces where applicable, and shall be inspected using magnetic particle testing (MT).
 3. The transitional slope after gouge removal shall not exceed 1:5.

2.3 FINISHES

- A. Prime Painting:
 1. Surfaces to be painted:
 - a. See SECTION 09 90 00 "PAINTING AND COATING" for structural steel surfaces permanently exposed to weather.
 - b. Apply one coat of primer to AESS members and members to be painted unless otherwise noted.
 - c. Do not prime paint following surfaces:
 - 1) Surfaces to be encased in concrete except initial 2".
 - 2) Surface to be field welded.
 - 3) Surface to receive sprayed-on fireproofing.
 - 4) Contact surfaces joined by high-strength bolts.
 2. Preparation of Surfaces:
 - a. Thoroughly clean mill scale, rust, dirt, grease, and other foreign matter from steel prior to painting.
 - b. Where hand-cleaning methods are inadequate, clean in accordance with SPC-SP1, SPC-SP 2, or SPC-SP 7, as required.
 3. Painting:
 - a. Apply primer in accordance with manufacturer's specifications to provide minimum dry film thickness of 1.0 mils per coat.
 - b. Permit thorough drying before shipment.
 - c. Do not prime in temperatures lower than 45 degrees Fahrenheit.
- B. Galvanization
 1. Galvanize steel where required by the Drawings or by other sections of the Specification.
 2. Galvanize Shapes in accordance with ASTM A153.
 3. Galvanize Fasteners in accordance with ASTM B695, Class 40 minimum.

2.4 SOURCE QUALITY ASSURANCE

- A. The Owner's Testing Laboratory will:
 1. Review ladle analysis and certificates of compliance. Where certification is questionable, test material to verify compliance per CBC Section 2231A.1.
 2. Inspect shop fabrication per CBC Section 2231A.2.
 3. Provide the management, personnel, equipment, and services required to perform the quality assurance functions required below.
 4. Verify that no improper attachments to the Protected Zone have been made.
 5. Forward copies of all product and procedure certificates, data sheets, and test and inspection reports to the Owner, Architect, Structural Engineer, Contractor, and DSA.

B. **Welding Inspection:** The Welding Inspector will perform the tasks indicated in the following list. This list shall not be considered exclusive of any additional inspection tasks that may be necessary to meet the requirements of AWS D1.1, CBC Section 2231A.5, and the Quality Assurance Plan

1. Review and understand the applicable portions of the specifications, the Contract Documents and the shop drawings for the project.
2. Verify that all applicable welder qualifications, welding operator qualifications and tack welder qualifications are available, current, accurate, and in compliance with these specifications.
3. Verify welder identification and qualification. Verify that any required supplemental welder qualification testing, if required for the joint, has been executed and that the welder has passed.
4. Verify that each welder has a unique identification mark or die stamp to identify welds.
5. Verify that all applicable Welding Procedure Specifications (WPSs), with Procedure Qualification Records (PQRs) as needed, are available, current and accurate, and comply with AWS D1.1 and this specification.
6. Verify that an approved Welding Procedure Specification (WPS) has been provided and that each welder performing the weld has reviewed the WPS. A copy of the appropriate WPS shall be available for each joint, although need not be present at each joint location.
7. Review mill test reports for all main member and designated connection base material for compliance with the project requirements.
8. Verify base material identification with the contract documents.
9. Verify the electrode, flux and shielding gas certifications for compliance with the Contract Documents.
10. Verify welding consumables with the approved WPSs.
11. Verify that electrodes are used only in the permitted positions and within the welding parameters specified in the WPS.
12. Verify that electrodes and fluxes are properly stored, and that exposure limits for the welding materials are satisfied.
13. At suitable intervals, observe joint preparation, assembly practice, preheat temperatures, interpass temperatures, welding techniques, welder performance and any post-weld controlled cooling and heat treatment to ensure that the requirements of the WPS and AWS D1.1 are satisfied.
14. At suitable intervals, verify current and voltage of the welding equipment in application of the WPS, if needed, by a calibrated amp and voltmeter. Current and voltage shall be measured near the arc with this equipment.
15. Inspect the work to ensure compliance with AWS D1.1 and the specified weld acceptance criteria.
16. Schedule NDT technicians in a timely manner, after the visual inspection is complete and the assembly has cooled. The final NDT on a specific weld shall be performed at least 24 hours after the welding has been completed.
17. Mark the welds, parts, and joints that have been inspected, and accepted, with a distinguishing mark or die stamp, or maintain records indicating the specific welds inspected and accepted by each inspector.
18. Document the accepted and rejected items in a written report. Transmit the report to the designated recipients in a timely manner.

C. **Nondestructive Testing of Welded Joints:**

1. **Magnetic Particle Testing:** Magnetic Particle Testing (MT) shall be conducted by the Owner's Testing Laboratory at the frequency designated in Table 2-1. MT shall be performed in accordance with AWS D1.1, and FEMA 353, Part I Appendix F.
2. **Ultrasonic Testing:** Ultrasonic testing (UT) shall be conducted by the Owner's Testing Laboratory for the percentage of joints designated in Table 2-1. UT shall be performed in accordance with AWS D1.1.
3. **Weld Acceptance Criteria** shall be in accordance with AWS D1.1. Regions of welds that cannot be inspected shall be identified and recorded, and the Structural

- Engineer shall be notified.
4. K-Area Welding Inspection: After welds of continuity plates and doubler plates have cooled to ambient temperature, test column webs for cracking using liquid penetrant (PT) or magnetic particle testing (MT) over a zone 3" above and below each weld.

Table 2-1. Nondestructive Testing Requirements:

Weld Category	Nondestructive Testing Requirements	
	Complete-Joint-Penetration Welds ¹	Partial-Joint-Penetration Welds and Fillet Welds
Welds not described below	No NDT required unless otherwise noted	No NDT required unless otherwise noted
SLRS welds not described below	MT 25% of joints, full length ² UT 25% of joints, full length ²	MT 25% of joints, 6" spot at random ²
Top-flange joints at cantilever beam connections ³	MT 100% of joints, full length UT 100% of joints, full length	MT 100% of joints, full length
Demand-Critical Welds	MT 100% of joints, full length UT 100% of joints, full length ⁴	MT 100% of joints, full length

Notes:

1. UT is required only when the weld thickness is 5/16" or greater.
2. If any joint fails testing, test 100% of joints until 40 consecutive welds pass. The testing rate may then be reduced to 25%.
3. Test joint on each side of cantilever beam support.
4. Reduce the rate of UT to 25% if after 40 welds have been inspected, an individual welder's reject rate is less than 5%.

PART 3 - EXECUTION**3.1 EXAMINATION**

- A. Examine units of Work to be placed and verify that all anchor rods have been installed properly and have sufficient bolt and thread elevation.
- B. Do not begin erection before unsatisfactory conditions have been corrected.

3.2 ERECTION

- A. General Requirements:
 1. Erect structural steel in accordance with AISC1 Chapter M, AISC2, and AWS D1.1 Structural Steel Welding Code as applicable to Statically Loaded Structures.
 2. Requirements for bolted and welded joints specified in Part 2 of this Specification shall also apply to field connections unless otherwise noted.
 3. Erection Tolerances: Do not exceed the erection tolerances specified in AISC2, Section 7. Where more restrictive tolerances are necessary to properly install other building systems and components then adopt the more restrictive tolerances.
 4. Where erection requires performing work of fabrication on site, conform to applicable standards for fabrication.
 5. Architecturally Exposed Structural Steel (AESS): All structural steel denoted "AESS" on the drawings shall be erected in accordance with the requirements of Section 10 of the AISC2.
 6. Ensure steel is plumb, level, and aligned before making final connections.
- B. Anchor rods shall be set in conformance with Section 7.5 of AISC2.

- C. Field Cutting or Alteration: There shall be no field cutting, alteration, or repair of structural steel members or of connections without prior review and approval by the Architect. Structural elements with fabrication errors or that do not satisfy tolerance limits shall be repaired. Submit drawings showing reasons for, and details of, proposed corrective work.
- D. Temporary Shoring and Bracing: Provide shoring and bracing as needed until permanent lateral-support is in place and complete with connections of sufficient strength to bear the imposed loads. Contractor is responsible for identifying the need for temporary shoring and bracing.
- E. Erection Procedures: Control erection procedures and sequences to avoid problems caused by temperature differentials and weld shrinkage, and other sources of expansion and contraction.
- F. Leveling of Column Base Plates: Contractor shall specify the means and methods for leveling the column base plates during erection. The leveling method shall have sufficient strength to support the imposed loads, including construction loading.
- G. Field Assembly:
 - 1. Clean bearing surfaces and surfaces to be in permanent contact before assembling members.
 - 2. Do not fasten members with bearing joints designated on the drawings before abutting surfaces have been brought completely into contact.
 - 3. Bolted Construction:
 - a. Installation of high-strength bolts shall conform to ASTM A325 for slip-critical or snug-tightened type joints, as applicable, in accordance with RCSC. Provide washer under head or nut of high strength bolts. Washer shall be provided under the element being turned during tightening. Bolts in welded connections shall be tensioned after completion of welding.
 - b. At bolted joints designated as Slip-Critical or that require pretension, use Twist-off-Type Tension-Control bolt assemblies or Direct Tension Indicators.
 - c. Do not use flame cutting to align bolt holes except as permitted by RCSC specifications. Ream holes that must be enlarged to admit bolts. Do not enlarge holes to a diameter greater than 1." When reaming beyond 1/32", drill or ream to the next larger hole size and use the next larger size bolt.
 - 4. Mill scale shall be removed from the column in the area where the beam flanges will be welded to the column.
- H. Gas Cutting: Use of flame cutting torch will be permitted only after the Architect's prior written approval and only where metal cut will not carry stress during cutting, and cut surfaces will not be visible. When thermal cutting is permitted, cutting shall be done with a mechanically guided torch or a torch controlled using a guide bar.
- I. Field Touch-Up Painting: After erection, touch-up paint field connections and abrasions resulting from the Work of this Section with same paint used for shop prime painting.
- J. Remove and repair galvanized surface as required for field welding in accordance with ASTM-A780, A2; required thickness is 100 micro-inches. Touch up with zinc-rich coating. Repair material shall extend at least three inches beyond edges of damaged areas.
- K. Protected Zone: Attachments to structural steel in the Protected Zone, other than spot welding of metal deck to beams and welding of metal studs to braces as shown on structural drawings, are not allowed

3.3 CLEANING

- A. After erection, thoroughly clean surfaces of foreign or deleterious matter such as dirt, mud, oil, or grease that would impair bonding of fireproofing, concrete, or other finishes as

applicable.

- B. Architecturally Exposed Structural Steel (AESS).
1. If temporary braces or erection clips are used, remove braces and clips in a manner which prevents unsightly surfaces.
 2. Tack welds shall be ground smooth.
 3. Holes shall be filled with weld filler metal or body solder and ground smooth.
 4. All operations shall be performed such that the close fit and neat appearance of the structure will not be impaired.

3.4 FIELD QUALITY ASSURANCE

- A. Owner's Testing Laboratory will:
1. Verify proper anchor rod group location, elevation, and orientation prior to placement of concrete foundations, and again subsequent to placement of concrete foundations prior to arrival of structural steel.
 2. Perform field welding inspection and testing in accordance with the requirements in Part 2 of this Specification for shop fabrication, unless otherwise noted.
 3. Inspect and test high strength bolted joints in accordance with RCSC and CBC Sections 2231A.2 and 2231A.6.
 4. Sample and test bolt assemblies that include direct tension indicators, on a daily basis to verify proper indication of deformation with required bolt tension for each size and lot. The Inspector shall have a torque wrench, calibrated daily, to verify correlation with proper tension as installation proceeds. Test at least 10 percent of the bolts with a minimum of two per connection from the start of bolting and until waived by the DSA Field Engineer upon demonstration of continued good workmanship.
 5. Inspect erected structural steel as required to establish conformity of Work with reviewed shop drawings and Contract Drawings.
 6. Perform testing and inspection of welded stud connectors in accordance with requirements of AWS D1.1. and CBC Section 2231A.3, except that the test studs shall be subjected to a 90 degree bend test by striking them with a heavy hammer. After the bend test, the weld section shall not exhibit any tearing or cracking.
 7. Inspect structural steel to verify that the Protected Zones of members of the Seismic-Load-Resisting System are free of damage and attachments not approved by the Structural Engineer.
 8. Forward copies of all test and inspection reports to the Owner, Architect, Structural Engineer, Contractor, and DSA.

END OF SECTION

SECTION 05 40 00**COLD-FORMED METAL FRAMING****PART 1 - GENERAL****1.1 DESCRIPTION**

- A. Section Includes: Provision of lightgauge steel stud and joist framing. Work includes, but is not necessarily limited to the following:
1. Non-load bearing steel stud framing at exterior walls.
 2. Interior stud wall and ceiling framing with studs.
 3. Framing accessories.
- B. Related Sections:
1. Section 05 12 00 - Structural Steel Framing.
 2. Section 05 50 00 - Metal Fabrications.
 3. Section 09 20 00 - Gypsum Board Assemblies.
 4. Section 09 22 16 - Non-Structural Metal Framing.

1.2 REFERENCES

- A. Requirements of the GENERAL CONDITIONS and DIVISION 01 apply to all Work in this Section.
- B. Published specifications, standards, tests, or recommended methods of trade, industry, or governmental organizations apply to Work of this Section where cited by abbreviations noted below (latest editions apply).
1. California Code of Regulations, Title 24, 2007 edition, also known as California Building Code (CBC).
 2. American Society for Testing and Materials (ASTM).
 3. Federal Specifications (FS).
 4. American Welding Society (AWS) D1.3: "Structural Welding Code - Sheet Steel."
 5. American Iron and Steel Institute (AISI): "Specifications for the Design of Cold-Formed Steel Structural Members."
 6. Steel Stud Manufacturer's Association (SSMA).
 7. Metal Lath Association (MLA): "Specifications for Metal Lath and Furring."
 8. Society of Protective Coatings (SSPC).

1.3 QUALITY ASSURANCE

- A. Regulatory Requirements:
1. Comply with fire-resistance ratings as indicated and as required by governing authorities and codes.
 2. Provide materials, accessories, and application procedures which have been listed by an approved testing agency or tested according to ASTM E119 for the type of construction shown.
 3. Comply with CBC Section 2203A.3 and AISI requirements for design and identification of cold-formed steel.
- B. Steel stud system shall conform to referenced AISI documents.
- C. Installer: Company specializing in performing the work of this Section with minimum 3 years' documented experience.

- D. Welders: Qualified in accordance with AWS D1.3 for welding process, position, type of weld and type of steel.

1.4 SUBMITTALS

- A. Submit in accordance with provisions of Section 01 32 19, "Submittal Procedures."
- B. Product Data: Manufacturer's ICBO report, specifications and installation instructions for steel studs, fasteners, and accessories.
- C. Experience of installer if requested by Architect.

1.5 PRODUCT DELIVERY, STORAGE AND HANDLING

- A. Procedures: In accordance with Section 01 60 00, "Product Requirements."
- B. Protect framing from rusting and damage.
- C. Deliver in manufacturer's unopened containers or bundles fully identified with name, brand, type and grade.
- D. Store inside a dry, ventilated space, and protect framing from rust and damage.

1.6 JOB CONDITIONS

- A. Coordinate stud sizes and layouts with the work of the various trades. Where ductwork, conduit, piping, casework, and other such items exceed indicated available space, increase stud sizes or make other minor modifications as necessary to accommodate the work at no change in cost of the Work.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

- A. Acceptable Manufacturers: Any member of Steel Stud Manufacturer's Association (ICBO #ER-4943P).

2.2 MATERIALS

- A. Sheet Steel: ASTM A653, A1008 or A1011.
- B. Studs and tracks:
 - 1. See drawings for size and gauge.
 - 2. Galvanization per ASTM A653 with G60 minimum.
- C. Cold-Rolled Furring Channels: As specified in Section 09 22 16, "Non-Structural Metal Framing."
- D. Vertical Deflection Clips (non-load-bearing framing): (If so required by project requirements and as indicated on approval shop drawings.) Manufacturer's standard bypass and head clips as required, capable of isolating wall stud from upward and downward vertical displacement of primary structure using mechanical fasteners. Acceptable Manufacturer: The Steel Network, Inc. (ICC criteria AC261 for metal to metal connections and ICC ESR-1903) or engineer approved equal.

1. VertiClip® series or equal to. Mechanical attachment to structure and screw attachment to stud web using step-bushings to permit frictionless vertical movement.
- E. Drift Clips (non-load-bearing framing): (If so required by project requirements and as indicated on approval shop drawings.) Manufacturer's standard bypass and head of wall clips (as required), capable of isolating wall stud from upward and downward vertical displacement and lateral drift of primary structure using mechanical fasteners. Acceptable Manufacturer: The Steel Network, Inc. (ICBO criteria AC261 for metal to metal connections and ICBO# ER-5623) or engineer approved equal.
1. Drift Clip series or equal. Mechanical attachment to structure and screw attachment to stud web using step-bushings to permit frictionless vertical and lateral movement.
- F. Sliptrack: as indicated on approved drawings. Acceptable Manufacturers: Sliptrack Systems (ICBO #ER-5344) or engineer approved equal.
- G. Partition Stiffeners or Bridging: Unpunched channel shape, formed of 16-gauge steel to required dimensions.
- H. Powder-Driven Fasteners:
1. Tempered-steel pins with special corrosive-resistant plating or coating.
 2. Pins shall have guide washers to accurately control penetration.
 3. Fastening shall be accomplished by low-velocity, piston-driven, powder-accentuated tool.
 4. Pins and tool shall be Hilti Fastening Systems DN-32-P8 (ICBO #2388) or equal product substituted per Section 01 60 00.
- I. Expansion Bolts: Hilti Fastening Systems "Kwik Bolt 3 Concrete Anchors" (ICC ESR-1385), or equal product substituted per Section 01 60 00.
- J. Welding Electrodes: AWS low hydrogen, rod number and diameter as approved by the Owner's Testing Agency.
- K. Bracing: Provide cross diagonal straps, attached as indicated on the Drawings and per stud manufacturer's specifications for frame stability.
- L. Touch-up Primer for Galvanized Surfaces: SSPC Paint 20 zinc rich.
- M. Metal Screws: Self-drilling and self-tapping; No. 8 and larger as noted on Drawings. Screws shall penetrate substrate by a minimum of three full threads exposed. Use low profile heads as required by architectural finish.

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Examine all parts of the supporting structure and the conditions under which studs will be installed.
- B. Notify the Architect, in writing, of any conditions detrimental to the proper and timely completion of the Work.
- C. Do not proceed with the installation of steel studs until unsatisfactory conditions have been corrected.

3.2 PREPARATION

- A. Coordinate details and requirements of other Work which adjoins or fastens to studs and requires backing or special support framing included in this Section.
 - 1. Items requiring backing or support include, but are not necessarily limited to casework, wall-specialties, and similar items.
 - 2. Obtain Architect's approval of backing method proposed to satisfy requirements of this Section which differs from methods noted or shown.

3.3 INSTALLATION

- A. Tracks shall be securely anchored to supporting structure, with fasteners specified at not more than 24-inches on center.
- B. Complete, uniform, and level bearing support shall be provided for the bottom track at each bearing-stud location. Install full metal shims below bottom track at stud locations as needed, or set bottom track in high-strength grout.
- C. Abutting or intersecting pieces or track shall be securely anchored to a common structural element or spliced together.
 - 1. Do not splice studs.
- D. Bearing wall studs shall sit in top and bottom track with 1/16" maximum gap between wall stud and track web.
 - 1. Studs shall be aligned or plumbed and securely fastened to the flanges of both top and bottom track.
 - 2. Space studs 16-inches on center maximum unless otherwise noted on Drawings.
- E. Isolate non-load-bearing steel framing from building structure to prevent transfer of vertical loads while providing lateral support.
 - 1. Connect vertical (and/or drift) deflection clips to studs and anchor to primary building structure in accordance with manufacturer's recommendations.
- F. Framed wall openings shall include a header and multiple studs at each edge of opening as indicated on Drawings.
- G. Diagonal bracing shall be installed at locations indicated for frame stability.
- H. Install bridging as indicated on Drawings.
- I. Form corners and intersections of partitions with three studs. Provide additional studs as indicated or required.
- J. Wire tying of framing members shall not be permitted.
- K. Welded connections shall be made by resistance spot fusion welding, fillet welding, or plug welding and shall be done in accordance with the latest recommended procedures and practices of the American Welding Society.
- L. Do not cut or notch stud flanges or cut additional opening in stud web.
- M. Field abrasions and welds shall be touched up with zinc rich primer.
- N. Erection Tolerances: Install cold formed metal framing to a maximum allowable tolerance variation from plumb, level, and true to line of 1/8-inch in 10 feet as follows:

1. Space individual framing members no more than plus or minus 1/8-inch from plan location. Cumulative error shall not exceed minimum fastening requirements of sheathing or other finishing materials.
- O. Provide all angles, clips and other miscellaneous pieces necessary to attach light gauge framing to building structure or to attach other materials to light gauge framing.
- P. Do not bridge building expansion and control joints with cold formed metal framing. Independently frame both sides of joints.
- Q. Install in built-up exterior framing members, such as headers, sills, boxed joists and double studs, inaccessible upon completion of framing work.

3.4 INSTALLATION OF FIRE-RATED ASSEMBLIES

- A. Install studs which are components of fire-rated wall assemblies as indicated.

3.5 BACKING IN STUD PARTITIONS

- A. Securely weld or screw cut sections of unpunched stud to at least three stud or furring supports, leaving flat surface of backing stud web to receive attachment of object to be secured.
- B. Verify that any pre-drilling of backing and attachment of spacers to prevent crushing of collateral material is done prior to application of collateral material.
- C. If it is determined by the Architect that backing was not provided for any items as required, the Contractor shall remove the finish material and install backing. The Contractor shall patch and refinish surface to match adjacent area and finish.

3.6 FIELD QUALITY CONTROL

- A. Owner's Testing Agency will:
 1. Provide continuous inspection of welding, including prior fit-up, welding equipment, weld quality, and welder certification in accordance with AWS and CBC Section 1701A.5.5.1.
 2. Provide continuous inspection during installation as required to establish conformity of Work requirements.

END OF SECTION

SECTION 05 50 00**METAL FABRICATIONS****PART 1 - GENERAL****1.1 SUMMARY**

- A. Section includes shop fabricated metal items:
1. Ladders at elevator pits.
 2. Steel pipe handrails and guardrails.
 3. Barrier gate at interior stairwell for exit control.
 4. Structural supports for miscellaneous attachments.
 5. Stair Nosings.
 6. Anchor bolts for sill plates and columns.
- B. Related Sections:
1. Section 03 30 00 - Cast-In-Place Concrete: Execution requirements for embedded anchors and attachments for metal fabrications specified by this section in concrete.
 2. Section 05 12 00 – Structural Steel: Structural steel column anchor bolts.
 3. Section 05 31 13 – Steel Floor Decking: Bearing plates and angles for metal deck bearing, including anchorage.
 4. Section 09 90 00 – Painting and Coating: Field applied paint finish.

1.2 REFERENCES

- A. American Architectural Manufacturer's Association:
1. AAMA 611 – Voluntary Specification for Anodized Architectural Aluminum.
- B. ASTM International:
1. ASTM A36/A36M - Standard Specification for Carbon Structural Steel.
 2. ASTM A53 - Standard Specification for Pipe, Steel, Black and Hot-Dipped, Zinc-Coated, Welded and Seamless.
 3. ASTM A123/A123M - Standard Specification for Zinc (Hot-Dip Galvanized) Coatings on Iron and Steel Products.
 4. ASTM A167.
 5. ASTM A283/283M - Standard Specification for Low and Intermediate Tensile Strength Carbon Steel Plates.
 6. ASTM A325 - Standard Specification for Structural Bolts, Steel, Heat Treated, 120/105 ksi Minimum Tensile Strength.
 7. ASTM A500 - Standard Specification for Cold-Formed Welded and Seamless Carbon Steel Structural Tubing in Rounds and Shapes.
 8. ASTM B26/B26M - Standard Specification for Aluminum-Alloy Sand Castings.
 9. ASTM B85 - Standard Specification for Aluminum-Alloy Die Castings.
 10. ASTM B209 - Standard Specification for Aluminum and Aluminum-Alloy Sheet and Plate.
 11. ASTM B209M - Standard Specification for Aluminum and Aluminum-Alloy Sheet and Plate (Metric).
 12. ASTM B210 - Standard Specification for Aluminum and Aluminum-Alloy Drawn Seamless Tubes.
 13. ASTM B210M - Standard Specification for Aluminum and Aluminum-Alloy Drawn Seamless Tubes (Metric).
 14. ASTM B211 - Standard Specification for Aluminum and Aluminum-Alloy Bar, Rod, and Wire.

- 15. ASTM B211M - Standard Specification for Aluminum and Aluminum-Alloy Bar, Rod, and Wire (Metric).
 - 16. ASTM B221 - Standard Specification for Aluminum and Aluminum-Alloy Extruded Bars, Rods, Wire, Profiles, and Tubes.
 - 17. ASTM B221M - Standard Specification for Aluminum and Aluminum-Alloy Extruded Bars, Rods, Wire, Profiles, and Tubes (Metric).
- C. American Welding Society:
- 1. AWS D1.1 - Structural Welding Code - Steel.
- D. SSPC: The Society for Protective Coatings:
- 1. SSPC Paint 15 - Steel Joist Shop Paint.
 - 2. SSPC-SP3 - Power Tool Cleaning.
- E. State of California Title 24:
- 1. Striping code for the visually impaired.
- F. National Ornamental & Miscellaneous Metals Association:
- 1. NOMMA Guideline 1 - Joint Finishes.

1.3 SUBMITTALS

- A. Section 01 32 19 – Submittal Procedures: Submittal requirements.
- B. Shop Drawings: Indicate profiles, sizes, connection attachments, reinforcing, anchorage, size and type of fasteners, and accessories. Include erection drawings, elevations, and details where applicable. Indicate welded connections using standard AWS A2.0 welding symbols. Indicate net weld lengths.
- C. Samples: If specifically requested for specified products; required for alternate products.
 - 1. Stair Nosings: Submit two 6-inch samples of the specified system.
- D. Product Data: Submit manufacturer's specifications, data, and installation instructions for review.
- E. Welders Certificates: Certify welders employed on the Work, verifying AWS and CBC qualification within previous 12 months.

1.4 QUALITY ASSURANCE

- A. Finish joints in accordance with NOMMA Guideline 1.

1.5 QUALIFICATIONS

- A. General: Fabricator and installer specializing in the work of this Section with minimum three (3) years documented experience.
- B. Welding: Performed by certified welders per AWS and CBC Section 2209A and 2212A.

1.6 DELIVERY, STORAGE, AND HANDLING

- A. Section 01 60 00 - Product Requirements: Product storage and handling requirements.
- B. Accept metal fabrications on site in labeled shipments. Inspect for damage.
- C. Protect metal fabrications from damage by exposure to weather.

1.7 FIELD MEASUREMENTS

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

PART 2 - PRODUCTS**2.1 MATERIALS - STEEL**

- A. Steel Sections: ASTM A36.
- B. Steel Tubing: ASTM A500, Grade B.
- C. Stainless Steel Sheet: ASTM A167, Type 304 flashing, 20 gauge.
- D. Plates: ASTM A283.
- E. Pipe: ASTM A53, Grade B, Schedule 40.
- F. Fasteners:
1. General: Galvanized steel fastenings or other non-rusting types for exterior steel work.
 2. Exposed in Finished Surfaces: Tamperproof countersunk Phillips flat head screws, unless otherwise shown; finish to match adjacent surfaces.
 3. Plastic Screw Anchors:
 - a. General: Type PSA, manufactured by Hilti, Inc.
 - b. Alternate Manufacturers: Compatible products manufactured by Star Anchors and Specialty Fasteners, Inc., or accepted equal.
- G. Bolts, Nuts, and Washers: ASTM A325, galvanized to ASTM A153 for galvanized components.
- H. Welding Materials: AWS D1.1; type required for materials being welded.
- I. Shop and Touch-Up Primer: SSPC Paint 15, Type 1, red oxide.
- J. Touch-Up Primer for Galvanized Surfaces: SSPC Paint 20, Type I Inorganic.

2.2 MATERIALS - ALUMINUM

- A. Extruded Aluminum: ASTM B221, B221M, Alloy 6063, Temper T5.
- B. Sheet Aluminum: ASTM B209, B209M. Grain matched.
- C. Aluminum-Alloy Drawn Seamless Tubes: ASTM B210, B210M, Alloy 6063, Temper T6.
- D. Aluminum-Alloy Bars: ASTM B211, B211M, Alloy 6063, Temper T6.
- E. Aluminum-Alloy Sand Castings: ASTM B26/B26M.
- F. Aluminum-Alloy Die Castings: ASTM B85.
- G. Bolts, Nuts, and Washers: Stainless steel.
- H. Welding Materials: AWS D1.1; type required for materials being welded.
- I. Wire: #9 gauge aluminum wire.

2.3 COMPONENTS

- A. Following is list of principal items only. Refer to Drawings for items not specifically scheduled.
- B. Posts, Ladders, Handrails and Guardrails: As detailed; galvanized finish.
- D. Plastic Cement: FS SS-C-153, Type 1.
- E. Non-Shrink Grout:
 - 1. General: "Embeco 636" manufactured by Master Builders, Inc.
 - 2. Alternate Manufacturers: Comparable products manufactured by W.R. Meadows, Inc. or accepted equal.

2.4 STAIR NOSINGS

- A. Manufacturers – Cast Aluminum Retrofit Stair Nosing:
 - 1. Balco Inc.; www.balcousa.com;
 - 2. American Stair Tread.
 - 3. Wooster Products Inc.
 - 4. Safe T Metal Company.
 - 5. Substitutions: Section 01 60 00 – Product Requirements: Product Options and Substitutions.
- B. Stair Nosings System Description: 6 inches wide x length 6 inches less than stair tread width, with anchors for anchoring into concrete.
 - 1. Stair nosing assemblies shall be anchored to substrate.
 - 2. Stair nosing treads shall be ribbed.
 - 3. Stair nosing treads shall be slip resistant.
 - 4. Stair nosing treads shall be removable and replaceable.
 - 5. Retrofit stair nosings shall be bevel back.
 - 6. Stair nosing treads shall meet OSHA Barrier-Free Code requirements for stair design in public buildings.
- C. Materials:
 - 1. Stair nosing system: Model RS-607LS.
 - a. Cast Aluminum: Class 30 Aluminum, tread plate.
 - 2. Insert Treads: Santoprene.
 - 3. Fasteners required for complete installation to manufacturer's instructions:
 - 4. Stair Nosings for Renovations: Concrete Screws.
- D. Fabrication:
 - 1. Fabricate stair nosing assemblies as detailed. Provide anchors and accessories necessary for complete installation.
 - a. Fabricate stair nosings with the depth of nose to measure underside 6 inches.
 - b. Provide Santoprene insert treads of specified color.
 - c. Provide specified anchors.
 - 2. Package components with anchors.
- E. Finishes:
 - 1. Aluminum tread plates shall be:
 - a. Mill finish.
 - b. Heat-treated for strength.
 - 2. Santoprene Insert Treads:
 - a. Color: As selected by Architect from standard color selection.

2.5 BARRIER GATES

- A. Manufacturers:
 - 1. Sharon Companies Ltd.; www.sharonstair.com.
 - 2. Substitutions: Section 01 60 00 – Product Requirements: Product options and substitutions.
- B. Barrier Gates: Manufacturer's standard swing gate assembly with steel spring hinges and rubber bumper between barrier/gate assembly and rail post.

2.6 ANCHOR BOLTS

- A. Anchor Bolts: ASTM A307; 3/4 inch steel bolt, standard, hex headed, with nut and washer; unfinished.

2.7 FABRICATION

- A. Workmanship:
 - 1. General: Shop assemble work in largest practical sections; minimize field connections. Grind smooth parts exposed to view; remove weld marks and leave free of fabrication marks. Miter corners and edges unless otherwise shown. Make members true to length so assembling may be done without fillers. Bends, twists, open joints in finished members, or projecting edges or corners at connections will not be permitted. Miter, cope, and block carefully to produce tight hairline joints. Provide lugs, clips, connections, bolts, and fastenings necessary to complete fabrication.
 - 2. Galvanizing: Treat all areas burned off or damaged during fabrication with specified repair compound.
 - 3. Reinforcement: Provide proper reinforcement for hardware, and other fabricated metal work, as required.
 - 4. Welding: All exposed welds shall be architectural grade. Use sequence welding to minimize distortion and heat stresses. Weld by shielded electric arc process per AWS. Use continuous welding along entire area of contact, except where spot welding is permitted. Grind all welds smooth on exposed surfaces. Spot welding not permitted on exposed surfaces.
- B. Exposed Mechanical Fastenings: Flush countersunk screws or bolts; unobtrusively located; consistent with design of component, except where specifically noted otherwise.
- C. Supply components required for anchorage of fabrications. Fabricate anchors and related components of same material and finish as fabrication, except where specifically noted otherwise.
- D. Fabrications:
 - 1. General: Fabricate the following items, complete as shown:
 - 2. Steel Pipe Guardrails, Handrails, Drinking Fountain Rails and Posts: Standard weight steel tube and bar stock as indicated; welded, plugged and ground smooth; weld to mounting plates where required.

2.8 FACTORY APPLIED FINISHES - STEEL

- A. Prepare surfaces to be primed in accordance with SSPC Standards.
- B. Galvanized Structural Steel Members: Galvanize after fabrication to ASTM A123. Furnish minimum 1.25 oz/sq ft. galvanized coating.

- C. Galvanized Non-structural Items: Galvanized after fabrication to ASTM A123. Furnish minimum 1.25 oz/sq ft. galvanized coating.
- D. Barrier Gate Components: Completely remove oil, grease, dirt, mill scale, rust, corrosion products, oxides, paint or other foreign matter from surface of steel in accordance with SSPC-SP3, "Power Tool Cleaning."
 - 1. Shop Primer: Immediately after shop fabrication and cleaning, spray apply primer to a minimum dry film thickness as recommended by primer manufacture, but not less than 2.0 mils. Apply one coat hi-solids red oxide anti corrosive primer meeting federal specifications TT-664, TT-P-636, and SSPC1364.
- E. Stainless Steel Sheet: No. 4 satin luster finish.

2.9 FACTORY APPLIED FINISHES - ALUMINUM

- A. Exterior Aluminum Surfaces: AAMA A41 anodized, prepared with mechanical pretreatment, anodized to clear color.
- B. Interior Aluminum Surfaces: AAMA A41 anodized, prepared with mechanical pretreatment, anodized to clear color.

2.10 FABRICATION TOLERANCES

- A. Squareness: 1/8 maximum difference in diagonal measurements.
- B. Maximum Offset Between Faces: 1/16 inch.
- C. Maximum Misalignment of Adjacent Members: 1/16 inch.
- D. Maximum Bow: 1/8 inch in 48 inches.
- E. Maximum Deviation From Plane: 1/16 inch in 48 inches.

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Verify field conditions are acceptable and are ready to receive Work.

3.2 PREPARATION

- A. Clean and strip primed steel items to bare metal and aluminum where site welding is required.
- B. Supply steel items required to be cast into concrete or embedded in masonry with setting templates to appropriate sections.

3.3 INSTALLATION

- A. Performance:
 - 1. General: Install with workmen skilled in the particular type of work required
 - 2. Coordination: Deliver miscellaneous metal items to be installed in concrete or masonry, complete with all clips, anchors, or bolts necessary to secure them in place.
 - 3. Workmanship: Set work plumb and true; properly assemble and erect in a rigid an workmanlike manner. Do cutting, punching, drilling and tapping for

attachment of other work coming into contact with fabricated metalwork where indicated or as directed. Do necessary cutting, drilling, and fitting for installation of fabricated metal work. Execute drilling, cutting, and fitting carefully; when required; fit work at job before finishing. No burning in field permitted. Replace, or repair parts damaged or injured during erection in an acceptable manner. Drill holes for fasteners to exact diameter as recommended by fastener manufacturer. Oversized holes or holes not properly located that produce misalignment of fastener will be rejected.

4. Galvanizing: Treat areas burned off or damaged during fabrication or erection with specified repair treatment.
 5. Field Touch-up: Touch-up damaged surfaces and field welds of steel, scheduled to be painted, per SSPC standards. After erection, prime welds, abrasions, and surfaces not shop primed except surfaces to be in contact with concrete.
 6. Protection: After erection, provide proper protection for fabricated metal items from other construction operations.
- B. Installation:
1. General: Install the metal items, complete as shown.
 2. Handrail and Guardrail Posts: Set posts in pipe sleeves set in concrete and anchor as shown; touch-up all primed surfaces damaged during installation.
- C. Make provisions for erection stresses. Install temporary bracing to maintain alignment, until permanent bracing and attachments are installed.
- D. Field weld components indicated on Drawings. All welds and steel exposed to view shall be architectural.
- E. Perform field welding in accordance with AWS D1.1.
- F. Obtain approval of Architect/Engineer prior to site cutting or making adjustments not scheduled.

END OF SECTION

SECTION 05 52 00**HANDRAILS AND RAILINGS****PART 1 - GENERAL****1.1 SUMMARY**

- A. Section includes:
 - 1. Wall mounted handrails.
 - 2. Stair railing and guardrails.
 - 3. Free standing railings at steps.
 - 4. Modification of (e) stair guardrails and handrails.
- B. Related Sections:
 - 1. Section 03 30 00 - Cast-In-Place Concrete: Execution requirements for placement of anchors specified in this section in concrete.
 - 2. Section 09 90 00 - Painting and Coating: Paint finish.

1.2 REFERENCES

- A. Aluminum Association:
 - 1. AA ADM 1 - Aluminum Design Manual.
 - 2. AA ASM 35 - Aluminum Sheet Metal Work in Building Construction.
- B. American Architectural Manufacturers Association:
 - 1. AAMA 611 - Voluntary Specification for Anodized Architectural Aluminum.
 - 2. AAMA 2605 - Voluntary Specification, Performance Requirements and Test Procedures for superior Performing Organic Coatings on Aluminum Extrusions and Panels.
- C. ASTM International:
 - 1. ASTM B221 - Standard Specification for Aluminum and Aluminum-Alloy Extruded Bars, Rods, Wire, Profiles, and Tubes.
 - 2. ASTM B221M - Standard Specification for Aluminum and Aluminum-Alloy Extruded Bars, Rods, Wire, Profiles, and Tubes (Metric).
 - 3. ASTM B241/B241M - Standard Specification for Aluminum and Aluminum-Alloy Seamless Pipe and Seamless Extruded Tube.
 - 4. ASTM D1730 - Standard Practice for Preparation of Aluminum and Aluminum-Alloy Surfaces for Painting.
 - 5. ASTM E935 - Standard Test Methods for Performance of Permanent Metal Railing Systems and Rails for Buildings.
 - 6. ASTM E985 - Standard Specification for Permanent Metal Railing Systems and Rails for Buildings.
- D. Green Seal:
 - 1. GC-03 - Anti-Corrosive Paints.
- E. National Ornamental & Miscellaneous Metals Association:
 - 1. NOMMA Guideline 1 - Joint Finishes.

1.3 SUBMITTALS

- A. Section 01 32 19 - Submittal Procedures: Submittal requirements.

- B. Shop Drawings: Indicate profiles, sizes, welding, fabrication, connection attachments to adjoining units of work, anchorage, size and type of fasteners, and accessories; including all plans, typical elevations, sections, and details of components.
- C. Samples: Submit two 6 inch long samples of handrail. Submit two 12 inch by 12 inch samples of wire mesh fabric. Submit two samples, of elbow, wall bracket, escutcheon, and end stop.

1.4 QUALITY ASSURANCE

- A. Perform Work for structural aluminum in accordance with AA ADM 1 and AA ASM 35.
- B. Finish joints in accordance with NOMMA Guideline 1.

1.5 DELIVERY, STORAGE AND HANDLING

- A. Deliver materials job site in good condition and adequately protect against damage as handrails are a finished product.
- B. Store on site in a location and manner to avoid damage. Stacking should be done in a manner that will prevent bending. Store material in a clean, dry location away from uncured concrete and masonry. Any protection on the railings during transportation should remain until installed.
- C. Keep handling on site to a minimum. Exercise caution to avoid damage to finishes of material.

1.6 PROJECT CONDITIONS

- A. Field Measurements: Where handrails and railings are indicated to fit to other construction, check actual dimensions of other construction by accurate field measurements before fabrication; show recorded measurements on final shop drawings. Where field measurements cannot be made without delaying the railing fabrication and delivery, obtain guaranteed dimensions in writing by the contractor and proceed with fabrication of products so as not to delay fabrication, delivery and installation.
- B. Coordinate fabrication and delivery schedule of handrails with construction progression and sequence to avoid delay of railing installation.

PART 2 - PRODUCTS

2.1 HANDRAILS AND RAILINGS

- A. Manufacturers:
 - 1. McNichols Company; www.mcnichols.com.
 - 2. Ametco Manufacturing Corporation; www.ametco.com.
 - 3. Substitutions: 01 60 00 – Product Requirements: Product Options and Substitutions.

2.2 RAILINGS – GENERAL REQUIREMENTS

- A. Design, fabricate, and test railing assemblies in accordance with the most stringent requirements of ASTM E935, ASTM E985 and CBC.

- B. Design railing assembly, wall rails, and attachments to resist lateral force of 50 lbs per lineal foot without damage or permanent set.
- C. Handrail, wall rail and Guardrail assemblies and attachments shall withstand a minimum concentrated load of 200 pounds applied horizontally or vertically down at any point on the top rail. Infill area of guardrail system capable of withstanding a horizontal concentrated load of 200 pounds applied to one square foot at any point in the system. Load not to act concurrently with loads on top rail of system in determining stress on guardrail.
- D. Allow for expansion and contraction of members and building movement without damage to connections or members.
- E. Dimensions: See drawings for configurations and heights.
- F. Provide anchors and other components as required to attach to structure, made of same materials as railing components unless otherwise indicated; where exposed fasteners are unavoidable provide flush countersunk fasteners.
 - 1. For anchorage to concrete, provide inserts to be cast in to concrete, for welding anchors.
 - 2. For anchorage to masonry, provide brackets to be embedded in masonry, for bolting or welding anchors.
 - 3. For anchorage to stud walls, provide backing plates for bolting or welding anchors.
 - 4. Posts: Provide adjustable flanged brackets.
- F. Provide welded fittings to join lengths, seal open ends, and conceal exposed mounting bolts and nuts, including but not limited to elbows, T-shapes, splice connectors, flanges, escutcheons, and wall brackets.

2.3 ALUMINUM RAILING SYSTEM COMPONENTS

- A. Top Rails: 1-1/2 inch diameter, Schedule 40 (1.90 inch outside diameter) extruded tubing, alloy 6063-T6, 6036-T5, 6005-T5 or 6061-T6 conforming to ASTM B221/B221M or ASTM B241/B241M.
- B. Handrails: 1-1/2 inch outside diameter, Schedule 40 extruded tubing, conforming to ASTM B221/B221M or ASTM B241/B241M.
- C. Posts: 2 inch x 2 inch x 1/8 inch square extruded tubing, conforming to ASTM B221/B221M or ASTM B241/B241M.
- D. Extruded Bars, Shapes and Moulding: Alloy 6063-T52 or Alloy 6063-T6 meeting ASTM B221/B221M.
- E. Fittings: Elbows, T-shapes, wall brackets, escutcheons, angles; cast or machined aluminum.
- F. Aluminum Wire Mesh: 2 inch x 2 inch square opening welded wire cloth; Aluminum wire: 0.120 inch diameter.
- G. Mounting: Brackets and flanges, with steel inserts for casting in concrete; with steel brackets for embedding into masonry. Prepare backing plate for mounting in metal stud wall construction.
- H. Splice Connectors: Concealed spigot; or welding collars, cast or machined aluminum.

- I. Exposed Fasteners: Flush countersunk stainless steel screws or bolts; consistent with design of railing.

2.4 FABRICATION

- A. Fit and shop assemble components in largest practical sizes for delivery to site.
- B. Fabricate components with joints tightly fitted and secured. Furnish spigots and sleeves to accommodate site assembly and installation.
- C. Exposed Mechanical Fastenings: Flush countersunk screws or bolts; unobtrusively located; consistent with design of component, except where specifically noted otherwise.
- D. Supply components required for anchorage of fabrications. Fabricate anchors and related components of same material and finish as fabrication, except where specifically noted otherwise.
- E. Exterior Components: Continuously seal joined pieces by continuous welds. Drill condensate drainage holes at bottom of members at locations not encouraging water intrusion.
- F. Interior Components: Continuously seal joined pieces by continuous welds.
- G. 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.
- H. Exposed Welded Joints: NOMMA Guideline 1 Joint Finish.
- I. Accurately form components to suit stairs and landings to each other and to building structure.
- J. Accommodate for expansion and contraction of members and building movement without damage to connections or members.

2.5 ALUMINUM FINISH

- A. Class I Natural anodized Finish: AAMA 611, AA-M12C22A41 Clear anodic coating not less than 0.7 mils thick.
- B. High Performance Organic Finish for Wire Mesh: AAMA 2605 multiple coat, thermally cured polyvinylidene fluoride system; color as selected from manufacturer's standard colors.
 1. Aluminum shall be cleaned with inhibited chemicals and the surface chemically converted to amorphous chromium phosphate to conform to ASTM D1730, Type B, Method 5, prior to coating.
 2. Apply manufacturer's standard 3-coat thermo-cured system composed of specially formulated inhibited primer, a fluoropolymer color coat and a clear fluoropolymer top coat with both the color coat and the clear coat containing not less than 70% polyvinylidene fluoride resin by weight.
 3. Provide coating which has been field tested under normal range of weathering conditions for a minimum of 10 years without significant peel, flake, chip, crack, or check in the finish, and without chalking in excess of 8 and without fading in excess of 5 NBS units.
- C. Touch-up Materials: As recommended by coating manufacturer for field application.

PART 3 - EXECUTION**3.1 EXAMINATION**

- A. Verify field conditions are acceptable and are ready to receive work.
- B. Verify concealed blocking and reinforcement is installed and correctly located to receive wall mounted handrails.

3.2 PREPARATION

- A. Clean and strip primed steel items to bare metal, and aluminum; where site welding is required.
- B. Supply items required to be cast into concrete, embedded in masonry, or placed in partitions, with setting templates, to appropriate sections.
- C. Apply one coat of bituminous paint to concealed aluminum surfaces in contact with cementitious or dissimilar materials.

3.3 INSTALLATION

- A. Install in accordance with manufacturer's instructions.
- B. Install components plumb and level, accurately fitted, free from distortion or defects, with tight joints.
- C. Perform cutting, drilling, and fitting required for installation of handrails. Set handrails and guardrails accurately in location, alignment, and elevation, measured from established lines and levels.
- D. Anchor railings to structure as detailed.
- E. Field weld anchors as indicated on Drawings or shop drawings. Touch-up welds with primer. Grind welds smooth.
- F. Conceal bolts and screws whenever possible. Where not concealed, use flush countersunk fastenings.
- G. Assemble with spigots and sleeves to accommodate tight joints and secure installation.

3.4 ERECTION TOLERANCES

- A. Maximum Variation From Plumb: 1/4 inch per floor level, non-cumulative.
- B. Maximum Offset From Alignment: 1/4 inch.
- C. Maximum Out-of-Position: 1/4 inch.

3.5 SCHEDULE

- A. Stair Adjacent to Quad Elevator:
 - 1. Stair: Aluminum pipe top rail at guardrail, aluminum mesh cloth infill, aluminum pipe handrail.
- B. Building 5, Stair 5-ST-N:
 - 1. Modification of (e) metal guardrail at 2nd and 3rd floor intermediate landings:

2. Modification of (e) metal guardrail/handrail:

END OF SECTION

SECTION 06 10 53**MISCELLANEOUS ROUGH CARPENTRY****PART 1 - GENERAL****1.1 SUMMARY**

- A. Section includes roof curbs, cantos, and perimeter nailers; blocking in wall openings; wood furring and grounds; telephone and electrical panel back boards; and preservative treatment of wood.

1.2 REFERENCES

- A. American National Standards Institute:
1. ANSI A208.1 - Mat-Formed Wood Particleboard.
- B. American Wood-Preservers' Association:
1. AWPA C1 - All Timber Products - Preservative Treatment by Pressure Process.
2. AWPA C20 - Structural Lumber - Fire-Retardant Treatment by Pressure Processes.
3. AWPA C27 - Plywood - Fire-Retardant Treatment by Pressure Process.
- C. ASTM International:
1. ASTM A36 - Standard Specification for Carbon Structural Steel.
2. ASTM A307 - Standard Specification for Carbon Steel Bolts and Studs, 60,000 PSI Tensile Strength.
- D. California Building Code, California Code of Regulations, Title 24, 2007 Edition (noted herein as CBC) Chapter 23A.
- E. National Institute of Standards and Technology:
1. NIST PS 20 - American Softwood Lumber Standard.
- F. The Redwood Inspection Service:
1. RIS - Standard Specifications for Grades of California Redwood Lumber.
- G. West Coast Lumber Inspection Bureau:
1. WCLIB - Standard Grading Rules for West Coast Lumber.
- H. Western Wood Products Association:
1. WWPA G-5 - Western Lumber Grading Rules.

1.3 SUBMITTALS

- A. Section 01 32 19 - Submittal Procedures: Submittal procedures.
- B. Product Data: Submit technical data on wood preservative and fire retardant treatment materials and application instructions.

1.4 QUALITY ASSURANCE

- A. Perform Work in accordance with the following:
1. Lumber Grading Agency: California Building Code Standard No. 23-1, Classification, Definition and Methods of Grading for all Species of Lumber.
2. Plywood: California Building Code Standard No. 23-2.

PART 2 - PRODUCTS**2.1 MATERIALS**

- A. Lumber Grading Rules: RIS; WCLIB.
- B. Structural Lumber and Plywood:
1. Lumber and plywood graded and grade-marked per standards specified.
 2. Lumber:
 - a. Size per industry standards for nominal sizes shown; S4S.
 - b. Moisture content of framing: Maximum 19 percent when installed and 15 percent maximum at time of close-in. In areas with dry hot summer months, maximum at close-in to be 12 percent.
 - c. Sills on concrete or masonry: Redwood foundation grade, or pressure treated No. 1 Douglas Fir.
 - d. Structural framing: Douglas Fir with grades as noted below unless otherwise specified on drawings. All grades per WCLIB STD grading rules #17.
 - 1) Permanently exposed framing: Select structural grade with no box heart.
 - 2) Except per Paragraph 2.1.B.2.d.1) above, minimum grades are: 1x, 2x4, 2x6, and 2x8 studs and plates D.F. No. 1; 4x and larger D.F. No. 1; Blocking DF No. 2.
 - 3) Miscellaneous framing - D.F. No. 2
 - e. Applicable WCLIB paragraphs for framing:

1x, 2 x 4 to 4 x 4	par. 124
2 x 6 to 4 x 16 Structural joists and planks	par. 123
Beams (6x), beams and stringers	par. 130
Posts (6x)	par. 131
 - f. Splits and checks: Limited to 1x the depth of the member.
 - g. Do not use warped/twisted and checked members regardless of grade marks.
 3. Plywood:
 - a. Structural plywood: Grade marked for conformance with CBC and Uniform Building Code Standard 23-2. "Product Standard PS-1-95" and fabricated with exterior glue. Grades shall be as required on drawings.

2.2 ACCESSORIES

- A. Fasteners and Anchors:
1. General requirements for fasteners:
 - a. Fastenings shall be of adequate size, spacing and number to resist design loads under intended use, and types shall be appropriate for the materials or conditions for which used.
 - b. Include washers, pre-drilling, etc. required for proper installation.
 - c. For exterior work, fastenings shall be hot dip galvanized, non-ferrous, or made rust-resistant by approved methods.
 - d. Fasteners at Treated Wood: Hot dip galvanized.
 2. Nails and nailing not otherwise shown or specified:
 - a. Comply with requirements of CBC.
 - b. For securing materials to hardened concrete or masonry: Hardened steel masonry nails or Tapcon screws.
 - c. For Framing, Plywood and General Structural Wood Work.

1. All nails for structural use shall be of bright common wire with full round heads and shall be of sufficient length to exceed required penetration into the supporting member by 1/8 inch.
 2. Framing nails shall be hand driven and shall meet the dimensional requirements for common wire nails Table 23A-III-C-2 of CBC.
 3. Plywood Nails: Hand driven nails shall conform to requirements above.
 4. Pneumatically (machine) driven nails shall not be used without a valid ICBO Report. Contractor shall provide for submittal to DSA and the Architect/Engineer a current ICBO Report, nail sample with nail dimensions (head and shank diameter and nail length) and specifications for the nailing device. Nailing device must be adjustable regarding the depth of driving the nail. Use of pneumatic (machine) nailing is subject to a satisfactory sample jobsite demonstration for each project. The approval is subject to continued satisfactory performance. If nail heads penetrate the outer ply more than would be normal for a hand hammer or if minimum allowable edge distances are not maintained, the performance will be deemed unsatisfactory. Nails and nailing shall also conform to 1 above.
 5. Nails into PTFD material to be galvanized.
3. Bolts:
- a. ASTM A-307, standard semi-finished machine bolts as shown or required; with malleable iron washers or steel plate washers, unless otherwise shown, shall be provided under all bolt heads and nuts.
 - b. Bolts in concrete: Wedge or expansion anchors set after casting: Simpson Wedge – All and Powers Wedge Bolt.
 - c. Anchor bolts: ASTM A307 with standard head or ASTM A36 with plate washer. No upset threads allowed. No L or J bolts allowed. Other grades of steel are as required on drawings and/or the Structural Steel Section.
 - d. Bolts at Treated Wood: Hot dip galvanized.
4. Powder-actuated fastenings: Use only as approved by the Architect/Engineer and DSA; operators shall be qualified.
 5. Framing hardware: Fabricated sheet metal timber framing connectors: Manufactured from hot-dipped galvanized steel by "Simpson Company", Dublin, CA; "USP Lumber Connectors", Livermore, CA, or approved equivalent. Connectors shall be at least 16 gauge material, (1/8 inch plate materials where welded), unless otherwise noted, punched for nailing. Nails and nailing shall conform to the manufacturer's instructions with a nail provided for each punched hole. Fabricate heavy hardware from ASTM A-36 steel per Division 5, Metals. Hardware intended for exterior use shall be galvanized.

2.3 FACTORY WOOD TREATMENT

- A. Preservative Treatments:
1. Field-applied treatment to light framing: For all lumber and plywood contacting or within 6-inches of soils and contacting concrete or masonry, except pressure treated materials. Use pressure treated materials for all items embedded in concrete, or in contact with soil.
 - a. F.S. TT-W-570a(1), non-creosote type.
 - b. Apply two brush coats; or fill-immersion dip not less than 15 minutes; or as required to thoroughly saturate all surfaces after cutting. Air dry 2-hours minimum before installation.
 - c. Acceptable Products: Cuprinol #10, Darworth Co., Avon, CT; Termin-8, Jasco.
 2. Framing lumber and plywood that is directly exposed to weather or soil:

- a. Pressure-treated materials shall be in accordance with CBC 2303.3 with preservative retention levels as follows: (16/F+³)
 - 1) Alkaline/Copper/Quaternary (ACQ), 0.25 lbs. Preservative per foot³ above ground, 0.40 lbs. Preservative per foot³ in contact with ground.
 - b. Preservative types:
 - 1) Alkaline/ Copper/ Quaternary (ACQ).
 - c. Treated lumber shall bear an AWPA treatment stamp on each piece.
 - d. Field treatment of end cuts and holes in pressure treated materials F.S. TT-W-472B and per Paragraph 2.3.A.2.a.1) above.
- B. Fire Resistant Treatment for all Interior Wood and Plywood:
1. All wood used inside the building envelope and roof curbs at openings is to be fire treated as follows:
 - a. Pressure treatment, AWPA C20 for lumber and AWPA C27 for plywood, Interior Type, chemically treated and pressure impregnated; capable of providing a maximum flame spread/smoke development rating of 25/450. Product and application process must be recommended by manufacturer of treatment as being suitable for painting. Fire retardant to be applied by a California State Fire Marshal approved licensed Contractor.

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Verify substrate conditions are ready to receive blocking, curbing and framing.

3.2 PREPARATION

- A. Coordinate placement of blocking, curbing and framing items.

3.3 INSTALLATION

- A. Set members level and plumb, in correct position.
- B. Place horizontal members, crown side up.
- C. Construct curb members of solid wood sections.
- D. Curb roof openings except where prefabricated curbs are provided. Form corners by alternating lapping side members.
- E. Coordinate curb installation with installation of decking and support of deck openings, and parapet construction.
- F. Space framing and furring 16 inches on center.
- G. Secure sheathing to framing members with ends over firm bearing and staggered.
- H. Install pre-painted telephone and electrical panel back boards with plywood sheathing material where required. Size back boards 12 inches beyond size of electrical and telephone panel.

3.4 SITE APPLIED WOOD TREATMENT

- A. Apply preservative treatment.

- B. Brush apply one coat of preservative treatment on wood in contact with cementitious materials, roofing and related metal flashings. Treat site-sawn cuts.
- C. Allow preservative to dry prior to erecting members.

3.5 SCHEDULES

- A. Roof Blocking and Curbs; Wood Blocking; Nailers; Shims: Douglas Fir species, 19 percent maximum moisture content, pressure preservative treatment.
- B. Telephone and Electrical Panel Boards: 3/4 inch thick, square edges, site brush applied preservative treated.

END OF SECTION

These paragraphs not used:

- C. Related Sections:
 - 1. Section 05 31 00 – Steel Decking: Metal roof decking to receive wood curbs and cants.

SECTION 06 20 00**FINISH CARPENTRY****PART 1 - GENERAL****1.1 SUMMARY**

- A. Section includes:
1. Interior trim and millwork.
 2. Hardware and attachment accessories.
- B. Related Sections:
1. Section 06 10 53 - Miscellaneous Rough Carpentry: Grounds and support framing.
 2. Section 06 41 00 - Custom Cabinets: Shop fabricated custom cabinet work.
 3. Section 07 90 00 - Joint Protection.
 4. Section 08 21 00 - Flush Wood Doors.
 5. Section 09 90 00 - Painting and Coating: Painting and finishing of finish carpentry items.

1.2 REFERENCES

- A. American National Standards Institute:
1. ANSI A135.4 - Basic Hardboard.
 2. ANSI A156.9 - Cabinet Hardware.
- B. APA-The Engineered Wood Association:
1. APA/EWA PS 1 - Voluntary Product Standard for Construction and Industrial Plywood.
- C. ASTM International:
1. ASTM E84 - Standard Test Method for Surface Burning Characteristics of Building Materials.
- D. American Wood-Preservers' Association:
1. AWPA C1 - All Timber Products - Preservative Treatment by Pressure Process.
- E. Federal Specification Unit:
1. FS A-A-1936 - Adhesive, Contact, Neoprene Rubber.
- F. Hardwood Plywood and Veneer Association:
1. HPVA HP-1 - American National Standard for Hardwood and Decorative Plywood.
- G. National Institute of Standards and Technology:
1. NIST PS 20 - American Softwood Lumber Standard.
- H. U. S Department of Commerce National Institute of Standards and Technology:
1. DOC PS 1 - Construction and Industrial Plywood.
 2. DOC PS 2 - Performance Standard for Wood-Based Structural-Use Panels.
 3. DOC PS 20 - American Softwood Lumber Standard.
- I. Woodwork Institute:
1. WI - Manual of Millwork.

1.3 SUBMITTALS

- A. Section 01 32 19 – Submittal Procedures: Requirements for submittals.
- B. Shop Drawings: Indicate materials, component profiles, fastening methods, jointing details, finishes, and accessories to a minimum scale of 1-1/2 inch to one foot.
 - 1. Furnish a WI - Certified Compliance label on first page of shop drawings.
- C. Product Data:
 - 1. Submit technical data on plastic lumber.
 - 2. Submit data on fire retardant treatment materials and application instructions.
- D. Samples:
 - 1. Submit two samples of wood trim 6 inch long.
- E. Certification: Submit copy of fabricators WI certified compliance certificate.

1.4 QUALITY ASSURANCE

- A. Perform work in accordance with WI (Woodwork Institute) Manual of Millwork, Custom Grade.
- B. Issue WI Certified Compliance Certificate to Architect prior to delivery of millwork and provide WI Certified Compliance Labels on all items of millwork.
- C. All millwork and the installation of millwork shall be monitored for compliance under the scope of the WI Certified Compliance Program (CCP).
- D. Provide WI Reinspection Service at the job site prior to installation. Provide to Architect a written report showing results of the reinspection.
- E. Upon completion of the installation, provide a WI Certified Compliance Certificate.
- F. Apply label from agency approved by authority having jurisdiction to identify each preservative treated and fire retardant treated material.

1.5 QUALIFICATIONS

- A. Fabricator: Authorized to provide WI Certified Compliance Certificate.

1.6 REGULATORY REQUIREMENTS

- A. Conform to UBC and UL requirements for fire ratings.
- B. Conform to Flame Spread Classifications of Interior Millwork contained within the Appendix of the WI Manual of Millwork for flame spread ratings.

1.7 DELIVERY, STORAGE, AND HANDLING

- A. Section 01 60 00 – Product Requirements: Product storage and handling requirements.
- B. Conform to Section 1 of WI – Manual of Millwork.
- C. Store materials in ventilated, interior locations under constant minimum temperatures of 70 degrees F and maximum relative humidity of 50 to 55 percent.
- D. Protect work from moisture damage.

1.8 FIELD MEASUREMENTS

- A. Verify field measurements prior to fabrication.

1.9 SEQUENCING

- A. Sequence work to ensure utility connections are achieved in orderly and expeditious manner.

1.10 COORDINATION

- A. Coordinate work with plumbing rough-in, electrical rough-in, and installation of associated and adjacent components.

PART 2 - PRODUCTS**2.1 FABRICATORS**

- A. Active member of the Woodwork Institute, licensed by WI to provide WI certified Compliance Certificates and Labels for the products and materials specified in this Section. Woodwork Institute Phone: (916) 372-9943.
- B. Substitutions: Under provisions of Section 01 60 00.

2.2 WOOD-BASED COMPONENTS - GENERAL

- A. Materials specified under Millwork Manual Section Numbers refer to the following lumber grades:
 - 1. Section 3, Lumber Grades – Hardwood/Softwood.
 - 2. Section 4, Plywood Grades – Hardwood/Softwood.
 - 3. Section 6, Exterior Trim, Frames & Millwork.
 - 4. Section 7, Exterior Sash and Windows.
 - 5. Section 9, Interior Trim, Jambs & Millwork.
 - 6. Section 11, Architectural Wall Surfacing.
 - 7. Section 12, Doors, Flush.
 - 8. Section 14, Casework.
- B. Wood fabricated from old growth timber is not permitted.
- C. Provide sustainably harvested wood, certified or labeled as specified in Section 01 60 00.
- D. Provide wood harvested within a 500 mile radius of the project site.
- E. Wood fabricated from timber recovered from riverbeds or otherwise abandoned is permitted, unless otherwise noted, provided it is clean and free of contamination; identify source; provide lumber re-graded by an inspection service accredited by the American Lumber Standard Committee, Inc.

2.3 LUMBER MATERIALS

- A. Softwood Lumber: NIST PS 20; Custom grade in accordance with WI; minimum moisture content of 6 percent and maximum of 12 percent. Douglas Fir species, with vertical grain, of quality capable of opaque finish.
- B. Hardwood Lumber: Custom grade in accordance with WI; minimum moisture content of 6 percent and maximum of 12 percent.

2.4 INTERIOR TRIM - PAINT GRADE

- A. Finger jointed kiln-dried pine is acceptable for all areas except high moisture areas.
- B. Trim profiles: Mill standard shapes as indicated.
- C. Paint-grade trim: Pre-prime at mill.

2.5 ADHESIVE

- A. Adhesives: Type 1 adhesive recommended by WI to accommodate application in accordance with the Appendix to the Millwork Manual.
- B. Formulation: Exterior type per AWPA C20, consisting of organic-resin solution, insoluble in water, thermally set in wood by kiln drying.
- C. Wall Adhesive: Solvent release, cartridge type, compatible with wall substrate, capable of achieving durable bond.

2.6 ACCESSORIES

- A. Nails: Size and type to suit application, galvanized finish for interior use, stainless steel for exterior use.
- B. Bolts, Nuts, Washers, Blind Fasteners, Lags, and Screws: Size and type to suit application; galvanized finish for interior use, stainless steel for exterior use.
- C. Lumber for Shimming and Blocking: Softwood lumber of Douglas Fir species.
- D. Primer: Alkyd primer sealer.
- E. Wood Filler: Solvent base, tinted to match surface finish color.

2.7 FABRICATION

- A. Fabricate to WI Custom standards.
- B. Shop assemble work for delivery to site, permitting passage through building openings.
- C. Fit exposed sheet material edges with matching hardwood edging. Use one piece for full length only.
- D. When necessary to cut and fit on site, provide materials with ample allowance for cutting. Furnish trim for scribing and site cutting.
- E. Interior Finish Trim: Mill reverse side of material ("back-out") when lumber is over 5/8 inch thick and more than 1-5/8 inch wide.
- F. Saw-Kerfing Flat Trim: To prevent cupping and warping, saw cut the backs of flat trim 1" x 8" and wider, or 2" x 6" and wider.

PART 3 - EXECUTION**3.1 EXAMINATION**

- A. Verify that surfaces and openings are ready to receive work and field measurements are as instructed by the fabricator.

- B. Verify mechanical, electrical, and building items affecting work of this Section are placed and ready to receive this work.
- C. Verify adequacy of backing and support framing.
- D. Beginning of installation means acceptance of existing conditions.

3.2 INSTALLATION

- A. Install work in accordance with WI Manual of Millwork, Custom quality standard.
- B. Set and secure materials and components in place, plumb and level.
- C. Carefully scribe work abutting other components, with maximum gaps of 1/32 inch. Do not use additional overlay trim to conceal larger gaps.
- D. Install components and trim with nails at 6 to 8 inches on center.
- E. Countersink mechanical fasteners at exposed and semi-exposed surfaces.
- F. Method of attachment, including the type, size, frequency, and/or spacing of anchoring devices and fasteners shall comply to WI Manual of Millwork minimum requirements or be as indicated on the drawings.

3.3 PREPARATION FOR SITE FINISHING:

- A. Set exposed fasteners. Sand work smooth.
- B. Site Finishing: Refer to Section 09 90 00.
- C. Before installation, prime paint surfaces of items or assemblies to be in contact with cementitious materials or that will be permanently concealed from view.

3.4 ERECTION TOLERANCES

- A. Maximum Variation from True Position: 1/16 inch.
- B. Maximum Offset from True Alignment with Abutting Materials: 1/32 inch.

END OF SECTION

SECTION 06 41 00**CUSTOM CABINETS****PART 1 - GENERAL****1.1 SUMMARY**

- A. Section includes custom-fabricated cabinet units; counter tops; cabinet hardware; preparation for installing utilities in cabinets; and shop finishing.
- B. Related Sections:
 - 1. Section 06 10 53 - Miscellaneous Rough Carpentry: Grounds and support framing.
 - 2. Section 06 20 00 - Finish Carpentry: Related trim not specified in this section.
 - 3. Section 09 65 00 - Resilient Flooring: Rubber base at exposed bases of casework.
 - 4. Section 22 30 00 - Plumbing Equipment: Plumbing utilities and fixtures.
 - 5. Section 26 01 00 - Basic Materials and Methods: Power, signal, and data wiring.

1.2 REFERENCES

- A. Air Quality Management District.
- B. American National Standards Institute:
 - 1. ANSI A156.9 - Cabinet Hardware.
 - 2. ANSI A208.1 - Mat-Formed Wood Particleboard.
- C. California Building Code:
 - 1. CBC - Chapter 16.
- D. Federal Specification Unit:
 - 1. FS A-A-1936 - Adhesive, Contact, Neoprene Rubber.
- E. National Electrical Manufacturers Association:
 - 1. NEMA LD 3 - High Pressure Decorative Laminates.
- F. South Coast Air Quality Management District:
 - 1. SCAQMD Rule 1168 - Adhesive and Sealant Applications.
- G. San Mateo County Community College District Design Standards:
 - 1. Design Standard - Casework.
- H. Woodwork Institute:
 - 1. WI - Manual of Millwork.

1.3 DEFINITIONS

- A. Exposed Portions - All Grades: Surfaces visible when doors and drawers are closed; underside of bottoms of cabinets over 4 feet above finished floor; cabinet tops under 6 feet above finished floor or if over 6 feet and visible from upper building level or floor; visible front edges of web frames, ends, divisions, tops, shelves, and hanging stiles; visible sloping tops of cabinets; visible portions of bottoms, tops, and ends in front of sliding doors.
 - 1. Additional Exposed Portions - Premium Grade Only
 - a. Visible surfaces in open cabinets or behind glass.

- b. Interior faces of hinged doors.
- B. Semi-Exposed Portions: Shelves; divisions; interior face of ends, backs, and bottoms; drawer sides, subfronts, backs, and bottoms; underside of bottoms of cabinets between 2-1/2 and 4 feet above finished floor; interior faces of hinged doors, except Premium Grade; visible surfaces in open cabinets or behind glass for Custom Grade and all rooms designated as storage, janitor, closet, or utility.
- C. Concealed Portions: Toe space; sleepers, web frames, stretchers, and solid sub-tops; security panels; underside of bottoms of cabinets less than 2-1/2 feet above finished floor; flat tops of cabinets 6 feet or more above finished floor except if visible from upper building level; 3 non-visible edges of adjustable shelves; underside of countertops, knee spaces, and drawer aprons; faces of cabinet ends of adjoining units that butt together.

1.4 SUBMITTALS

- A. Section 01 32 19 – Submittal Procedures: Submittal procedures.
- B. Shop Drawings: Indicate materials, component profiles and elevations, assembly methods, joint details, fastening methods, accessory listings, hardware location and schedule of finishes.
 - 1. Apply WI Certified Compliance Label to first page of shop drawings.
- C. Product Data: Submit data for hardware accessories.
- D. Samples:
 - 1. Submit two 8 by 10 inch size samples, illustrating cabinet finish and edge treatment.
 - 2. Submit two 8 by 10 inch size samples, illustrating counter top finish and edge treatment.
 - 3. Submit two samples of drawer pulls and hinges, illustrating hardware finish.
- E. Certification: Submit copy of fabricator's WI certified compliance certificate.

1.5 QUALITY ASSURANCE

- A. Perform work in accordance with WI (Woodwork Institute of California) Manual of Millwork, Custom Grade.
 - 1. Mark each unit of architectural woodwork with WI Certified Compliance Label indicating quality grade required.
- B. Contractor to arrange for and pay costs of WI inspections, and obtain WI Certified Compliance Label on each unit of casework indicating grade specified.
- C. Millwork specified shall be manufactured in accordance with the standards established in the Manual of Millwork of the Woodwork Institute, current edition, in the grade or grades hereinafter specified or as shown on the drawings. If the manufacturer of millwork is not a WI licensee, Contractor shall furnish to Architect, prior to installation, a Certificate of Reinspection by the WI indicating that the millwork in question meets the requirements of the WI grade specified. If the manufacturer of millwork is a WI licensee, each unit of millwork shall bear the WI Certified Compliance grade stamp indicating the grade specified, and by the completion of the job WI Certified Compliance Certificates shall be provided indicating the grade specified. The foregoing shall not be construed to limit the power and authority of Architect to reject millwork which does not, in Architect's opinion, meet with any one or more of the specifications of the contract.

1.6 QUALIFICATIONS

- A. Fabricator: Authorized to provide WI Certified Compliance Certificate. Fabricator shall be equipped for and experienced in doing work, including fabricating, finishing, and installing, equal to standards specified, and be able to provide evidence of such experience to the Architect's and District's satisfaction. Failure to meet these qualifications may be sufficient cause for rejection.

1.7 MOCKUP

- A. Construct mockup of full size base cabinet and upper cabinet including hardware, and accessories.
- B. Locate where directed by Architect.
- C. Approved mockup may be accepted as part of Work.

1.8 PRE-INSTALLATION MEETINGS

- A. Convene minimum one week prior to commencing work of this section.

1.9 DELIVERY, STORAGE, AND HANDLING

- A. Section 01 60 00 - Product Requirements: Product storage and handling requirements.
- B. Protect units from moisture damage.

1.10 ENVIRONMENTAL REQUIREMENTS

- A. Section 01 60 00 - Product Requirements.
- B. During and after installation of Work of this section, maintain same temperature and humidity conditions in building spaces as will occur after occupancy.

1.11 FIELD MEASUREMENTS

- A. Verify field measurements prior to fabrication.

PART 2 - PRODUCTS**2.1 COMPONENTS**

- A. General:
 - 1. Material Grade: WI Custom Grade unless otherwise noted.
 - 2. Lumber and Plywood: Kiln-dry to equilibrium moisture content suitable for fabrication in shop and use intended. Particleboard not permitted.
- B. Lumber, Solid Stock:
 - 1. Concealed Portions: Paint grade Birch.
- C. Plywood: Marine plywood, surfaced 1 side.
- D. Hardboard: ANSI A135.4, tempered, smooth surface both faces.
- E. Medium Density Fiberboard: ANSI A208.2.

- F. High Pressure Decorative Laminate: NEMA LD 3, GP50 for horizontal surfaces, GP28 for vertical surfaces, CL20 for cabinet liner surfaces, BK20 for undecorated backing sheets, PF42 for post forming, FR50 for fire-retardant surfaces;
1. Manufacturer: Nevamar Corp.; Wilsonart; Formica; Pionite; or equal.
 2. Colors and textures: Multiple colors to be selected by Architect from District standard color palette:
 - a. Nevamar ARP textured finish:
 - 1) Alpine Essence ES5001.
 - 5) Jett Black S6053.
- G. Melamine Laminate: Low pressure decorative, ALA approved.
- H. Sheet Metal Components: Stainless steel, Type 304 with #4 satin finish, 16 gauge.

2.2 ACCESSORIES

- A. Adhesive for High Pressure Decorative Laminates: Urea formaldehyde cold setting or phenol resin with catalytic agent.
- B. Plastic Edge Banding: 3mm PVC, black, at plastic laminate finished cabinets. Self-edges, T-mold or bull-nosed laminate edges are unacceptable.
- C. Fasteners: Size and type to suit application.
- D. Bolts, Nuts, Washers, Lags, Pins, and Screws: Of size and type to suit application; US26D finish in exposed locations.
- E. Concealed Joint Fasteners: Threaded steel.
- F. Hardware:
1. General Requirements:
 - a. General: Furnish necessary screws, staples, bolts or other fastenings of proper size and type to secure items in position and, where exposed, to match finish of hardware item fastened.
 - b. Finish: Exposed hardware; US26D (satin chromium plated).
 - c. Keying: Key groups of locks the same in accordance with the Owner's directions.
 2. Typical hardware except where specifically noted otherwise.
 - a. Pulls at Drawers and Doors:
 - 1) General: Provide U-shaped wire pulls or equally accessible pull hardware at all accessible casework.
 - 2) 1 per drawer unless otherwise shown; solid stainless steel wire pull, 4 inches center-to-center.
 - 3) Manufacturer: Trimco 562-4.
 3. Hinges at 3/4-inch Thick Doors:
 - a. Self closing concealed hinge, stainless steel, heavy duty.
 - b. 1 pair typically; 1-1/2 pair where more than 3 feet high, 170-degree swing, self-closing.
 - c. Manufacturer: Blum, #BH71T6550, or equal; with minimum 170 degree opening.
 4. Drawer Slides:
 - a. 3/4 partial extension or full extension steel slides: 125 pounds load capacity minimum

- b. Finish: Stainless steel, white epoxy coated, with nylon ball bearing rollers and integral positive stops.
 - c. Manufacturer: Accuride, model 4032, or equal.
5. Locks for Cabinet Doors:
- a. Manufacturer: Olympus Lock Inc.
 - b. Function: 777 Series.
 - c. Description: Door cabinet lock, 1-7/16" throw for Schlage large format IC classic core. Core must be ordered separately (not supplied by Olympus).
 - d. Finish: 626.
6. Locks for Cabinet Drawers:
- a. Manufacturer: Olympus Lock Inc.
 - b. Function: 888 Series.
 - c. Description: Door cabinet lock, 1-7/16" throw for Schlage large format IC classic core. Core must be ordered separately (not supplied by Olympus).
 - d. Finish: 626.
7. Catches: Magnetic, with plastic housing.
8. Shelf Hardware:
- a. Standards:
 - 1) Steel, zinc plated.
 - 2) Finish: US32, satin finish.
 - 3) Manufacturer: Knape and Vogt Mfg. Co., "No. 255ZC"; or equal.
 - b. Supports:
 - 1) Steel, zinc plated.
 - 2) Finish: US32, satin finish.
 - 3) Manufacturer: Knape and Vogt Mfg. Co., "No. 239ZC"; or equal.
9. Door and Drawer Silencers:
- a. Gray rubber.
 - b. Manufacturer: Builders Brass Works, Model W06, or equal.
10. Seismic Restraints at all shelving.
11. Coat Hooks:
- a. Base: 1-3/4 inches H x 1-1/4 inches W.
 - b. Projection: 3 inches.
 - c. Conforms to ANSI/BHMA L33113.
 - d. Material: Cast aluminum.
 - e. Finish: Polished aluminum.
 - f. Manufacturer: Ives #571 Coat Hook.
12. Metal Label Holders:
- a. Provide metal label holders on every casework door and drawer.
 - b. Holders are sized to receive commercially available, standard office-type name badges that can be printed using standard office computer applications and standard office printers.

2.3 EPOXY RESIN WORK SURFACES

- A. Manufacturers:
- 1. Durcon Incorporated; www.durcon.com
 - 2. Kewaunee Scientific Corporation; www.kewaunee.com

3. Fisher-Hamilton; www.fisherhamilton.com
4. Substitutions: Section 01 63 00 – Product Options and Substitutions.

B. Materials:

1. General: Material shall be a monolithic, filled epoxy resin product and shall consist of a polymerized cast resin material formulated to provide a work surface with high chemical resistance characteristics. The combination of epoxy resin and asbestos free inert materials shall be oven-cured in molds to obtain maximum chemical resistance, then removed from the molds and oven tempered to achieve maximum physical strength and stability. Surfaces shall have a uniform low-sheen surface and the finished material shall be extremely hard and resistant to scratches and abrasion.
2. Thickness: 1" thick (industry standard).
3. Edges and Corners: Furnish exposed work surface edges and corners, except as indicated, with a 1/8" machined top edge with blended radius corners.
4. Surface: Furnish worksurfaces as flat.
5. Backsplashes: Supplied loose for field application in the same material and thickness as countertops. Install 4" high curbs, unless otherwise indicated on drawings. Bond backsplashes to the countertops at jobsite. Include top mounted end curb backsplash where worksurfaces abut walls, fume hoods, and locations detailed on drawings.
6. Color: Black Onyx (industry standard).

2.4 FABRICATION

- A. General:** Manufacture to Custom Grade standards, except where specifically noted otherwise, per Section 15 of WI Manual of Millwork. Provide WI Certified Compliance Label for grade specified, to each elevation of casework.

B. Construction:

1. General: Style A; Type I, frameless construction with doweled joints. Multiple self-supporting units fastened together to form a larger unit. Completely face exposed and semi-exposed surfaces with plastic laminate. Interior faces of hinged doors: Faced with same laminate as exposed surface. As far as practical, fabricate casework complete as a unit in the shop; backs required.
2. Door and Drawer Fronts: 3/4 inch flush overlay; Type A.
3. Shelving: One of the following:
 - a. Douglas Fir, solid-stock, Custom Grade for opaque finish.
 - b. Douglas Fir plywood, Custom Grade for opaque finish; with 3/8 inch minimum edge-banding or Architect approved machine-applied-type edge banding.
 - c. Plastic laminate faced plywood.
 - d. Thicknesses: Per WI Standards; 3/4 inch minimum thickness, 1 inch thickness for spans between 2'-9" and 4'-0". Any facings shall be in addition to these thicknesses.
 - e. Shelf spans greater than 4'-0" not permitted.
4. Filler Panels: As required, to match cabinets as shown.

C. Countertops:

1. General: Fabricate as shown, in longest practical length; minimum number of joints. Make joints neat and watertight; abutting ends splined and adjoining surfaces flush; ease exposed edges.
2. Core Material: Medium density fiberboard, or close grain hardwood plywood. Thickness: As shown; not less than 3/4 inch.
3. Backsplash: Height, type, and edge: As shown on drawings.

D. Epoxy Resin Countertops:

1. Fabrication: Provide in longest practical lengths. Bond joints with a highly chemical and corrosion resistant epoxy grout. Provide 1/8" drip groove on underside of exposed edges set back 1/2" from edge at all sink areas and where shown on drawings. All exposed edges to be molded or finished.
 2. Thickness Tolerances: Each corner of top shall not deviate more than plus or minus 1/16" from nominal.
 3. Size Tolerances: Length, plus or minus 1/8". Width, plus or minus 1/16".
 4. Squareness: Compare the diagonal corner-to-corner measurements across the width of each work surface. The diagonal measurements must be within 1/16".
 5. Penetrations: Location of cutouts and drillings: Plus or minus 1/8". Sizes of cutout and drillings: Plus or minus 1/16".
 6. Warpage: Check work surface for warpage before fabrication. Measure in unrestrained condition. Work surface will be accepted for use if there is no gap exceeding 1/16" in a 36" span.
- E. Casework Hardware:
1. General: Prefit; remove for application of finish. Keep hardware with casework to which it has been prefit; reinstall after casework is anchored in place, as shown.
 2. Hinges: Four (4) No. 8 screws into end panel and door panel; 1-1/2 pair on 7'-0" high cabinet doors; tall cabinet doors must swing 180 degrees when adjacent to low cabinets without interference from counter top.
 3. Magnetic Catches: One catch on cabinet doors up to 48 inches high; two catches (top and bottom) on cabinet doors over 48 inches high.
- F. Shop assemble casework for delivery to site in units easily handled and to permit passage through building openings.
- G. Fit shelves, doors, and exposed edges with matching veneer for wood cabinets and plastic edge binding for plastic laminate cabinets. Use one piece for full length only.
- H. Cap exposed high pressure decorative laminate finish edges with plastic edge binding.
- I. When necessary to cut and fit on site, fabricate materials with ample allowance for cutting. Furnish trim for scribing and site cutting.
- J. Apply high pressure decorative laminate finish in full uninterrupted sheets consistent with manufactured sizes. Fit corners and joints hairline; secure with concealed fasteners. Slightly bevel arises. Locate counter butt joints minimum 2 feet from sink cut-outs.
- K. Fabricate metal counter top surfaces pressure glued to plywood core without visible joints.
- L. Mechanically fasten back splash to counter tops with steel brackets at 16 inches on center.
- M. Fabricate cabinets and counter tops with cutouts for plumbing fixtures, inserts, appliances, outlet boxes, fixtures and fittings. Verify locations of cutouts from on-site dimensions. Seal cut edges.

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Verify adequacy of backing and support framing.
- B. Verify location and sizes of utility rough-in associated with work of this section.

3.2 INSTALLATION

- A. General: Install in conformance with referenced standards, manufacturer's written directions, as shown, and as specified. Provide WI Certified Compliance Certificate for installation.
- B. Casework:
 - 1. General: Install level, with tight joints between units; scribe edges to fit adjacent structure. Secure to blocking or plates in wall or to casework carriers with flathead screws to permit removal; screw penetration of not less than 1 inch into 2 inch nominal blocking or framing is required.
 - 2. Filler Panels: Scribe to cabinets and abutting structure.
- C. Countertops:
 - 1. General: Install level, using concealed fasteners, with tight joints; scribe to fit wall surfaces.
 - 2. Countertop Supports: Install as shown.
- D. Hardware:
 - 1. General: Check hardware upon delivery to site; store in an orderly manner. Fit and install in place without marring or injuring either hardware or casework.
 - 2. Coat Hooks: Install coat hooks at interior side of all Office doors, mounted at +66 inches AFF, centered.
- E. Set and secure casework in place; rigid, plumb, and level.
- F. Use fixture attachments in concealed locations for wall mounted components. Attach to blocking in walls per DSA requirements.
- G. Use concealed joint fasteners to align and secure adjoining cabinet units and counter tops.
- H. Carefully scribe casework abutting other components, with maximum gaps of 1/32 inch. Do not use additional overlay trim for this purpose.
- I. Secure cabinet and counter bases to floor using appropriate angles and anchorages. Provide a bead of silicone caulk where casework base meets floor, prior to installation of rubber base, to ensure that floor cleaning activities do not damage the structural integrity of the casework base. Provide rubber base around exposed bases of casework, to create a unified appearance at the base of walls and casework.
- J. Countersink anchorage devices at exposed locations. Conceal with solid wood plugs of species to match surrounding wood; finish flush with surrounding surfaces.

3.3 ADJUSTING

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

3.4 CLEANING

- A. Section 01 74 00 – Cleaning: Final cleaning.
- B. Immediately following installation, clean casework (including counters, shelves, hardware, fittings, and fixtures) to remove dirt, stains, scratches, and abrasions. Protect casework against damage by other trades; repair or replace damaged and defaced material at no cost to Owner.

3.5 JOBBING

- A. General: Six (6) months after final acceptance of the building, and at any time within a year after acceptance when so directed, examine casework doors, drawers, fittings, etc., and perform such fitting and adjustments as necessary to put items in good condition and working order.

END OF SECTION

SECTION 07 13 00**PVC SHEET WATERPROOFING****PART 1 - GENERAL****1.1 SECTION INCLUDES**

- A. Requirements for materials, fabrications, and installation of Polyvinyl Chloride (PVC) Waterproofing and associated accessory items.

1.2 SUBMITTALS

- A. Submit under provisions of Section 01 32 19.
- B. Certificates of Compliance.
- C. Manufacturers' Product Data
1. Product List: All products proposed for use.
 2. Manufacturer's catalog data.
- D. Shop Drawings of all metal and thermoplastic flashings showing exact profiles, lengths, joints, terminations, and methods of attachment.
- E. Samples:
1. All materials proposed for use.
 2. Label each sample.
 3. Sizes and quantities:
 - a. Sheet Goods: 2 each, minimum 12 x 12 inch.
 - b. Fasteners: 4 of each type.
 - c. Sealants: Two containers.
- F. Manufacturer's Printed Installation Instructions.
- G. Do not order materials before receiving the Architect's written approval of all submittals required by this Section.
- H. Do not start work before receiving the Architect's written approval of the Certificates of Compliance.

1.3 QUALITY ASSURANCE

- A. Applicator Qualifications:
1. Demonstrate, to Architect's satisfaction, successful completion of at least three projects of similar size and complexity within 3 years previous to bid.
 2. Certified or otherwise authorized, in writing, by manufacturer.
 3. Demonstrate, by written certification that four members of the applicator crew have attended a manufacturer's training seminar specifically for work on this contract, and that same trained applicators will not be replaced or removed from the job, except by approval of Architect or special manufacturer training of replacement applicator(s).
- B. Attend preconstruction conference to be held with the District, Architect, Contractor field superintendent, waterproofing foreman, and other involved trades to discuss waterproofing practices applicable to the project.

1.4 DELIVERY, STORAGE, AND HANDLING

- A. Deliver materials in manufacturer's original containers.
 - 1. Clearly labeled with manufacturer's name, brand, number, and batch identification.
 - 2. Dry, undamaged.
 - 3. Seals and wrappers intact.
- B. Store materials in weather-protected environment, clear of ground, moisture, and in compliance with manufacturer's directions.
- C. Handle and protect all materials using precautions required to avoid damage.

1.5 JOB CONDITIONS

- A. Work Sequence:
 - 1. Avoid use of newly constructed waterproofing for storage, walking surface, or equipment movement.
 - 2. Protect waterproofing surface against mechanical damage.
- B. Seal all temporary waterproofing and flashing terminations and maintain in a watertight state until permanent waterproofing and flashing is installed.

1.6 GUARANTEE

- A. Section 01 70 00 – Contract Closeout: Requirements for warranties.
- B. Guarantee all work under this section for 2 years in a written document endorsed by the Contractor:
 - 1. "If, within 2 years after the date of Final Acceptance, any of the work of this Section (POLYVINYL CHLORIDE WATERPROOFING) is found to be defective, or not in accordance with the Contract Documents, the Waterproofing Contractor will correct it promptly after receipt of a written notice from the District to do so, unless the District has previously given the Waterproofing Contractor a written acceptance of such condition. Provide for prompt repair and replacement of all component materials or systems which admit water or otherwise malfunction, including damaged components, and elements which require excessive frequent repair or service calls. The General Contractor will provide access to the waterproof membrane by removing and replacing the overburden. This work will be done at no cost to the District. The obligation of this Guarantee shall run directly to the District, may be enforced by the District against the General Contractor and Waterproofing Contractor, and shall survive the termination of the Contract."
- C. Provide the membrane manufacturer's 10-year materials and labor warranty.

PART 2 - PRODUCTS**2.1 POLYVINYL CHLORIDE WATERPROOFING**

- A. Manufacturers:
 - 1. Products listed below are by Sarnafil, Inc., except as otherwise specified.
 - 2. Substitutions: Not permitted.

2.2 MATERIALS

- A. PVC Membrane: G-476-20, fiberglass-reinforced PVC membrane.
- B. PVC Flashing Membrane: G-476-15, fiberglass-reinforced PVC flashing membrane.

- C. PVC Grid Strips and Transition Membrane: G-459, fiberglass-reinforced PVC membrane.
- D. Flexible Protection Board: G-445-13, fiberglass-reinforced membrane.
- E. Drainage Mat: J-Drain D100
- F. Leveling Layer: 18 oz. Sarnafelt, unsaturated polypropylene felt NWP-HD.
- G. Adhesives: Sarnacol 2170 adhesive.
- H. Metal Termination Bar: Sarnabar, 14 gauge stainless steel bar, 1 inch wide prepunched, 1 inch on center.
- I. PVC Cord: 4mm round RPC cord, Sarnacord, by Sarnafil.
- J. Disk Fastener: Sarnadisc, 2 inch diameter, 20 ga steel disc with prepunched center hole.
- K. NC Flashing Boot: Factory Fabricated PVC Flashing Boot by Sarnafil.
- L. Expansion Joint: Sarnaflash by Sarnafil.
- M. Disk Fasteners:
 - 1. To Concrete: Rawl Nailin anchors in diameters to extend through disk fasteners and lengths to provide 2 inch minimum embedment.
- N. Sealant: One-part polyurethane – Sikaflex 1a by Sika.
- O. Liquid Membrane Components:
 - 1. Primer over concrete: E5320 by Gaco-Western.
 - 2. Two component liquid urethane – LM-60V by Gaco- Western.

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Notify the Architect of any discrepancies between plans and field conditions.
- B. Alert manufacturer's representative prior to commencement of work.
- C. Examine all surfaces scheduled to receive waterproofing membrane and flashing for roughness, contaminants, unsound structural substrates, or other conditions that may impair the waterproofing. Notify the District in writing of any such conditions; do not commence work until all defects are remedied.
- D. Do not allow bitumen or oil in any form to contact the PVC membrane or flashing components.

3.2 APPLICATION

- A. General:
 - 1. Install system in conformance with manufacturer's approved, written installation instructions and recommendations.
 - 2. Protect the unfinished exposed membrane and flashing components if rain threatens during the day, or if an emergency occurs.
 - a. Remove and replace affected area at the Contractor's expense.

- b. Do not allow asphalt to be in contact with PVC materials of the permanent installation.
 3. Workmen and all others who walk on the membrane shall wear clean, soft-soled shoes, so as not to damage the waterproofing materials. Equipment shall have no sharp edges and shall be clean and free of any asphaltic and coal tar products.
 4. Weld adjacent sheets in accordance with the manufacturer's written instructions. Hot air weld all side and end lap joints.
 5. Provide welding equipment approved by the membrane manufacturer. All mechanics using the equipment shall have successfully completed a course of instruction provided by the membrane manufacturer's representative prior to welding.
 6. Surfaces to be welded: Clean and dry. No adhesive shall be present within the lap areas.
 7. Machine Welding:
 - a. Manufacturer's automatic welding equipment may be used to machine weld seams.
 - b. Follow the manufacturer's instructions and observe local codes for electric supply, grounding, and over-current protection.
 - c. The automatic welding machines require 218 to 230 volts at 30 amps.
 - d. Use of a portable generator is recommended.
 8. Hand Welding: Complete hand welded seams in three stages. Allow equipment to warm up for at least one minute prior to start of welding.
 - a. Tack weld the lap every 3 feet to hold the seam in place.
 - b. Weld the back edge of the lap with a thin, continuous weld to prevent loss of hot air during the final welding.
 - c. Insert the hot air nozzle into the lap, keeping the welding equipment at a 45° to the side lap.
 - 1) Once the proper welding temperature has been reached and the material starts to flow, apply the hand roller at a right angle to the welding gun and pressed lightly.
 - 2) Use the 1-1/2 inch wide nozzle for straight laps.
 - 3) Use the 3/4 inch wide nozzle for corners and compound connections.
 - 4) 3-way welds or T-joints:
 - a) Shave sheets at intersection.
 - b) Install 6 in. x 6 in. square patch over joint and hot air weld into place.
- B. Grid Strips and Termination Strips – Concrete:
 1. Install grid strips and termination strips over concrete deck and curbs at locations indicated.
 - a. Prepare concrete by sandblasting existing membrane residue to concrete. Provide protection to surrounding finishes to prevent damage.
 - b. Dry concrete substrate as required to allow application and adhesion of primer.
 2. Apply primer and allow to dry.
 3. Apply liquid membrane in 16 in. strips and embed 12 in. wide termination grid strips into wet material.
 4. Allow to cure and add additional liquid membrane as required.
 5. At locations shown on drawing install termination bars through termination grids.
- C. Horizontal Sheet Membrane:
 1. Loose lay leveling felt and waterproof membrane over deck.
 2. Install membrane termination base at perimeters.
 3. Hot air weld flashing membrane to grid and field membrane strips.
 4. Hot air weld lap seams in accordance with manufacturer's recommendations.
 - a. Shave edges of sheets at 3 weld laps.
 5. Install fastener disks around penetrations at 4 inches on center.

- D. Existing Concrete Anchors:
 - 1. Prepare concrete anchors by sandblasting to clean steel.
 - 2. Prime with epoxy primer and apply liquid membrane as detailed.
- E. PVC Flashing:
 - 1. Hot air weld PVC flashing full to grid strip and horizontal flashing membrane.
- F. Expansion Joint Assembly:
 - 1. Install expansion joint assembly per the manufacturer's requirements.
- G. Protection Board/Drainage Mat:
 - 1. Install in accordance with manufacturer's instructions over vertical and horizontal surfaces.
 - 2. Protection Board:
 - a. Spot adhere protection board to membrane using specified adhesive, as required.
 - b. Lap adjoining sheets 4 inches minimum.
 - c. Heat weld all seams as described in paragraph 3.2.a above.
 - 3. Drainage Mat:
 - a. Spot adhere drainage mat (Geotextile fabric side to the backfill) to protection board using specified adhesive.
 - b. Provide 4 inch lap between adjoining sections of drainage mat.

3.3 FIELD QUALITY CONTROL

- A. Welded Seams:
 - 1. Check completed welded seams for continuity after cooling using screwdriver or other suitable blunt object.
 - 2. Be alert to visible evidence of positive welding while welding is proceeding, such as smoke during welding, shiny membrane surfaces, and uninterrupted flow of black material from edge of completed joints.
 - 3. Take 2 inch wide cross-section samples at the Architect's or manufacturer's representative's direction through completed seams; patch test cut at no additional cost to the District.
- B. Water Test:
 - 1. Provide 24 hour water test of membrane, with a minimum of 4 in. of standing water at the high point, following manufacturer's procedure to ensure warrantability of membrane.
 - 2. Repair areas which show leakage and continue water test until no evidence of leakage through the membrane occurs over a 24 hour period.
- C. Indicate in writing with confirmation by signature of manufacturer's representative that the membrane passed the water test.

END OF SECTION

SECTION 07 19 00**WATER REPELLENTS****PART 1 - GENERAL****1.1 SUMMARY**

- A. Section includes water repellent coating applied to exterior slate veneer and precast concrete surfaces.
- B. Related Sections:
 - 1. Section 04 20 19 - Slate Veneer.
 - 2. Section 07 90 00 - Joint Protection.

1.2 REFERENCES

- A. ASTM International:
 - 1. ASTM D5703 - Standard Practice for Preparatory Surface Cleaning for Clay Brick Masonry.

1.3 SYSTEM DESCRIPTION

- A. Applied Penetrant: Material to restrict moisture absorption in material being treated as recommended by manufacturer for specific substrate.

1.4 SUBMITTALS

- A. Section 01 32 19 – Submittal Procedures: Submittal procedures.
- B. Product Data: Submit details of product description, tests performed, limitations to coating, and chemical properties including percentage of solids.
- C. Manufacturer's Installation Instructions: Submit special procedures and conditions requiring special attention, and cautionary procedures required during application.
- D. Manufacturer's Field Reports: Manufacturer's field reports specified herein.
- E. Manufacturer's Certificate: Certify products meet or exceed specified requirements.
- F. Closeout Submittals: Submit the following:
 - 1. Operation and Maintenance Data: Operation and maintenance data for installed products in accordance with Section 01 77 00 – Contract Closeout. Include methods for maintaining installed products, and precautions against cleaning materials and methods detrimental to finishes and performance.

1.5 QUALITY ASSURANCE

- A. Submit Certified test reports showing compliance with specified performance characteristics and physical properties.
- B. Submit product certificates signed by manufacturer certifying materials comply with specified performance characteristics and criteria, and physical characteristics.
 - 1. Submit certificate by water repellent manufacturer certifying compliance with regulations controlling VOC content.

- C. Preinstallation Testing: Before full-scale application, review manufacturer's product data sheets to determine the suitability of each product for the specific surfaces. Apply each protective treatment to test panels to determine number of applications, coverage rates, compatibility, effectiveness, surface preparation, application procedures, and desired results.
- D. Apply protective treatments to test panels in accordance with manufacturer's application instructions. Allow 48 hours cure time or until test panels are thoroughly dry before evaluating final appearance and results. Do not begin full-scale application until test panels are inspected and approved by Architect.
- E. Test panel requirements:
 - 1. Size: Minimum 4 feet by 4 feet on each type of masonry.
 - 2. Location: as determined by Architect.
 - 3. Number: As required to completely test each protective treatment with each type of substrate to be protected.
 - 4. Keep test panels available for comparison throughout the protective treatment project.

1.6 QUALIFICATIONS

- A. Manufacturer: Company specializing in manufacturing products specified in this section with minimum three years documented experience, capable of providing field service representation during construction.
- B. Applicator: Company specializing in performing Work of this section with minimum three years documented experience, approved by manufacturer.

1.7 MOCKUP

- A. Section 01 32 19 – Submittal Requirements: Requirements for mockup.
- B. Prepare masonry surface minimum 48 inches by 48 inches in size for each type of masonry, in accordance with ASTM D5703. Use manufacturer's application instructions. Let test area protective treatment cure before inspection. Keep test panels available for comparison throughout the protective treatment period.
- C. Test mockup with 5/8 inch garden hose with spray nozzle located approximately 10 feet from wall and aimed upward so water strikes at 45 degree downward angle.
 - 1. Do not begin testing until mockup has fully cured, minimum 20 days unless longer period recommended by manufacturer.
 - 2. Run water continuously for minimum three hours and observe back side of mockup for water penetration and leakage.
 - 3. When leakage is detected make changes as needed and retest; retest until no leakage is detected.
- D. Locate where directed by Architect.
- E. Obtain Owner's and Architect's acceptance of finish color, texture and pattern, and workmanship standard. Incorporate accepted mockup as part of Work.

1.8 PRE-INSTALLATION MEETINGS

- A. Section 01 31 19 – Project Meetings: Pre-installation meeting.
- B. Convene minimum one week prior to commencing work of this section.

- C. Conduct Preinstallation meeting to verify project requirements, substrate conditions, manufacturer's installation instructions, and manufacturer's warranty requirements.

1.9 DELIVERY, STORAGE, AND HANDLING

- A. Section 01 60 00 - Product Requirements: Product storage and handling requirements.
- B. Delivery materials in manufacturer's original, unopened, undamaged containers with identification labels intact.
- C. Store materials protected from exposure to harmful weather conditions and at temperature and humidity conditions recommended by manufacturer.

1.10 ENVIRONMENTAL REQUIREMENTS

- A. Section 01 60 00 - Product Requirements.
- B. Environmental Requirements/Conditions: Substrate and ambient air temperature: in accordance with manufacturer's requirements.
 - 1. Surface and air temperatures must be at least 40 degrees F during application and for 8 hours following. If freezing conditions exist before application, let masonry thaw. Subfreezing temperatures will cause Blok-Guard® & Graffiti Control II's water carrier to freeze or crystallize which inhibits penetration and impairs results.
 - 2. Surface and air temperatures should not exceed 95 degrees F. High temperatures cause rapid evaporation of water carrier and result in reduced penetration.
- C. Comply with applicable VOC requirements of regulatory agency having jurisdiction.

1.11 WARRANTY

- A. Section 01 77 00 – Contract Closeout: Requirements for warranties.
- B. Furnish one year manufacturer warranty for water repellents.

PART 2 - PRODUCTS

2.1 WATER REPELLENTS

- A. Manufacturers:
 - 1. ProSoCo, Inc. 3741 Greenway Circle, Lawrence, IK 66046. Phone: (800) 255-4255; E-mail: CustomerCare@prosoco.com. Product: "Sure Klean® Weather Seal Blok-Guard® & Graffiti Control II".
 - 2. Sonneborn Building Products.
 - 3. Pecora Corporation.
 - 4. Substitutions: Section 01 60 00 – Product Requirements: Product Options and Substitutions.
- B. Product Description and Basis of Design: Sure Klean® Weather Seal Blok-Guard® & Graffiti Control II is a clear, solvent-based silicone elastomer formulated to weatherproof concrete block and other porous masonry materials and protect treated surfaces from repeated graffiti attacks without altering the natural appearance. Blok-Guard® & Graffiti Control II penetrates and fills pores to prevent water penetration through exterior walls exposed to normal weathering. Graffiti removal is fast and easy using Defacer Eraser® Graffiti Wipe.

2.2 COMPONENTS

- A. Silicone Water Repellent: "Weather Seal Blok-Guard® & Graffiti Control II," penetrating type water repellent.
1. Form: Milky white liquid.
 2. Specific Gravity: 1.0.
 3. Active content: 6 percent.
 4. pH: N/A.
 5. Weight/Gal: 8.32 lbs.
 6. Flash Point: >212 degrees F.
 7. Freeze Point: 34 degrees F.
 8. VOC Content: Manufactured and marketed in compliance with USEPA AIM VOC regulations (40 CFR 59.403).
- B. Limitations:
1. Not suitable for extremely dense or polished surfaces.
 2. Not recommended for below-grade applications.
 3. Will not prevent water penetration through structural cracks, defects, or open joints.
 4. May be difficult to remove from adjacent surfaces. Always protect.
 5. Not recommended for horizontal surfaces.

2.3 SOURCE QUALITY

- A. Obtain water repellent materials and surface preparation cleaners from a single manufacturer.

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Verify joint sealants are installed and cured.
- B. Verify surfaces to be coated are dry, clean, and free of efflorescence, oil, or other matter detrimental to application of coating.

3.2 PREPARATION

- A. Delay Work until masonry mortar substrate is cured minimum of 60 days.
- B. Protect people, vehicles, property, plants, windows and all surfaces not set for treatment from product, splash, residue, fumes and wind drift. Use polyethylene or other tested material for protecting nonmasonry surfaces. Protect/divert pedestrian and auto traffic.
- C. Surface Preparation:
1. General: Before applying, read "Preparation" and "Safety Information" sections in the Manufacturer's Product Data Sheet for Weather Seal Blok-Guard® & Graffiti Control. Refer to the Product Data Sheet for additional information about application of Blok-Guard® & Graffiti Control. Do not dilute or alter,
 2. Surface should be clean, dry and absorbent. If necessary, thoroughly clean the surface using appropriate Sure Klean® cleaner. Do not use raw acids. Let cleaned surfaces dry completely.
 3. Newly constructed surfaces and repointed surfaces should cure for 28 days before application. Sealing and caulking compounds should be in place and cured before application.
 4. Fill cracks and voids to prevent penetration of fumes into building.

3.3 APPLICATION

- A. Test each type of surface for suitability and desired results before overall application. Use the following application instructions. Let surface dry thoroughly before inspection and approval.
- B. Dilution: Do not dilute or alter.
- C. Vertical Application Instructions:
 - 1. For best results, apply Blok-Guard® & Graffiti Control II "wet-on-wet" to a visibly dry and absorbent surface.
 - a. Spray: Saturate from the bottom up, creating a 6 inch to 8 inch rundown below the spray contact point. Let the first application penetrate for 2-3 minutes. Resaturate. Less material will be needed for the second application. Immediately brush out runs and drips to prevent build-up.
 - b. Brush or Roller: Saturate uniformly. Let Blok-Guard® & Graffiti Control II penetrate for 2 to 3 minutes. Re-saturate. Brush out heavy runs and drips that do not penetrate.
- D. Dense Surface Applications Instructions:
 - 1. Apply a single coat. Use enough. Use enough Blok-Guard® & Graffiti Control II to completely wet the surface without creating drips, puddles or rundown. Do not over apply. Test for application rate.
 - 2. Treated surfaces will be dry to touch within 1 hour. Protect surfaces from rainfall for a minimum of 4 hours following treatment. Protect from foot and vehicle traffic until visibly dry. Surfaces may require as many as 72 hours to gain their water repellency properties.
- E. Porous Surface Application Instructions:
 - 1. Some surfaces may need an additional coat of Blok-Guard® & Graffiti Control II for maximum protection. Apply the second wet-on-wet coat as soon as the first application is dry to the touch or within one hour. Allowing more than one hour between coats could reduce the effectiveness of the second coat or cause darkening.
 - 2. Treated surfaces dry to touch in 1 hour. Protect surfaces from rainfall for 6 hours following treatment. Blok-Guard® & Graffiti Control II treatment gains its water-repellency properties in 24 hours.

3.4 MANUFACTURER'S FIELD SERVICES

- A. Provide manufacturer's field service consisting of product use recommendations and periodic site visits for inspection of product installation in accordance with manufacturer's instructions.
 - 1. Site Visits: Minimum of one (1).

3.5 CLEANING

- A. Section 01 74 00 – Cleaning: Final cleaning.
- B. Remove temporary coverings and protection of adjacent work areas.
- C. Repair or replace damaged installed products.
- D. Clean installed products in accordance with manufacturer's instructions prior to Owner's acceptance.
- E. Remove construction debris from project site and legally dispose of debris.

3.6 PROTECTION OF INSTALLED CONSTRUCTION

- A. Protect adjacent surfaces not scheduled to receive coating.
- B. Protect landscaping, property, and vehicles.
- C. When applied to unscheduled surfaces, remove immediately by methods as instructed by coating manufacturer.

END OF SECTION

SECTION 07 21 16**BLANKET INSULATION****PART 1 - GENERAL****1.1 SUMMARY**

- A. Section includes formaldehyde-free fiberglass thermal and sound control insulation made with non-toxic thermosetting resin.
- B. Related Sections:
 - 1. Section 07 27 00 - Air Barriers: Air barrier materials adjacent to insulation.
 - 2. Section 07 84 00 - Firestopping.
 - 3. Section 07 90 00 - Joint Protection.
 - 4. Section 09 21 16 - Gypsum Board Assemblies: Acoustic insulation.

1.2 REFERENCES

- A. ASTM International:
 - 1. ASTM C165 - Test Method for Measuring Compressive Properties of Thermal Insulations.
 - 2. ASTM C411 - Test Method for Hot-Surface Performance of High-Temperature Thermal Insulation.
 - 3. ASTM C612 - Specification for Mineral Fiber Block and Board Thermal Insulation.
 - 4. ASTM C665 - Standard Specification for Mineral-Fiber Blanket Thermal Insulation for Light Frame Construction and Manufactured Housing; 2001.
 - 5. ASTM C1104 - Test Method for Determining the Water Vapor Sorption of Unfaced Mineral Fiber Insulation.
 - 6. ASTM C1304 - Standard Test Method for Assessing the Odor Emission of Thermal Insulation Materials.
 - 7. ASTM C1338 - Standard Test Method for Determining Fungi Resistance of Insulation Materials and Facings.
 - 8. ASTM E84 - Standard Test Method for Surface Burning Characteristics of Building Materials; 2001.
 - 9. ASTM E96 - Test Methods for Water Vapor Transmission of Materials.
 - 10. ASTM E119, - Test Methods for Fire Tests of Building Construction and Materials.
 - 11. ASTM E136 - Standard Test Method for Behavior of Materials in a Vertical Tube Furnace at 750 Degrees C; 1999.
 - 12. ASTM E970 - Critical Radiant Flux of Exposed Attic Floor Insulation Using a Radiant Heat Energy Source.
- B. California Integrated Waste Management board (CIWMB):
 - 1. Section 01 35 00 - Special Environmental Requirements.
- C. National Fire Protection Association:
 - 1. NFPA 255 - Standard Method of Test of Surface Burning Characteristics of Building Materials.
- D. Underwriters Laboratories Inc.:
 - 1. UL 723 - Tests for Surface Burning Characteristics of Building Materials.
- E. California Building Code: 2007 CBC, Chapter 7.

1.3 SYSTEM DESCRIPTION

- A. Materials of This Section: Provide thermal protection to air seal materials at building enclosure elements in conjunction with air barrier materials in Section 07 27 00.
- B. Performance Requirements: Provide products that have been manufactured, fabricated and installed to the following criteria:
 - 1. Surface Burning Characteristics, Unfaced (ASTM E84): Flamespread index 25, smoke developed 50.
 - 2. Recycled Glass Content: 25 percent.
 - 3. Combustibility (ASTM E136): Noncombustible.
 - 4. Formaldehyde Content: Free of formaldehyde.

1.4 SUBMITTALS

- A. Section 01 32 19 – Submittal Procedures: Submittal procedures.
- B. Product Data: Submit data on manufacturer's specifications, product characteristics, performance criteria, limitations, and installation instructions.
- C. Manufacturer's Certificate: Submit manufacturer's certification that insulating materials comply with California Quality Standards for insulation materials; CBC, Section 5311.

1.5 QUALITY ASSURANCE

- A. Source Limitations: Obtain each type of building insulation through one source.
- B. Fire-Test-Response Characteristics: Provide insulation and related materials with the fire-test-response characteristics indicated, as determined by testing identical products per test method indicated below by UL or another testing and inspecting agency acceptable to authorities having jurisdiction. Identify materials with appropriate markings of applicable testing and inspecting agency.
 - 1. Surface-Burning Characteristics: ASTM E84.
 - 2. Fire-Resistance Ratings: ASTM E119.
 - 3. Combustion Characteristics: ASTM E136.

1.6 DELIVERY, STORAGE AND HANDLING

- A. Section 01 60 00 – Product Requirements: Requirements for transporting, handling, storing, and protecting products.
- B. Protect insulation materials from physical damage and from deterioration by moisture, soiling, and other sources. Store inside and in a dry location. Comply with manufacturer's written instructions for handling, storing, and protecting during installation.

1.7 COORDINATION

- A. Coordinate the Work with Section 07 27 00 for air seal materials.

PART 2 - PRODUCTS

2.1 BLANKET INSULATION

- A. General: Refer to Section 01 60 00 – Product Requirements.
- B. Manufacturers:

1. General: Products are manufactured by Johns Manville International, Inc. (JM), PO Box 5108, Denver, CO 80217. (800) 654-3103. Fax: (303) 978-2318.
2. Alternate Manufacturers: Comparable products manufactured by CertainTeed Insulation; Owens Corning Fiberglas; USG; Thermafiber; or accepted equal
3. Substitutions: Section 01 60 00 - Product Requirements: Product Options and Substitutions.
4. Thickness: As shown; where not shown, as required to meet CBC ratings.

2.2 INSULATING MATERIALS - GENERAL

- A. General: Provide insulating materials that comply with requirements and with referenced standards.
1. Preformed Units: Sizes to fit applications indicated; selected from manufacturer's standard thicknesses, widths, and lengths.

2.3 FORMALDEHYDE-FREE INSULATING MATERIALS

- A. Formaldehyde-Free Unfaced Glass-Fiber Batt Insulation: JM Formaldehyde-Free Unfaced Batts; ASTM C665, Type I; with maximum flame-spread and smoke-developed indices of 25 and 50, respectively; and of the following properties:
1. Thermal Resistance (R-Value): R-11 and R-19.
 2. Combustion Characteristics: Passes ASTM E136.
 3. Critical Radiant Flux: ASTM E970, greater than 0.11 Btu/sq ft s (0.12 W/cm sq).
 4. Water Vapor Sorption: ASTM C1104, 5 percent or less.
 5. Odor Emission: Passes ASTM C1304.
 6. Corrosiveness: Passes ASTM C665.
 7. Fungi Resistance: Passes ASTM C1338.
 8. Recycled Content: Certified by Scientific Certification Systems to contain minimum of 20 percent post-consumer and 5 percent pre-consumer recycled glass product, on average of manufacturer's products.\
 9. Prove through documentation that product complies with CIWMB Section 01350 for indoor air quality.
 10. Thickness: 3-5/8 inches for R11; and 6-1/2 inches for R-19.
- B. Formaldehyde-Free FSK-25 Faced Glass-Fiber Batt Insulation: JM Formaldehyde-Free FSK-25 Faced Batts; ASTM C665, Type III, Class A, Category 1 with maximum flame-spread and smoke-developed indices of 25 and 50, respectively; and of the following properties:
1. Thermal Resistance (R-Value): R-11 and R-19.
 2. Combustion Characteristics: Passes ASTM E136.
 3. Critical Radiant Flux: ASTM E970, greater than 0.11 Btu/sq ft s (0.12 W/cm sq).
 4. Water Vapor Permeance: ASTM E96, 0.05 Perms (3 ng/Pa-s m²).
 5. Water Vapor Sorption: ASTM C1104, 5 percent or less.
 6. Odor Emission: Passes ASTM C1304.
 7. Corrosiveness: Passes ASTM C665, 13.8.
 8. Fungi Resistance: Passes ASTM C1338.
 9. Recycled Content: Certified by Scientific Certification Systems to contain minimum of 20 percent post-consumer and 5 percent pre-consumer recycled glass product, on average of manufacturer's products.
 10. Prove through documentation that product complies with CIWMB Section 01350 for indoor air quality.
 11. Thickness: 3-5/8 inches for R11; and 6-1/2 inches for R-19.

2.4 ACCESSORIES

- A. Safing: USG (800-874-4968) SAFB mineral wool.

- B. Nails: 11 gage, barbed, galvanized; 5/8 inch diameter heads.
- C. Staples: 7/16 inch steel wire staples.
- D. Tape: Self-adhesive vapor retarder tape with flame spread index of 25 or less, smoke developed index of 50 or less.
- E. Adhesive: Gemco Tuff Bond Hanger Adhesive.
- F. Insulation Fasteners: Steel impale spindle and clip on flat metal base, self adhering backing, length to suit insulation thickness, capable of securely and rigidly fastening insulation in place. Cemco Insul-Anchors.
- G. Wire Mesh: Galvanized steel, hexagonal wire mesh.

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Examine substrates and conditions for compliance with requirements for Sections in which substrates and related work are specified and other conditions affecting performance.
- B. Verify substrate, adjacent materials, and insulation are dry and ready to receive insulation.
- C. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 PREPARATION

- A. Clean substrates of substances harmful to insulations or vapor retarders, including removing projections capable of puncturing vapor retarders or of interfering with insulation attachment.

3.3 INSTALLATION, GENERAL

- A. Comply with insulation manufacturer's written instructions applicable to products and application indicated.
- B. Install insulation that is undamaged, dry, and unsoiled and that has not been left exposed at any time to ice and snow.
- C. Extend insulation in thickness indicated to envelop entire area to be insulated. Cut and fit tightly around obstructions and fill voids with insulation. Remove projections that interfere with placement.
- D. Water-Piping Coordination: If water piping is located on inside of insulated exterior walls, coordinate location of piping to ensure that it is placed on warm side of insulation and insulation encapsulates piping.
- E. Apply single layer of insulation to produce thickness indicated, unless multiple layers are otherwise shown or required to make up total thickness.

3.4 INSTALLATION OF GENERAL BUILDING INSULATION

- A. Seal joints between closed-cell (non-breathing) insulation units by applying adhesive, mastic, or sealant to edges of each unit to form a tight seal as units are shoved into place. Fill voids in completed installation with adhesive, mastic, or sealant as recommended by insulation manufacturer.
- B. Set vapor-retarder-faced units with vapor retarder to warm side of construction, unless otherwise indicated. Do not obstruct ventilation spaces, except for firestopping.
 - 1. Tape ruptures in vapor retarder, and seal each continuous area of insulation to surrounding construction to ensure airtight installation.
- C. Install glass-fiber blankets in cavities formed by framing members according to the following requirements:
 - 1. Use blanket widths and lengths that fill the cavities formed by framing members. If more than one length is required to fill cavity, provide lengths that will produce a snug fit between ends.
 - 2. Place blankets in cavities formed by framing members to produce a friction fit between edges of insulation and adjoining framing members.
 - 3. For metal-framed wall cavities where cavity heights exceed 96 inches, support unfaced blankets mechanically and support faced blankets by taping stapling flanges to flanges of metal studs.

3.5 PROTECTION OF INSTALLED CONSTRUCTION

- A. Protect installed insulation from damage due to harmful weather exposures, physical abuse, and other causes. Provide temporary coverings or enclosures where insulation is subject to abuse and cannot be concealed and protected by permanent construction immediately after installation.

3.6 SCHEDULE

- A. Interior Wall (Sound) Insulation: R-11 batt, 3-5/8 inch thick, unfaced; and R-19 batt, 6-1/2 inch thick, unfaced. See drawings for location.
- B. Exterior Wall (Thermal) Insulation: R19 batt, 6-1/2 inch thick, FSK-25 faced. See drawings for location.

END OF SECTION

SECTION 07 26 00**CONCRETE VAPOR CONTROL BARRIER****PART 1 – GENERAL****1.1 SUMMARY**

- A. Section includes application of a polymer-resin based (non-silicate) vapor control barrier in areas scheduled to receive floor coverings; and for use as a finished floor sealer.
- B. Related Sections:
 - 1. Section 03 30 00 – Cast-in-Place Concrete.
 - 2. Section 09 65 00 – Resilient Flooring.
 - 3. Section 09 68 16 – Sheet Carpeting.

1.2 REFERENCES

- A. American Concrete Institute:
 - 1. ACI 318 – Building Code Requirements for Structural Concrete.
- B. ASTM International:
 - 1. ASTM D1308 – Standard Test Method for Effort of Household Chemicals on Clear and Pigmented Organic Finishes.
 - 2. ASTM D4541 – Standard Test Method for Pull-Off Strength of Coatings Using Portable Adhesion Testers.
 - 3. ASTM E96 – Standard Test Methods for Water Vapor Transmission of Materials.
 - 4. ASTM F710 – Standard Practice for Preparing Concrete Floors to Receive Resilient Flooring.
 - 5. ASTM F1869 – Standard Test method for Measuring Moisture Vapor Emission Rate of Concrete Subflooring Using Anhydrous Calcium Chloride.
- C. Bay Area Air Quality Management District. www.baaqmd.gov

1.3 SYSTEM DESCRIPTION

- A. Clear penetrating-film forming polymer based, moisture-alkaline barrier for suppressing water vapor emission rates, alkalinity, salt migration and water absorption. Final surface shall maintain a water vapor emission rate of 2.5 pounds/1000 sf/24 hrs (plus or minus 0.50 pounds) and alkaline resistance of 14 pH for a period of 15 years.
 - 1. Option 1: Apply as a curing, sealing, moisture barrier to freshly poured concrete.
 - 2. Option 2: Application is required to suppress moisture vapor emission rates where testing results exceed flooring tolerances at no cost to Owner.

1.4 SUBMITTALS

- A. Section 01 32 19 – Submittal Procedures: Requirements for submittals.
- B. Product Data: Physical properties, technical limitations and application requirements.
- C. Material Samples: Submit three (3) concrete samples coated one surface and uncoated on opposite surface.
- D. Installer: Approved, certified installer certificates.
- E. Provide verification of the following:
 - 1. ASTM E 96 - Water Vapor Transmission Reduction.

2. ASTM D 4541 - Concrete Adhesion.
3. ASTM D 1308 - Alkaline, 14pH resistance.
4. VOC content per EPA Method 24.

1.5 QUALIFICATIONS

- A. Manufacturer: Company specializing in manufacturing products specified in this section (polymer based moisture-alkaline control barriers) with minimum three years documented experience.
- B. Installer: Company specializing in performing work of this section with minimum two years experience, approved by manufacturer prior to project start.

1.6 PRE-INSTALLATION MEETING

- A. Section 01 31 19 – Project Meetings: Pre-Installation Meetings.
- B. Convene pre-installation meeting a minimum of three weeks prior to commencing work of this section. Testing Agency to participate in the meeting.
 1. Review ASTM F1869, ASTM F710 testing results, building temperature, interior humidity and site conditions. Installer will provide specified vapor-alkalinity control barrier installation procedures and application details.
- C. Safety Meeting: Installer shall report ventilation requirements, site protection and material data safety information to disclose product limitations and precautions prior to application. Information is to prevent site contamination and safety issues with other trades.

1.7 DELIVERY, STORAGE, AND HANDLING

- A. Section 01 60 00 – Product Requirements: Requirements for transporting, handling, storing, and protecting products.
- B. Deliver Material Safety Data Sheets to site prior to application.

1.8 WARRANTY

- A. Section 01 77 00 – Contract Closeout: Requirements for warranties.
- B. Performance: Application of product shall yield a water vapor emission rate of 2.5 pounds/1000 SF/24 hrs (plus or minus 0.50 pounds) per ASTM F 1869 prior to flooring application. Repair areas above specified requirements at no cost to Owner.
 1. Issuance of warranty shall NOT remove specified performance requirements.
- C. Flooring Warranty: In the event moisture vapor emission rates exceed 2.5 pounds/1000 SF/24 hrs (plus or minus 0.50 pounds) and floor covering adhesion is damaged during a period of 15 year period, manufacturer and installer shall repair or replace damaged flooring at no cost to Owner. Repair shall include new barrier materials, floor coverings, adhesives and patching materials.

PART 2 - PRODUCTS

2.1 CONCRETE VAPOR CONTROL BARRIER

- A. Manufacturers:
 1. Synthetics Intl; www.SyntheticsIntl.com (866) 646-0356.
 - a. Product: Synthetic10.

2. Diamond Stone Products; www.DiamondStoneProducts.com
 - a. Project: Vapor Remediation System – VRS.
3. Dex-o-Tex; www.CrossfieldProducts.com
 - a. Primer 100.
4. Substitutions: Not permitted.

2.2 PHYSICAL PROPERTIES

- A. The below methods are to be reported by independent laboratory testing:
 1. ASTM E96 - Water Vapor Transmission, wet method: 75-95% vapor reduction
 2. ASTM D4541 - Concrete Adhesion: 400-600psi (100% concrete cohesive failure).
 3. ASTM D1308 – Chemical Resistance: 14pH solution: 100% Resistant to long term 30 day exposure
 4. VOC Content Testing per EPA Method 24: 50 g/liter or less.
- B. Site Performance:
 1. ASTM F1869 Moisture Reduction.....2.5 lbs. (±0.50).
 2. ASTM F710 Alkalinity Resistance.....Resistant to 12.5 -14pH.
 3. ASTM D4541 Concrete Adhesion.....100% concrete surface failure.
- C. Environmental:
 1. Dry to the Touch: 1 hour.
 2. Flooring Ready: 24 hours (70 degrees F).
 3. Pot Life: 4 hours.
 4. Reduction: Water only, up to 5 percent.
 5. Clean Up: Water cleanable, no solvents.
 6. Cement Patching: Non-pours primer required.
 7. Odor: Low odor and no CFC's.
 8. VOC Content Testing per EPA Method 24: 50 g/liter or less for primers, sealers and undercoaters.
- D. Formulation:
 1. Color: Clear, water reduced polymer chemistry.

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Verify existing conditions before starting work.
- B. Verify conditions are acceptable for a warranted application.
- C. Report unacceptable conditions prior to application.
- D. New Concrete: Review approved concrete mix design and site conditions prior to application. Notify Architect of unacceptable conditions.
- E. Substrates: Slabs where emission rates per ASTM F1869 exceed 3.0 pounds and do not exceed 10 pounds are acceptable for the application of control barrier.

3.2 PREPARATION

- A. Clean concrete surfaces to allow maximum material penetration in the presence of manufacturer's technical personnel.
- B. Vacuum and remove surfaces contamination.

3.3 INSTALLATION

- A. New Concrete: Apply barrier to clean, absorbent and contaminate free surfaces of newly placed concrete slabs as a replacement for traditional curing methods. No mechanical preparation is required.
- B. Substrates: Prepare slabs by the use of a shot blaster or diamond grinding machine to provide a solid, absorbent surface.
- C. Apply barrier at a rate of 300 square feet per gallon for a seamless layer, drag with a 3/8 inch nap roller to saturate surface. Allow material penetration for 5 minutes and re-coat surfaces at a rate of 350 square feet per gallon in the opposite direction until saturation in accordance with manufacturer requirements.
- D. Allow to cure 1 hour prior to light foot traffic.
 - 1. Cement patching materials may be installed after 24 hours of cure with the use of a primer for non-porous surfaces.
 - 2. Apply flooring adhesives after 24 hours of cure.

3.4 FIELD QUALITY CONTROL

- A. Section 01 45 23 – Testing and Inspection: Inspections and Tests by Manufacturer's Representatives.
- B. Protect from damage for 2 hours after application.
- C. Perform a minimum of ten (10) concrete moisture vapor emission tests (ASTM F 1869) over barrier surface to verify vapor reduction.
 - 1. Re-apply barrier in areas where emission rates exceed 2.5 pounds (plus or minus 0.50 pounds).
 - 2. Apply at a rate to suppress emission rates to compliance.
- D. Floor Covering Applications:
 - 1. Allow barrier to cure for a minimum of 24 hours prior to flooring application.
 - 2. Cement patching material will require a primer for non-porous surfaces.
- E. Report field testing to Architect, Owner and Inspector for approval.

END OF SECTION

SECTION 07 27 00**AIR BARRIERS****PART 1 - GENERAL****1.1 SUMMARY**

- A. Section includes air leakage criteria for primary air seal building enclosure materials and assemblies; materials and installation methods supplementing primary air seal materials and assemblies; and air seal materials to connect and seal openings, joints, and junctions between other air seal materials and assemblies.
1. Provide air barrier/weather resistant barrier over exterior of wall sheathing at all locations regardless of whether or not indicated on drawings to protect exterior sheathing and interior walls.
- B. Related Sections:
1. Section 04 42 00 – Stone Veneer.
 2. Section 05 40 00 – Cold-Formed Metal Framing.
 3. Section 07 42 13 – Metal Wall Panels.
 4. Section 07 62 00 – Sheet Metal Flashing and Trim.
 5. Section 09 21 16 – Gypsum Board Assemblies: Exterior Gypsum Sheathing.
 7. Section 09 25 13 – Acrylic-Modified Portland Cement Plaster.

1.2 REFERENCES

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

1.3 DEFINITIONS

- A. Air Barrier: Continuous network of materials and joints providing air tightness, with adequate strength and stiffness to not deflect excessively under air pressure differences, to which it will be subjected in service. It can be comprised of single material or combination of materials to achieve performance requirements.

1.4 SUBMITTALS

- A. Section 01 32 19 – Submittal Procedures: Submittal Procedures.
- B. Product Data: Submit manufacturer's current technical literature for each component.
- C. Samples: Submit two of manufacturer's 8.5 inch x 11 inch standard sample of commercial air-moisture barrier sheet membrane for Architect's approval.
- D. Design Data/Test Reports: Provide manufacturer's test reports indicating product compliance with indicated requirements.
- E. Manufacturer's Installation Instructions: Submit preparation, installation requirements and techniques, product storage and handling criteria.
- F. Quality Assurance Submittals:
 - 1. Manufacturer's field service reports: Site reports on periodic visits indicating air-barrier system observation installation by an authorized field service representative.
- G. Contract Closeout Submittals: Refer to Section 01 77 00 for contract closeout submittal Information.
 - 1. Air-Barrier Warranty: Manufacturer's executed standard warranty form with authorized signatures and endorsements indicating date of Substantial Completion.

1.5 QUALITY ASSURANCE

- A. Source Limitations: Provide weather barrier and accessory materials produced by one manufacturer.
- B. Installation shall be in accordance with weather barrier manufacturer's installation guidelines and recommendations.
 - 1. Installer shall have experience with installation of DuPont™ Tyvek® weather barrier assemblies under similar conditions.

1.6 QUALIFICATIONS

- A. Manufacturer: Company specializing in manufacturing products specified in this section, with proven compliance with performance requirements listed in Paragraph 2.2.B and five (5) years experience with high quality manufacturing of non-woven, spun-bonded olefin sheet membrane air-barrier materials:
- B. Installer: Company specializing in installation of commercial sheet membrane weather-resistant, air-moisture barrier systems on new construction projects of similar type, with minimum three years documented experience.

1.7 MOCK-UP

- A. Install mock-up using approved weather barrier assembly including fasteners, flashing, tape and related accessories per manufacturer's current printed instructions and recommendations.
 - 1. Mock-up size: 4 feet by 8 feet (minimum size) to demonstrate weather resistant air-moisture barrier/secondary weather resistant barriers.
 - 2. Mock-up Substrate: Match assembly wall construction, including window opening.
 - 3. Maintain mock-up during construction for workmanship standard.

4. Mock-up to be incorporated into final construction upon written approval by Architect.
5. Contact manufacturer's designated representative prior to weather barrier assembly installation, to perform required mock-up visual inspection and analysis as required for warranty.

1.8 PRE-INSTALLATION MEETINGS

- A. Section 01 31 19 – Project Meetings: Pre-installation meeting.
- B. Convene a pre-installation meeting a minimum of two weeks prior to start of weather barrier installation. Meeting will be scheduled by General Contractor with Architect, General Contractor, Installing Contractor, Owner or Owner's Representative, and Manufacturer's designated Representative or Commercial Specialist at the project site.
- C. 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.

1.9 DELIVERY, STORAGE AND HANDLING

- A. Section 01 60 00 – Product Requirements: Requirements for transporting, handling, storing and protecting products.
- B. Deliver weather barrier materials and components in manufacturer's original, unopened, undamaged containers with identification labels intact.
- C. Store and protect weather barrier materials at temperatures and conditions as recommended by weather barrier manufacturer.

1.10 SEQUENCING

- A. Review requirements for sequencing of installation of weather barrier assembly and components with installation of windows, doors, louvers and flashings to provide a weather-tight barrier system.
- B. Comply with manufacturer's ordering instructions and lead-time requirements to avoid construction scheduling conflicts and delays.
- C. Schedule installation of weather barrier materials and exterior cladding within nine months of weather barrier assembly installation.

1.12 WARRANTY

- A. Section 01 77 00 – Contract Closeout: Requirements for Warranties.
- B. Special Warranty:
 1. Weather barrier manufacturer's warranty for weather barrier for a period of ten years from date of Substantial Completion.
 2. Approval by weather barrier manufacturer for warranty is required prior to assembly installation.
 3. Warranty Areas: All exterior walls scheduled to receive weather barrier assembly under cement plaster finish.

PART 2 - PRODUCTS**2.1 AIR BARRIERS**

- A. Manufacturers:
1. E.I. du Pont de Nemours and Company; 4417 Lancaster Pike, Chestnut Run Plaza 721, Wilmington, DE 19805; 1.800.44TYVEK (8-9835); <http://construction.tyvek.com>
 2. Substitutions: Section 01630 – Product Options and Substitutions.
- B. Basis of Design: High-performance, flash spun-bonded olefin, non-woven, non-perforated, secondary weather barrier is based upon DuPont™ Tyvek® CommercialWrap® D and related assembly components.

2.2 MATERIALS

- A. DuPont™ Tyvek® CommercialWrap® D: A flash spunbonded olefin, non-woven, non-perforated secondary weather barrier.
- B. Performance Characteristics:
1. Air Penetration: Type 1 when tested in accordance with ASTM E 1677.
 2. Water Vapor Transmission: 30 perms, when tested in accordance with ASTM E 96, Method B.
 3. Water Penetration Resistance: 235 cm when tested in accordance with AATCC Test Method 127.
 4. Basis Weight: 2.4 oz/yd², when tested in accordance with TAPPI Test Method T-410.
 5. Air Infiltration Resistance: Air infiltration at >750 seconds, when tested in accordance with TAPPI Test Method T-460.
 6. Tensile Strength: 33/41 lbs/in., when tested in accordance with ASTM D 822 , Method A.
 7. Surface Burning Characteristics: Class A, when tested in accordance with ASTM E 84 . Flame Spread: 15, Smoke Developed: 25.
- C. Sealing Tape/Fasteners:
1. DuPont™ Tyvek® Tape, DuPont Weatherization Systems.
 2. For steel frame construction: DuPont™ Tyvek® Wrap Cap Screws, DuPont Weatherization Systems. 1-5/8 inch rust resistant screws with 2-inch diameter plastic cap
 3. Caulks and Sealants: Polyurethane or elastomeric sealants.
 - a. Available Products:
 - 1) OSI® Quad Pro-Series®, solvent release butyl rubber sealant.
 - 2) DAP® Dynaflex 230™.
 - 3) Other products as approved and recommended by air barrier/weather resistant barrier manufacturer.

2.3 ACCESSORIES

- A. Seam Tape: 3 inch wide, DuPont™ Tyvek® Tape for commercial applications.
- B. Fasteners:
1. Steel Frame Construction: DuPont™ Tyvek® Wrap Cap Screws, as manufactured by DuPont Building Innovations: 1-5/8 inch rust resistant screw with 2-inch diameter plastic cap or manufacturer approved 1-1/4" or 2" metal gasketed washer
- C. Sealants

1. Provide sealants that comply with ASTM C920, elastomeric polymer sealant to maintain watertight conditions.
 2. Products:
 - a. Tremco 830
 - b. Tremco Butyl
 - c. Sealants recommended by the weather barrier manufacturer.
- D. Adhesives:
1. Provide adhesive recommended by weather barrier manufacturer.
 2. Products:
 - a. Liquid Nails[®] LN-109.
 - b. Polyglaze[®] SM 5700.
 - c. Denso Butyl Liquid.
 - d. 3M High Strength 90.
 - e. SIA 655
 - f. Adhesives recommend by the weather barrier manufacturer.
- E. Primers:
1. Provide flashing manufacturer recommended primer to assist in adhesion between substrate and flashing.
 2. Products:
 - a. 3M High Strength 90.
 - b. Denso Butyl Spray.
 - c. SIA 655.
 - d. Permagrip 105.
 - e. ITW TACC Sta' Put SPH.
 - f. Primers recommended by the flashing manufacturer.
- F. Flashing:
1. DuPont[™] FlexWrap[™], as manufactured by DuPont Building Innovations: Flexible membrane flashing materials for window openings and penetrations.
 2. DuPont[™] StraightFlash[™], as manufactured by DuPont Building Innovations: straight flashing membrane materials for flashing windows and doors and sealing penetrations such as masonry ties, etc.
 3. DuPont[™] StraightFlash[™] VF, as manufactured by DuPont Building Innovations: dual-sided straight flashing membrane materials for brick mold and non-flanged windows and doors.
 4. DuPont[™] Thru-Wall[™] Surface Adhered Membrane with Integrated Drip Edge: Thru-Wall flashing membrane materials for flashing at changes in direction or elevation (shelf angles, foundations, etc.) and at transitions between different assembly materials.
 5. Preformed Inside and Outside Corners and End Dams as manufactured by DuPont: Preformed three-dimensional shapes to complete the flashing system used in conjunction with DuPont[™] Thru-Wall Flashing.

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.
1. General: Do not proceed with weather resistant air-moisture barrier system installation work until unsatisfactory conditions have been corrected.

- B. Commencement of installation constitutes acceptance of existing conditions and responsibility of satisfactory performance.

3.2 INSTALLATION – WEATHER BARRIER

- A. Install weather barrier over exterior face of exterior wall substrate in accordance with manufacturer recommendations.
- B. Install weather barrier prior to installation of windows and doors.
- C. Start weather barrier installation at a building corner, leaving 12 inches of weather barrier extended beyond corner to over lap.
- D. Apply wrap with grooved surface pattern in vertical direction.
- E. 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.
- F. Sill Plate Interface: Extend lower edge of weather barrier over sill plate interface 3-6 inches. Secure to foundation with elastomeric sealant as recommended by weather barrier manufacturer.
- G. Window and Door Openings: Extend weather barrier completely over openings.
- H. Overlap weather barrier
 1. Exterior corners: minimum 12 inches.
 2. Seams: minimum 6 inches.
- I. Weather Barrier Attachment:
 1. Steel or Wood Frame Construction: Attach weather barrier to studs through exterior sheathing. Secure using weather barrier manufacturer recommended fasteners, space 12 -18 inches vertically on center along stud line, and 24 inch on center, maximum horizontally.
- J. Install air barrier to maintain continuity across different substrates.

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 (FOR USE WITH NON-FLANGED WINDOWS)

- A. Flush cut weather barrier at edge of sheathing around full perimeter of opening.
- B. Cut a head flap at 45-degree angle in the weather barrier at window head to expose 8 inches of sheathing. Temporarily secure weather barrier flap away from sheathing with tape.

3.5 FLASHING (FOR USE WITH NON-FLANGED WINDOWS)

- A. Cut 9-inch wide DuPont™ FlexWrap™ a minimum of 12 inches longer than width of sill rough opening. Apply primer as required by manufacturer.

- 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 DuPont™ 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 installation.
- H. On exterior, install backer-rod in joint between window frame and flashed rough framing. Apply sealant at jambs and head, leaving sill unsealed. Apply sealants in accordance with sealant manufacturer's instructions and ASTM C 1193.
- I. Position weather barrier head flap across head flashing. Adhere using 4-inch wide DuPont™ StraightFlash™ over the 45-degree seams.
- J. Tape top of window in accordance with manufacturer recommendations.
- K. On interior, install backer rod in joint between frame of window and flashed rough framing. Apply sealant around entire window to create air seal. Apply sealant in accordance with sealant manufacturer's instructions and ASTM C 1193.

3.6 OPENING PREPARATION (FOR USE WITH FLANGED WINDOWS)

- A. Cut weather barrier membrane in a modified "I-cut" pattern.
 - 1. Cut weather barrier horizontally along the bottom of the header.
 - 2. Cut weather barrier vertically 2/3 of the way down from top center of window opening.
 - 3. Cut weather barrier diagonally from bottom of center vertical cut to the left and right corners of the opening.
 - 4. Fold side and bottom weather barrier flaps into window opening and fasten.
- B. Cut a head flap at 45-degree angle in the weather barrier membrane at window head to expose 8 inches of sheathing. Temporarily secure weather barrier membrane flap away from sheathing with tape.

3.7 FLASHING (FOR USE WITH FLANGED WINDOWS)

- A. Cut 9-inch wide DuPont™ FlexWrap™ a minimum of 12 inches longer than width 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. On exterior, apply continuous bead of sealant to wall or backside of window mounting flange across jambs and head. Do not apply sealant across sill.
- E. Install window according to manufacturer's instructions.
- F. Apply 4-inch wide strips of DuPont™ StraightFlash™ at jambs overlapping entire mounting flange. Extend jamb flashing 1-inch above top of rough opening and below bottom edge of sill flashing.
- G. Apply 4-inch wide strip of DuPont™ StraightFlash™ as head flashing overlapping the mounting flange. Head flashing should extend beyond outside edges of both jamb flashings.
- H. Position weather barrier head flap across head flashing. Adhere using 4-inch wide DuPont™ StraightFlash™ over the 45-degree seams.
- I. Tape head flap in accordance with manufacturer recommendations.
- J. On interior, install backer rod in joint between frame of window and flashed rough framing. Apply sealant around entire window to create air seal. Apply sealant in accordance with sealant manufacturer's instructions and ASTM C 1193.

3.8 THRU-WALL FLASHING INSTALLATION

- A. Apply primer per manufacturer's instructions.
- B. Install preformed corners and end dams bedded in sealant in appropriate locations along wall.
- C. Starting at a corner, remove release sheet and apply membrane to primed surfaces in lengths of 8 to 10 feet.
- D. Extend membrane through wall and leave ¼ inch minimum exposed to form drip edge.
- E. Roll flashing into place. Ensure continuous and direct contact with substrate.
- F. Lap ends and overlap preformed corners 4 inches minimum. Seal all laps with sealant.
- G. Terminate membrane on vertical wall. Terminate with termination bar.
- H. Apply sealant bead at each termination.

3.9 THRU-WALL FLASHING / WEATHER BARRIER INTERFACE AT BASE OF WALL

- A. Overlap thru-wall flashing with weather barrier by 6-inches.
- B. Mechanically fasten bottom of weather barrier through top of thru-wall flashing.
- C. Seal vertical and horizontal seams with tape or sealing membrane.

3.10 THRU-WALL FLASHING / WEATHER BARRIER INTERFACE AT WINDOW HEAD

- A. Cut flap in weather barrier at window head.
- B. Prime exposed sheathing.
- C. Install lintel as required. Verify end dams extend 4 inches minimum beyond opening.

- D. Install end dams bedded in sealant.
- E. Adhere 2 inches minimum thru-wall flashing to wall sheathing. Overlap lintel with thru-wall flashing and extend ¼ inch minimum beyond outside edge of lintel to form drip edge.
- F. Apply sealant along thru-wall flashing edges.
- G. Fold weather barrier flap back into place and tape bottom edge to thru-wall flashing.
- H. Tape diagonal cuts of weather barrier.
- I. Secure weather barrier flap with fasteners.

3.11 MANUFACTURER'S FIELD SERVICES

- A. Section 01 45 23 – Testing and Inspection: Requirements for manufacturer's field services.
- B. Notify manufacturer's designated representative to obtain required periodic observations of weather barrier assembly installation.

3.12 PROTECTION OF INSTALLED CONSTRUCTION

- A. Protect installed weather barrier from damage.

END OF SECTION

SECTION 07 51 00**COLD PROCESS ROOFING****PART 1 - GENERAL****1.1 SUMMARY**

- A. Section includes cold process roofing, flashings, and miscellaneous materials.
- B. Work includes:
1. Removal and replacement of designated roofing, insulation, and flashing. Buildings 5 and 6 shall be a patch and repair as noted below.
 2. Installation of:
 - a. Base flashings at the designated parapet wall:
 - 1) Hypalon sheeting: CSPE reinforced 0.45 mils.
 - 2) Flashing Coating:
 - a) T-24 compliant Hi-Build white reflective coating.
 - b. Roof Membrane Surfacing:
 - 1) Crushed granite Roof Surfacing.
 3. Coping Metal: 24 gauge Kynar 500 colorized coping metal with District approved color (bone white) as provided by manufacturer. Install new coping metal at designated walls.
 4. All metal work to be SMACNA approved detail.
- C. Site Specific Note:
1. Building 6: The perimeter coping cap and base flashing membrane shall be changed to hypalon to reflect Buildings 16, 17, and 18. The new hypalon membrane shall encapsulate the existing base flashing and extend over the top of parapet wall, draping over the outside of the nailer by at least 2 inches.

1.2 REFERENCES

- A. ASTM International, Philadelphia, PA.
- B. FS - Federal Specification.
- C. NRCA - National Roofing Contractors Association, Chicago, IL.
- D. UL - Underwriters Laboratories, Northbrook, IL.
 1. UL Class A.
- E. FM - Factory Mutual:
 1. Class I-90 wind uplift.

1.3 SUBMITTALS

- A. Section 01 32 19 – Submittal Procedures: Submittal procedures.
- B. The performance requirements outlined in Article 2.8 of this specification shall be strictly adhered to. Submittal of alternate materials and/or systems not conforming to these performance specifications will not be permitted. Submit the following:
1. Product compatibility:
 - a. Written verification from Tremco, Inc. that major roofing components, including (but not limited to) coatings, cold process adhesives; roofing ply sheets; reinforcement fabric felts and mats; mastics; and sealants are all compatible with each other.

2. Test reports:
 - a. Written verification from Tremco, Inc. that roofing system meets or exceeds regulatory agency/s requirements. A photocopy of the UL Class "A" listing for the specified system with proposed manufacturer as listed in the 2008 UL Building Materials Directory. The components of the system listed as UL Class 'A' must match the system specified for each respective building.
3. Product data:
 - a. Product data sheets.
 - b. Material safety data sheets.

1.4 QUALIFICATIONS

- A. Contractor shall:
 1. Be experienced in cold process roofing ten years minimum under same company name.
 2. Be acceptable by Owner and roofing material supplier.
 3. Provide list of at least six projects available for inspection within twenty-five (25) mile radius of Owner employing same system.
 7. Maintain a copy of roofing specification on the job site at all times.
 8. Shall be a Certified Applicator by the material manufacturer.
 9. All contractors to include six (6) days of parttime inspection days provided by the manufacturer's technical service department.
- B. Roofing material supplier shall:
 1. Be Associate Member in good standing with National Roofing Contractors' Association (NRCA).
 2. Be nationally recognized in roofing, waterproofing, and moisture survey industry.
 3. Provide Owner names of at least five (5) qualified applicators.
 4. Provide local Field Representative to make periodic site visits, report work quality and job progress. Provide inspection services as specified by technical service department.
 5. Provide list of at least six (6) projects available for inspection employing same roofing system in 25 mile radius of the school district.
 6. The presence and activity of the manufacturer's/ specifier's representative and/or owner's representative shall in no way relieve the contractor of his contractual responsibilities or duties.

1.5 QUALITY ASSURANCE

- A. Pre-installation Meeting:
 1. Will be scheduled by Owner within fifteen (15) days after notice of award.
 2. Attendance:
 - a. Representative of Owner.
 - b. Roofing material manufacturer/specifier.
 - c. Contractor.
 3. Agenda:
 - a. Distribution of contract documents.
 - b. Submittal of list of subcontractors, material submittals, and progress schedule.
 - c. Designation of responsible personnel.
 - d. Walkover inspection.
 - e. Review preparation and installation procedures and coordinating and scheduling required with related Work.
- B. Progress meetings:
 1. Will be scheduled by Owner as required.
 2. Attendance:
 - a. Contractor.

- b. Job superintendent.
 - c. Roofing material manufacturer.
 - d. Architect.
 - e. Subcontractors, as appropriate.
3. Minimum agenda:
- a. Review of work progress.
 - b. Field observations, problems, and decisions.
 - c. Identification of problems which impede planned progress.
 - d. Maintenance of progress schedule.
 - e. Maintenance of quality and work standards.
 - f. Effect of proposed changes on progress schedule and coordination.
- C. Final inspection:
- 1. Will be scheduled by roofing material manufacturer upon job completion.
 - a. Contractor.
 - b. Roofing material manufacturer/specifier.
 - 2. Minimum agenda:
 - a. Walkover inspection.
 - b. Identification of problems which may impede issuance of warranty.
- D. Drawings and specifications:
- 1. Contractor must notify Owner and Architect of any omissions, contradictions or conflicts seven (7) days before bid date. Owner and Architect will provide necessary corrections or additions to drawings and specifications by addendum. If he does not so notify Owner and Architect of any such condition, it will be assumed he has included the necessary items in his bid to complete this specification.
 - 2. It is the intent that this be a completed project as far as the contract documents set forth. It is not the intent that different phases of work on this project be delegated to various trades and subcontractors by the contract documents. Contractor must make his own contracts with various subcontractors, setting forth the work these subcontractors will be held responsible for. Contractor alone will be held responsible by the Owner for the completed project.
 - 3. If the contractor feels a conflict exists between what is considered good roofing practice and these specifications he shall state in writing all objections prior to submitting quotations.
 - 4. It is the contractor's responsibility during the course of the work, to bring to the attention of the Owner's representative any defective membrane, insulation or deck discovered where not previously identified.

1.6 DELIVERY, STORAGE AND HANDLING

- A. Delivery of materials:
- 1. Deliver materials to job-site in new, dry, unopened, and well-marked containers showing product and manufacturer's name.
 - 2. Deliver materials in sufficient quantity to allow continuity of work.
 - 3. Coordinate delivery with Owner.
 - 4. Store roll goods on ends only. Discard rolls which have been flattened, creased, or otherwise damaged. Place materials on pallets. Do not stack pallets.
 - 5. Stack insulation on pallets.
 - 6. Store materials marked "Keep from Freezing" in areas where temperatures will remain above 40 degrees F.
 - 7. Rooftop storage: Disperse material to avoid concentrated loading.
 - 8. Cover top and sides of all exterior stored materials with canvas tarpaulin (or polyethylene). Secure tarpaulin.
 - 9. No materials may be stored in open or in contact with ground or roof surface.
 - 10. Should Contractor be required to quickly cover material temporarily, such as during an unanticipated rain shower, all materials shall be stored on a raised platform covered with secured canvas tarpaulin (or polyethylene), top to bottom. This is only

- a temporary covering, since at end of each day's work, all roofing materials and accessories are to be stored in trailers.
11. Contractor shall assume full responsibility for the protection and safekeeping of products stored on premises.

1.7 SITE CONDITIONS

- A. Field measurements and material quantities:
 1. Applicator shall have SOLE responsibility for accuracy of all measurements, estimates of material quantities and sizes, and site conditions that will affect work. Contractor will be responsible for determining entire existing roof assembly. Change orders will not be accepted by District for undetermined existing insulation or hidden membrane. All asbestos testing results shall be provided to contractors at the pre-bid conference.
- B. Existing conditions:
 1. Building space directly under roof area covered by this specification will be utilized by on-going operations. Do not interrupt Owner operations unless written approval is received from Owner.
 2. Access to roof shall be from exterior only or as approved by owner. No unauthorized roofing employees will be allowed within building.
 3. Air-conditioning units and other equipment shall be moved as required to install roofing materials complete and in accordance with drawings and specifications. When units and equipment are to be moved, they shall be carefully disconnected and moved to a protected area so as not to damage any part or component thereof, and shall be reconnected in such a way that they are restored to a prior work operating condition.
- C. Asbestos:
 1. Owner agrees to exonerate, indemnify, defend, and hold harmless contractor and roofing material manufacturer from and against all claims, demands, lawsuits, damages, expenses and losses incurred by Contractor's removal of asbestos-containing materials from Owner's building and work site provided Contractor conducts its operations according to applicable requirements established by:
 - a. Occupation Safety and Health Administration (OSHA).
 - b. Environmental Protection Agency (EPA).
- D. Environmental requirements:
 1. Do not work in rain, snow, or in presence of water.
 2. Do not work in temperatures below 40 deg F.
 3. Do not install materials marked "keep from freezing" when daily temperatures are scheduled to fall below 40 deg F.
 4. Do not perform masonry work below 35 deg F. Make proper provisions to protect work from freezing 48 hours after laying if work is performed between 35 deg F. and 45 deg F.
 5. Remove any work exposed to freezing.
- E. Safety requirements:
 1. All application, material handling, and associated equipment shall conform to and be operated in conformance with OSHA safety requirements.
 2. Comply with federal, state, local and Owner fire and safety requirements.
 3. Advise Owner whenever work is expected to be hazardous to Owner employees and/or operators.
 4. Maintain a crewman as a floor area guard whenever roof decking is being repaired or replaced.
 5. Maintain fire extinguisher within easy access whenever power tools, roofing kettles, and torches are being used.
 6. Advise Owner when volatile materials are to be used near air ventilation intakes so

that they can be shut down or blocked.

- F. Security requirements:
 - 1. Comply with Owner security requirements.
 - 2. Provide Owner with current list of accredited persons.
 - 3. Require identification be displayed by all persons employed on this project.
- G. Temporary sanitary facilities:
 - 1. Furnish, install, and maintain temporary sanitary facilities for employee use during project. Remove on project completion.
 - 2. Place portable toilets in conformance with applicable laws, codes, and regulations.

1.8 SUBSTITUTIONS

- A. Owner reserves right to be final authority on acceptance or rejection of any substitute.

1.9 QUANTITIES INCLUDED IN THE BASE BID

- A. All wood blocking and fastening components.
 - 1. All perimeter flashing and metal components.
 - 2. All tapered edge and cant strips.
 - 3. All existing or new counterflashing.
 - 4. All surface mastics, coatings, stripping ply, etc.

1.10 WARRANTY/GUARANTEE

- A. Section 01 77 00 – Contract Closeout: Requirements for warranties.
- B. Warranty:
 - 1. Upon project completion, material manufacturer's acceptance, and once complete payment has been received by both Contractor and material manufacturer, material manufacturer shall deliver to owner a ten (10) year ltd. material only warranty.
- C. The Manufacturers Material Warranty shall include a guarantee for materials used on the repair project at buildings' 5 and 6 only.
- D. Guarantee:
 - 1. Upon project completion and Owner acceptance, effective upon complete payment, Contractor shall issue Owner a guarantee against defective workmanship and materials for a period of two (2) years.
- E. The roofing system shall be inspected during installation by manufacturer's technical service department a minimum of three (3) days. This roofing system also will be inspected on a regular basis by the local manufacturer's representative during installation.
- F. All roofing drawings and flashing details as provided by this specification shall be bid accordingly. There shall be no substitutes allowed to the details.

PART 2 - PRODUCTS

2.1 GENERAL

- A. Comply with quality control, references, specifications, and manufacturer's data. Products containing asbestos are prohibited on this project. Use only asbestos-free products.

2.2 ACCEPTABLE MANUFACTURER

- A. Tremco Inc., Cleveland, OH 216/292-5000 to match existing Tremco Burmastic 200 roofing system.
- B. Substitutions: Not permitted.

2.3 WOOD BLOCKING AND CURBS

- A. Sleepers: Nominal 4 x 6, or as specified.
- B. All exterior wood to be treated wood.

2.4 INSULATION

- A. None, existing concrete deck.

2.5 ASSEMBLY FASTENERS

- A. Base sheet to gypsum deck, if applicable:
 - 1. Tremco base sheet fastener with a 2.7 inch diameter disc.
- B. One (1) inch cap nails:
 - 1. Type: Spiral or annular ring shank, twelve (12) gage minimum, with integral one (1) inch cap.
 - 2. Acceptable manufacturers:
 - a. Hillwood Manufacturing Co., Cleveland, OH.
 - b. Hoffer Wire Products Co., Inc., Nevada City, CA.
 - c. Independent Nail, Inc., Bridgewater, MA.
 - d. W. H. Maze Co., Peru, IL.
 - e. National Nail Corp., Grand Rapids, MI.
 - f. Simplex Nails, Inc., Americus, GA.
- C. Galvanized sheet steel to wood blocking:
 - 1. FS FF-N-105B(3) Type II, Style 20, roofing nails; galvanized steel wire, flat head, diamond point, round, barbed shank.
 - 2. Length: Sufficient to penetrate wood blocking 1-1/4 inches minimum.
- D. Drawband:
 - 1. Gold Seal stainless steel worm gear clamp by Murray Corporation, Cockeysville, MD.
 - 2. Power-Seal stainless steel worm drive clamps by Breeze Clamp Company, Saltsburg, PA.
- E. Termination Bar:
 - 1. 16 gauge galvanized steel "C" bar, 2-1/2 inches wide with 1/2-inch receivers and 1/4-inch x 8 inch oblong holes placed 8 inches on center.

2.6 ROOFING MATERIALS

- A. Adhesives:
 - 1. Interply and surfacing adhesive: Cold process mastic - Burmastic LV.
- B. Ply/Base sheet:
 - 1. Trilaminate reinforced ply sheet - Burmastic Composite Ply.
- C. Reinforcing membrane: Trilaminate reinforced ply sheet.
- D. Roofing system: Cold Process BUR - Burmastic 200 at Bldg. 6.
- E. Related materials:

1. Asphalt mastic: Asphalt mastic - ELS.
2. Asphalt primer: Water based primer - Tremprime WB.
3. Elastomeric mastic: Modified asphalt mastic - Polyroof LV.
4. Flashing adhesive: Hypalon flashing adhesive for Hypalon - Sheeting Bond, white.
5. Flashing sheet:
 - a. Hypalon elastomeric sheeting - HP-4510.
 - b. Color: White.
6. Sealants:
 - a. General purpose sealant: High performance, low modulus sealant - Tremseal D.
 - b. Silicone based sealant: Tremseal S for hypalon seams.
7. Walkway panels:
 - a. Tremtred by materials manufacturer.
8. Flashing Coating: T-24 compliant white reflective coating - Hi Build.
9. Flashing Tape: Butyl tape - TF Tape.
10. Base sheet fastener for gypsum decks: Tremco.
11. Kynar 500 painted 24 ga. flashing metal: Tremlock Series II flat stock metal.
 - a. Color: Bone White.

2.7 METAL FLASHINGS

- A. Coping cap metal:
1. Metal: 24 gage. Kynar 500. Color: Bone White.
 2. Kick and hem all metal.
 3. Install metal per SMACNA approved detail.
 4. Cleat metal: 22 gauge

2.8 SYSTEM PERFORMANCE REQUIREMENTS

A TRILAMINATE REINFORCED SHEET:

<u>Property</u>	<u>Typical Value</u>	<u>Test Method</u>
Weight	31 lb/100 sq feet	ASTM D228-90a
Breaking Strength	135 lbf/in (600N) MD	ASTMD D 146-90
Pliability, 2 in. Radius	No failures	ASTM D 146-90
Mass of desaturated glass/polyester/glass mat, min.	2.2 lb/100 sq. ft.	ASTM D 228-90a
Surfacing & Stabilizer	65%	ASTM D 4601-91
Asphalt	10 lb/100 sq. ft.	ASTM D 228-90a
Resistance to puncture	120 lbf	ASTM E 154-88

B. WATER BASED PRIMER

<u>Property</u>	<u>Typical Value</u>	<u>Test Method</u>
Asbestos content	None	ASTM D276-87
Viscosity at 77 deg F (Stormer Krieb)	65 KU	ASTM D562-81
Density at 77 deg F	8.8 lb/gal	ASTM D1475-85
Nonvolatile Content	32%	ASTM D1644-88

Flash point	Not Applicable	ASTM D3278-82
VOC*	60 g/l	ASTM D3960-89
* Volatile Organic Compound		

C.	ASPHALT MASTIC		
	<u>Property</u>	<u>Typical Value</u>	<u>Test Method</u>
	Asbestos content	None	ASTM D 276-87
	Viscosity at 77 deg F	480,000 - 1,000,000 cP	ASTM D 2196-86
	Density at 77 deg F	9.3 lb/gal	ASTM D 1475-85
	Nonvolatile Matter	80%	ASTM D 4586-86
	Behavior at 140 deg F (Sag Resistance)	1/8 in.	ASTM D 4586-86
	Moisture vapor transmission rate	0.10 - 0.40 g/100 in. ² /24 hrs @ 0.020 in. thickness	ASTM E 398-83

D.	COLD PROCESS INTERPLY MASTIC		
	<u>Property</u>	<u>Typical Value</u>	<u>Test Method</u>
	Asbestos content	None	ASTM D 276-87
	Viscosity at 77 deg F	80,000-200,000 cP	ASTM D 2196-86
	Density at 77 deg F	8.1 lb/gal	ASTM D 1475-85
	Nonvolatile Matter	67%	ASTM D 4479-85
	Asphalt content, min	42%	ASTM D 4479-85
	Flash point	> 100 deg F	ASTM D 93-85
	Uniformity & Consistency	Pass	ASTM D 4479-85

E.	HYPALON FLASHING ADHESIVE		
	<u>Property</u>	<u>Typical Value</u>	<u>Test Method</u>
	Asbestos content	None	ASTM D 276-87
	Viscosity at 77 deg F	400,000 - 1,600,000 cP	ASTM D 2196-86
	Density at 77 deg F	8.7 lb/gal	ASTM D 1475-85
	Lap shear adhesion, min	25 psi	ASTM D816-82
	Adhesion in peel, min	3 lbf/in.	ASTM D1876-72

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Verify existing conditions as satisfactory to receive work.
- B. Do not begin roofing until all unsatisfactory conditions are corrected. Beginning work constitutes acceptance of conditions.
- C. Verify that work of other trades penetrating roof deck or requiring men and equipment to traverse roof deck has been approved by Owner, manufacturer, and roofing contractor.
- D. Check projections, curbs, and deck for inadequate anchorage, foreign material, moisture, or unevenness that would prevent quality and execution of new roofing system.

3.2 GENERAL WORKMANSHIP

- A. Substrate: Free of foreign particles prior to laying roof membrane.
- B. Phased application: Not permitted. All plies shall be completed each day.
- C. Traffic and equipment: Kept off completed plies until adhesive has set.
- D. Wrapper and packaging materials: Not to be included in roofing system.
- E. Mechanical fasteners if applicable:
 - 1. Seated firmly in metal discs with fastener heads flush or below disc's top surface.
 - 2. Length: Sufficient to accommodate roof deck.
- F. Base flashing height: Not less than eight (8) inches above finished roof surface.
- G. Flashing adhesive: Allow solvent to flash prior to installation of flashing sheet.
- H. Elastomeric sheeting end laps: Heat weld on a flat surface after cleaning seams with xylene. Use silicone sealant on seams.

3.3 PREPARATION

- A. Protection:
 - 1. Contractor shall be responsible for protection of property during course of work. Lawns, shrubbery, paved areas, and building shall be protected from damage. Repair damage at no extra cost to Owner.
 - 2. Provide at site prior to commencing removal of debris, a dumpster or dump truck to be located adjacent to building where directed by Owner.
 - 3. Roofing, flashings, membrane repairs, and insulation shall be installed and sealed in a watertight manner on same day of installation or before arrival of inclement weather.
 - 4. At start of each work day drains within daily work area shall be plugged. Plugs to be removed at end of each work day or before arrival of inclement weather.
 - 5. Preparation work shall be limited to those areas that can be covered with installed roofing material on same day or before arrival of inclement weather.
 - 6. Arrange work sequence to avoid use of newly constructed roofing for storage, walking surface, and equipment movement. Move equipment and ground storage areas as work progresses.
 - 7. Provide clean plywood walkways and take other precautions required to prevent tracking of aggregate/debris from existing membrane into new work area where aggregate/debris pieces can be trapped within new roofing membrane. Contractor shall instruct and police his workmen to ensure that aggregate/debris is not tracked into new work areas on workmen's shoes or equipment wheels. Discovery of entrapped aggregate/debris within new membrane is sufficient cause for its rejection.
 - 8. Surface preparation:
 - a. Remove: Designated roofing aggregate at least 36 inches from designated parapet wall to expose roofing plies.
 - b. Sweep clean roof deck.
 - c. Remove designated existing perimeter metal. Leave existing roofing plies and base flashing in place.
 - d. Prime exposed area with Tremprime WB.

3.4 THERMAL INSULATION

- A. Not applicable.

3.5 ROOF SYSTEM APPLICATION

- A. Roofing system to remain in place. Base flashing at parapet wall shall be encapsulated with new membrane and coping cap.

3.6 DAILY WATERSTOP/TIE-INS

- A. Not applicable.

3.7 FLASHINGS

- A. General flashing requirements:
1. Elastomeric Flashing:
 - a. Adhere elastomeric sheeting completely to flashing surface, cant, and roofing with Hypalon Flashing Adhesive.
 - b. Ensure complete bond and continuity without wrinkles or voids. Lap sheeting ends 4 inches (100 mm). Adhere laps by heat welding. Clean laps before welding with xylene.
 - c. Elastomeric sheeting width: Sufficient to extend at least 6 inches (150 mm) beyond toe of cant onto existing roof.
 - d. Seal horizontal edges of sheeting with reinforcing membrane embedded in a base course of Hypalon Flashing Adhesive and a top course of Asphalt Mastic and one 6" wide composite ply.
 - e. Apply silicone based sealant to all vertical seams.
 2. Base flashing height: To match existing height of wall.
- B. At Wall Flashings and Roof Top Units:
1. Adhere elastomeric Hypalon sheeting completely to flashing surface, cant, and roofing with flashing adhesive. Apply flashing adhesive in a uniform and continuous manner.
 2. Ensure complete bond and continuity without wrinkles or voids. Lap sheeting ends six (6) inches; splice ends with lap adhesive; steel roll.
 3. Elastomeric sheeting width: Sufficient to extend at least four (4) inches beyond toe of cant onto new roof.
 4. Seal bottom edge of sheeting with reinforcing membrane embedded between alternate continuous courses of asphalt mastic (1' - 6" wide composite ply set into asphalt mastic).
 5. Three course top edge of sheeting to wall.
 6. Top coat all flashings with Hi Build at one (1) gallon per square.
 7. Mechanically fasten top edge of all flashings 8 inches on center and fasten through counterflashing into underlying wood nailer or concrete.
 8. Any units which have platforms underneath: Fully encapsulate the platform with Hypalon. Fabricate and install new 24 gauge GSM cap flashing before reinstalling unit.
- C. At plumbing vents:
1. Remove existing stack flashing.
 2. Wedge plumbing vent tight against deck.
 3. Provide tapered edge at vent base. Firmly butt edge strip to blocking; miter corners. Mechanically attach edge strip to deck.
 4. Apply 1/16 inch uniformly thick layer of asphalt mastic to surface receiving metal flange.
 - a. Pipe outside diameter greater than two (2) inches: Bend lead inside pipe one (1) inch minimum with pliers or rubber/plastic mallet; replace cracked lead.
 - b. Pipe outside diameter two (2) inches or less: Cut lead at vent top; fabricate and install integral lead cap.
 5. Seal flange with two (2) strips of flashing ply flashing embedded between alternate applications of asphalt mastic. Extend first ply two (2) inches beyond flange; second ply two (2) inches beyond first ply.

3.8 SURFACING APPLICATION

- A. Low Slope Surface:
1. Remove all loose gravel, debris and dirt, and repair any defects during a pre-surfacing inspection by materials Manufacturer.
 2. Over the localized roof surface apply flood coat of Burmastic LV at an application rate of 4 gallons per 100 sq.ft.
 3. Into wet mastic embed #5 sieve crushed granite to match existing. Broom for even distribution.

3.9 MISCELLANEOUS

- A. Parapet walls:
1. Bring hypalon up and over parapet walls and nail off on back side of wall top nailer.
 2. Install cleat and new coping. Coping metal to exactly match Architect's detail. Fasten face of coping 24 inches on center with self sealing hex tek screws.
- B. Pipes and conduit:
1. Capture all pipes and projections with a lead jack and storm collar per detail drawing.
- C. Sleepers:
1. All wood blocking supporting conduit or pipes shall be set on/adhered to walkpads 2 inches wider than conduit or pipe diameter. Do not adhere walkpad to membrane.

3.10 ADJUSTING AND CLEANING

- A. Section 01 74 00 – Cleaning: Requirements for final cleaning.
- B. Clean-up:
1. Immediately upon job completion, clean roof membrane and metal surfaces of debris.
 2. Clean grounds around building of any debris from roofing project. Clean interior space of any roofing debris to Owner's satisfaction.

END OF SECTION

SECTION 07 54 13**ADHERED TRI-POLYMER ALLOY MEMBRANE ROOFING****PART 1 - GENERAL****1.1 SUMMARY**

- A. Section includes an adhered (tri-polymer alloy) single ply roof system, with insulation.
- B. Related Sections:
 - 1. Section 03 33 00 – Cast-in-Place Concrete: Concrete deck substrate.
 - 2. Section 06 10 53 – Miscellaneous Rough Carpentry: Wood nailers.
 - 3. Section 07 62 00 – Sheet Metal Flashing and Trim: Counterflashing.

1.2 SCOPE OF WORK

- A. Provide an adhered 60 mil TPA FB system roofing membrane as described in this specification and in accordance with the detail drawings.
- B. Adhere polyisocyanurate tapered insulation system over concrete deck using Tremco Fas N Free insulation adhesive. Overlay with Dens Deck Prime™ over the tapered system. Prime concrete deck with Tremprime WB before installation of the tapered insulation.
- C. All perimeter metal associated with the TPA system shall be coated to meet the specification.

1.3 REFERENCES

- A. ASTM International:
 - 1. ASTM C209 - Standard Test methods for Cellulosic Fiber Insulating Board.
 - 2. ASTM E96 - Standard Test Methods for Water Vapor Transmission of Materials.
 - 3. ASTM D638 - Standard Test Methods for Tensile Properties of Plastics.
 - 4. ASTM D751 - Standard Test methods for Coated Fabrics.
 - 5. ASTM D1149 - Standard Test Method for Rubber Deterioration – Surface Ozone Cracking in a Chamber.
 - 6. ASTM D1204 - Standard Test Method for Linear Dimensional changes of Nonrigid Thermoplastic Sheeting or Film at elevated Temperatures.
 - 7. ASTM D2136 - Standard Test Method for Coated Fabrics – Low Temperature Bend Test.
 - 8. ASTM D3045 - Standard Practice for Heat Aging of Plastics Without Load.
 - 9. ASTM D3167 - Standard Test Method for Floating Roller Peel Resistance of Adhesives.
- B. FM Global:
 - 1. FM DS 1-28 – Wind Loads to Roof Systems and Roof Deck Securement.
 - 2. FM Loss Prevention Data Sheet 1-41.
- C. Sheet Metal and Air Conditioning Contractors National Association:
 - 1. SMACNA – Architectural Sheet Metal Manual.

1.4 SUBMITTALS

- A. Section 01 32 19 – Submittal Procedures: Requirements for submittals.

- B. **Shop Drawings:** Indicate setting plan for tapered insulation, joint and termination detail conditions, conditions of interface with other materials. Indicate membrane layout and seam locations. Shop drawings shall be accepted by manufacturer prior to submittal.
- C. **Product Data:** Submit characteristics on membrane materials, adhesives, seaming materials, flashing materials, and insulation. Submit copies of specifications and details.
- D. **Samples:** Submit samples of each material to be used in the roof system including each component manufacturer's literature
- E. **Submit written approval by insulation manufacturer (as required) for use and performance of the product in the proposed system.**
- F. **Installer Qualifications:** Submit written verification from manufacturer that installer is an authorized applicator.
- G. **Manufacturer's Installation Instructions:** Submit special precautions required for seaming membrane.
- H. **Manufacturer's Certificates:**
 - 1. Submit certification that the system to be installed meets local building code specifications and insurance requirements. Information can be obtained from the manufacturer.
 - 2. Submit Certificates of Compliance from insulation and roofing component manufacturers that all material to be supplied comply with all industry standards.
- I. **Submit, for approval, any necessary items not furnished by roofing manufacturer. Only items that have written approval from the manufacturer will be accepted.**
- J. **Manufacturer's Field Reports:** Indicate procedures followed; ambient temperatures, humidity, wind velocity during application, and other factors affecting installation.
- K. **Submit results of pull-out tests to confirm the ability of the deck to retain mechanical fasteners, if applicable.**

1.5 QUALITY ASSURANCE

- A. **Roofing system shall be installed by the preferred manufacturer's certified roofing contractor.**
- B. **There shall be no deviations made from these specifications or manufacturer's drawings without prior written approval of an authorized manufacturer representative.**
- C. **Applicable code or insurance requirements shall be identified by the owner or his representative.**

1.6 QUALIFICATIONS

- A. **Manufacturer:** Company specializing in manufacturing products specified in this section with minimum ten years documented experience.
- B. **Applicator:** Company specializing in performing Work of this section with minimum 10 years documented experience, certified by manufacturer.

1.7 PRE-INSTALLATION MEETINGS

- A. **Section 01 31 19 – Project Meetings:** Preinstallation meetings.

- B. Convene minimum one week prior to commencing Work of this section.
- C. Review preparation and installation procedures and coordinating and scheduling required with related Work.

1.8 DELIVERY, STORAGE AND HANDLING

- A. Section 01 60 00 – Product Requirements: Requirements for transporting, handling, storing, and protecting products.
- B. Deliver materials in original, unopened containers.
- C. Deliver products to job site with manufacturer's labels on each roll or container. When required, label shall also indicate the specified code/insurance approvals.
- D. Store materials flat, elevated from roof or deck, protected with waterproof covers as necessary to keep materials dry. The plastic wrap on TPA FB System rolls is not a waterproof cover.
- E. Store TPA bonding adhesive at temperatures above 40 degrees F. Store flammable materials in a cool, dry area away from spark and open flames.
- F. Protect materials from damage.
- G. Do not use materials damaged in handling or storage without authorization by the manufacturer. Replace unsalvageable materials at contractor's expense.
- H. Review Material Safety Data Sheets, available from the manufacturer.

1.9 ENVIRONMENTAL REQUIREMENTS

- A. Section 01 60 00 – Product Requirements: Environmental conditions affecting products on site.
- B. The TPA FB Single Ply System shall not be installed during periods of precipitation, but may be installed under certain adverse weather conditions (temperature and humidity). Contact manufacturer for precautions that should be followed.
- D. Only as much of the new roofing as can be made weathertight each day shall be completed in accordance with the manufacturer's specifications, including all field flashings.
- E. Schedule and execute work without exposing the interior building area(s) to the effect of inclement weather. Protect the building and its contents against all risks associated with installation of the roof system.
- F. Surface areas to receive insulation, membrane or flashings, shall be thoroughly dry. Should surface moisture occur, provide necessary materials and equipment to dry the surface area affected prior to installation.
- G. Clean areas contaminated by dirt, debris, and dust by vacuuming, sweeping or power blowing.
- H. The roofing contractor shall take measures necessary to avoid damage to the TPA FB Single Ply System during construction. When the roofing contractor is a subcontractor, he shall advise the general contractor concerning potential damage to the System and the measures taken to avoid such damage during construction.
- I. When storing material on the roof, and during application, the roofing contractor shall ensure

that overloading of the deck and structure does not occur.

- J. Install temporary waterstops at the end of each day's work, and remove before proceeding with the next day's work. Waterstops shall be compatible with all materials. Water tightness of waterstops is contractor's responsibility.
- K. Promptly report to the owner or designated owner's representative, any deteriorated deck or flashing substrate which is discovered.
- L. The roofing contractor shall investigate all existing roof drain lines. Nonfunctioning drains shall be reported to the owner's representative prior to job start. It is the responsibility of the roofing contractor to insure adequate connection of the drain to the drain lines.
- M. The roofing contractor shall investigate the structural deck on the building to determine the type and length of fastener required.
- N. If waste products, petroleum, grease, oil, solvents, mineral oil, and other contaminants come into contact with the TPA FB roofing membrane, contact the manufacturer for precautions and cleaning procedures.
- O. Site clean-up, including both interior and exterior building areas that have been affected by the roof installation, shall be completed to the Owner's satisfaction.

1.10 COORDINATION

- A. Coordinate Work with installation of associated roof penetrations and metal flashings, as Work of this section proceeds.

1.11 WARRANTY

- A. Section 01 77 00 – Contract Closeout: Requirements for warranties.
- B. Upon completion of the roof system, and after passing a final inspection performed by the manufacturer's authorized field inspector, a Twenty (20) Year Tremco QA+ warranty shall be issued to Owner. At years = 2, 5, 10, and 15 the manufacturer's technical field staff will inspect the system, provide housekeeping and minor repairs if needed, and provide a written report to the Owner.
- C. Contractor shall furnish the Owner with a Two Year Guarantee against materials and workmanship and provide any leak calls free-of-charge to Owner during this period.

PART 2 - PRODUCTS

2.1 ADHERED TRI-POLYMER ALLOY MEMBRANE

- A. Manufacturers;
 - 1. Tremco Inc.
 - 2. Substitutions: Section 01 60 00 – Product Requirements: Product Options and Substitutions.

2.2 GENERAL

- A. All components of the Tremco TPA FB Single Ply System shall be either manufactured, supplied, or accepted in writing by Tremco or Architect; accepted as equal in quality and performance.

2.3 PHYSICAL PROPERTIES

- A. Membrane: TPA FB, a tri-polymer alloy, polyester reinforced roofing membrane, conforming to the properties listed below. NOTE: The physical properties listed below are typical values.
1. Color: White (top)/Gray (bottom).
 2. Roll Size: 76 inches wide x 90 feet long.
 3. Weight: 4.8 oz. ft² (nominal).
 4. Thickness ASTM D-751: 60 mil (nominal).
 5. Breaking Strength ASTM D-751: 350 lbs x 325 lbs.
 6. Seam Strength ASTM D-638: 90%.
 7. Elongation at Break ASTM D-751: 40% x 30%.
 8. Heat Aging ASTM D-3045: 80% x 80%.
 9. Tear Strength ASTM D-751: 100 lbs x 100 lbs.
 10. Low Temperature Bend ASTM D-2136: Pass (-40 degrees F).
 11. Permeance ASTM D-96: 0.003 Perms.
 12. Dimensional Change ASTM D-1204: 0.3%.
 13. Hydrostatic Resistance ASTM D-751: 400 psi.
 14. Ozone Resistance ASTM D-1149: Pass.
 15. EMMAQUA Test ASTM E-838: Pass (2.7 million Langleys)
- B. The TPA FB membrane may be mopped in adhesive directly to compatible insulation or substrates that exhibit sufficient tensile and peel resistance.

2.4 RELATED MATERIALS

- A. Insulation:
1. Provide insulation over roof deck substrate to obtain the desired thermal value (minimum R-40).
 - a. Insulation for use with TPA FB Single Ply System shall be a Factory Mutual Class I Fire Rated, I-90 Uplift approved board.
 - b. Insulation shall meet all identified code/insurance requirements.
 - c. Insulation shall be compatible with TPA FB membrane and cold applied application.
 - d. Insulation must exhibit adequate transverse tensile strength, in the direction of the normal to the surface (with an average tensile strength of 4 psi when tested according to ASTM C209 method), and adequate peel strength (with an average resistance against peeling of 1 ply or more when tested according to ASTM D-3167 method) when TPA FB membrane is adhered to it.
 - e. Insulation shall be accepted by manufacturer in writing.
 2. The following insulation boards are acceptable for use with the Tremco TPA FB Single Ply System:
 - a. Polyisocyanurate insulation, 4 feet x 8 feet x 8 inch thick with organic facers.
 - b. Overlay board: Georgia Pacific, Dens Deck Prime™, 4 feet x 8 feet x 1/4-inch thick.
- B. Insulation Attachment:
1. Insulation Adhesive: Tremco Fas-n-Free insulation adhesive; one-part solvent free, moisture curing, asphaltic urethane adhesive possessing high elastomeric and adhesive characteristics; UL and FM approved.
 - a. Insulation Primer: Tremco Tremprime WB.
 2. Insulation Adhesive for Dens Deck Prime™: Type III hot asphalt.
- C. Flashing:
1. Tremco TPA FB Membrane Flashing and/or TPA membrane.
 2. Tremco TPA Coated Metal: 0.020 inch thick membrane laminated to 24 gauge G-90 galvanized steel with acrylic backwash coating.

3. Tremco TPA Prefabricated Flashing: Pipe boots, inside corners, outside corners.
- D. Membrane Flashing Adhesive: Tremco Tremply HP4510 Adhesive Water Based.
 1. Application rates for Tremco TPA bonding adhesive are listed below:
 - a. Organic Facer (insulation) – 1.25 to 1.5 gal./square.
 - b. Rate of application may vary due to substrate finish.
- E. Sealants: Tremseal D.
- F. Night Seal: Roofing asphalt mastic – ELS.
- G. Mechanical Termination: Approved metal plates and screws or TPA coated metal.
- H. Base flashing membrane adhesive: Sheeting Bond by Tremco.
- I. Foam Rod Stock: Polyethylene or Neoprene in shapes and sizes as needed.
- J. Sheet Metal Fasteners: Masonry anchors by Tremco/Olympic.
- K. Wood Nailers:
 1. Minimum #2 lumber, "wolmanized" or pressure treated for rot resistance with a salt-based preservative. No cresote or asphaltic type preservations shall be allowed.
 2. Wood nailers shall conform to Factory Mutual's Loss Prevention Data Sheet 1-49.
 3. All wood shall have a maximum moisture content of 19% by weight on a dry weight basis.
- L. Gutters and counterflashing: Tremlock Series II flat sheet, Kynar 500 coated 24 gauge with District approved color.
- M. Base Sheet over insulation: Burmastic 28# Glass Ply. Three sq. roll.

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Verify surfaces and site conditions are ready to receive Work.
- B. Verify deck is supported and secure.
- C. Verify deck is clean and smooth, free of depressions, waves, or projections, properly sloped to drains, and suitable for installation of roof system.
- D. Verify deck surfaces are dry and free of snow or ice.
- E. Verify roof openings, curbs, pipes, sleeves, ducts, and vents through roof are solidly set, and wood cant strips and wood nailing strips are in place.

3.2 PREPARATION

- A. Concrete Deck:
 1. Fill surface honeycomb and variations with latex filler.

3.3 WOOD NAILERS

- A. Securely anchor nailers to deck to resist 200 lbs. per foot applied in any direction.

- B. Provide nailer thickness such that top of nailer is flush with surface to which the TPA FB membrane is to be applied.

3.4 INSULATION

- A. Insulation manufacturer shall agree that use of its product below the adhered Tremco TPA FB Single Ply System is appropriate and that insulation has the necessary strengths. It is responsibility of roofing contractor to insure appropriate selection of specific brand of insulation for use under the Tremco TPA FB Single Ply System. Consult Tremco for information concerning generic insulations which are appropriate for use under Tremco TPA FB Single Ply System.
- B. Install insulation according to insulation manufacturer's instructions and Factory Mutual Technical Bulletin 1-28 recommendations. This includes board layout, and adhesive application.
- C. Insulation shall be adequately supported to sustain normal roof traffic without damage. Lay insulation on acceptable substrate or air barrier with tight joints in parallel courses with end joints staggered. When more than one layer is used, lay second layer of insulation transverse to first layer with joints staggered. Stagger joints minimum of 6 inches.
- D. Tightly fit field-trimmed insulation around roof protrusions and terminations.
- E. Insulation attachment:
 - 1. Areas to receive FAS-n-Free Adhesive must be clean, dry, and free of dust, dirt, oil, and other contaminants which may adversely affect installation.
 - 2. Prime substrates with Tremprime WB and allow to dry thoroughly.
 - 3. When applying multiple layers of insulation, the previous insulation course does not require priming.
 - 4. Apply insulation adhesive to either substrate or insulation board with 1/2-inch to 3/4-inch diameter beads are required coverage rate.
 - 5. Set insulation into adhesive immediately. Step board in. Do not allow adhesive to skim over.
 - 6. Stagger offset joints as specified.
 - 7. Apply adhesive at the rate of 1-1/2 gallon per Square: Six 4 ft. x 1/2-inch diameter beads per 4' x 4' board.
 - 8. Increase coverage of adhesive in perimeter and corner areas by applying additional ribbons to the substrate. Refer to Factory Mutual Loss Prevention Data Sheet 1-29.
- F. No more insulation shall be applied than can be covered with the finished TPA FB membrane by the end of the day or the onset of inclement weather.
- G. Attach insulation in accordance with guidelines established by FM, NRCA, and specific insulation and deck manufacturers, as minimum requirements.
- H. Adhere Dens Deck Prime™ overlay board over insulation boards using Type III hot asphalt at an application rate of 30 lbs. per 100 sq.ft.

3.5 TREMCO TPA COATED METAL FLASHINGS

- A. All flashing other than TPA membrane or TPA FB membrane shall be fabricated out of Tremco Roofing Systems TPA coated metal. Metal used other than Tremco TPA coated metal is not covered under the provisions of the warranty.
- B. Fabricate and install Tremco TPA coated metal flashing to comply with details and project drawings and the recommendations of SMACNA Sheet Metal Manuals for fabrication and Factory Mutual's Loss Prevention Data Sheet I-49.

- C. Complete metal work in conjunction with roofing and flashing operation so as to provide a daily watertight condition.
- D. Install metal to provide adequate resistance to bending and to allow for normal thermal expansion and contraction. Allow for minimum 1/4-inch space between metal joints.
- E. Metal flashing shall have a 5-inch minimum nailing flange and hemmed metal edge. Fasten metal flashing to solid wood blocking with annular ring nails, 4 inches on center. Fasteners shall penetrate the wood a minimum of 1 -1/4 inches.
- F. Continuous metal hook strips are required on all metal fascia that exceeds 4 inches. Each hook strip shall be fastened 12 inch on center into wood blocking. Hook strips should be continuous and at least 22-gauge. Secure with annular threaded nails long enough to penetrate the wood 1 - 1/4 inches. The nail head should be 3/16-inch minimum. When screws are used, they should be No. 8 minimum, long enough to penetrate wood 3/4-inch or metal 3/8-inch. Screws should be 24 inches apart in Zone 1 and 16 inches apart in Zone 2 (refer to FM I-49). Screws should be either corrosion-resistant steel or treated to resist corrosion. When an existing metal panel wall has no hook strip, the fascia metal should be fastened directly to the wall with No. 8 galvanized sheet metal screws, through neoprene washers, spaced 24 inches in Zone 1 and 16 inches in Zone 2.
- G. Install gravel stops and drip edges with a face larger than 4 inches using a continuous 22 gauge hook strip fastened 12 inches on center using galvanized annular ring nails.
- H. Fasten Tremco TPA coated metal flashings 4 inches on center to treated wood nailers using galvanized annular ring nails.
- I. Install Tremco TPA coated metal flashings prior to the installation of the TPA FB membrane. Flange of flashing component shall be at the same level as the insulation or other substrate to which the membrane will be applied.
- J. Install adjacent pieces of coated metal flashing with 1/4-inch gap. Apply a 2 inch wide continuous strip of foil tape over the gap to act as a bond breaker. Hot air weld a 6 inch strip of C3 membrane, over the foil tape, to each piece of flashing to form a watertight splice.
- K. Fasten the top of Tremco TPA coated metal base flashing 8 inches on center using fasteners appropriate for the underlying substrate.

3.6 MEMBRANE INSTALLATION

- A. Placement:
 - 1. Fully adhere Tremco TPA FB membrane to properly-installed and prepared substrate surface. The surface shall be clean, dry, smooth, and free from contamination.
 - 2. Cut membrane to fit neatly around all penetrations and roof projections. This includes wrapping all parapet walls.
 - 3. Unroll roofing membrane and position with a minimum 3 inch overlap. Laps shall be shingled with, or run parallel to, the slope of the roof.
- B. Attachment:
 - 1. Apply bonding adhesives over the properly installed and prepared surface, using approved solvent-resistant roller, or sprayed. Apply adhesive at a rate of approximately 1-1/2 gallons per 100 square feet of surface dependent upon substrate material. Apply adhesive to substrate only, in a smooth even coating with no globs, puddles, voids or similar irregularities. Only areas that can be completely covered in the same day shall be coated with adhesive. Allow the surface with adhesive coating to become tacky prior to installing the roof membrane.

NOTE: Drying time of the adhesive increases with the presence of higher humidity or cooler temperatures.

2. When the surface is ready, unroll TPA FB membrane (field and perimeter sheets) and set in proper position. Overlap adjacent sheets a minimum of 3 inches.
3. Do not apply bonding adhesive to lap (seam) areas that are to be welded to flashings or adjacent membrane sheets by means of hot-air and/or solvent welding procedures.

3.7 MEMBRANE FLASHING

- A. Install flashings as shown on the detail drawings. Install TPA membrane or TPA FB flashings concurrently with roof membrane as project progresses. No temporary flashings shall be allowed without prior written approval of the authorized Tremco agent. If any water is allowed to enter under the roofing due to incomplete flashings, the affected area shall be removed and replaced at contractor's expense.
- B. Do not apply flashings over existing thru-wall flashings or weep holes. Extend flashings a minimum of 8-inches above roof level.
- C. Membrane base flashings can be TPA or TPA FB membrane.
 1. Fully adhere TPA FB membrane to a dry, smooth solvent-resistant and compatible substrate using approved Bonding Adhesive.
 2. Over the properly installed and prepared substrate, apply approved Bonding Adhesive using approved solvent resistant rollers, squeegee or sprayed. Apply adhesive at a rate of approximately 1-1/2 gallons per 100 square feet, depending upon substrate material. Apply adhesive in a smooth even coat with no globs, puddles, or voids. Allow substrate with the adhesive coating to become tacky, before installing the TPA FB membrane.

NOTE: Drying time of adhesive increases with presence of humidity or cooler temperatures.

3. When the TPA FB membrane has been cut to correct width and length, embed the flashing into the substrate adhesive, taking care to avoid wrinkles.
4. Care should be taken to ensure that the flashing does not bridge where there is a change of direction.
5. Fasten the top of installed flashing under metal counterflashing. The maximum distance between fasteners for TPA flashings shall be 8 inches through flat bar with TF tape and masonry anchors.

3.9 FIELD QUALITY CONTROL

- A. Section 01 77 00 - Contract Closeout: Field inspecting, testing, adjusting, and balancing.
- B. Require site attendance and onsite inspection service provided by roofing materials' manufacturers for a period of one day minimum (or as determined by manufacturer's authorized representative) during installation of the Work.
- C. Upon completion of the installation, an authorized manufacturer's field inspector shall inspect the completed roof to verify that the visible elements of the installation have been installed in accordance with manufacturer's specifications, detail drawings, and approved changes.

3.10 ADJUSTING

- A. Repair of deficiencies:
 - 1. Installations of details or appearance items noted as deficient during final inspection must be repaired and corrected by applicator, and made ready for reinspection within five (5) working days of formal notification.

3.11 CLEANING

- A. Section 01 74 00 - Cleaning: Final cleaning.
- B. Immediately upon job completion, clean roof membrane and flashing surfaces of debris.
- C. Clean or repaint areas of overspray and/or other contamination to the satisfaction of the Owner.
- D. Clean drains of debris. Flow test to ensure proper function. If obstructions exist, restore normal flow. Any internal drains shall have cast iron strainers.

3.12 PROTECTION OF INSTALLED CONSTRUCTION

- A. Protect building surfaces against damage from roofing Work.
- B. Where traffic must continue over finished roof membrane, protect surfaces.

END OF SECTION

SECTION 07 62 00**SHEET METAL FLASHING AND TRIM****PART 1 - GENERAL****1.1 SUMMARY**

- A. Section includes flashings and counterflashings and fabricated sheet metal items.
 - 1. Provide reglets and accessories.
 - 2. Provide protective threshold cover plates at doors and seismic joint locations.

- B. Related Sections:
 - 1. Section 06 10 53 – Miscellaneous Rough Carpentry: Wood blocking for metal roofing substrate profiles.
 - 2. Section 07 13 00 – PVC Sheet Waterproofing.
 - 3. Section 07 54 13 – Adhered Tri-Polymer Alloy Membrane Roofing.
 - 3. Section 07 55 00 – Modified Bituminous Membrane Roofing.
 - 5. Section 07 90 00 – Joint Protection.

1.2 REFERENCES

- A. American Architectural Manufacturers Association:
 - 1. AAMA 611 - Voluntary Specification for Anodized Architectural Aluminum.

- B. ASTM International:
 - 1. ASTM B32 – Standard Specification for Solder Metal.
 - 2. ASTM B209 – Standard Specification for Aluminum and Aluminum-Alloy Sheet and Plate.
 - 3. ASTM B749 – Standard Specification for Lead and Lead Alloy Strip, Sheet and Plate.
 - 4. ASTM D4586 – Standard Specification for Asphalt Roof Cement, Asbestos Free.
 - 5. ASTM D4601 – Standard Specification for Asphalt Coated Glass Fiber Base Sheet Used in Roofing.

- C. National Roofing Contractor's Association:
 - 1. NRCA – Roofing Manual.

- D. Sheet Metal and Air Conditioning Contractors National Association:
 - 1. SMACNA - Architectural Sheet Metal Manual.

- E. SSPC – Structural Steel Painting Council.

1.3 SYSTEM DESCRIPTION

- A. Work of this section is to provide flashing and sheet metal not specifically described in other sections of these specifications but required to prevent penetration of water through exterior shell of the building.

1.4 SUBMITTALS

- A. Section 01 32 19 – Submittal Procedures: Requirements for Submittals.

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

- C. Setting Drawings or Templates: Submit setting drawings or templates and setting instructions for exact locations of items to be embedded in work of other sections.
- D. Product Data: Submit data on manufactured components metal types, finishes, and characteristics.

1.5 QUALITY ASSURANCE

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

1.6 QUALIFICATIONS

- A. Fabricator and Installer: Company specializing in sheet metal work with minimum of five years documented experience.

1.7 PRE-INSTALLATION MEETINGS

- A. Section 01 31 19 – Project Meetings: Pre-installation meeting.
- B. Convene minimum one week prior to commencing work of this section.

1.8 DELIVERY, STORAGE AND HANDLING

- A. Section 01 60 00 – Product Requirements: Product storage and handling requirements.
- B. Deliver products to site, store, handle and protect in accordance with manufacturer's instructions and recommendations.
- C. Deliver, store and handle packaged materials in original containers with seals unbroken and labels intact until time of use.
- D. Discharge materials carefully and store on clean concrete or raised platform in secure dry area. Do not dump on ground.
- E. Stack preformed and prefinished material to prevent twisting, bending, or abrasion, and to provide ventilation. Slope metal sheets to ensure drainage.
- F. Prevent contact with materials during storage which may cause discoloration, staining or damage.
- G. Do not store materials with strippable film in areas exposed to sunlight.

1.9 FIELD MEASUREMENTS

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

1.10 COORDINATION

- A. Ensure timely delivery of items to be embedded in work of other sections furnish with setting drawings and templates.
- B. Coordinate installation of reglets with installation of sheet metal roofing.
- C. Coordinate installation of sheet metal work in contact, but not incorporated into, membrane roofing with installation of roofing; install under supervision of roofing system applicators.

1.11 WARRANTY

- A. Section 01 77 00 – Contract Closeout: Requirements for warranties.
- B. Provide two-year installer's warranty covering damage to work resulting from failure of work of this section to resist penetration of moisture.

PART 2 - PRODUCTS**2.1 SHEET METAL FLASHING AND TRIM**

- A. Aluminum Sheet: ASTM B209; 5005 alloy, 0.032 inch thick, Class I clear anodized finish.
- B. Stainless Steel: 18-8 Stainless Steel, AISI Type 304, 20 Finish.
 - 1. 24 gauge sheet metal counterflashing (unless noted otherwise)
- C. Lead: ASTM B749, Grade B; minimum 4 lbs./sq. ft.

2.2 MANUFACTURED ASSEMBLIES

- A. Reglets with Counterflashing: 24- gauge galvanized steel reglet with 2 inch factory formed end lap and prefabricated factory mitered and sealed corner pieces; 24 gauge galvanized steel counterflashing with 3 inch end lap; Fry Reglet Corporation Type ST Stucco Reglet with Springlock Flashing or equal product substituted under the provisions of Section 01 60 00.

2.3 ACCESSORIES

- A. Fasteners:
 - 1. General: Aluminum or stainless steel, with soft neoprene washers at exposed fasteners; finish exposed fasteners to match flashing metal.
 - 2. Concrete Substrates: Type 304 Stainless Steel Tappers® with neoprene-bonded washers 1/4 in. x 1-1/4 in. by Rawl.
 - 3. Sheet Metal Substrates: Type 304 Stainless Steel Tek screws in lengths as required.
- B. Drawbands: Stainless steel hose clamps; worm drive.
- C. Protective Backing Paint: SSPC Paint 12; cold-applied asphalt mastic; inert type; non-corrosive; compounded for 15 mil dry film thickness.
- D. Sealant: Type H butyl sealant as specified in Section 07 90 00.
 - 1. Sealant for Reglets and Counterflashing Filler: Sikaflex 1a.
- E. Plastic Cement: ASTM D4856; asphalt type with mineral fiber components; capable of setting within 24 hours at temperature of 75 degrees F and 50 percent humidity.
- F. Flashing Compound: Polyisobutylene type non-skinning non-drying sealant, bulk or tape form as applicable to installation requirements.
- G. Downspout Boots: Cast-iron.
 - 1. Manufacturer: Zurn.
 - 2. Model: Z192; 4 inch x 3 inch x 24 inch downspout boot, Dura-Coated cast iron body and strap with 1/4 inch diameter cast holes for flat head bolts.
- H. Solder: ASTM B32; 50/50 type.

2.4 FABRICATION

- A. Form sections shape indicated on Drawings, accurate in size, square, and free from distortion or defects.
- B. Fabricate cleats of same material as sheet metal, interlocking with sheet.
- C. Form pieces in longest possible lengths.
- D. As far as practicable, form and fabricate sheet metal in shop. Where on-site fabrication is required, provide work equal to shop quality.
- E. Fabricate required connection pieces.
- F. Allow for expansion and contraction at joints.
 - 1. Provide loose locking slip joints:
 - a. At maximum 8 feet from internal and external corners.
 - b. At maximum 24 foot intervals on straight runs.
 - c. At centers of runs, less than 20 feet but more than 20 feet.
 - 2. Fill loose locked seams with flashing compound prior to assembly.
- G. Mechanically fasten and solder joints, splices, and transitions which are not designed for expansion.
 - 1. Fasten metal for strength by solid riveting, welding, or forming double lock seams.
 - 2. Seal for water tightness by soldering.
 - 3. Sealant filled joints may not be substituted for soldered joints: Use sealant where and as indicated on Drawings, and as specified herein.
- G. Reinforce for strength and appearance.
- H. Cut, fit and drill sheet metal to accommodate related, adjacent of adjoining work.
- I. Hem exposed edges of metal on underside 1/2 inch; miter and seam corners.
- J. Provide standing seam joints in copings and caps. Provide lock joints in other components where practical; where impractical, lap, rivet and solder joints.
 - 1. Turn lock joints on exposed surfaces in direction of flow.
 - 2. Provide seams that follow direction of water flow.
- K. Solder metal joints. After soldering, remove flux. Wipe and wash solder joints clean.
- L. Fabricate corners, transitions and terminations as a single unit; extend a minimum of 4 inches and not more than 8 inches in any direction.
- M. Form edge metal in either 8 or 10 foot sections; lengths shorter than 8 feet may be used at end of runs, with a minimum of 2 feet.
- N. Fabricate vertical faces with bottom edge formed outward 1/4 inch and hemmed to form drip.
- O. Fabricate lead flashing for roof scuppers as shown on drawings.

2.5 FACTORY FINISHING

- A. Class I Natural Anodized Finish: AAMA 611, AA-M12C22A41; clear anodic coating not less than 0.7 mils thick.

PART 3 - EXECUTION**3.1 EXAMINATION**

- A. Verify roof openings, curbs, pipes, sleeves, ducts, and vents through roof are solidly set, reglets in place, and nailing strips located.
- B. Verify roofing termination and base flashings are in place, sealed, and secure.
- C. Do not begin installation until unsatisfactory conditions have been corrected.

3.2 PREPARATION

- A. Allow wet substrates to dry thoroughly; clean debris from all substrates.
- B. Install starter and edge strips, and cleats before starting installation.
- C. Install surface mounted reglets to lines and levels indicated in Drawings. Seal top of reglets with sealant.
- D. Paint concealed metal surfaces with protective backing paint to minimum dry film thickness of 15 mil.

3.3 INSTALLATION

- A. General:
 - 1. Manufactured products: Comply with manufacturer's written instructions except as modified herein.
 - 2. Proceed with sheet metal installation in conjunction with waterproofing and flashing in each area.
 - 3. Do not dilute primers, coatings, or sealants
 - 4. Keep containers closed except when removing materials from them.
 - 5. Field fabricate sheet metal following the same criteria set forth in Article 2.4, FABRICATION, above.
- B. Conform to details indicated on Drawings and included in NRCA and SMACNA Manuals.
- C. Install shop fabricated sheet metal work in accordance with final reviewed shop drawings. Install manufactured assemblies in accordance with manufacturer's installation instructions.
- D. Perform required site fabrication in accordance with Article 2.4 above.
- E. Install work watertight with components in true and accurate alignment with other components and related work, with joints accurately fitted, with corners reinforced and with surfaces free from dents.
- F. Install flashings to ensure diversion of moisture to exterior.
- G. Coordinate sheet metal installation with work of other trades to ensure proper sequencing.
- H. Secure flashings in place using concealed fasteners. Use exposed fasteners only in locations indicated or authorized by Architect.
 - 1. Fasten in accordance with SMACNA.
 - 2. Fasten sheet metal runs to underlying material by nailing through slotted holes in flange at 3 inches on center maximum, unless indicated otherwise.
 - 3. Provide waterproof washers where fasteners penetrate flashings.

4. Where sheet metal occurs over other sheet metal, use nails with minimum 1-inch metal disks.
5. At concrete substrates:
 1. Predrill concrete for fastener installation.
 2. Set counterflashing assembly against concrete in a full and continuous bed of sealant. Apply sealant bead to both concrete substrate and assembly.
- I. Apply plastic cement compound between metal flashings and felt flashings.
- J. Fit flashings tight in place. Make corners square faces true and straight in planes, and lines accurate to profiles.
- K. Seal metal joints watertight.
- L. Install sheet metal work so as to adequately provide for expansion and contraction in the finished work.
- M. Connect downspouts to downspout boots. Seal connection watertight.
- N. Apply joint compound at slip joints or wherever metal-to-metal contact occurs and movement may occur.
- O. Install sealant and sealant accessories in accordance with Section 07 90 00.
- P. Provide cover plate over all splice joints and seal all joints with sealant.
- Q. Mechanically fasten and solder metal joints not intended for expansion watertight for full metal surface contact.

3.4 ADJUSTING

- A. Replace damaged material with new undamaged material prior to final acceptance.

3.5 CLEANING

- A. Section 01 74 00 – Cleaning: Requirements for final cleaning.
- B. Clean sheet metal work; leave free from grease, finger marks and stains.
- C. Remove scrap and debris from surrounding areas and grounds.

3.6 PROTECTION

- A. Protect installed work of this section from defacement or damage until final acceptance.

END OF SECTION

SECTION 07 71 23**MANUFACTURED GUTTERS AND DOWNSPOUTS****PART 1 - GENERAL****1.1 SUMMARY**

- A. Section includes galvanized steel scuppers and downspouts.
- B. Related Sections:
 - 1. Section 07 54 13 - Adhered Tri-Polymer Alloy Membrane Roofing.
 - 2. Section 07 62 00 - Sheet Metal Flashing and Trim.
 - 3. Section 07 90 00 - Joint Protection.
 - 3. Section 09 90 00 - Painting and Coating: Finish painting of scuppers and downspouts.

1.2 REFERENCES

- B. ASTM International:
 - 1. ASTM A653 – Standard Specification for Steel Sheet Zinc-Coated (Galvanized) or Zinc-Iron Alloy-Coated (Galvanealed) by the Hot-Dip Process.
 - 2. ASTM B32 – Standard Specification for Solder Metal.
- C. Federal Specification Unit:
 - 1. FS TT-C-494 - Coating Compound, Bituminous, Solvent Type, Acid Resistant.
- D. Sheet Metal and Air Conditioning Contractors National Association:
 - 1. SMACNA - Architectural Sheet Metal Manual.

1.3 SUBMITTALS

- A. Section 01 32 19 – Submittal Procedures: Submittal procedures.
- B. Shop Drawings: Clearly indicate general construction, configurations, jointing methods and locations, fastening methods and locations and installation details.
- C. Product Data: Provide product data on prefabricated components.

1.4 QUALITY ASSURANCE

- A. Perform Work in accordance with SMACNA Manual.

1.5 DELIVERY, STORAGE AND HANDLING

- A. Section 01 60 00 – Product Requirements: Requirements for transporting, handling, storing, and protecting products.
- B. Stack preformed material to prevent twisting, bending, or abrasion, and to aid ventilation. Slope to drain.
- C. Prevent contact with materials during storage which may cause discoloration, staining or damage.

1.6 COORDINATION

- A. Coordinate fabrication of scupper with fabrication of leaderhead at downspouts.

1.7 FIELD MEASUREMENTS

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

PART 2 - PRODUCTS

2.1 GUTTERS AND DOWNSPOUTS

- A. Product Description:
 - 1. Scuppers: Sheet metal; SMACNA; profile as indicated on Drawings.
 - 2. Downspouts: Sheet metal; SMACNA rectangular profile as indicated on Drawings.

2.2 COMPONENTS

- A. Galvanized Steel Sheet: ASTM A653/A653M G90 (Z275) zinc coating, one gauge heavier than SMACNA Recommended Minimum Gages for gutters and downspouts, unless otherwise noted.
 - 1. Rectangular downspouts: 18 gauge (0.047 inch) core steel.
 - 2. Scuppers: 24 gauge (0.02 inch) core steel.

2.3 ACCESSORIES

- A. Anchors and Supports: Profiled to suit scuppers and downspouts.
 - 1. Anchoring Devices: In accordance with SMACNA requirements.
 - 2. Downspout Supports: Straps.
- B. Fasteners: Stainless steel, with soft neoprene washers.
- C. Primer: Zinc molybdate or galvanized iron primer.
- D. Protective Backing Paint: FS TT-C-494, bituminous; acid and alkali resistant type.
- E. Solder: ASTM B32; Alloy Grade Sn50 (50/50) type.

2.4 FABRICATION

- A. Form scuppers and downspouts to profiles and sizes indicated.
- B. Fabricate with required connecting pieces.
- C. Form sections square, true, and accurate in size, in maximum possible lengths and free of distortion or defects detrimental to appearance or performance. Allow for expansion at joints.
- D. Hem exposed edges of metal.
- E. Fabricate gutter accessories; seal watertight.

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Verify that surfaces are ready to receive scuppers and downspouts.
- B. Do not begin installation until unsatisfactory conditions have been corrected. Beginning of installation means acceptance of existing conditions.

3.2 PREPARATION

- A. Paint concealed metal surfaces and surfaces in contact with dissimilar metals with protective backing paint to minimum dry film thickness of 15 mil.

3.3 INSTALLATION

- A. General: Conform to SMACNA details.
- B. Install scupper and downspout accessories in accordance with manufacturer's instructions.
- C. Sheet Metal: Join lengths with formed seams sealed watertight. Flash and seal scuppers to downspouts and accessories.
- D. Seal metal joints watertight.
- E. Coordinate installation of steel downspouts.
- F. Secure scuppers and downspouts in place using concealed fasteners.
- J. Seal scuppers watertight. Seal joint of scupper to downspout.

3.4 CLEANING

- A. Upon completion of roofing installation, clear debris and obstructions from scuppers and downspouts connected to scuppers. Test by flooding with water.

END OF SECTION

SECTION 07 84 00**FIRESTOPPING****PART 1 - GENERAL****1.1 SUMMARY**

- A. Section includes firestopping and through-penetration protection system materials and accessories; and firestopping tops of fire-rated walls.
- B. Related Sections
 - 1. Section 07 27 00 – Air Barriers: Air barrier materials to adjacent insulation.
 - 2. Section 09 21 16 – Gypsum Board Assemblies: Gypsum board fireproofing.
 - 4. Section 23 00 00 – Basic HVAC Requirements: HVAC work requiring firestopping.
 - 5. Section 26 00 00 – Basic Electrical Requirements: Electrical work requiring firestopping.
- C. Only tested firestop systems shall be used in specific locations as follows:
 - 1. Penetrations for the passage of duct, cable, cable tray, conduit, piping, electrical busways and raceways through fire-rated vertical barriers (walls and partitions), horizontal barriers (floor/ceiling assemblies), and vertical service shaft walls and partitions.
 - 2. Openings between structurally separate sections of wall or floors.
 - 3. Gaps between the top of walls and ceilings or roof assemblies.
 - 4. Expansion joints in walls and floors.
 - 5. Openings and penetrations in fire-rated partitions or walls containing fire doors.
 - 6. Openings around structural members which penetrate floors or walls.

1.2 REFERENCES

- A. ASTM International:
 - 1. ASTM E84 - Standard Test Method for Surface Burning Characteristics of Building Materials.
 - 2. ASTM E119 - Standard Test Methods for Fire Tests of Building Construction and Materials.
 - 3. ASTM E814 - Standard Method for Fire Tests of Through-Penetration Fire Stops.
 - 4. ASTM E1966 – Standard Test Method for Fire Resistive Joint Systems.
 - 5. ASTM E2174 – Standard Practice for On-Site Inspection of Installed Fire Stops.
- B. California Building Code: 2007 CBC, Chapter 7.
- C. International Firestop Council Guidelines for Evaluating Firestop Systems Engineering Judgments.
- D. Intertek Testing Services (Warnock Hersey Listed):
 - 1. WH - Certification Listings.
- E. National Fire Protection Association:
 - 1. NFPA 101 - Life Safety Code.
 - 2. NFPA 70 - National Electric Code.
- F. South Coast Air Quality Management District:
 - 1. SCAQMD Rule 1168 – Adhesive and Sealant Applications.
- G. Underwriters Laboratories Inc.:

2. UL 263 - Fire Tests of Building Construction and Materials.
3. UL 723 - Tests for Surface Burning Characteristics of Building Materials.
4. UL 1479 - Fire Tests of Through-Penetration Firestops.
5. UL 2079 - Tests for Fire Resistance of Building Joint Systems.
6. UL - Fire Resistance Directory.
 - a. Firestop Devices (XHJI).
 - b. Fire Resistance Ratings (BXUV).
 - c. Through-Penetration Firestop Systems (XHEZ).
 - d. Fill, Voids, or Cavity Material (XHHW).
 - e. Forming Materials (XHKU).
6. Alternate "Omega Point Laboratories Directory" (updated annually).

1.3 DEFINITIONS

- A. Firestopping (Through-Penetration Protection System): Sealing or stuffing material or assembly placed in spaces between and penetrations through building materials to arrest movement of fire, smoke, heat, and hot gases through fire rated construction.

1.4 SUBMITTALS

- A. Section 01 32 19 – Submittals: Submittal procedures.
- B. Product Data: Submit data on product characteristics, performance and limitation criteria.
- C. Schedule: Submit schedule of opening locations and sizes, penetrating items, and required listed design numbers to seal openings to maintain fire resistance rating of adjacent assembly.
- D. Manufacturer's Installation Instructions: Submit preparation and installation instructions.
- E. Manufacturer's Certificate: Certify products meet or exceed specified requirements and applicable code requirements.
- F. Engineering Judgements: For conditions not covered by UL or WH listed designs, submit judgements by licensed professional engineer suitable for presentation to authority having jurisdiction for acceptance as meeting code fire protection requirements. Engineering judgment must include both project name and contractor's name who will install firestop system as described in drawing.
- G. Submit material safety data sheets provided with product delivered to job-site.

1.5 QUALITY ASSURANCE

- A. Regulatory Requirements: Conform to CBC for fire resistance ratings and surface burning characteristics.
- B. Provide certificate of compliance from authority having jurisdiction indicating approval of materials used.
- C. Coordinating Work: Coordinate construction of openings and penetrating items to ensure that designated through penetration firestop systems are installed per specified requirements.
- D. A manufacturer's direct representative (not distributor or agent) to be on-site during initial installation of firestop systems to train appropriate contractor personnel in proper selection and installation procedures. This will be done per manufacturer's written recommendations published in their literature and drawing details.

- E. Through Penetration Firestopping of Fire Rated Assemblies: Firestop System installation must meet requirements of ASTM E-814, UL 1479 or UL 2079 tested assemblies that provide a fire rating equal to that of construction being penetrated.
- F. Fire Resistant Joints in Fire Rated Floor, Roof, and Wall Assemblies: ASTM E1966 or UL 2079 to achieve fire resistant rating as indicated on Drawings for assembly in which joint is installed.
- G. Fire Resistant Joint Between Floor Slabs and Exterior Walls: ASTM E119 with 0.10 inch water gage (24.0 Pa) minimum positive pressure differential to achieve fire resistant rating as indicated on Drawings for floor assembly.
- H. Proposed firestop materials and methods shall conform to applicable governing codes having local jurisdiction.
- I. 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 assembly.
- J. For those firestop applications that exist for which no UL tested system is available through a manufacturer, an engineering judgment derived from similar UL system designs or other tests will be submitted to local authorities having jurisdiction for their review and approval prior to installation. Engineering judgment drawings must follow requirements set forth by the International Firestop Council (September 7, 1994, as may be amended from time to time).

1.6 QUALIFICATIONS

- A. Manufacturer: Company specializing in manufacturing products specified in this section with minimum three years documented experience.
- B. Applicator: Company specializing in performing Work of this section with minimum three years documented experience, certified, licensed, or otherwise qualified by the firestopping manufacturer as having been provided the necessary training to install manufacturer's products per specified requirements.

1.7 DELIVERY, STORAGE, AND HANDLING

- A. Section 01 60 00 – Product Requirements: Requirements for transporting, handling, storing, and protecting products.
- B. Deliver materials undamaged in manufacturer's clearly labeled, unopened containers, identified with brand, type, and UL label where applicable.
- C. Coordinate delivery of materials with scheduled installation date to allow minimum storage time at job-site.
- D. Store materials under cover and protect from weather and damage in compliance with manufacturer's requirements, including temperature restrictions.
- E. Comply with recommended procedures, precautions or remedies described in material safety data sheets as applicable.
- F. Do not use damaged or expired materials.

1.8 ENVIRONMENTAL REQUIREMENTS

- A. Section 01 60 00 – Product Requirements: Environmental conditions affecting products on site.
- 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: 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.
- F. During installation, provide masking and drop cloths to prevent firestopping materials from contaminating any adjacent surfaces.

PART 2 - PRODUCTS

2.1 FIRESTOPPING

- A. Manufacturers:
 - 1. Hilti, Inc., Tulsa, Oklahoma; 800-879-8000.
 - 2. A/D Fire Protection Systems, Inc.
 - 3. Dow Corning Corp.
 - 4. 3M Fire Protection Products.
 - 5. General Electric.
 - 6. Specified Technologies.
 - 7. United States Gypsum Company.
 - 8. Substitutions: Section 01 60 00 – Product Requirements: Product Options and Substitutions.
- B. Provide firestopping composed of components that are 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.
- C. Provide components for each firestopping system that are 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.
- D. Firestopping Materials are either "cast-in-place" (integral with concrete placement) or "post installed." Provide cast-in-place firestop devices prior to concrete placement.
- E. Provide products subject to compliance with through penetration firestop systems (XHEZ) and joint systems (XHBN) listed in Volume 2 of the UL Fire Resistance Directory. provide products of the following manufacturers as identified below:
- F. Product Description: Different types of products by multiple manufacturers are acceptable as required to meet specified system description and performance requirements; provide only one type for each similar application.
 - 1. Silicone Firestopping Elastomeric Firestopping: Single or Multiple component silicone elastomeric compound and compatible silicone sealant.
 - 2. Foam Firestopping Compounds: Single or Multiple component foam compound.
 - 3. Formulated Firestopping Compound of Incombustible Fibers: Formulated compound mixed with incombustible non-asbestos fibers.

4. Fiber Stuffing and Sealant Firestopping: Composite of mineral fiber stuffing insulation with silicone elastomer for smoke stopping.
 5. Mechanical Firestopping Device with Fillers: Mechanical device with incombustible fillers and silicone elastomer, covered with sheet stainless steel jacket, joined with collars, penetration sealed with flanged stops.
 6. Intumescent Firestopping: Intumescent putty compound which expands on exposure to surface heat gain.
 7. Firestop Pillows: Formed mineral fiber pillows.
- G. Color: As selected from manufacturer's full range of colors.

2.2 MATERIALS

- A. Use only firestop products that have been UL 1479, ASTM E-814, or UL 2079 tested for specific fire-rated construction conditions conforming to construction assembly type, penetrating item type, annular space requirements, and fire-rating involved for each separate instance.
- B. Cast-in place firestop devices for use with non-combustible and combustible plastic pipe (closed and open piping systems) penetrating concrete floors, the following products are acceptable:
1. Hilti CP 680 Cast-In Place Firestop Device:
 - a. Add Aerator adaptor when used in conjunction with aerator ("sovent") system.
 2. Hilti CP 681 Tub Box Kit for use with tub installations.
- C. Sealants, caulking materials, or foams for use with non-combustible items including steel pipe, copper pipe, rigid steel conduit and electrical metallic tubing (EMT), the following products are acceptable:
1. Hilti FS-ONE Intumescent Firestop Sealant.
 2. Hilti CP 604 Self-leveling Firestop Sealant.
 3. Hilti CP 620 Fire Foam.
 4. Hilti CP 606 Flexible Firestop Sealant.
 5. Hilti CP 601s Elastomeric Firestop Sealant.
- D. Sealants or caulking materials for use with sheet metal ducts, the following products are acceptable:
1. Hilti CP 601s Elastomeric Firestop Sealant.
 2. Hilti CP 606 Flexible Firestop Sealant.
 3. Hilti FS-ONE Intumescent Firestop Sealant.
- E. Sealants, caulking or spray materials for use with fire-rated construction joints and other gaps, the following products are acceptable:
1. Hilti CP 672 Speed Spray.
 2. Hilti CP 601s Elastomeric Firestop Sealant.
 3. Hilti CP 606 Flexible Firestop Sealant.
 4. Hilti CP 604 Self-leveling Firestop Sealant.
- F. Pre-formed mineral wool designed to fit flutes of metal profile deck and gap between top of wall and metal profile deck; as a backer for spray material.
1. Hilti CP 777 Speed Plugs.
 2. Hilti CP 767 Speed Strips.
- G. Intumescent sealants, caulking materials for use with combustible items (penetrants consumed by high heat and flame) including insulated metal pipe, PVC jacketed, flexible cable or cable bundles and plastic pipe, the following products are acceptable:
1. Hilti FS-ONE Intumescent Firestop Sealant.

- H. Foams, intumescent sealants, caulking or putty materials for use with flexible cable or cable bundles, the following products are acceptable:
 - 1. Hilti FS-ONE Intumescent Firestop Sealant.
 - 2. Hilti CP 618 Firestop Putty Stick.
 - 3. Hilti CP 620 Fire Foam.
 - 4. Hilti CP 601s Elastomeric Firestop Sealant.
 - 5. Hilti CP 606 Flexible Firestop Sealant.

- I. Non curing, re-penetrable intumescent sealants, caulking or putty materials for use with flexible cable or cable bundles, the following products are acceptable:
 - 1. Hilti CP 618 Firestop Putty Stick.

- J. Wall opening protective materials for use with U.L. listed metallic and specified nonmetallic outlet boxes, the following products are acceptable:
 - 1. Hilti CP 617 Firestop Putty Pad.

- K. Firestop collar or wrap devices attached to assembly around combustible plastic pipe (closed and open piping systems), the following products are acceptable:
 - 1. Hilti CP 642 Firestop Collar.
 - 2. Hilti CP 643 Firestop Collar.
 - 3. Hilti CP 645 Wrap Strips.

- L. Materials used for complex penetrations made to accommodate cable trays, multiple steel and copper pipes, electrical busways in raceways, the following products are acceptable:
 - 1. Hilti CP 637 Trowelable Firestop Compound.
 - 2. Hilti FS 657 FIRE BLOCK.
 - 3. Hilti CP 620 Fire Foam.

- M. Non curing, re-penetrable materials used for large size/complex penetrations made to accommodate cable trays, multiple steel and copper pipes, electrical busways in raceways, the following products are acceptable:
 - 1. Hilti FS 657 FIRE BLOCK.

- N. Sealants or caulking materials used for openings between structurally separate sections of wall and floors, the following products are acceptable:
 - 1. Hilti CP 672 Speed Spray.
 - 2. Hilti CP 601s Elastomeric Firestop Sealant.
 - 3. Hilti CP 606 Flexible Firestop Sealant.
 - 4. Hilti CP 604 Self-Leveling Firestop Sealant.

- O. Provide a firestop system with a "F" Rating as determined by UL 1479 or ASTM E814 which is equal to the time rating of construction being penetrated.

- P. Provide a firestop system with an Assembly Rating as determined by UL 2079 which is equal to the time rating of construction being penetrated.

- Q. Acoustical Firestopping: As manufactured by General Electric, "GERTV6428". No known equal.

2.3 ACCESSORIES

- A. Primer: Type recommended by firestopping manufacturer for specific substrate surfaces and suitable for required fire ratings.

- B. Installation Accessories: Provide clips, collars, fasteners, temporary stops or dams, and other devices required to position and retain materials in place.

PART 3 - EXECUTION**3.1 EXAMINATION**

- A. Examine areas and conditions under which work is to be performed and identify conditions detrimental to proper or timely completion.
- B. Verify openings are properly sized and in suitable condition for application of firestopping materials.

3.2 PREPARATION

- A. Clean substrate surfaces of dirt, dust, grease, oil, rust, laitance, release agents, water repellents, loose material, or other matter affecting bond of firestopping material.
- B. Remove incompatible materials affecting bond.
- C. Install backing and damming materials to arrest liquid material leakage.
- D. Provide masking and temporary covering to prevent soiling of adjacent surfaces by firestopping materials.
- E. Comply with manufacturer's recommendations for temperature and humidity conditions before, during and after installation of firestopping.
- F. Do not proceed until unsatisfactory conditions have been corrected.

3.3 COORDINATION

- A. Coordinate location and proper selection of cast-in-place Firestop Devices with trade responsible for the work. Ensure device is installed before placement of concrete.
- B. Responsible trades to provide adequate spacing of field run pipes to allow for installation of cast-in-place firestop devices without interferences.

3.4 INSTALLATION

- A. Regulatory Requirements: Install firestop materials in accordance with UL Fire Resistance Directory or Omega Point Laboratories Directory.
- B. Manufacturer's Instructions: Comply with manufacturer's instructions for installation of through-penetration and construction joint materials.
 - 1. Seal all holes or voids made by penetrations to ensure an air and water resistant seal.
 - 2. Consult with mechanical engineer, project manager, and damper manufacturer prior to installation of UL firestop systems that might hamper the performance of fire dampers as it pertains to duct work.
 - 3. Protect materials from damage on surfaces subjected to traffic.

3.5 FIELD QUALITY CONTROL

- A. Section 01 45 23 – Testing and Inspection: Testing and Inspection Services.
- B. Inspect installed firestopping for compliance with specifications and submitted schedule.
- C. All areas of work must be accessible until inspected by the Architect and the Owner's applicable fire protection representative. Correct unacceptable firestops and provide additional inspection to verify compliance with this Specification at no additional cost.

- D. Inspection of through-penetration firestopping shall be performed in accordance with ASTM E 2174.
- E. Perform under this section patching and repairing of firestopping caused by cutting or penetrating of existing firestop systems already installed by other trades.

3.6 CLEANING

- A. Section 01 74 00 - Cleaning: Final cleaning.
- B. Clean surfaces adjacent to sealed holes and joints to be free of excess firestop materials and soiling as work progresses.

3.7 PROTECTION OF INSTALLED CONSTRUCTION

- A. Protect adjacent surfaces from damage by material installation.

END OF SECTION

SECTION 07 90 00**JOINT PROTECTION****PART 1 - GENERAL****1.1 SUMMARY**

- A. Section includes sealants and joint backing, and accessories.
- B. Related Sections:
 - 1. Section 07 27 00 – Air Barriers: Sealants required in conjunction with air barriers.
 - 2. Section 07 51 00 – Cold Process Roofing: Sealants required in conjunction with roofing.
 - 3. Section 07 84 00 – Firestopping: Firestopping sealants.
 - 4. Section 08 80 00 – Glazing: Glazing sealants and accessories.
 - 5. Section 09 26 00 - Gypsum Board Assemblies: Acoustic sealant.

1.2 REFERENCES

- A. ASTM International:
 - 1. ASTM C719 - Test Method for Adhesion and Cohesion of Elastomeric Joint Sealants Under Cyclic Movement.
 - 2. ASTM C834 - Standard Specification for Solvent Release Type Sealants.
 - 3. ASTM C834 - Standard Specification for Latex Sealing Compounds.
 - 4. ASTM C919 - Practice for Use of Sealants in Acoustical Applications.
 - 5. ASTM C920 - Standard Specification for Elastomeric Joint Sealants
 - 6. ASTM C1083 - Test Method for Water Absorption of Cellular Elastomeric Gaskets and Sealing Materials.
 - 7. ASTM C1193 - Guide for Use of Joint Sealants.
 - 8. ASTM D1056 - Standard Specification for Flexible Cellular materials - Sponge or Expanded Rubber.
 - 9. ASTM D1623 - Test Method for Tensile and Tensile Adhesive Properties of Rigid Cellular Plastics.
 - 10. E84 - Test Method for Surface Burning Characteristics of Building Materials.

1.3 SUBMITTALS

- A. Section 01 32 19 – Submittal Procedures: Submittal procedures.
- B. Product Data: Submit data indicating sealant chemical characteristics, performance criteria, substrate preparation, limitations, and color availability.
- C. Samples: Submit two samples for initial selection purposes in form of manufacturer's standard bead samples, consisting of strips of actual products showing full range of colors available, for each product exposed to view.
- D. Samples for verification purposes of each type and color of joint sealant required. Install joint sealant samples in 1/2-inch wide joints formed between two 6 inch long strips of material matching the appearance of exposed surfaces adjacent to joint sealants.
- E. Manufacturer's Installation Instructions: Submit special procedures, surface preparation, and perimeter conditions requiring special attention.

- F. **Warranty:** Include coverage for installed sealants and accessories failing to achieve airtight seal, watertight seal, exhibit loss of adhesion or cohesion, and sealants which do not cure.
 - 1. Furnish 20 year weatherseal warranty.
 - 2. Furnish 20 year non-stain warranty for use with sensitive substrates.

1.4 QUALIFICATIONS

- A. **Manufacturer:** Company specializing in manufacturing products specified in this section with minimum three years documented experience.
- B. **Applicator:** Company specializing in performing Work of this section with minimum three years documented experience.
- C. **Single Source Responsibility for Joint Sealant Materials:** Obtain joint sealant materials from a single manufacturer for each different product required.

1.5 DELIVERY, STORAGE, AND HANDLING

- A. Section 01 60 00 - Product Requirements.
- B. **Acceptance at Site:** Deliver materials to Project site in original unopened containers or bundles with labels indicating manufacturer, product name and designation, color, expiration period for use, pot life, curing time, and mixing instructions for multi-component materials.
- C. **Storage and Protection:** Store and handle materials in compliance with manufacturer's recommendations to prevent their deterioration or damage due to moisture, high or low temperatures, contaminants, or other causes.

1.6 ENVIRONMENTAL REQUIREMENTS

- A. Section 01 60 00 – Product Requirements.
- B. **Maintain temperature and humidity** recommended by sealant manufacturer during and after installation.
- C. **Joint Width Conditions:** Do not proceed with installation of joint sealants where joint widths are less than allowed by joint sealant manufacturer for application indicated.
- D. **Joint Substrate Conditions:** Do not proceed with installation of joint sealants until contaminants capable of interfering with their adhesion are removed from joint substrates.

1.7 COORDINATION

- A. Section 01 60 00 – Product Requirements: Coordination and project conditions.
- B. **Coordinate Work** with sections referencing this section.
- C. **Sequence installation** of joint sealants to occur not less than 21 nor more than 30 days after completion of waterproofing, unless otherwise indicated.

1.8 WARRANTIES

- A. Section 01 77 00 – Contract Closeout: Requirements for warranties.
- B. **Correct defective work** within a five year period after Date of Substantial Completion.

- C. Warranty: Include coverage for installed sealants and accessories which fail to achieve airtight seal; watertight seal; exhibit loss of adhesion or cohesion, or do not cure.

PART 2 - PRODUCTS

2.1 JOINT SEALERS

- A. Manufacturers:
1. Tremco Incorporated (800) 852-8173.
 2. Dow Corning Corp. (800) 248-2481.
 3. Henry's Company.
 4. Hevi-duty/Nelson (800-331-7325).
 5. Lowry. (800-772-2521).
 6. Macklanburg Duncan (800-348-3571).
 7. Mameco International Inc.
 8. Pecora Corp. (800-233-9754).
 9. Sika Corp.
 10. Specified Technologies, Inc. (800-922-1180).
 11. United States Gypsum Co.
 12. W.R. Meadows.
 13. Substitutions: Section 01630 – Product Options and Substitutions.
- B. Compatibility:
1. Provide joint sealants, joint fillers and accessory joint materials that are compatible with one another and with joint substrates under project conditions.
 2. Install joint sealants, joint fillers and related joint materials that are nonstaining to visible joint surfaces and surrounding substrate surfaces.
- C. Provide colors selected by Architect from manufacturer's standard color range.

2.2 ELASTOMERIC SEALANTS

- A. Sealant Type A:
1. For exterior joints in vertical surfaces and non-traffic horizontal surfaces such as, but not limited to:
 - a. Control and expansion joints in cast-in-place concrete.
 - b. Joints between architectural precast concrete units.
 - c. Control and expansion joints in unit masonry.
 - d. Butt joints between metal panel.
 - e. Joints between marble or granite.
 - f. Joints between different materials listed above.
 - g. Perimeter joints between materials listed above and frames of doors, windows, storefronts, louvers and similar openings.
 - h. Control and expansion joints in ceiling and overhead surfaces.
 2. Provide single-component or multi-component, low-modulus, non-sag sealant; comply with ASTM C920, Type S or M, Grade NS, Class 50.
 3. Acceptable sealants:
 - a. Urethanes:
 - 1) Single Component:
 - a) Dymonic FC.
 - b) Vulkem 116.
 2. Multi Component:
 - a) Dymeric 240 FC.
 - b) Vulkem 227.
 - b. Silicones:
 - 1) Single Component:
 - a) Dow Corning 790.

- b) Dow Corning 795.
- c) Dow Corning 756SMS.
- d) Dow Corning 791.
- e) Dow Corning CWS and CCS.
- f) Spectrem 1.
- g) Spectrem 2.
- h) Spectrem 3.

B. Sealant Type B:

1. For interior joints in vertical surfaces and non-traffic horizontal surfaces such as, but not limited to:
 - a. Control and expansion joints on exposed interior surfaces of exterior walls.
 - b. Perimeter joints on exposed interior surfaces of exterior openings.
 - c. Joints on precast beams and planks.
 - d. Perimeter joints between interior wall surfaces and frames of interior doors, windows, storefronts, louvers, elevator entrances and similar openings.
 - e. Trim or finish joints subject to movement.
2. Acceptable sealants:
 - a. Single Component Urethane:
 - 1) Dymonic FC.
 - 2) Vulkem 116.
 - b. Multi Component Urethane:
 - 1) Dymeric 240 FC.
 - 2) Vulkem 227.
 - c. Single Component Silicone:
 - 1) Dow Corning 790.
 - 2) Dow Corning 795.
 - 3) Dow Corning CWS, and CCS.
 - 4) Spectrem 1.
 - 5) Spectrem 2.
 - d. Acrylic Latex:
 - 1) Tremflex 834.

C. Sealant Type C:

1. For exterior and interior joints in horizontal and sloped traffic surfaces such as, but not limited to:
 - a. Control, expansion and isolation joints in cast-in-place concrete.
 - b. Control, expansion and isolation joints in structural precast concrete units.
 - c. Joints between architectural precast concrete paving units.
 - d. Tile control and expansion joints.
 - e. Joints between different materials listed above.
2. Provide single-component or multi-component polyurethane sealant having a Shore A hardness of not less than 25 or more than 50 and plus-or-minus 25 percent joint movement capability; comply with ASTM C920, Type S or M, Grade P or NS, Class 25.
3. Acceptable sealants:
 - a. THC-900/901.
 - b. Vulkem 45 SSL.

D. Sealant Type D:

1. For interior joints in vertical and horizontal surfaces requiring pick-resistant security sealant such as, but not limited to:
 - a. Control and expansion joints on exposed interior surfaces of exterior walls.
 - b. Perimeter joints on exposed interior surfaces of exterior openings.

- c. Perimeter joints between concrete surfaces and frames of interior doors, windows and elevator entrances.
 - d. Trim or finish joints subject to minimal movement.
 2. Provide a single-component or multi-component, non-sag polyurethane sealant having a Shore A hardness of 55.
 3. Acceptable sealants:
 - a. Vulkem 617.
- E. Sealant Type E:
 1. For interior joints in vertical and horizontal surfaces where incidental food contact may occur.
 2. Provide single component or multi-component sealant complying United States Department of Agriculture (USDA) guidelines for incidental food contact with the cured sealant; comply with ASTM C920, Type S or M, Grade P or NS, Class 25; select color from listing of those approved.
 3. Acceptable Sealants:
 - a. Polyurethanes:
 - 1) Vulkem 116.
 - 2) Dymonic FC.
 - b. Silicones:
 - 1) Proglaze.
 - 2) Spectrem 1.
 - 3) Spectrem 2.
 - 4) Spectrem 3.
- F. Sealant Type F: Not used.
- G. Sealant Type G: Not used.
- H. Sealant Type H:
 1. For interior or exterior joints in vertical surfaces between laps in fabrications of sheet metal.
 2. Acceptable products:
 - a) Tremco Butyl Sealant.
 - b) Tremco Acoustical Sealant.
- I. Sealant Type I:
 1. For exterior vertical joints under metal thresholds and saddles or as a bedding sealant for sheet metal flashing and frames of metal or wood.
 2. Acceptable products:
 - a. Polyurethanes:
 - 1) Vulkem 116.
 - 2) Dymonic FC.
 - b. Silicones:
 - 1) Dow Corning 790.
 - 2) Dow Corning 795.
 - 3) Spectrem 2.
 - 4) Proglaze.
 - 5) Spectrem 3.
 - c. Other:
 - 1) Tremco Butyl Sealant.
 - 2) Tremco Acoustical.

2.3 ACOUSTICAL SEALANT

- A. General: For use at Sound-Rated Constructions.
- B. Acoustical sealant: Non-skinning, non-hardening, flexible sealant specifically designed for sealing gypsum wallboard. Sealant shall be capable of spanning 1/2-inch wide by 3/8-inch deep gaps. Synthetic rubber based products comply with ASTM Standard D-217 and acrylic latex based products comply with ASTM Standard C-834.
 - 1. Acceptable Products: Tremco (800-321-7906), USG acoustical sealant, Pecora AC-20 FTR (800-233-9754), or approved equivalent.
- C. Sheet caulking for junction boxes: "Lowry's Electrical Box Sealer" (800-772-2521), or Tremco sheet caulking (800-321-7906). Sheet caulking for junction boxes at fire-rated assemblies: "Firestop Putty Pads" by Hevi-duty/Nelson (800-331-7325), or Specified Technologies, Inc. (800-992-1180).
- D. Backing Rod: Closed-cell, neoprene rod or polyethylene foam.
- E. Expanding Foam Sealant: Class 1 fire retardant polycell expanding foam by Macklanburg Duncan (800-348-3571).
- F. Cementitious sealant: Spray-applied (40 pcf) Monokote Z-146.

2.4 ACCESSORIES

- A. Joint cleaner: Non-corrosive and non-staining type, recommended by sealant manufacturer for substrates indicated, compatible with joint forming materials.
- B. Joint primer: Non-staining type, recommended by sealant manufacturer for substrates, conditions and exposures indicated.
- C. Bond breaker: Polyethylene tape or other adhesive faced tape as recommended by sealant manufacturer to prevent sealant contact where it would be detrimental to sealant performance.
- D. Joint backer: Polyethylene foam rod or other compatible non-waxing, non-extruding, non-staining resilient material in dimension 25 percent to 50 percent wider than joint width as recommended by sealant manufacturer for conditions and exposures indicated.
- E. Masking tape: Non-staining, non-absorbent tape product compatible with joint sealants and adjacent joint surfaces that is suitable for masking.

2.5 OTHER MATERIALS

- A. Provide other materials, not specifically described but required for a complete and proper installation, as selected by the Contractor and approved by the sealant manufacturer as compatible, subject to review of the Architect.

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Verify substrate surfaces and joint openings ready to receive work.
- B. Verify joint backing and release tapes are compatible with sealant.

- C. Do not proceed with installation of joint sealants until unsatisfactory conditions have been corrected.

3.2 PREPARATION

- A. Perform preparation in accordance with ASTM C1193.
- B. Protect elements surrounding Work of this section from damage or disfiguration.
- C. Prepare surfaces to receive sealants in accord with sealant manufacturer's instructions and recommendations except where more stringent requirements are indicated.
- D. Thoroughly clean joint surfaces using cleaners approved by sealant manufacturer whether primers are required or not.
 - 1. Remove all traces of previous sealant and joint backer by mechanical methods, such as by cutting, grinding and wire brushing, in manner not damaging to surrounding surfaces.
 - 2. Remove paints from joint surfaces except for permanent, protective coatings tested and approved for sealant adhesion and compatibility by sealant manufacturer.
 - 3. Remove wax, oil, grease, dirt film residues, temporary protective coatings and other residues by wiping with cleaner recommended for that purpose. Use clean, white, lint-free cloths and change cloths frequently.
 - 4. Remove dust by blowing clean with oil-free, compressed air.
- E. Provide joint backer material uniformly to depth required by sealant manufacturer for proper joint design using a blunt instrument.
 - 1. Fit securely by compressing backer material 25 percent to 50 percent so no displacement occurs during tooling.
 - 2. Avoid stretching or twisting joint backer.
- F. Provide bond-breaker where indicated or recommended by sealant manufacturer, adhering strictly to the manufacturers installation requirements.
- G. Prime joint substrates where required.
 - 1. Use and apply primer according to sealant manufacturers recommendations.
 - 2. Confine primers to sealant bond surfaces; do not allow spillage or migration onto adjoining surfaces.
- H. Taping:
 - 1. Use masking tape where required to prevent sealant or primer contact with adjoining surfaces that would be permanently stained or otherwise damaged by such contact or the cleaning methods required for removal.
 - 2. Apply tape so as not to shift readily and remove tape immediately after tooling without disturbing joint seal.

3.3 INSTALLATION OF JOINT SEALANTS

- A. General: Comply with joint sealant manufacturer's printed installation instructions applicable to products and applications indicated, except where more stringent requirements apply.
- B. Sealant Installation Standard: Comply with recommendations of ASTM C1193 for use of joint sealants as applicable to materials, applications and conditions indicated.
- C. Acoustical Sealant Application Standard: Comply with recommendations of ASTM C919 for use of joint sealants in acoustical applications as applicable to materials, applications and conditions indicated.

- D. Installation of Sealant Backings: Install sealant backings to comply with the following requirements:
1. Install joint fillers of type indicated to provide support of sealants during application and at position required to produce the cross-sectional shapes and depths of installed sealants relative to joint widths that allow optimum sealant movement capability.
 - a) Do not leave gaps between ends of joint fillers.
 - b) Do not stretch, twist, puncture or tear joint fillers.
 - c) Remove absorbent joint fillers that have become wet prior to sealant application and replace with dry material.
 2. Install bond breaker tape between sealants where backer rods are not used between sealants and joint fillers or back of joints.
- E. Installation of Sealants: Install sealants by proven techniques that result in sealants directly contacting and fully wetting joint substrates, completely filling recesses provided for each joint configuration and providing uniform, cross-sectional shapes and depths relative to joint widths that allow optimum sealant movement capability. Install sealants at the same time sealant backings are installed.
1. Use acoustical sealant to form an airtight seal at all penetrations and perimeter of sound-rated partitions, floors and ceilings. Comply with Section 09260 – Gypsum Board Assemblies and ASTM C919. Use backer-rod where gaps to be sealed exceed 3/8-inch.
 2. Use sheet caulking to seal the back and sides of all junction boxes (4 gang and smaller) recessed in sound-rated partitions.
 3. Apply acoustical sealant as a continuous bead along gypsum board face layer at all head and sill conditions of sound-rated partitions and around the perimeter of resilient ceilings.
 4. Apply expanding foam sealant where detailed and where multiple pipes or conduits penetrate sound-rated construction.
- F. Tooling of Nonsag Sealants: Immediately after sealant application and prior to time skinning or curing begins, tool sealants to form smooth, uniform beads of configuration indicated, to eliminate air pockets and to ensure contact and adhesion of sealant with sides of joint. Remove excess sealants from surfaces adjacent to joint. Do not use tooling agents that discolor sealants or adjacent surfaces or are not approved by sealant manufacturer.
1. Provide concave joint configuration per Figure 5A in ASTM C1193, unless otherwise indicated.
- G. Installation of Preformed Foam Sealants: Install each length of sealant immediately after removing protective wrapping, taking care not to pull or stretch material, and to comply with sealant manufacturer's directions for installation methods, materials, and tools that produce seal continuity at ends, turns and intersections of joints. For applications at low ambient temperatures where expansion of sealant requires acceleration to produce seal, apply heat to sealant in conformance with sealant manufacturer's recommendations.

3.4 CLEANING

- A. Section 01 77 00 – Contract Closeout: Final cleaning.
- B. Clean off excess sealants or sealant smears adjacent to joints as work progresses by methods and with cleaning materials approved by manufacturers of joint sealants and of products in which joints occur.

3.5 PROTECTION OF INSTALLED CONSTRUCTION

- A. Protect sealants until cured.

END OF SECTION

SECTION 08 12 14**STANDARD STEEL FRAMES****PART 1 - GENERAL****1.1 SUMMARY**

- A. Section includes fire-rated and non-rated steel frames.
 - 1. Provide frames for interior glazed lits.
- B. Related Sections:
 - 1. Section 08 21 00 - Flush Wood Doors.
 - 2. Section 08 14 33 - Stile and Rail Wood Doors.
 - 3. Section 08 71 00 - Door Hardware: Hardware, silencers, and weatherstripping.

1.2 REFERENCES

- A. American National Standards Institute:
 - 1. ANSI A250.8 - Recommended Specifications for Standard Steel Doors and Frames.
 - 2. ANSI A250.10 - Test Procedure and Acceptance Criteria for Prime Painted Steel Doors and Frames.
 - 3. ANSI A250.11 - Recommended Erection Instructions for Steel Frames.
- B. ASTM International:
 - 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 A924/A924M - Standard Specification for General Requirements for Steel Sheet, Metallic-Coated by the Hot-Dip Process.
- C. Door and Hardware Institute (DHI):
 - 1. RL - Recommended Locations for Builder's Hardware on Standard Steel Doors and Frames.
 - 2. ANSI/DHI A115 Series - Specifications for Steel Doors and Frame Preparation for Hardware.
- D. National Fire Protection Association:
 - 1. NFPA 80 - Standard for Fire Doors, Fire Windows.
 - 2. NFPA 252 - Standard Methods of Fire Tests of Door Assemblies.
- E. Steel Door Institute (SDI):
 - 1. SDI 100 - Recommended Specifications Standard for Steel Doors and Frames.
 - 2. SDI 105 - Recommended Installation Instructions for Steel Frames
 - 3. SDI 112 - Galvanized Standard for Steel Doors and Frames.
 - 4. SDI 117 - Manufacturing Tolerances Standard for Steel Doors and Frames.
 - 5. SDI 118 - Basic Fire Door Requirements.
- F. Underwriters Laboratories Inc.:
 - 1. UL 10B - Fire Tests of Door Assemblies.
 - 2. UL 10C - Positive Pressure Tests of Door Assemblies.
- G. Uniform Building Code
 - 1. UBC Standard 7-2 - Fire Tests of Door Assemblies.

1.3 SUBMITTALS

- A. Section 01 32 19 – Submittal Procedures: Submittal procedures.
- B. Shop Drawings: Indicate frame elevations, reinforcement, anchor types and spacing, location of cut-outs for hardware, and finish.
- C. Product Data: Submit frame configuration and finishes.
- D. Samples: If specifically requested for specified products; required for alternate products.
- E. Manufacturer's Installation Instructions: Submit manufacturer's published instructions, including any special installation instructions relating to this project.
- F. Manufacturer's Certificate: Certify products meet or exceed specified requirements.

1.4 QUALITY ASSURANCE

- A. Conform to requirements of ANSI A250.8.
- B. Fire Rated Frame Construction at neutral pressure fire tested door frames: Conform to ASTM E152 and UL-10B.
- C. Fire Rated Frame Construction at positive pressure fire tested doors: Conform to UBC 7-2 and UL-10C.
- D. Fire Rated Frame Construction: Conform to UBC Standard 7-2.
- E. Installed Fire Rated Frame Assembly: Conform to NFPA 80 for fire rated class same as fire door.
- F. Attach label from agency approved by authority having jurisdiction to identify each fire rated door frame.
 - 1. Attach smoke label to smoke and draft control door frames.

1.5 QUALIFICATIONS

- A. Manufacturer: Company specializing in manufacturing products specified in this section with minimum three years documented experience.

1.6 DELIVERY, STORAGE, AND HANDLING

- A. Section 01 60 00 – Product Requirements: Product storage and handling requirements.
- B. Accept frames on site in manufacturer's packaging. Inspect for damage.
- C. Break seal on-site to permit ventilation.

1.7 FIELD MEASUREMENTS

- A. When verification of field measurements are necessary, verify field measurements prior to fabrication.

1.8 COORDINATION

- A. Coordinate Work with frame opening construction, door, and hardware installation.

PART 2 - PRODUCTS**2.1 STANDARD STEEL FRAMES**

- A. Manufacturers:
1. Steelcraft; www.steelcraft.com; Model: MU16 Series Multi-Use Flush Frames.
 2. Assa Abloy; Ceco Door Products; Curries; www.assaabloydss.com.
 3. Substitutions: Section 01 60 00 – Product Requirements: Product Options and Substitutions.
- B. Product Description: Standard shop fabricated steel frames, fire-rated and non-rated types.
1. Exterior Frames:
 - a. Level 3 for Door Model 1, nominal 16 gauge/0.053 inch thick material, base metal thickness; 14 gauge/0.067 inch thick material, base metal thickness, for frames over 3'-0" wide.
 2. Interior Frames:
 - a. Level 2 for Door Model 1, nominal 16 gauge/0.053 inch thick material, base metal thickness.
 - b. Level 2 for Door Model 3, nominal 16 gauge/0.053 inch thick material, base metal thickness.

2.2 ACCESSORIES

- A. Removable Stops: Rolled steel channel shape, butted corners; prepared for countersink style tamper proof screws.
- B. Bituminous Coating: Non-asbestos fibered asphalt emulsion.
- C. Primer: ANSI A250.10 rust inhibitive type.
- D. Silencers: Specified in Section 08 71 00. Resilient rubber fitted into drilled hole.
- E. Plaster Guards: 26 gauge steel plaster guards or mortar boxes.
- F. Grout for Frames: Portland cement grout of maximum 4-inch slump for hand troweling; thinner pumpable grout is prohibited.
- G. Temporary Frame Spreaders: Provide for all factory- or shop-assembled frames.

2.3 FABRICATION

- A. Fabricate frames as welded unit, for gypsum board slip on type.
- B. Construction of MU-Series Flush Frames:
1. Manufacture flush frames from 16 or 14 gauge cold-rolled or galvanized steel.
 2. Fabricate frames with 2 inch faces and double return backbends.
 3. Corner Connections: SUA (Set-up and welded), in accordance with ANSI A250.8 (SDI-100). Backweld frames.
 4. Reinforce mitered corners with corner clips to provide a firm interlocking of jamb to head. Mitered joints shall be drawn up and secured by screws.
 5. Supply frames with factory installed rubber silencers, 3 per strike jamb and 2 per head for pair of doors.
 6. Frames for 1-3/4 inch doors shall have 7 gage universal steel hinge reinforcements and prepared for 4-1/2" x 4-1/2" standard or heavy weight template hinges.
 7. Strike reinforcements: 16 gage and prepared for an ANSI-A115 1-2 strike.

8. Strike jambs: 14 gage reinforcement and prepared for cylindrical ANSI-AI 15.3 strikes.
 9. Provide metal plaster guards for mortised cutouts.
 10. Reinforcements for surface closer: 14 gage steel.
 11. Galvannealed frames shall have galvannealed hardware reinforcements.
 12. Provide adequate reinforcements for other hardware when required.
 13. Furnish frames with a minimum of six wall anchors and two base anchors of manufacturer's standard design.
- C. Construction of Architectural Stick Systems:
1. Fabricate Architectural stick frame assemblies of standard frame components, manufactured from 16 gage galvannealed steel.
 2. Where sticks are used at door openings and frame assemblies, prepare for hardware as specified.
 3. Fabricate frame assemblies from three basic components:
 - a. Open sections: (Perimeter members).
 - b. Closed sections: (Intermediate members.)
 - c. Sill sections.
 4. Open sections: Identical in configuration to Steelcraft standard frames.
 5. Closed sections: Identical jamb depths, face dimensions and stops as the open sections.
 6. Closed sections: Full length internal reinforcement of 16 gage steel, spot welded to both soffits at 8 inches on center.
 7. Sill Sections: Either flush with both faces of adjacent vertical members or recessed from one face of the adjacent vertical members.
 8. Cut individual components to length and notch to assure square joints and corners.
 9. Weld joints and corners of frame assembly and grind smooth at face of sections.
 10. Ship frame assemblies to job site completely welded. Field joints permitted only when size of total assembly exceeds shipping limitations.
 11. When frame assemblies are subjected to windloads, fabricate vertical members free of field splices.
 12. Provide steel channel glazing beads with assemblies for all areas in which glazing will be installed.
 13. Provide all necessary anchors for jambs, heads, and sills of assemblies.
- D. Mullions for Double Doors: Removable type, specified in Section 08710 – Door Hardware.
- E. Transom Bars for Glazed Lights: Fixed type, of same profiles as jamb and head.
- F. Fabricate frames with hardware reinforcement plates welded in place. Provide mortar guard boxes.
- G. Reinforce frames wider than 48 inches with roll formed steel channels fitted tightly into frame head, flush with top.
- H. Prepare frames for silencers. Provide three single silencers for single doors and mullions of double doors on strike side. Provide two single silencers on frame head at double doors without mullions.
- I. Attach fire rated label to each fire rated frame.
- J. Weld plaster guards to back of finish hardware cutouts where mortar or other materials might obstruct hardware operation.

2.4 SHOP FINISHING

- A. Steel Sheet:
 - 1. Exterior Locations: Hot-dipped galvanized steel, A60 zinc-iron alloy coating conforming to ASTM A924.
 - 2. Interior Locations: CRS (Cold rolled steel) conforming to ASTM A653; or galvanized steel per Paragraph 2.4.A.1.
- B. Surface Preparation (Factory Pretreatment): Thoroughly wash, de-grease, clean and treat with phosphatized process.
- C. Primer: One coat of baked-on, rust-inhibiting primer in accordance with ANSI A250.10.
- D. Coat inside of frame profile with bituminous coating to minimum thickness of 1/16 inch for protection of steel frame from corrosion when in contact with masonry.

PART 3 - EXECUTION**3.1 EXAMINATION**

- A. Verify existing conditions before starting work.
- B. Verify opening sizes and tolerances are acceptable.

3.2 PREPARATION

- A. Coat inside of frames to be installed in masonry or to be grouted, with bituminous coating, prior to installation.
- B. Coat inside of frames with bituminous coating to a thickness of 1/16 inch.

3.3 INSTALLATION

- A. Install frames in accordance with ANSI A250.8, SDI 105, and ANSI/DHI A115-IG.
 - 1. Install fire rated frames in accordance with NFPA Pamphlet 80.
- B. Anchors:
 - 1. Jambs:
 - a. General: Position one (1) anchor above top butt reinforcement and one (1) anchor below bottom butt reinforcement; minimum of four (4) anchors per door jamb, 24 inches on center maximum.
 - b. Frames set in Metal Stud Partitions: Lock-in 18 gauge steel jamb anchors, designed to be attached to webbing of the closed steel studs which are built around the frame. Adjustable base anchors are attached directly to the floor and adjusted.
 - 2. Head: Provide minimum of two (2) anchors at frames over 2'-6" wide; 24 inches on center, maximum.
- C. Coordinate frame anchor placement with wall construction type (cement plaster, masonry, gypsum board, concrete, etc.)
- D. Metal Frames:
 - 1. General: Set frames plumb, straight and square; align and securely brace until permanent anchors are set; use shims where required. Remove temporary braces after wall construction is completed.

2. Door Frames: Where shown, provide overhead frame bracing; securely anchor to structure. Install roll-formed steel reinforcement channels between two abutting frames. Anchor to structure and floor.
 3. Grouted Frames: In sound rated partitions, grout entire door frames solid with plaster or appropriate grouting material.
 4. Glazed Frames: Attach frames to structure to withstand 24 lbs. per square foot wind load normal to glass surface. Coordinate installation of glazing per Section 08 80 00 – Glazing.
 5. Sealant: Seal perimeter of frames and adjoining material per Section 07 90 00 – Joint Protection.
- E. Coordinate installation of frames with glazing specified in Section 08 80 00.
- F. Coordinate installation of frames with hardware specified in Section 08 71 00.
- G. Coordinate installation of frames with wood doors specified in Section 08 14 16 and Section 08 14 33.
- H. Install roll formed steel reinforcement channels between two abutting frames. Anchor to structure and floor.
- I. Touch up damaged factory finishes.

3.4 ERECTION TOLERANCES

- A. Clearance Between Door and Frame: As specified in ANSI A250.8.
- B. Maximum Diagonal Distortion: 1/8 inch measured with straight edges, crossed corner to corner.

END OF SECTION

SECTION 08 13 14**STANDARD STEEL DOORS****PART 1 - GENERAL****1.1 SUMMARY**

- A. Section includes non-rated, and fire-rated steel doors.
- B. Related Sections:
 - 1. Section 08 12 14 - Standard Steel Frames.
 - 2. Section 08 71 00 - Door Hardware.
 - 3. Section 08 80 00 - Glazing: Glass for doors.
 - 4. Section 09 90 00 - Painting Coating: Field painting of doors.

1.2 REFERENCES

- A. American National Standards Institute:
 - 1. ANSI/DHI A115 – Installation Guide for Doors and Hardware.
 - 2. ANSI A117.1 – Specifications for Making Buildings and Facilities Accessible to and Usable by Physically Handicapped People.
 - 3. ANSI A2242.1 – Test Procedure and Acceptance Criteria for Prime Painted Steel Surfaces for Steel Doors and Frames.
 - 4. ANSI A250.8 - Recommended Specifications for Standard Steel Doors and Frames.
 - 5. ANSI A250.10 – Test Procedure and Acceptance Criteria for Prime Painted Steel Doors and Frames.
- B. ASTM International:
 - 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 A924/A924M – Standard Specification for General Requirements for Steel Sheet, Metallic-Coated by the Hot-Dip Process.
- C. Door Hardware Institute (DHI): Installation of Commercial Steel Doors and Steel Frames, Insulated Steel Doors in Wood Frames and Builder's Hardware.
- D. Hollow Metal Manufacturers Association:
 - 1. HMMA 810 - Hollow Metal Doors.
- E. National Fire Protection Association:
 - 1. NFPA 80 - Standard for Fire Doors, Fire Windows.
 - 2. NFPA 252 - Standard Methods of Fire Tests of Door Assemblies.
- F. Steel Door Institute:
 - 1. SDI 100 - Recommended Specifications Standard for Steel Doors and Frames.
 - 2. SDI 105 – Recommended Installation Instructions for Steel Frames.
 - 3. SDI 108 - Recommended Selection and Usage Guide for Standard Steel Doors.
- G. Underwriters Laboratories Inc.:
 - 1. UL 10B - Fire Tests of Door Assemblies (Neutral test pressure).
 - 2. UL 10C – Standard for Safety for Positive Pressure Fire Tests of Door Assemblies.
- H. Uniform Building Code

1. UBC Standard 7-2 - Fire Tests of Door Assemblies.

1.3 SUBMITTALS

- A. Section 01 32 19 – Submittal Procedures: Submittal procedures.
- B. Shop Drawings: Indicate door elevations, internal reinforcement, closure method, and cut-outs for glazing, and finishes.
- C. Product Data: Submit door configurations, location of cut-outs for hardware reinforcement.
- D. Samples: Submit two samples of door face metal, 6 inch by 6 inch in size illustrating shop finish colors and surface texture.
- E. Manufacturer's Installation Instructions: Submit special installation instructions.
- F. Manufacturer's Certificate: Certify Products meet or exceed specified requirements.

1.4 QUALITY ASSURANCE

- A. Perform Work in accordance with ANSI A250.8.
- B. Fire Rated Door Construction: Conform to one of the following:
 - 1. NFPA 252; with neutral pressure level at 40 inches maximum above sill at 5 minutes into test.
 - 2. UL 10C.
 - 3. 20-Minute Fire Rated Corridor and Smoke Barrier Doors: Fire tested without hose stream test.
- C. Labeled Doors and Frames: Conform to requirements of State Fire Marshal Standard 12-43-4 and Underwriters Laboratory. Provide label information required by CCR Title 24, Section 12-43-407, Part 12.
- D. Installed Fire Rated Door Assembly: Conform to NFPA 80 for fire rated class as indicated on Drawings.
- E. Attach label from agency approved by authority having jurisdiction to identify each fire rated door.
 - 1. Attach smoke label to smoke and draft control doors.

1.5 QUALIFICATIONS

- A. Manufacturer: Company specializing in manufacturing Products specified in this section with minimum three years documented experience.
- B. Installer: Company specializing in performing work of this section with minimum three years documented experience.

1.6 DELIVERY, STORAGE, AND HANDLING

- A. Section 01 60 00 – Product Requirements: Requirements for transporting, handling, storing, and protecting products.
- B. Accept doors on site in manufacturer's packaging. Inspect for damage.
- C. Break seal on site to permit ventilation.

1.7 COORDINATION

- A. Coordinate Work with door opening construction, door frame, and door hardware installation.
- B. Coordinate installation to accommodate door hardware electric wire connections.

PART 2 - PRODUCTS**2.1 STANDARD STEEL DOORS**

- A. Manufacturers:
 - 1. Steelcraft; L-W16 Series Honeycomb Doors.
 - 2. Ceco Door Products.
 - 3. Curries; 707 Series Composite Core Doors.
 - 4. Substitutions: Section 01 60 00 – Product Requirements: Product Options and Substitutions.
- B. Product Description:
 - 1. Exterior Doors: SDI 108, 1-3/4 inch thick.
 - a. Level 3 - Extra heavy Duty, Model 1, full flush design.
 - 2. Interior Doors (Fire Rated): SDI 108, 1-3/4 inch thick.
 - a. Level 3 - Extra heavy Duty, Model 1, full flush design.
 - 3. Interior Doors (Non-Rated): SDI 108, 1-3/4 inch thick.
 - a. Level 3 - Extra heavy Duty, Model 1, full flush design.

2.2 COMPONENTS

- A. Face: Steel sheet in accordance with SDI 108.
- B. End Closure: 14 gauge welded channels top and bottom, inverted.
 - 1. Steel top cap, screwed in at factory, for exterior doors with inverted channels.
- C. Core: Kraft honeycomb, or insulating polystyrene.

2.4 ACCESSORIES

- A. Vision Lite Frames:
 - 1. Steelcraft Dezigner® Trim. Factory supplied recessed into door face, to provide a neat flush door surface. Trim is designed to accommodate 1/4-inch thick glass.
- B. Astragals for Double Doors: Steel, Z-shaped, specifically for double doors.
- C. Primer: ANSI A250.10 rust inhibitive type.

2.5 FABRICATION

- A. Exterior Doors: 16 gauge hot dipped galvanized steel, with closed tops.
- B. Interior Doors: 16 gauge commercial quality carbon steel or galvanized steel.
- C. Construction of Flush Doors - Laminated core doors:
 - 1. L-Series Doors: Full-flush or full-flush seamless construction, fabricated from commercial quality carbon steel or hot-dipped galvanized steel (see Paragraph 2.2.A), 16 gage for 1-3/4 inch doors.

2. Doors shall be reinforced, stiffened, sound deadened and insulated with impregnated Kraft honeycomb core completely filling the inside of the doors and laminated to inside faces of both panels using contact adhesive applied to both panels and honeycomb core.
 3. Edges: Doors shall have continuous vertical mechanical interlocking joints at lock and hinge edges with edge seams welded and ground smooth (LW door edge). Doors shall have beveled 1/8 inch in 2 inches hinge and lock edges.
 4. Hinge reinforcements: 7 gage for 1-3/4 inch doors. Lock reinforcements: 16 gage and closer reinforcements 14 gage - box minimum 6 inches high and 20 inches long. Hinge and lock reinforcements: Projection welded to the edge of the door. Galvannealed doors shall have galvannealed hardware reinforcements. Provide adequate reinforcements for other hardware as required.
 4. Glass trim for doors with cutouts: 20 gage cold rolled steel conforming to ASTM A366 cold rolled steel with a zinc coating of 0.06 ounces per square foot.
 - a. Install trim into the door as a four sided welded assembly. The trim shall cap the cutout but shall not extend more than 1/16 inch from the door face. The corners of the assembly shall be mitered, reinforced and welded. The trim shall be the same on both sides of the door. Exposed fasteners permitted interior side of door only. Label and non-label doors shall use the same trim.
 5. Close tops of exterior out swing doors to eliminate moisture penetration. Door tops shall no have holes or openings. Top caps are permitted.
 6. Install a self-adjusting, concealed door sweep in the bottom channel of exterior doors. The bottom seal shall not include springs.
- D. Fabricate doors with hardware reinforcement welded in place.
- E. Attach astragal to inactive leaf of pairs of fire-rated doors.
- F. LW Edge Seam: Weld and finish mechanical edge seam prior to applying factory primer.
- G. Attach fire rating label to each fire rated door. Indicate temperature rise rating for stair doors.

2.6 SHOP FINISHING

- A. Steel Sheet: Galvanized to ASTM A653/A653M, A60.
- B. Surface Preparation (Factory Pretreatment): Thoroughly wash, de-grease, clean and treat with phosphatized process.
- C. Primer: One coat of factory baked-on, rust-inhibiting primer in accordance with ANSI A250.10.

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Verify existing conditions before starting work.
- B. Verify opening sizes and tolerances are acceptable.

3.2 INSTALLATION

- A. General: Match doors into their respective frames; install plumb, straight and square.

- B. Install doors in accordance with SDI 105, ANSI A250.8, ANSI/DHI A115-IG and manufacturer's installation instructions.
- C. Install labeled doors and frames per NFPA 80.
- D. Coordinate installation of glazing with Section 08800 – Glazing. Mount frame with exposed fasteners facing interior of room.
- E. Coordinate installation of doors with installation of frames specified in Section 08115 and hardware specified in Section 08710.
- F. Touch-up damaged shop finishes.

3.3 ERECTION TOLERANCES

- A. Maximum Diagonal Distortion: 1/8 inch measured with straight edge, corner to corner.

3.5 ADJUSTING

- A. Adjust door for smooth and balanced door movement.

END OF SECTION

SECTION 08 14 16**FLUSH WOOD DOORS****PART 1 - GENERAL****1.1 SUMMARY**

- A. Section includes flush wood doors, flush configuration, fire rated and non-rated.
- B. Related Sections:
 - 1. Section 08 12 14 - Standard Steel Frames.
 - 2. Section 08 71 00 - Door Hardware.
 - 3. Section 08 80 00 – Glazing.

1.2 REFERENCES

- A. American National Standards Institute:
 - 1. ANSI A135.4 - Basic Hardboard.
 - 2. ANSI A115. W Series – Wood Door Hardware Standards.
 - 3. ANSI A208.1 – Particleboard.
 - 4. ANSI / WDMA I.S. 1-A-04 Industry Standard for Flush Wood Doors.
- B. ASTM International:
 - 1. ASTM E-90 – Standard Test Method for Laboratory Measurement of Airborne Sound Transmission Loss of Building Partitions and Elements.
 - 2. ASTM E152 – Methods of Fire Tests for Wood Doors.
 - 3. ASTM E336 – Standard Test Method for Measurement of Airborne Sound Insulation at Buildings.
 - 4. ASTM E413 - Standard Classification for Rating Sound Insulation.
- C. Architectural Woodwork Institute:
 - 1. AWI - Quality Standards Illustrated, Section 1300.
- D. Hardwood Plywood and Veneer Association:
 - 1. HPVA HP-1 - American National Standard for Hardwood and Decorative Plywood.
- E. Intertek Testing Services (Warnock Hersey Listed):
 - 1. WH - Certification Listings.
- F. National Electrical Manufacturers Association:
 - 1. NEMA LD 3 - High Pressure Decorative Laminates.
- G. National Fire Protection Association:
 - 1. NFPA 80 - Standard for Fire Doors, Fire Windows.
 - 2. NFPA 252 - Standard Methods of Fire Tests of Door Assemblies.
- H. Underwriters Laboratories Inc.:
 - 1. UL - Building Materials Directory.
 - 2. UL 10B - Fire Tests of Door Assemblies. – Neutral Pressure.
 - 3. UL 10C – Fire Tests of Door Assemblies – Positive Pressure.
 - 4. UL - Building Materials Directory.
- I. Uniform Building Code:
 - 1. UBC Standard 7-2 - Fire Tests of Door Assemblies.

- J. Window and Door Manufacturers Association:
 - 1. WDMA Finish System TR-6, Transparent or OP-6, Ppaque – Catalized Polyurethane.
 - 2. WDMA I.S. 1-A – Architectural Wood Flush Doors.
- K. Woodwork Institute:
 - 1. WI – Manual of Millwork, Section 12 – Architectural Flush Wood Doors.

1.3 SUBMITTALS

- A. Section 01 32 19 – Submittal Procedures: Submittal procedures.
- B. Shop Drawings: Illustrate door opening criteria, elevations, sizes, types, swings, undercuts required, special blocking for hardware, factory machining criteria, identify cutouts for glazing.
 - 1. Indicate dimensions and locations of mortises and holes for hardware.
 - 2. Indicate dimensions and locations of cutouts.
 - 3. Indicate doors to be factory finished and finish requirements where scheduled.
 - 4. Indicate fire ratings for doors.
- C. Indicate compliance with Positive Pressure.
- D. Product Data: Submit information on door core materials and construction, and on veneer species type and characteristics, including WDMA I.S.10A and AWI classifications. See WDMA “A Specifier’s Guide to Door Face Veneers” for cut and matching requirements, factory machining and factory finishing criteria.
- E. Samples:
 - 1. Submit two samples of door construction, 8 inch by 8 inch in size cut from bottom corner of door.
 - 2. Submit two samples of door veneer 8 inch by 8 inch in size, illustrating wood grain, stain color, and sheen.
- F. Manufacturer’s Installation Instructions: Submit special installation instructions.
- G. Manufacturer’s Certification: Submit manufacturer’s certification that doors comply with specified requirements and are suitable for intended application.
- H. Manufacturer’s full lifetime warranty.

1.4 QUALITY ASSURANCE

- A. Source limitations: Obtain flush wood doors through one source from a single manufacturer.
- B. Flush wood doors shall conform to the latest edition of the WDMA I.S. 1-A requirements for “Premium Grade” and/or AWI Version 7 Custom Grade and WI Custom Grade.
- C. Finish doors in accordance with AWI Quality Standard Section 1500, Custom Grade.
- D. Perform Work in accordance with AWI Quality Standard Section 1300, Custom Grade.
- E. Tolerances for Warp, Telegraphing, Squareness, and Prefitting Dimensions: WDMA I.S. 1-A.
- F. Identifying Label:

1. Door manufacturer.
 2. Order number.
 3. Door number.
 4. Fire rating, if applicable.
- G. Fire Rated Door Construction: Labeled by Intertek Testing Services/Warnock Hersey (ITS-WH):
1. Construction Details and Hardware Application: Approved by labeling agency.
- H. Fire Rated Door Construction: Conform to one of the following for positive pressure fire tested doors:
1. NFPA 252, with neutral pressure level at 40 inches (maximum above sill at 5 minutes into test).
 2. UL 10C.
 3. 20-Minute Fire Rated Corridor Doors: Fire tested without hose stream test.
- I. Positive Pressure Opening Assemblies: UBC 7-2-1997/UL 10C.
- J. Fire-rated Door Construction: Doors complying with NFPA 80 that are listed and labeled by a testing and inspecting agency acceptable to authorities having jurisdiction, for fire ratings indicated, based on testing according to UBC 7-2-1997 (Positive Pressure).
- K. Installed Fire Rated Door Assembly: Conform to NFPA 80 for fire rated class as scheduled.
- L. Attach label from agency approved by authority having jurisdiction to identify each fire rated door.
1. Attach smoke label to smoke and draft control doors.
- M. Environmental Responsibility: Provide doors manufactured with the following environmentally responsible core materials:
1. Particleboard Core: Scientific Certification Systems (SCS) certified.

1.5 QUALIFICATIONS

- A. Manufacturer: Company specializing in manufacturing products specified in this section with minimum three years documented experience.

1.6 DELIVERY, STORAGE, AND HANDLING

- A. Section 01 60 00 – Product Requirements: Product storage and handling requirements.
- B. Deliver, store, protect and handle products under provisions of WDMA, AWI, WI and manufacturer's care and handling instructions.
1. Deliver doors to site in manufacturer's original, unopened containers and packaging, with labels clearly identifying product name and manufacturer.
 2. Package doors individually in polybags.
- C. Storage:
1. Store doors in accordance with manufacturer's instructions.
 2. Store doors in clean, dry area indoors, protected from damage and direct sunlight.
 3. Store doors flat on level surface.
 4. Do not store doors directly on concrete.
 5. Keep doors completely covered. Use covering which allows air circulation and does not permit light to penetrate.
 6. Store doors between 50 and 90 degrees F and 25 to 55 percent relative humidity.

- D. Handling:
1. Handle doors in accordance with manufacturer's instructions.
 2. Protect doors and finish during handling and installation to prevent damage.
 3. Handle doors with clean hands or clean gloves.
 4. Lift and carry doors. Do not drag doors across other doors or surfaces.
- E. Certain wood species are light sensitive. Protect doors from exposure to natural and artificial light after delivery.

1.7 ENVIRONMENTAL REQUIREMENTS

- A. Do not subject doors to extreme conditions or changes in heat, dryness, or humidity in accordance with the latest edition of WDMA I.S. 1-A.

1.8 COORDINATION

- A. Coordinate Work with door opening construction, door frame and door hardware installation with a pre-installation conference.

1.9 WARRANTY

- A. Section 01 77 00 – Contract Closeout: Requirements for warranties.
- B. Warrant solid core, interior doors for life of installation against warpage, delamination, and defects in materials and workmanship.
- C. Defects noted during warranty period shall be corrected at no cost to Owner. Corrective work shall include labor and material for repair, replacement, refinishing, and rehangng as required.

PART 2 - PRODUCTS

2.1 FLUSH WOOD DOORS

- A. Manufacturers:
1. VT Industries, Inc., www.vtindustries.com
 2. Marshfield Door Systems™; www.marshfielddoors.com.
 3. Algoma Hardwoods Inc.; www.algomahardwoods.com
 4. Eggers Industries; www.eggersindustries.com
 5. Substitutions: Section 01 60 00 – Product Requirements: Product Options and Substitutions.
- B. Product Description: Solid core flush wood doors, wood veneer facing material, fire rated and non-rated types; flush and flush glazed design, factory pre-fit, shop finished wood doors.
1. Flush Interior Doors: 1-3/4 inches thick; solid core 5-ply hot press construction; fire-rated, and non-fire rated, where indicated on Drawings.

2.2 5-PLY FLUSH BONDED PARTICLE-CORE DOORS

- A. 5-Ply Flush Bonded Particle-Core Doors:
1. Model: 5502-2, particleboard core, non-rated and 20-minute rated.
 2. Compliance: WDMA I.S.1-A.
 - a. Quality Grade: Premium grade, extra heavy duty.
 - b. Type: PC-5ME.

3. 7-Ply and Non-Bonded Core Construction: Not acceptable.
4. Door Thickness: 1-3/4 inches.
5. Stiles:
 - b. Inner Stiles: 1-3/8 inches wide, before prefitting.
 - c. Structural Composite Lumber (SCL) With Outer Stile: Same species as face veneer.
 - d. Outer Stile: Apply after beveling and before face application.
6. Rails:
 - a. Structural composite lumber (SCL).
 - b. Minimum Width Before Prefitting: 1-3/8 inches.
7. Core:
 - a. Material: Particleboard.
 - b. Particleboard Compliance: ANSI A208.1, Grade 1-LD-2.
8. Door Assembly:
 - a. Glue stiles and rails to core.
 - b. Sand entire assembly flat as a unit to ensure minimal telegraphing of core components through face veneers.
9. Composite Crossbands:
 - a. Apply to core before application of matching hardware stiles.
 - b. Exposed Crossbanding: Not allowed along stile edges.
10. Veneers:
 - a. Apply to crossbanded core in hot press using Type I, exterior, water-resistant adhesive.
 - b. 5-ply construction.
11. Face Veneers:
 - a. Veneer Species: "Select White" Birch, or "Select White" Maple; as approved by Owner.
 - b. Veneer Cut: Plain sliced.
 - c. Veneer Match: Slip match running.
 - d. Veneer Grade: Custom.
 - e. Minimum Thickness Before Sanding: 1/42 inch.

2.3 FLUSH FIRE-RATED WOOD DOORS

- A. Flush Fire-Rated Wood Doors:
 1. Model: 5511-2, 90-minute rated.
 2. Compliance: WDMA I.S.1-A.
 - a. Quality Grade: Premium.
 - b. Type: FD-5.
 3. Door Thickness: 1-3/4 inches.
 4. Outer Stiles: Same species as face veneer.
 5. Inner Stiles:
 - a. Noncombustible material, 90-minute rated.
 - b. Warranted for use with standard-weight mortise butt hinges and No. 12, 1-1/4-inch steel threaded-to-head screws.
 6. Rails:
 - a. Noncombustible material, 90-minute rated.
 - b. Width: Manufacturer's standard width.
 7. Core:
 - a. Non-combustible mineral board.
 - b. Weight: 30.8 pcf to 34.7 pcf.
 - c. Does not contain asbestos or added urea formaldehyde.
 8. Composite Crossbands:
 - a. High Density Fiber (HDF); apply to core before application of matching hardware stiles.
 - b. Exposed Crossbanding: Not allowed along stile edges.
 9. Face Veneers:

- a. Veneer Species: "Select White" Birch or "Select White" Maple, as approved by Owner.
 - b. Veneer Cut: Plain sliced.
 - c. Veneer Match: Slip match running.
 - d. Veneer Grade: Custom.
 - e. Minimum Thickness Before Sanding: 1/42 inch.
10. Positive Pressure:
- a. Where UBC 7-2-1997/UL 10C standards for positive pressure apply, doors shall be constructed in accordance with Category A guidelines as published by Intertek/Warnock Hersey.
 - b. Smoke Gasketing: Apply smoke gasketing around frame perimeter to meet S-rating.
 - c. Intertek/Warnock Hersey Category B Guidelines: Edge sealing systems not allowed on frames.

2.4 FABRICATION

- A. Fabricate doors in accordance with WDMA I.S.1-A and AWI Section 1300 Quality Standards requirements.
- B. Factory fit doors to suit frame-opening sizes indicated, with the following uniform clearances and bevels, unless otherwise indicated:
 1. WDMA prefit clearances for factory fit doors.
 2. NFPA 80 for fire rated doors.
 3. Manufacturer's hardware templates.
- C. Factory machine doors for hardware that is not surface applied. Comply with final hardware schedules, door frame Shop Drawings, and hardware templates.
 1. Coordinate measurements of hardware mortises in metal frames to verify dimensions and alignment before factory machining.
- D. Fabricate fire rated doors in accordance with WDMA I.S.1 and to Warnock Hersey requirements. Attach fire rating label to door edge.
- E. Furnish lock blocks at lock edge and top of door for closer for hardware reinforcement, if required by manufacturer for warranty coverage. Supply innerblocking for all surface applied hardware for 45, 60 and 90 minute mineral-core fire rated doors. Through bolts not accepted.
- F. Factory machine doors for finish hardware in accordance with hardware requirements and dimensions. Do not machine for surface hardware. Factory-machine doors for mortised hardware, including pilot holes for hinge screws and lock fronts.
- G. Factory seal top and bottom rails of doors before shipping, if required by manufacturer for warranty coverage.
- H. Provide edge clearances in accordance with AWI 1300.
- I. Factory fit doors for frame opening dimensions identified on shop drawings.
- J. Prefit tolerances shall be in accordance with the requirements of WDMA I.S. 1-A and AWI Section 1300, latest editions.
- K. Apply appropriate labels.

2.5 FACTORY FINISH

- A. Doors shall receive factory finishing.
- B. Factory Finishing: WDMA System TR-6, catalyzed polyurethane, premium grade. WDMA finish Types 2 and 3 are not acceptable.
 - 1. Stain coat.
 - 2. Sealer: 3 coats.
 - 3. Sanding: 320-grit sandpaper.
 - 4. Topcoat: 2 coats.
- C. Stain Color: Medium tone Honey Birch, or Honey toned Maple, as approved by Owner.
- D. Top and Bottom Rails: Factory sealed with wood sealer.

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Examine locations to receive doors. Notify Architect of conditions that would adversely affect installation or subsequent use. Do not begin installation until unacceptable conditions are corrected.
- B. Ensure frames are solidly anchored, allowing no deflection when doors are installed.
- C. Ensure frames are plumb, level, square, and within tolerance.

3.2 PREPARATION

- A. Allow doors to become acclimated to building temperature and humidity before installation.

3.3 INSTALLATION

- A. General: Install doors to comply with manufacturer's written instructions, referenced quality standards, and as indicated.
- B. Install fire rated and non-rated doors in accordance with AWI Quality Standard, NFPA 80, and to requirements for fire rating label by UL or Intertek Testing Services (Warnock Hersey Listed).
- C. Factory-Finished Doors: Do not field cut or trim; if fit or clearance is not correct, replace door.
- D. Do not trim Positive Pressure Rated Doors for width.
- E. Machine cut doors for hardware installation.
- F. Coordinate installation of doors with installation of frames specified in Section 08 12 14 and hardware specified in Section 08 71 00.
- G. Pilot drill screw and bolt holes using templates provided by hardware manufacturer.
- H. Exercise caution when drilling pilot holes and installing hinges so that pilot holes are not over-drilled and screws are not over-torqued. Follow manufacturer's installation instructions for positive pressure doors.

3.4 INSTALLATION TOLERANCES

- A. Conform to specified quality standard for fit and clearance tolerances.
- B. Conform to specified quality standard for maximum diagonal distortion.
- C. Conform to WDMA standards and testing methods for warp, cup, bow and telegraphing.

3.5 ADJUSTING

- A. Adjust doors to swing freely, without binding in frame.
- B. Adjust hardware to operate properly.
- C. Repair minor damages to finish in accordance with manufacturer's instructions and as approved by Architect.
- D. Remove and replace damaged doors that cannot be successfully repaired, as determined by Architect.

3.6 CLEANING

- A. Section 01 74 00 – Cleaning: Requirements for cleaning.
- B. Clean doors promptly after installation in accordance with manufacturer's instructions.
- C. Do not use harsh cleaning materials or methods that could damage finish.

3.7 PROTECTION

- A. Protect installed doors from damage during construction.
- B. Place polybags over doors after adjusting and cleaning.

END OF SECTION

SECTION 08 14 33

STILE AND RAIL WOOD DOORS

PART 1 - GENERAL

1.1 SUMMARY

- A. Section includes wood doors, stile and rail design; glazed "French" configuration; non-rated.
- B. Related Sections:
 - 1. Section 08 12 14 - Standard Steel Frames.
 - 2. Section 08 71 00 - Door Hardware.
 - 3. Section 08 80 00 - Glazing.

1.2 REFERENCES

- A. American National Standards Institute:
 - 1. ANSI A115, W Series, Wood door Hardware Standards.
- B. Architectural Woodwork Institute:
 - 1. AWI - Quality Standards Illustrated.
- C. ASTM International:
 - 1. ASTM E152 – Standard Methods of Fire Tests of Door Assemblies.
 - 2. ASTM E2074 – Standard Test Method for Fire Tests of Door Assemblies, Including Positive Pressure Testing of Side-Hinged and Pivoted Swinging Door Assemblies.
- D. Hardwood Plywood and Veneer Association:
 - 1. HPVA HP-1 - American National Standard for Hardwood and Decorative Plywood.
- E. National Fire Protection Association:
 - 1. NFPA 80 - Standard for Fire Doors, Fire Windows.
 - 2. NFPA 252 - Standard Methods of Fire Tests of Door Assemblies.
- F. Underwriters Laboratories Inc.:
 - 1. UL 10B - Fire Tests of Door Assemblies.
 - 2. UL 10C - Positive Pressure Test of Door Assemblies.
 - 3. UL - Building Materials Directory.
- G. Uniform Building Code
 - 1. UBC Standard 7-2 - Fire Tests of Door Assemblies.
 - 2. UBC 43-2 – Fire Tests of Door Assemblies.
- H. Intertek Testing Services (Warnock Hersey Listed):
 - 1. WHI – Directory of Certification Listings for Fire Doors..
- H. Window and Door Manufacturer's Association (formerly National Wood Window and Door Association):
 - 1. ANSI/WDMA (formerly NWWDA) I.S. 6-A-2001 Quality Standards.
- I. Woodwork Institute:
 - 1. WI – Manual of Millwork.

1.3 SUBMITTALS

- A. Section 01 32 19 - Submittal Procedures: Submittal procedures.
- B. Shop Drawings: Illustrate door opening criteria, elevations, sizes, types, swings, undercuts, special beveling, special blocking for hardware, glass and glazing.
- C. Product Data: Indicate door core materials, thickness, construction, panel and sticking profile, veneer species, cut and matching requirements, factory machining and factory finishing criteria.
- D. Construction Samples: Submit one or more of manufacturer's standard samples demonstrating door construction.
- E. Finish Samples: A set of 3 illustrating the range of color and grain of the specified door face materials.
- F. Manufacturer's Limited Lifetime Warranty

1.4 QUALITY ASSURANCE

- A. Meet or exceed WDMA I.S. 6-A-2001 Custom Grade and/or AWI Version 1.0 1997 Custom Grade.
- B. Obtain true stile and rail wood doors from a single manufacturer.

1.5 QUALIFICATIONS

- A. Manufacturer: Company specializing in manufacturing products specified in this section with minimum three years documented experience.

1.6 DELIVERY, STORAGE AND HANDLING

- A. Section 01 60 00 – Product Requirements: Product storage and handling requirements.
- B. Deliver, store, protect and handle products under provisions of WDMA, AWI and manufacturer's instructions.
- C. Accept doors on site in manufacturer's standard packaging. Inspect for damage upon receipt.
- D. Do not store in damp or wet areas or in areas where light might cause oxidization.
- E. HVAC systems should be operating and balanced prior to arrival of doors. Acceptable humidity shall be no less than 25 percent nor greater than 55 percent.
- F. Break seal on packages while at site to permit ventilation.

1.7 COORDINATION

- A. Coordinate work with door opening construction, door frame and door hardware installation with a pre-installation conference.

1.8 WARRANTY

- A. Section 01 70 00 – Contract Closeout: Requirements for warranties.

- B. Furnish manufacturer's warranty to the following term:
1. Interior Stile and Rail Doors: Limited Lifetime.

PART 2 - PRODUCTS

2.1 STILE AND RAIL WOOD DOORS

- A. Manufacturers:
1. Marshfield DoorSystems, Inc. Model: Marshfield Signature Series™ Stile and Rail Doors;
 2. Eggers Industries. Model: 200 Series Stile and Rail Doors.
 3. Mohawk Flush Doors, Inc., Model: Stile and Rail Doors.
 4. VT Industries, Inc., Model: Stile and Rail Doors.
 5. The Maiman Co. Model: True Stile and Rail Premium Series Doors.
 6. Substitutions: Section 01 60 00 – Product Requirements: Product Options and Substitutions.
- B. Product Description and Basis of Design: Stile and rail wood doors, non-rated type; glazed "French" design; factory pre-fit; site finished. Marshfield Signature Series (WSR-1).
1. Interior Doors: 1-3/4 thick; Medium-Density Overlay (MDO) faces, and lumber stile and rail construction; doweled and glued joints.

2.2 WORKMANSHIP

- A. Comply with WDMA/AWI workmanship for veneer faces, vertical edges, stiles, rails, panels, horizontal edges and dimensional tolerances.
- B. Face veneers to be wide belt machine sanded to not less than 180 grit paper. Cross grain sanding scratches must not exceed 180 grit.

2.3 MATERIALS

- A. DOOR CONSTRUCTION GRADE:
1. Fabricate work of this section to WDMA "Custom Grade/" AWI "Custom Grade".
- B. STILE AND RAIL DOOR FACE, SLICE OR CUT, FINISH AND MATCHING
1. Transparent finish wood veneer: AWI - A Grade: specie and cut shall be as noted.
 2. Matching: Direction of veneer for all rails shall be horizontal and shall be vertical for mullions and stiles. Veneer match and sequence within and between all panels shall be mill option. Panel species to match stiles and rails. All door components shall be selected for compatibility of grain and color.
 3. Panels: species to be the same as stiles and rails.
- C. GLAZING:
1. Non-rated Doors: Marshfield Door Systems Expressions del Sol; 1/4 inch clear tempered glass.

2.4 FABRICATION

- A. DOOR CORE CONSTRUCTION:
1. Stiles, rails mullions and cross rails shall be veneered construction using Medium Density Fiberboard core. Joints to be tongue and groove plus doweled and glued under pressure.

- B. VERTICAL EDGES:
 - 1. Non-rated: Solid hardwood lumber edges to match face veneer.
- C. STICKING
 - 1. Sticking: Solid lumber, to match face specie and coped at corners. Sticking shape as selected by Architect from Marshfield DoorSystems Inc. standard profile selection.
- D. COMPONENT FACE DIMENSIONS:
 - 1. Sizes of stiles, rails, mullions and muntins shall conform to Marshfield DoorSystems Inc. standard face dimensions, prior to beveling or fitting or shall meet custom dimensions as specified.
 - 2. Top Rail Width: 6 inches.
 - 3. Stile Width: 6 inches.
 - 4. Bottom Rail Width: 10 inches.
- E. ADHESIVES
 - 1. Face veneer and component assembly adhesive: Type 1 - Waterproof.
 - 2. Core assembly adhesive: Type II – Water-resistant.

2.5 FACTORY GLAZING

- A. Glazing in wood doors to be installed by wood door manufacturer.
 - 1. Glass as selected by Architect from Marshfield Door Systems Expressions del Sol.
- B. Glazing Stops: W-8 Reveal Lite Molding.

2.6 SHOP FINISHING

- A. Factory finish doors in accordance with WDMA Finish System Description or AWI Division 1500-S-4 - Finish System Standards. Factory finish to be water based stain and infrared cured waterborne lacquer to comply with DPA Title 5 guidelines for Volatile Organic Compound (VOC) emission limitations. Finish must meet or exceed performance standards of TR-3 waterborne lacquer. Color shall be Marshfield DoorSystems Inc. Enviroclad UV™ Designer or custom color as selected by architect.
- B. Factory finish doors in accordance with approved sample set.
- C. Factory finished doors to be installed just prior to substantial completion.
- D. Reveals: Paint black.

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Verify substrate opening conditions.
- B. Verify that opening sizes and tolerances are acceptable and ready to receive doors.
- C. Do not install doors in frame openings which are not plumb or are out of tolerance for size or alignment.

3.2 INSTALLATION

- A. Install non-rated doors in accordance with NFPA 80, manufacturer's instructions, and fire-rated labeling requirements.
- B. Trim non-rated door width by cutting equally on both outer stile edges.
- C. Trim door height by cutting bottom edge to a maximum 3/4 inch.
- D. Pilot drill screw and bolt holes using templates provided by hardware manufacturer. (Use threaded throughbolts for half surface hinges).
- E. Coordinate installation of doors with installation of frames and hardware.
- F. Align and install light molding, astragal or other accessories plumb and level.
- G. Coordinate installation of glass and glazing specified in Section 08800.
- H. Reseal and or refinish any doors that required site alteration.

3.3 WARRANTY TOLERANCES

- A. Conform to WDMA standards and testing methods for determining unacceptable warp, cup, bow and telegraphing.

3.4 ADJUSTING

- A. Section 01700 - Execution Requirements: Testing, adjusting and balancing.
- B. Adjust doors for smooth, quiet and balanced movement.
- C. Adjust closer for full closure.

END OF SECTION

SECTION 08 17 43**FRP FLUSH DOORS****PART 1- GENERAL****1.1 SUMMARY**

- A. Section includes fiberglass reinforced polyester (FRP) flush doors with aluminum frames.
- B. Related Sections:
 - 1 Section 08 71 00 – Door Hardware.

1.2 REFERENCES

- A. American Architectural Manufacturers Association:
 - 1. AAMA 1503-98 - Thermal Transmittance and Condensation Resistance of Windows, Doors and Glazed Wall Sections.
- B. American National Standards Institute:
 - 1. ANSI A250.4 - Test Procedure and Acceptance Criteria for Physical Endurance for Steel Doors and Hardware Reinforcings.
- C. ASTM International:
 - 1. ASTM B 117 - Operating Salt Spray (Fog) Apparatus.
 - 2. ASTM B 209 - Aluminum and Aluminum-Alloy Sheet and Plate.
 - 3. ASTM B 221 - Aluminum-Alloy Extruded Bars, Rods, Wire, Profiles, and Tubes.
 - 4. ASTM D 256 - Determining the Pendulum Impact Resistance of Notched Specimens of Plastics.
 - 5. ASTM D 543 - Evaluating the Resistance of Plastics to Chemical Reagents.
 - 6. ASTM D 570 - Water Absorption of Plastics.
 - 7. ASTM D 638 - Tensile Properties of Plastics.
 - 8. ASTM D 790 - Flexural Properties of Unreinforced and Reinforced Plastics and Electrical Insulating Materials.
 - 9. ASTM D 1308 - Effect of Household Chemicals on Clear and Pigmented Organic Finishes.
 - 10. ASTM D 1621 - Compressive Properties of Rigid Cellular Plastics.
 - 11. ASTM D 1623 - Tensile and Tensile Adhesion Properties of Rigid Cellular Plastics.
 - 12. ASTM D 2126 - Response of Rigid Cellular Plastics to Thermal and Humid Aging.
 - 13. ASTM D 2583 - Indentation Hardness of Rigid Plastics by Means of a Barcol Impressor.
 - 14. ASTM D 3029 – Impact Resistance of Flat Rigid Plastic Specimens by Means of a Falling Weight.
 - 15. ASTM D 6670-01 - Standard Practice for Full-Scale Chamber Determination of Volatile Organic Emissions from Indoor Materials/Products.
 - 16. ASTM E 84 - Surface Burning Characteristics of Building Materials.
 - 17. ASTM E 90 - Laboratory Measurement of Airborne Sound Transmission Loss of Building Partitions.
 - 18. ASTM E 283 - Determining the Rate of Air Leakage Through Exterior Windows, Curtain Walls, and Doors Under Specified Pressure Differences Across the Specimen.
 - 19. ASTM E 330 - Structural Performance of Exterior Windows, Curtain Walls, and Doors by Uniform Static Air Pressure Difference.
 - 20. ASTM E 331 - Water Penetration of Exterior Windows, Skylights, Doors, and Curtain Walls by Uniform Static Air Pressure Difference.

21. ASTM F 476 - Security of Swinging Door Assemblies.
- C. SFBC:
1. SFBC PA 201 - Impact Test Procedures.
 2. SFBC PA 203 - Criteria for Testing Products Subject to Cyclic Wind Pressure Loading.
 3. SFBC 3603.2 (b)(5) - Forced Entry Resistance Test.

1.3 PERFORMANCE REQUIREMENTS

- A. General: Provide door assemblies that have been designed and fabricated to comply with specified performance requirements, as demonstrated by testing manufacturer's corresponding standard systems.
- B. Air Infiltration: For a single door 3'-0" x 7'-0", test specimen shall be tested in accordance with ASTM E 283 at pressure differential of 6.24 psf. Door shall not exceed 0.90 cfm per linear foot of perimeter crack.
- C. Water Resistance: For a single door 3'-0" x 7'-0", test specimen shall be tested in accordance with ASTM E 331 at pressure differential of 7.50 psf. Door shall not have water leakage.
- D. Indoor air quality testing per ASTM D 6670-01: GREENGUARD Environmental Institute Certified including GREENGUARD for Children and Schools Certification.
- E. Hurricane Test Standards, Single Door with Single-Point Latching:
1. Uniform Static Load, ASTM E 330: Plus or minus 75 pounds per square foot.
 2. Forced Entry Test, 300 Pound Load Applied, SFBC 3603.2 (b)(5): Passed.
 3. Cyclic Load Test, SFBC PA 203: Plus or minus 53 pounds per square foot.
 4. Large Missile Impact Test, SFBC PA 201: Passed.
- F. Swinging Door Cycle Test, Doors and Frames, ANSI A250.4: Minimum of 25,000,000 cycles.
- G. Swinging Security Door Assembly, Doors and Frames, ASTM F 476: Grade 40.
- H. Salt Spray, Exterior Doors and Frames, ASTM B 117: Minimum of 500 hours.
- I. Sound Transmission, Exterior Doors, STC, ASTM E 90: Minimum of 25.
- J. Thermal Transmission, Exterior Doors, U-Value, AAMA 1503-98: Maximum of 0.29 BTU/hr x sf x degrees F. Minimum of 55 CRF value.
- K. Surface Burning Characteristics, FRP Doors and Panels, ASTM E 84:
1. Flame Spread: Maximum of 200, Class C.
 2. Smoke Developed: Maximum of 450, Class C.
- L. Surface Burning Characteristics, Class A Option On Interior Faces of FRP Exterior Panels and Both Faces of FRP Interior Panels, ASTM E 84:
1. Flame Spread: Maximum of 25.
 2. Smoke Developed: Maximum of 450.
- M. Impact Strength, FRP Doors and Panels, Nominal Value, ASTM D 256: 15.0 foot-pounds per inch of notch.
- N. Tensile Strength, FRP Doors and Panels, Nominal Value, ASTM D 638: 14,000 psi.

- O. Flexural Strength, FRP Doors and Panels, Nominal Value, ASTM D 790: 21,000 psi.
- P. Water Absorption, FRP Doors and Panels, Nominal Value, ASTM D 570: 0.20 percent after 24 hours.
- Q. Indentation Hardness, FRP Doors and Panels, Nominal Value, ASTM D 2583: 55.
- R. Gardner Impact Strength, FRP Doors and Panels, Nominal Value, ASTM D 3029: 120 in-lb.
- S. Abrasion Resistance, Face Sheet, Taber Abrasion Test, 25 Cycles at 1,000 Gram Weight with CS-17 Wheel: Maximum of 0.029 average weight loss percentage.
- T. Stain Resistance, ASTM D 1308: Face sheet unaffected after exposure to red cabbage, tea, and tomato acid. Stain removed easily with mild abrasive or FRP cleaner when exposed to crayon and crankcase oil.
- U. Chemical Resistance, ASTM D 543. Excellent rating.
 - 1. Acetic acid, Concentrated.
 - 2. Ammonium Hydroxide, Concentrated.
 - 3. Citric Acid, 10%.
 - 4. Formaldehyde.
 - 5. Hydrochloric Acid, 10%
 - 6. Sodium hypochlorite, 4 to 6 percent solution.
- V. Compressive Strength, Foam Core, Nominal Value, ASTM D 1621: 79.9 psi.
- W. Compressive Modulus, Foam Core, Nominal Value, ASTM D 1621: 370 psi.
- X. Tensile Adhesion, Foam Core, Nominal Value, ASTM D 1623: 45.3 psi.
- Y. Thermal and Humid Aging, Foam Core, Nominal Value, 158 Degrees F and 100 Percent Humidity for 14 Days, ASTM D 2126: Minus 5.14 percent volume change.

1.4 SUBMITTALS

- A. Comply with Section 01 32 19 - Submittal Procedures.
- B. Product Data: Submit manufacturer's product data, including description of materials, components, fabrication, finishes, and installation.
- C. Shop Drawings: Submit manufacturer's shop drawings, including elevations, sections, and details, indicating dimensions, tolerances, materials, fabrication, doors, panels, framing, hardware schedule, and finish.
- D. Samples:
 - 1. Door: Submit manufacturer's sample of door showing face sheets, core, framing, and finish.
 - 2. Color: Submit manufacturer's samples of standard colors of doors and frames.
- E. Test Reports: Submit certified test reports from qualified independent testing agency indicating doors comply with specified performance requirements.
- F. Manufacturer's Project References: Submit list of successfully completed projects including project name and location, name of architect, and type and quantity of doors manufactured.
- G. Maintenance Manual: Submit manufacturer's maintenance and cleaning instructions for

doors, including maintenance and operating instructions for hardware.

H. Warranty: Submit manufacturer's standard warranty.

1.5 QUALITY ASSURANCE

A. Manufacturer's Qualifications:

1. Continuously engaged in manufacturing of doors of similar type to that specified, with a minimum of 25 years successful experience.
2. Door and frame components from same manufacturer.
3. Evidence of a compliant documented quality management system.

1.6 DELIVERY, STORAGE, AND HANDLING

- A. Section 01 60 00 – Product Requirements: Requirements for transporting, handling, storing, and protecting products.
- B. Delivery: Deliver materials to site in manufacturer's original, unopened containers and packaging, with labels clearly identifying opening door mark and manufacturer.
- C. Storage: Store materials in clean, dry area indoors in accordance with manufacturer's instructions.
- D. Handling: Protect materials and finish from damage during handling and installation.

1.7 WARRANTY

- A. Section 01 77 00 – Contract Closeout: Requirements for warranties.
- B. Warrant doors, frames, and factory hardware against failure in materials and workmanship, including excessive deflection, faulty operation, defects in hardware installation, and deterioration of finish or construction in excess of normal weathering.
- C. Warranty Period: Ten years from date of Substantial Completion.

PART 2- PRODUCTS

2.1 MANUFACTURER

- A. Special-Lite, Inc., PO Box 6, Decatur, Michigan 49045. Toll Free (800) 821-6531. Phone (269) 423-7068. Fax (800) 423-7610. Web Site www.special-lite.com. E-Mail info@special-lite.com.
- B. Substitutions: Section 01 60 00 – Product Requirements: Product Options and Substitutions.

2.2 FRP FLUSH DOORS

- A. Model: SL-17 Flush Doors with SpecLite3 fiberglass reinforced polyester (FRP) face sheets.
- B. Door Opening Size(s): As indicated on the Drawings.
- C. Construction:
1. Door Thickness: 1-3/4 inches.
 2. Stiles and Rails: Aluminum Alloy 6063-T5, minimum of 2-5/16-inch depth.
 3. Corners: Mitered.

4. Provide joinery of 3/8-inch diameter full-width tie rods through extruded splines top and bottom as standard tubular shaped stiles and rails reinforced to accept hardware as specified.
 5. Securing Internal Door Extrusions: 3/16-inch angle blocks and locking hex nuts for joinery. Welds, glue, or other methods are not acceptable.
 6. Furnish extruded stiles and rails with integral reglets to accept face sheets. Lock face sheets into place to permit flush appearance.
 7. Rail caps or other face sheet capture methods are not acceptable.
 8. Extrude top and bottom rail legs for interlocking continuous weather bar.
 9. Meeting Stiles: Pile brush weatherseals. Extrude meeting stile to include integral pocket to accept pile brush weatherseals.
 10. Bottom of Door: Install bottom weather bar with nylon brush weatherstripping into extruded interlocking edge of bottom rail.
 11. Glue: Use of glue to bond sheet to core or extrusions is not acceptable.
- D. Face Sheet:
1. Material: SpecLite3 FRP, 0.120-inch thickness, finish color throughout. Abuse-resistant engineered surface.
 2. Texture: Pebble.
 3. Color: As selected by Architect.
- E. Core:
1. Material: Poured-in-place polyurethane foam.
 2. Density: Minimum of 5 pounds per cubic foot.
 3. R-Value: Minimum of 9.
- F. Cutouts:
1. Manufacture doors with cutouts for required vision lites, louvers, and panels.
 2. Factory install vision lites, louvers, and panels.
- G. Hardware:
1. Premachine doors in accordance with templates from specified hardware manufacturers and hardware schedule.
 2. Factory install hardware.

2.3 MATERIALS

- A. Aluminum Members:
1. Extrusions: ASTM B 221.
 2. Sheet and Plate: ASTM B 209.
 3. Alloy and Temper: As required by manufacturer for strength, corrosion resistance, application of required finish, and control of color.
- B. Components: Door and frame components from same manufacturer.
- C. Fasteners:
1. Material: Aluminum, 18-8 stainless steel, or other noncorrosive metal.
 2. Compatibility: Compatible with items to be fastened.
 3. Exposed Fasteners: Screws with finish matching items to be fastened.

2.4 FABRICATION

- A. Sizes and Profiles: Required sizes for door and frame units, and profile requirements shall be as indicated on the Drawings.
- B. Coordination of Fabrication: Field measure before fabrication and show recorded

measurements on shop drawings.

- C. Assembly:
 1. Complete cutting, fitting, forming, drilling, and grinding of metal before assembly.
 2. Remove burrs from cut edges.
- D. Welding: Welding of doors or frames is not acceptable.
- E. Fit:
 1. Maintain continuity of line and accurate relation of planes and angles.
 2. Secure attachments and support at mechanical joints with hairline fit at contacting members.

2.5 ALUMINUM DOOR FRAMING SYSTEMS

- A. Tubular Framing:
 1. Size and Type: As indicated on the Drawings.
 2. Materials: Aluminum Alloy 6063-T5, 1/8-inch minimum wall thickness.
 3. Applied Door Stops: 0.625-inch high, with screws and weatherstripping. Door stop shall incorporate pressure gasketing for weathering seal. Counterpunch fastener holes in door stop to preserve full metal thickness under fastener head.
 4. Frame Members: Box type with 4 enclosed sides. Open-back framing is not acceptable.
 5. Caulking: Caulk joints before assembling frame members.
 6. Joints:
 - a. Secure joints with fasteners.
 - b. Provide hairline butt joint appearance.
 7. Field Fabrication: Field fabrication of framing using stick material is not acceptable.
 8. Applied Stops: For side, transom, and borrowed lites and panels. Applied stops shall incorporate pressure gasketing for weathering seal. Reinforce with solid bar stock fill for frame hardware attachments.
 9. Hardware:
 - a. Premachine and reinforce frame members for hardware in accordance with manufacturer's standards and hardware schedule.
 - b. Factory install hardware.
 10. Anchors:
 - a. Anchors appropriate for wall conditions to anchor framing to wall materials.
 - b. Door Jamb and Header Mounting Holes: Maximum of 24-inch centers.
 - c. Secure head and sill members of transom, side lites, and similar conditions.

2.6 HARDWARE

- A. Premachine doors in accordance with templates from specified hardware manufacturers and hardware schedule.
- B. Hardware: As specified in Section 08 71 00.
- C. Factory install hardware.
- D. Finish: As specified in Section 08 71 00.

2.7 VISION LITES

- A. Factory Glazing: 1/4-inch glass.
- B. Lites in Exterior Doors: Allow for thermal expansion.

- C. Rectangular Lites:
 - 1. Size: As indicated on the Drawings.
 - 2. Factory glazed with screw-applied aluminum stops anodized to match perimeter door rails.

2.8 ALUMINUM FINISHES

- A. Anodized Finish: Class I finish, 0.7 mils thick.
 - 1. Clear 215 R1, AA-M10C12C22A41, Class I, 0.7 mils thick.

PART 3- EXECUTION

3.1 EXAMINATION

- A. Examine areas to receive doors. Notify Architect of conditions that would adversely affect installation or subsequent use. Do not proceed with installation until unsatisfactory conditions are corrected.

3.2 PREPARATION

- A. Ensure openings to receive frames are plumb, level, square, and in tolerance.

3.3 INSTALLATION

- A. Install doors in accordance with manufacturer's instructions.
- B. Install doors plumb, level, square, true to line, and without warp or rack.
- C. Anchor frames securely in place.
- D. Separate aluminum from other metal surfaces with bituminous coatings or other means approved by Architect.
- E. Set thresholds in bed of mastic and backseal.
- F. Install exterior doors to be weathertight in closed position.
- G. Repair minor damages to finish in accordance with manufacturer's instructions and as approved by Architect.
- H. Remove and replace damaged components that cannot be successfully repaired as determined by Architect.

3.4 FIELD QUALITY CONTROL

- A. Manufacturer's Field Services: Manufacturer's representative shall provide technical assistance and guidance for installation of doors.

3.5 ADJUSTING

- A. Adjust doors, hinges, and locksets for smooth operation without binding.

3.6 CLEANING

- A. Section 01 74 00 – Cleaning: Requirements for cleaning.
- B. Clean doors promptly after installation in accordance with manufacturer's instructions.
- C. Do not use harsh cleaning materials or methods that would damage finish.

3.7 PROTECTION OF FINISHED WORK

- A. Protect installed doors to ensure that, except for normal weathering, doors will be without damage or deterioration at time of substantial completion.

END OF SECTION

SECTION 08 31 13**ACCESS DOORS AND FRAMES****PART 1 - GENERAL****1.1 SUMMARY**

- A. Section includes fire resistive rated and non-rated access doors and panels with frames.
 - 1. Provide for access to controls, valves, traps, dampers, cleanouts, and similar items requiring operation behind inaccessible finished surfaces.
 - 2. Coordinate exact locations with various trades to assure proper placement of access doors and panels.
- B. Related Sections:
 - 1. Section 09 90 00 - Painting and Coating: Field paint finish.
 - 2. Section 09 26 00 - Gypsum Board Assemblies.
 - 3. Section 23 00 00 - Basic HVAC Requirements: Access doors in ductwork.

1.2 REFERENCES

- A. ASTM International:
 - 1. ASTM E119 – Standard Test Methods for Fire Tests of Building Construction and Materials.
- B. Intertek Testing Services (Warnock Hersey Listed):
 - 1. WH – Certification Listings.
- C. National Fire Protection Association:
 - 1. NFPA 80 – Standard for Fire Doors, Fire Windows.
- D. UL - Underwriters' Laboratories, Inc.:
 - 1. UL – Building Materials Directory.

1.3 SUBMITTALS

- A. Section 01 32 19 – Submittal Procedures: Submittal procedures.
- B. Shop Drawings: Indicate exact position of access door units. Refer to Divisions 23 and 26 regarding requirements for showing locations of access doors provided under those Divisions.
- C. Product Data: Submit literature indicating sizes, types, finishes, hardware, scheduled locations, fire resistance listings, and details of adjoining Work.
- D. Samples: Submit two 12 x 12 inch in size illustrating frame configuration and anchors.
- E. Manufacturer's Installation Instructions: Submit installation requirements and rough-in dimensions.

1.4 CLOSEOUT SUBMITTALS

- A. Section 01 77 00 – Contract Closeout: Closeout procedures.
- B. Project Record Documents: Record actual locations of access units.

1.5 QUALITY ASSURANCE

- A. Fire Resistance Ratings: Where indicated as fire rated provide assemblies from manufacturers listed in UL Directory or Intertek Testing Services (Warnock Hersey Listed) Directory.
- B. Attach label from agency approved by authority having jurisdiction to identify each fire rated access door.

1.6 QUALIFICATIONS

- A. Manufacturer: Company specializing in manufacturing products specified with minimum three years documented experience.

1.7 DELIVERY, STORAGE AND HANDLING

- A. Section 01 60 00 – Product Requirements: Requirements for transporting, handling, storing, and protecting products.
- B. Packaging and Shipping: Identify type and size of each door.
- C. Storage and Protection:
 - 1. Deliver and store packaged products in original containers with seals unbroken and labels intact until time of use.
 - 2. Deliver products only after proper facilities are available; handle carefully to prevent damage and store on clean concrete surface or raised platform in safe, dry area.

1.8 COORDINATION

- A. Coordinate Work with work requiring controls, valves, traps, dampers, cleanouts, and similar items requiring operation being located behind finished surfaces.

PART 2 - PRODUCTS**2.1 ACCESS DOORS AND PANELS**

- A. Manufacturers:
 - 1. J.L. Industries.; www.jlindustries.com
 - 2. Milcor LTD, Partnership.; www.milcorinc.com
 - 3. Nystrom Products Co.; www.nystrom.com
 - 4. Karp Associates, Inc.; www.karp.com
 - 5. Substitutions: Section 01 60 00 – Product Requirements: Product Options and Substitutions.

2.2 MATERIALS

- A. Non-Fire Rated:
 - 1. Type 1: Flush steel door and flanged frame for gypsum board walls and ceiling installations.
 - a. Manufacturer: Milcor, Inc., "Model DW"; Karp Associates, Inc., "DSC-214M", or equal.
- B. Fire Rated:
 - 1. Type A: Fire resistive steel door with recess to receive gypsum board and flanged frame for rated suspended gypsum board ceiling installations.
 - a. Manufacturer:

- 1) JL Industries, Model "FD".
 - 2) Milcor, Inc. Model "ATR".
 - 3) Karp Associates, Inc., Model "KATR".
 - 4) Or equal.
2. Type B: Fire rated flush steel door and flanged frame, UL 1-1/2 hour rated, self latching with direct action knurled knob, for installation in rated walls.
- a. Manufacturer:
 - 1) JL Industries, Model "FDWB".
 - 2) Milcor, Inc., Model "Fire-Rated Access Door"
 - 3) Karp Associates, Inc., Model "KRP-250FR"
 - 4) Or equal.

2.3 ACCESSORIES

- A. Smoke Seal: Pemko S-88 smoke seal.
- B. Acoustical Sealant: As specified in Section 07 90 00 – Joint Protection.

2.4 FABRICATION

- A. Fabricate units of continuous welded construction; weld, fill, and grind joints to assure flush and square unit.
- B. Wall and Ceiling Access Door and Panel Hardware:
 1. Hinge: Standard continuous or concealed spring pin type, 175 degree steel hinges.
 2. Lock: Screw driver slot for quarter turn cam lock.
- C. Size Variations: Obtain acceptance of manufacturer's standard size units which vary slightly from sizes shown or scheduled.

2.5 SHOP FINISHING

- A. Base Metal Protection: Prime coat units with baked-on rust-inhibitive zinc dust primer.
- B. Access Doors at ceramic tile surfaces: Stainless Steel; No. 4 finish.
- C. Finish Painting: As specified in Section 09 90 00 – Painting and Coating.

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Verify rough openings for access doors and panels are correctly sized and located.
- B. Do not install access doors and panels until unsatisfactory conditions have been corrected.

3.2 PREPARATION

- A. Coordinate details with other work supporting, adjoining or requiring access doors.
- B. Verify that location will serve portion of work to which access is required.

3.3 INSTALLATION

- A. General: Install access doors in accordance with manufacturer's instructions and at locations authorized by the Architect in accordance with requirements for work of Divisions 22 and 23.

- B. Secure frames rigidly in place, plumb and level in opening, with plane of door and panel face aligned with adjacent finished surfaces.
 - 1. Set concealed frame type units flush with adjacent finished surfaces.
- C. Position unit to provide convenient access to concealed work requiring access.
- D. Install fire rated units in accordance with NFPA 80 and requirements for fire listing.
- E. Provide fire-rated access doors at sound-rated construction. Seal door flanges with specified smoke seal. Seal entire assembly to gypsum board with acoustical sealant.

3.4 ADJUSTING AND CLEANING

- A. Thoroughly clean surfaces of grease, oil, or other impurities, touch-up abraded prime coat, and otherwise prepare for finish painting where required.

END OF SECTION

SECTION 08 41 13**ALUMINUM-FRAMED ENTRANCES AND STOREFRONTS****PART 1 - GENERAL****1.1 SUMMARY**

- A. Section Includes: Architectural Aluminum Storefront Systems, including swing doors, project-out windows, perimeter trims, stools, accessories, window installation hardware and accessories, shims and anchors, and perimeter sealing of storefront units.
- B. Related Sections:
1. Section 07 27 00 - Air Barriers: Air barrier between glazed wall systems and adjacent construction
 2. Section 07 84 00 - Fire Stopping.
 3. Section 07 90 00 - Joint Protection: Joint sealants installed as part of aluminum entrance and storefront systems
 4. Section 08 71 00 - Door Hardware.
 5. Section 08 80 00 - Glazing.

1.2 REFERENCES

- A. American National Standards Institute:
1. ANSI Z97.1 – Safety Glazing Materials used in Buildings Safety.
- B. American Architectural Manufacturers Association:
1. AAMA 503 - Voluntary Specification for Field Testing of Metal Storefronts. Curtain Wall and Sloped Glazing Systems.
 2. AAMA 505 –
 3. AAMA 1503 - Voluntary Test Method for Thermal Transmittance and Condensation Resistance of Windows, Doors and Glazed Wall Sections.
 4. AAMA 2605 - Voluntary Specification, Performance Requirements and Test Procedures for Superior Performing Organic Coatings on Aluminum Extrusions and Panels.
 5. AAMA CW-10 – Care and Handling of Architectural Aluminum From Shop to Site.
- C. ASTM International:
1. ASTM B221 - Standard Specification for Aluminum and Aluminum-Alloy Extruded Bars, Rods, Wire, Profiles, and Tubes.
 2. ASTM E283 - Standard Test Method for Determining the Rate of Air Leakage Through Exterior Windows, Curtain Walls, and Doors Under Specified Pressure Differences Across the Specimen.
 3. ASTM E330 - Standard Test Method for Structural Performance of Exterior Windows, Curtain Walls, and Doors By Uniform Static Air Pressure Difference.
 4. ASTM E331 - Standard Test Method for Water Penetration of Exterior Windows, Curtain Walls, and Doors By Uniform Static Air Pressure Difference.
 5. ASTM E783 – Standard Test Method for Field Measurement of Air Leakage Through Installed Exterior Windows and Doors.
 6. ASTM E1105 - Standard Test Method for Field Determination of Water Penetration of Installed Exterior Windows, Curtain Walls, and Doors by Uniform or Cyclic Static Air Pressure Difference.
- D. Glass Association of North America:
1. GANA – Glazing Manual.

- E. National Fenestration Rating Council Incorporated:
 1. FRC 100 - Procedures for Determining Fenestration Product U-Factors.

1.3 PERFORMANCE REQUIREMENTS

- A. Wind loads: Provide framing system; include anchorage, capable of withstanding wind load design pressures of 20 lbs./sq. ft. inward and 20 lbs./sq. ft. outward. The design pressures are based on the CBC Building Code; 2007 Edition.
- B. Air Infiltration: The test specimen shall be tested in accordance with ASTM E 283. Air infiltration rate shall not exceed 0.06 cfm/ft² at a static air pressure differential of 6.24 psf.
- C. Water Resistance: The test specimen shall be tested in accordance with ASTM E 331. There shall be no leakage at a minimum static air pressure differential of 8 psf as defined in AAMA 501.
- D. Uniform Load: A static air design load of 20 psf shall be applied in the positive and negative direction in accordance with ASTM E 330. There shall be no deflection in excess of L/175 of the span of any framing member. At a structural test load equal to 1.5 times the specified design load, no glass breakage or permanent set in the framing members in excess of 0.2% of their clear spans shall occur.
- E. Thermal Transmittance (U-factor): When tested to AAMA Specification 1503, the thermal transmittance (U-factor) shall not be more than:
 1. Glass to Exterior: 0.47 (low-e) BTU/hr/ft²/°F.
 2. Glass to Center: 0.44 (low-e) or 0.61 (clear) BTU/hr/ft²/°F.
 3. Glass to Interior: 0.56 (clear) BTU/hr/ft²/°F.
- F. Condensation Resistance (CRF): When tested to AAMA Specification 1503, the condensation resistance factor shall not be less than:
 1. Glass to Exterior: 70_{frame} and 69_{glass} (low-e).
 2. Glass to Center: 62_{frame} and 68_{glass} (low-e) or 63_{frame} and 56_{glass} (clear).
 3. Glass to Interior: 54_{frame} and 58_{glass} (clear).

1.4 PERFORMANCE REQUIREMENTS – PROJECT-OUT WINDOW

- A. Windows shall be Architectural Aluminum Project Out windows in accordance with ANSI/AAMA/NWDA 101/I.S.2-97 or NAFS-1 Voluntary Specifications for Aluminum and Poly Prime Windows and Glass Doors for a Class and Grade of P-HC40 – P-HC70 for Project Out Windows.
- B. Test Units:
 1. Conform to minimum size in accordance with ANSI/AAMA/NWDA 101/I.S.2-97 or NAFS-1 for each test unit sizes and configurations.
 2. Units submitted for laboratory testing shall be manufacturer's standard construction, glazed and assembled in accordance with manufacturer's specifications and ANSI/AAMA/NWDA 101/I.S.2-97 or NAFS-1
- C. Window Performance Requirements:
 1. Air Infiltration:
 - a. Project Out windows: When closed and locked, the test specimen shall be tested in accordance with ASTM E 283 at a minimum frame size of 60 inches x 36 inches. Air infiltration rate shall not exceed 0.06 cfm/ft of sash perimeter at a static air pressure differential of 6.24 psf.
 2. Water Resistance:
 - a. Project Out Windows: When closed and locked, the test specimen shall be tested in accordance with ASTM E 547 and ASTM E 331 at a

- minimum frame size of 60 inches x 36 inches. There shall be no leakage as defined in test method at a static air pressure differential of 12 psf.
3. Uniform Design Load: When closed and locked, a minimum static air pressure difference of 40 psf and 70 psf shall be applied in the positive and negative direction in accordance with ASTM E 330.
 4. Uniform Load Structural Test:
 - a. Project Out Windows: When closed and locked, a minimum static air pressure difference of 60 psf and 105 psf shall be applied in the positive and negative direction in accordance with ASTM E 330. (1.5 x Design Load).
 5. Thermal Transmittance (Conductive U-factor):
 - a. Project Out Windows: When tested to AAMA Specification 1503, the conductive thermal transmittance (U-factor) shall not be more than 0.68 BTU/hr/ft²/°F. (NFRC – 0.62)
 6. Condensation Resistance (CRF): When tested to AAMA Specification 1503, the condensation resistance factor shall not be less than Frame 51, Glass 54. or Condensation Index (I): when tested to CSA-A440-00, the condensation index shall not be less than Frame 47, Glass 48.
 7. Forced Entry Resistance: Windows shall conform to ASTM F588, Performance Level 10, or AAMA 1302.5.

1.5 SUBMITTALS

- A. Section 01 32 19 – Submittal Procedures: Submittal procedures.
- B. Shop Drawings: Indicate opening dimensions, framed opening tolerances, affected related Work; and installation requirements.
- C. Product Data: Submit component dimensions, anchorage and fasteners, glass, internal drainage, and typical details.
- D. Samples: Submit two 12 by 12 inches in size illustrating window frame section, factory finished aluminum surfaces, and glazing materials illustrating edge and corner.
- E. Test Reports: Submit certified test reports by independent third party such as AAMA, CAWM, or NFRC showing compliance with specified performance characteristics.
- F. Hardware Schedule: Complete itemization of each item of hardware to be provided for each door, cross-referenced to door identification numbers in Contract Documents.
- G. Installation Data: Special installation requirements.

1.6 QUALIFICATIONS

- A. Manufacturer: Company specializing in manufacturing products specified in this section with minimum 10 years documented experience, capable of providing field service representation during construction, approving acceptable installer and approving application method.
- B. Installer: Company experienced in performing Work of this section with minimum three years documented experience, acceptable to manufacturer.

1.7 REGULATORY REQUIREMENTS

- A. The aluminum-framed entrances and storefronts system requires Deferred Approval from Division of the State Architect.

- B. Fabrication of the aluminum-framed entrances and storefronts system shall not be started until Contractor's Deferred Approval Submittal, including Shop Drawings, Specifications, and Engineering Calculations for the actual system to be installed have been accepted and signed by the Architect or Structural Engineer and approved by DSA.

1.8 PRE-INSTALLATION MEETING

- A. Section 01 31 19 – Project Meetings: Pre-installation meeting.
- B. Conduct pre-installation meeting to verify project requirements, substrate conditions, manufacturer's installation instructions, and manufacturer's warranty requirements.
- C. Convene minimum one week prior to commencing work of this section.

1.9 DELIVERY, STORAGE, AND HANDLING

- A. Section 01 60 00 – Product Requirements: Requirements for transporting and handling products.
- B. Ordering: Comply with manufacturer's ordering instructions and lead-time requirements to avoid construction delays.
- C. Packing, Shipping, Handling and Unloading: Handle products of this section in accordance with AAMA CW-10. Deliver materials in manufacturer's original, unopened, undamaged containers with identification labels intact.
- D. Storage: Store materials protected from exposure to harmful weather conditions. Handle framing material and components to avoid damage.
- E. Protection: Protect framing material against damage from elements, construction activities, and other hazards before, during and after framing installation.

1.10 ENVIRONMENTAL REQUIREMENTS

- A. Section 01 60 00 - Product Requirements.
- B. Do not install sealants when ambient temperature is less than 40 degrees F during and 48 hours after installation.

1.11 WARRANTY

- A. Section 01700 – Execution Requirements: Requirements for warranties.
- B. Manufacturer's Product Warranty: Submit, for Owner's acceptance, manufacturer's warranty for entrance system as follows:
 - 1. Warranty Period: Two (2) years from Date of Substantial Completion of the project provided however that the Limited Warranty shall begin in no event later than six months from date of shipment by Kawneer. In addition, welded door corner construction shall be supported with a limited lifetime warranty for the life of the door under normal use.
- C. Provide 5 year manufacturer warranty against failure of glass seal on insulating glass units, including interpane dusting or misting. Include provision for replacement of failed units.
- D. Provide 5 year manufacturer warranty against excessive degradation of exterior finish. Include provision for replacement of units with excessive fading, chalking, or flaking.

PART 2 - PRODUCTS**2.1 METAL FRAMED STOREFRONTS**

- A. Manufacturers:
1. Kawneer Company, Inc., www.kawneer.com; 555 Guthridge Court, Technology Park/Atlanta, Norcross, GA 30092; Telephone: 770 449 5555; Fax: 770 734 1560.
 2. EFCO Corp. www.efcocorp.com.
 3. United States Aluminum Corp; www.usalum.com.
 4. Substitutions: Section 01 60 00 - Product Options and Substitutions.
- B. Product Description and Basis of Design: Kawneer Aluminum Storefront Systems.
1. Series: Trifab® VG 451T (thermal) Framing System.
 2. Framing Member Profile: 2-inch x 4-1/2 inch nominal dimension; Front, Inside Glazed, Structural Silicone or Weatherseal Glazed (Type B); Shear Block.
 3. Finish/Color: (See Article 2.5 Shop Finishing).
- C. Product Description and Basis of Design: Kawneer Aluminum Entrances.
1. 500 Swing door; wide stile, 5" vertical face dimension, 1-3/4" depth, high traffic applications.
 2. Finish/Color: (See Article 2.5 Finishes)
- D. Product Description and Basis of Design: Kawneer Sealair® Heavy Commercial Architectural Aluminum Windows.
1. Storefront GLASSvent, Thermal (Structural Silicone Glazed), 2-3/4" Deep Frame, Project-Out, for installation into Kawneer Storefront System. P-HC40.

2.2 COMPONENTS

- A. Aluminum (Framing and Components):
1. Material Standard: ASTM B 221; 6063-T6 alloy and temper
 2. Member Wall Thickness: Each framing member shall provide structural strength to meet specified performance requirements.
 3. Tolerances: Reference to tolerances for wall thickness and other cross-sectional dimensions of storefront members are nominal and in compliance with AA Aluminum Standards and Data.
- B. Aluminum Entrances and Components:
1. Material Standard: ASTM B 221; 6063-T6 alloy and temper.
 2. Door stile and rail face dimensions of the 500 Entrance Door as follows:
 - a. Vertical Stile: 5 inches.
 - b. Top Rail: 5 inches.
 - c. Bottom Rail: 10 inches.
 3. Major portions of the door members to be 0.125 inch nominal in thickness and glazing molding to be 0.05 inch thick.
 4. Tolerances: Reference to tolerances for wall thickness and other cross-sectional dimensions of entrance members are nominal and in compliance with Aluminum Standards and Data, published by The Aluminum Association.
 5. Glazing gaskets: Either EPDM elastomeric extrusions or a thermoplastic elastomer.
 6. Provide adjustable glass jacks to help center the glass in the door opening.
- C. Project-Out Awning Window:
1. Product: Kawneer Sealair® Heavy Commercial Architectural Aluminum Windows. Series: Storefront GLASSvent™, project-out awning window.
 - a. Framing Member Profile: 2-3/4 inch for 1-inch glass.
 - b. Grade Designation: P-HC40 for Project Out Windows.

- c. Finish: As specified under Article 2.5.
- 2. Materials: Aluminum Windows and Components:
 - a. Material Standard: ASTM B221, G.S. 10A-T5; 6063-T5 alloy and temper.
 - b. Total Frame Depth: Not less than 2-3/4 inches (1-inch glass).
 - c. Member Wall Thickness: Each framing member shall have a wall thickness sufficient to meet the specified structural requirements.
 - d. Frame and ventilator corner construction: Consists of a mitered corner joint with an internal clip, sealed and mechanically staked.
 - e. Frame shall have a continuous primary weather seal of polyethylene clad urethane foam, the rainscreen weather stripping shall be dual durometer Santoprene. Each corner shall be neatly mitered.
 - f. Factory fabricate and assemble frames and ventilators.
- 3. Accessories:
 - a. Fasteners: Where exposed, shall be 300 Series, Stainless Steel.
 - b. Standard Hardware:
 - 1) Cast White Bronze Cam Locking Handles.
 - 2) Stainless Steel 4-Bar Hinges.
 - c. Insect Screens: Extruded aluminum frames, 6063-T5 alloy and temper, joined at corners; 18 x 16 mesh aluminum screen cloth; frames finished to match aluminum windows; splines shall be extruded vinyl, removable to permit rescreening, individual standard wickets.
- 4. Glass and Glazing:
 - 1. General: Glass thickness and type shall be in accordance with manufacturer's recommendations for prescribed design pressure. Factory glazing shall be in accordance with manufacturer's standard requirements.
 - a. Material Compatibility: Glazing materials shall be of material compatible with aluminum and those sealants and sealing materials used in the composite structure. Interior glazing tape shall be a foam-type tape installed per the manufacturer's instructions.
 - b. Manufacturer's Standards: The structural seal and weather seal shall be silicone applied and cured per the silicone manufacturer's instructions.
 - c. For insulating glass, secondary seal shall be silicone sealant and be designed for 4-sided silicone applications.
 - B. Glass Materials:
 - 1. Insulating Low-E Glass Units as specified in Section 08 80 00 – Glazing.
- D. Sealants: Refer to Section 07 90 00 – Joint Protection.
- E. Glass: Refer to Section 08 80 00 – Glazing.

2.3 ACCESSORIES

- A. Fasteners: Where exposed, shall be Stainless Steel.
- B. Glazing gaskets: Extruded EPDM rubber.
- C. Perimeter Anchors: Aluminum. When steel anchors are used, provide insulation between steel material and aluminum material to prevent galvanic action.
- D. Thermal Barrier (Trifab® VG 451T):
 - 1. Kawneer IsoLock® Thermal Break with a 1/4 inch separation consisting of a two part chemically curing, high density polyurethane which is mechanically and adhesively joined to aluminum storefront sections.

- a. Thermal Break shall be designed in accordance with AAMA TIR-A8 and tested in accordance with AAMA 505.
- E. Entrance Door Hardware:
- 1. Weatherstripping:
 - a. Meeting stiles on pairs of doors shall be equipped with an adjustable astragal utilizing wool pile with polymeric fin.
 - b. The door weathering on a single acting offset pivot or butt hung door and frame (single or pairs) shall be Kawneer Sealair® weathering. This is comprised of a thermoplastic elastomer weathering on a tubular shape with a semi-rigid polymeric backing.
 - 2. Sill Sweep Strips: EPDM blade gasket sweep strip in an aluminum extrusion applied to the interior exposed surface of the bottom rail with concealed fasteners (Necessary to meet specified performance tests).
 - 3. Threshold: Extruded aluminum, one piece per door opening, with ribbed surface.
 - 4. Continuous Hinge: As specified in Section 08 71 00.
 - 5. Push/Pull: As specified in Section 08 71 00.
 - 6. Closer: As specified in Section 08 71 00.
 - 7. Latch Handle: As specified in Section 08 71 00.
 - 8. Cylinder(s)/Thumbturn: As specified in Section 08 71 00.

2.4 FABRICATION

- A. Fabricate components per manufacturer's installation instructions and with minimum clearances and shim spacing around perimeter of assembly, yet enabling installation and dynamic movement of perimeter seal.
- B. Accurately fit and secure joints and corners. Make joints flush, hairline and weatherproof.
- C. Prepare components to receive anchor devices. Fabricate anchors.
- D. Coat concealed metal surfaces that will be in contact with cementitious materials or dissimilar metals with bituminous paint.
- E. Arrange fasteners and attachments to conceal from view.
- F. Reinforce interior horizontal head rail to receive blind track brackets and attachments.
- G. Reinforce components internally for door hardware and door operators.
- H. Finishing: Apply factory finish to all surfaces that will be exposed in completed assemblies.
 - 1. Touch-up surfaces cut during fabrication so that no natural aluminum is visible in completed assemblies, including joint edges.

2.5 SHOP FINISHING

- A. Interpon® D2000, AAMA 2604, Powder Coating. Color as selected by Architect from manufacturer's standard colors.

2.6 SOURCE QUALITY CONTROL

- A. Source Quality: Provide aluminum framing specified herein from a single source.
 - 1. Building Enclosure System: When aluminum framing is part of a building enclosure system, including entrances, entrance hardware, windows, curtain wall system and related products, provide building enclosure system products from a single source manufacturer.

- B. Fabrication Tolerances: Fabricate aluminum framing in accordance with framing manufacturer's prescribed tolerances.

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Verify existing conditions before starting work.
- B. Verify substrate conditions (which have been previously installed under other sections) are acceptable for product installation in accordance with manufacturer's instructions. Verify openings are sized to receive storefront system and sill plate is level in accordance with manufacturer's acceptable tolerances.
 - 1. Field Measurements: Verify actual measurements/openings by field measurements before fabrication; show recorded measurements on shop drawings. Coordinate field measurements, fabrication schedule with construction progress to avoid construction delays.

3.2 INSTALLATION

- A. Install framing system in accordance with manufacturer's instructions and AAMA storefront and entrance guide specifications manual.
 - 1. Dissimilar Materials: Provide separation of aluminum materials from sources of corrosion or electrolytic action contact points.
 - 2. Weathertight Construction: Install sill members and other members in a bed of sealant or with joint filler or gaskets, to provide weathertight construction. Coordinate installation with wall flashings and other components of construction.
 - 3. Attach to structure to permit sufficient adjustment to accommodate construction tolerances and other irregularities.
 - 4. Provide alignment attachments and shims to permanently fasten system to building structure.
 - 5. Align assembly plumb and level, free of warp and twist. Maintain assembly dimensional tolerances aligning with adjacent work.
- B. Install entrance system in accordance with manufacturer's instructions and AAMA storefront and entrance guide specifications manual.
 - 1. Attach to structure to permit sufficient adjustment to accommodate construction tolerances and other irregularities.
 - 2. Provide alignment attachments and shims to permanently fasten system to building structure.
 - 3. Align assembly plumb and level, free of warp and twist. Maintain assembly dimensional tolerances aligning with adjacent work.
 - 4. Set thresholds in bed of mastic and secure.
 - 5. Adjusting: Adjust operating hardware for smooth operation.
- C. Install window units plumb, level, and true to line, without warp or rack of frames or sash with manufacturer's prescribed tolerances. Provide support and anchor in place.
 - 1. Dissimilar Materials: Provide separation of aluminum materials and other corrodible surfaces from sources of corrosion or electrolytic action contact points.
 - 2. Weathertight Construction: Install sill members and other members in a bed of sealant or with joint filler or gaskets, to provide weathertight construction. Coordinate installation with wall flashings and other components of construction.
 - a. Refer to Section 07900 – Joint Sealers for installation requirements.
- D. Related Products Installation Requirements:
 - 1. Sealants (Perimeter): Refer to Section 07 90 00.
 - 2. Glass: Refer to Section 08 80 00 - Glazing.

- a. Reference: ANSI Z97.1, CPSC 16 CFR 1201 and GANA Glazing Manual.

3.3 FIELD QUALITY CONTROL

- A. Section 01 45 23 – Testing and Inspection: Field inspecting, testing, adjusting, and balancing.
- B. Field Tests: Architect shall select storefront units to be tested as soon as a representative portion of the project has been installed, glazed, perimeter caulked and cured. Conduct tests for air infiltration and water penetration with manufacturer's representative present. Tests not meeting specified performance requirements and units having deficiencies shall be corrected as part of the contract amount.
 1. Testing: Testing shall be performed by a qualified independent testing agency. Refer to Division 1 Testing Section for payment of testing and testing requirements. Testing Standard per AAMA 503, including reference to ASTM E 783 for Air Infiltration Test and ASTM E 1105 Water Infiltration Test.
 - a. Air Infiltration Tests: Conduct tests in accordance with ASTM E 783. Allowable air infiltration shall not exceed 1.5 times the amount indicated in the performance requirements or 0.09 cfm/ft², which ever is greater.
 - b. Water Infiltration Tests: Conduct tests in accordance with ASTM E 1105. No uncontrolled water leakage is permitted when tested at a static test pressure of two-thirds the specified water penetration pressure but not less than 6.24 psf.

3.4 MANUFACTURER'S FIELD SERVICES

- A. Manufacturer's Field Services: Upon Owner's or Architect'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.
- B. Monitor and report installation procedures and unacceptable conditions.

3.5 CLEANING

- A. Section 01 74 00 - Cleaning: Final cleaning.
- B. Repair or replace damaged installed products.
- C. Clean installed products in accordance with manufacturer's instructions prior to owner's acceptance.
- D. Remove construction debris from project site and legally dispose of debris.

3.6 PROTECTION OF FINISHED WORK

- A. Protect installed product's finish surfaces from damage during construction.
- B. Protect aluminum storefront system from damage from grinding and polishing compounds, plaster, lime, acid, cement, or other harmful contaminants.

END OF SECTION

SECTION 08 41 23**FIRE RATED GLASS AND FRAMING SYSTEMS****PART 1 - GENERAL****1.1 SUMMARY**

- A. Section Includes:
1. Fire-rated curtain wall systems, including full vision fire-rated doors, perimeter trims, stools, accessories, shims and anchors, and perimeter sealing of curtain wall framing.
- B. Related Sections include the following:
1. Section 05 12 00 - Structural Steel Framing: Steel attachment members
 2. Section 05 50 00 - Metal Fabrications: Steel attachment members inserts and anchors
 3. Section 07 27 00 - Air Barriers: Perimeter air, water and vapor seal between the work of this section and adjacent construction
 4. Section 07 62 00 - Sheet Metal Flashing and Trim: Flashing between this work and other work
 5. Section 07 84 00 - Firestopping: for perimeter fire-containment systems (safing insulation) field installed with steel fire-rated glazed curtain-wall systems.
 6. Section 07 90 00 - Joint Protection: For installation of joint sealants installed with steel fire-rated glazed curtain-wall systems and for sealants to the extent not specified in this Section.
 7. Section 08 71 00 - Door Hardware: Door hardware not provided by this Section.
 8. Section 08 41 13 - Aluminum-Framed Entrances and Storefronts: Non-fire-rated glass and framing.

1.2 REFERENCES

- A. ASTM International:
1. ASTM A36/A36M - Standard Specification for Carbon Structural Steel.
 2. ASTM A123/A123M - Standard Specification for Zinc (Hot-Dip Galvanized) Coating on Iron and Steel Products.
 3. ASTM A153/A153M - Standard Specification for Zinc Coating (Hot-Dip) on Iron and Steel Hardware.
 4. ASTM A1008/A 1008M - Standard Specification for Steel, Sheet, Cold-Rolled, Carbon, Structural, High-Strength, Low Alloy, and High-Strength Low-Alloy with Improved Formability, Solution Hardened, and Bake Hardenable; 2007.
 5. ASTM A1011/A 1011M - Standard Specification for Steel, Sheet and Strip, Hot-Rolled, Carbon, Structural, High-Strength Low-Alloy and High-Strength Low-Alloy with Improved Formability, and Ultra-High Strength; 2006b.
 6. ASTM C612 - Standard Specification for Mineral Fiber Block and Board Thermal Insulation.
 7. ASTM C864 - Standard Specification for Dense Elastomeric Compression Seal Gaskets, Setting Blocks, and Spacers.
 8. ASTM C1048 - Standard Specification for Heat-Treated Flat Glass - Kind HS, Kind FT, Coated and Uncoated Glass.
 9. ASTM E119: Methods for Fire Tests of Building Construction and Materials.
- B. National Fire Protection Association (NFPA):
1. NFPA 80: Fire Doors and Windows.
 2. NFPA 251: Fire Tests of Building Construction & Materials
 3. NFPA 252: Fire Tests of Door Assemblies

4. NFPA 257: Fire Test of Window Assemblies
- C. Underwriters Laboratories, Inc. (UL):
 1. UL 9: Fire Tests of Door Assemblies
 2. UL 10 B: Fire Tests of Door Assemblies
 3. UL 10 C: Positive Pressure Fire Tests of Window & Door Assemblies
 4. UL 263: Fire tests of Building Construction and Materials
 5. UL-752: Ratings of Bullet-Resistant Materials
- D. Uniform Building Code
 1. UBC 7-2 (1997) -- Fire Tests of Door Assemblies, Parts I and II
 2. UBC 7-4 (1997) -- Fire Tests of Window Assemblies
- E. American National Standards Institute (ANSI):
 1. ANSI Z97.1: Standard for Safety Glazing Materials Used in Buildings
- F. Consumer Product Safety Commission (CPSC):
 1. CPSC 16 CFR 1201: Safety Standard for Architectural Glazing Materials

1.3 PERFORMANCE REQUIREMENTS

- A. System Description:
 1. Steel fire-rated glazed curtain wall system, outside glazed pressure plate, cover cap format.
 2. Face Width: 1 3/4-inch.
 3. Water Drainage:
 - a. System is vertically weeped. No joint plugs or weep holes at horizontal mullions. Horizontal gaskets are notched and received by vertical gaskets.
- B. Structural Loads:
 1. Uniform Wind Load: ASTM E 330; Static air design load of 40 psf applied in positive and negative direction; no deflection in excess of L/175 of span of any framing member at design load.
 2. At structural test load equal to 1.5 times specified design load, no glass breakage or permanent set in the framing members in excess of 0.2% of their clear spans shall occur.
 3. Seismic Loads: <Insert specific loads>.
- C. Fire Rating Requirements:
 1. Duration - Doors: Capable of providing a fire rating of 60 minutes.
 2. Duration - Windows: Capable of providing a fire rating for 60 minutes.
 3. Duration - Walls: Capable of providing a fire rating for 60 minutes.

1.4 SUBMITTALS

- A. Submit in accordance with Section 01 32 19 – Submittal Procedures.
- B. Product Data: Include construction details, material descriptions, dimensions of individual components and profiles, and finishes for each type of product indicated.
- C. Shop Drawings: Prepared by or under the supervision of a qualified professional engineer detailing fabrication and assembly of steel fire-rated glazed curtain-wall systems.
 1. Include structural analysis data signed and sealed by the qualified professional engineer responsible for their preparation.

- D. Hardware schedule: list of manufacture supplied hardware and verification of cylinder size complying with Section 08 71 00
- E. Samples for Initial Color Selection: For steel frames with factory-applied powder coat color finishes.
 - 1. Triplicate copies of manufacturer's powder coating color charts showing the full range of colors available.
- F. Samples for Initial Selection: For units with factory-applied color finishes.
- G. Samples:
 - 1. Submit two 8-inch x 10 inch samples for glass.

1.5 QUALITY ASSURANCE

- A. Installer Qualifications: Installer experienced (as determined by contractor) to perform work of this section who has specialized in the installation of work similar to that required for this project and who is acceptable to product manufacturer.
 - 1. Engineering Responsibility: Preparation of data for glazed curtain-wall systems including the following:
 - a. Shop Drawings based on testing and engineering analysis of manufacturer's standard units in assemblies similar to those indicated for this Project and submission of reports of tests performed on manufacturer's standard assemblies.
- B. Manufacturer Qualifications: Manufacturer capable of providing field service representation during construction, approving acceptable installer and approving application method.
- C. Fire-Rated Door Assemblies: Assemblies complying with NFPA 80 that are listed and labeled by UL, for fire ratings indicated, based on testing according to NFPA 252, ASTM E119. Assemblies must be factory-welded or come complete with factory-installed mechanical joints and must not require job site fabrication.
- D. Certification: Signed by manufacturers of glass and glazing products certifying that products furnished comply with requirements.
 - 1. Door assemblies shall be tested to the acceptance criteria of ASTM E2074-00, NFPA 252, UL 9, UL 10-C Standard Methods of Fire Tests of Door Assemblies.
 - 2. Window assemblies shall be tested to the acceptance criteria of ASTM E2010-01, NFPA 257, UL 10-B, UL 10-C Standard methods for Fire Tests of Window Assemblies.
 - 3. Wall assemblies shall be tested to the acceptance criteria of ASTM E119, NFPA 251, UL 263 Standard Test Methods for Fire Tests of Building Construction and Materials.
 - 4. Underwriters Laboratories (UL) shall conduct fire test.
- E. Listings and Labels - Fire Rated Assemblies: Under current follow-up service by an approved independent agency maintaining a current listing or certification. Label assemblies accordance with limits of manufacturer's listing.
- F. Door assemblies shall be marked with the hourly rating followed by the letter "S". The letter "S" indicates air leakage resistance testing conformance to UBC 7-2 Parts I and II.
- G. Regulatory Requirements: Comply with provisions of the following:
 - 1. Where indicated to comply with accessibility requirements, comply with Americans with Disabilities Act (ADA), "Accessibility Guidelines for Buildings and Facilities (ADAAG),"; ANSI A117.1; FED-STD-795, "Uniform Federal Accessibility Standards,"; as follows:

- a. Handles, Pulls, Latches, Locks, and other Operating Devices: Shape that is easy to grasp with one hand and does not require tight grasping, tight pinching, or twisting of the wrist.
- b. Door Closers: Comply with the following maximum opening-force requirements indicated:
 - 1) Fire Doors: Minimum opening force allowable by authorities having jurisdiction.
- 2. NFPA 101: Comply with the following for means of egress doors:
 - a. Latches, Locks, and Exit Devices: Not more than 15 lbf to release the latch. Locks shall not require the use of a key, tool, or special knowledge for operation.
 - b. Door Closers: Not more than 30 lbf to set door in motion and not more than 15 lbf to open door to minimum required width.
- H. Pre-Installation Meetings: Conduct pre-installation meeting to verify project requirements, substrate conditions, manufacturer's installation instructions, and manufacturer's warranty requirements.

1.6 DELIVERY, STORAGE, AND HANDLING

- A. Ordering: Comply with manufacturer's ordering instructions and lead-time requirements to avoid construction delays.
- B. Packing, Shipping, Handling, and Unloading: Deliver materials in manufacturer's original, unopened, undamaged containers with identification labels intact.
- C. Storage and Protection: Store materials protected from exposure to harmful weather conditions. Handle material and components to avoid damage. Protect curtainwall material against damage from elements, construction activities, and other hazards before, during and after curtainwall installation.

1.7 PROJECT CONDITIONS

- A. Field Measurements: Verify actual locations of structural supports for steel fire-rated glazed curtain-wall systems by field measurements before fabrication and indicate measurements on Shop Drawings.

1.8 WARRANTY

- A. Section 01 77 00 – Contract Closeout: Requirements for warranties.
- B. Assembly Warranty: Manufacturer's standard form in which manufacturer agrees to repair or replace components of steel fire-rated glazed curtain-wall systems that do not comply with requirements or that deteriorate as defined in this Section within specified warranty period.
 - 1. Failures include, but are not limited to, the following:
 - a. Structural failures including, but not limited to, excessive deflection.
 - b. Noise or vibration caused by thermal movements.
 - c. Deterioration of metals, metal finishes, and other materials beyond normal weathering.
 - d. Water leakage.
 - e. Failure of operating components to function normally.
- C. Finish Warranty: Manufacturer's standard form in which manufacturer agrees to repair or replace components on which finishes fail within specified warranty period. Warranty does not include normal weathering.
 - 1. Warranty Period: 20 years from date of Substantial Completion.

PART 2 - PRODUCTS**2.1 MANUFACTURERS**

- A. Manufacturer Glazing Material: "Pyrostop™" fire-rated glazing as manufactured by the Pilkington Group and distributed by Technical Glass Products, 600 6th Street South, Kirkland, WA 98033 (800-426-0279) fax (800-451-9857) e-mail sales@fireglass.com, web site <http://www.fireglass.com>.
- B. Frame System: "Fireframes® Curtainwall Series" fire-rated steel frame system as supplied by Technical Glass Products, 600 6th Street South, Kirkland, WA 98033 (800-426-0279) fax (800-451-9857) e-mail sales@fireglass.com web site <http://www.fireglass.com>.
- C. Door System: "Fireframes® Heat Barrier Series" fire-rated steel door system as manufactured and supplied by Technical Glass Products, 2425 Carillon Point, Kirkland, WA 98033 (800-426-0279) fax (800-451-9857) e-mail sales@fireglass.com web site <http://www.fireglass.com>
- D. Substitutions: Section 01 60 00 – Product Requirements: Product options and substitutions.

2.2 MATERIALS - GLASS

- A. Fire Rated Glazing: ASTM C 1036 and ASTM C 1048; composed of multiple sheets of "Optiwhite" high visible light transmission glass laminated with an intumescent interlayer.
- B. Thickness of Glazing Material: Pyrostop™ 60, 27mm, 1-1/16 inch.
- C. Approximate Visible Transmission: Varies with thickness (approximate range 75 to 88 percent).
- D. Logo: Each piece of fire-rated glazing shall be labeled with a permanent logo including name of product, manufacture, testing laboratory (UL), fire rating period, safety glazing standards, and date of manufacture.

2.3 MATERIALS - STEEL FRAMING

- A. Steel Curtainwall Framing System: 60 minute rated.
 - 1. Steel Frame: Profiled steel tubing permanently joined with steel bolts.
 - 2. Steel Pressure Plates: Formed stainless steel pressure plate with dimensions recommended by manufacturer to securely hold glazing material in place.
 - 3. Cover Caps: Formed steel.
- B. Aluminum: Alloy and temper recommended by manufacturer for type of use and finish indicated.
 - 1. Extruded Bars, Rods, Shapes, and Tubes: ASTM B 221 (ASTM B 221M).
- C. Steel Reinforcement: With manufacturer's standard corrosion-resistant primer complying with SSPC-PS Guide No. 12.00 applied immediately after surface preparation and pretreatment. Select surface preparation methods according to recommendations in SSPC-SP COM and prepare surfaces according to applicable SSPC standard.
 - 1. Structural Shapes, Plates, and Bars: ASTM A 36/A 36M.
 - 2. Cold-Rolled Sheet and Strip: ASTM A 611.
 - 3. Hot-Rolled Sheet and Strip: ASTM A 570/A 570M.

- D. Brackets and Reinforcements: Manufacturer's standard high-strength materials with nonstaining, nonferrous shims for aligning system components.
- E. Fasteners and Accessories: Manufacturer's standard corrosion-resistant, nonstaining, nonbleeding fasteners and accessories compatible with adjacent materials.
 - 1. Where fasteners are subject to loosening or turn out from thermal and structural movements, wind loads, or vibration, use self-locking devices.
 - 2. Reinforce members as required to receive fastener threads.
- F. Anchors: Three-way adjustable anchors that accommodate fabrication and installation tolerances in material and finish compatible with adjoining materials and recommended by manufacturer.
 - 1. Concrete and Masonry Inserts: Hot-dip galvanized cast-iron, malleable-iron, or steel inserts complying with ASTM A 123/A 123M or ASTM A 153/A 153M requirements.
- G. Concealed Flashing: Manufacturer's standard corrosion-resistant, nonstaining, nonbleeding flashing compatible with adjacent materials.

2.4 MATERIALS – DOORS

- A. Manufacturer's standard double leaf doors with manufacture's standard hardware.
- B. Coordinate door hardware with cylinder specified in Section 08 71 00 Hardware.

2.5 ACCESSORIES

- A. Exposed Fasteners: Use fasteners fabricated from Type 304 or Type 316 stainless steel.
- B. Glazing Gaskets:
 - 1. Interior Applications: Glaze Pyrostop glass with approved, closed cell PVC tape, or pure silicone sealant
- C. Intumescent Tape: As supplied by frame manufacturer.
- D. Setting Blocks: Calcium silicate.
- E. Perimeter Anchors: Steel or 316 Stainless steel when exposed.
- F. Flashings: As recommended by manufacturer; same material and finish as cover caps.
- G. Silicone Sealant: One-Part Low Modulus, High Movement-Capable Sealant: Type S; Grade NS; Class 25 with additional movement capability of 100 percent in extension and 50 percent in compression (total 150 percent); Use (Exposure) NT; Uses (Substrates) M, G, A, and O as applicable. (Use-O joint substrates include: Metal factory-coated with a high-performance coating; galvanized steel; ceramic tile.)
 - 1. Available Products: Dow Corning 790 - Dow Corning Corp.
- H. Intumescent Caulk: Single component, latex-based, intumescent caulk designed to stop passage of fire, smoke, and fumes through fire-rated separations; permanently flexible after cure; will not support mold growth; flame spread/smoke developed 10/10.
 - 1. Available Products: Firetemp CI - John-Manville.

2.6 SLAG-WOOL-FIBER/ROCK-WOOL-FIBER INSULATION

- A. Available Manufacturers:
 - 1. Fibrex Insulations Inc.

- 2. Owens Corning.
 - 3. Thermafiber.
- B. Unfaced, Slag-Wool-Fiber/Rock-Wool-Fiber Board Insulation: ASTM C 612, maximum flame-spread and smoke-developed indexes of 15 and 0, respectively; passing ASTM E 136 for combustion characteristics; and of the following nominal density and thermal resistivity:
- 1. Nominal density of 4 lb/cu. ft., Types IA and IB, thermal resistivity of 4 deg F x h x sq. ft./Btu x in. at 75 deg F.
 - 2. Fiber Color: Regular color, unless otherwise indicated.

2.7 FABRICATION

- A. General:
- 1. Fabricate components per manufacturer's installation instructions and with minimum clearances and shim spacing around perimeter of assembly, yet enabling installation and dynamic movement of perimeter seal.
 - 2. Accurately fit and secure joints and corners. Make joints flush and weatherproof.
 - 3. Prepare components to receive anchor devices.
 - 4. Fabricate anchors.
 - 5. Arrange fasteners and attachments to be concealed from view.
- B. Door and Frame Assemblies:
- 1. Furnish frame assemblies pre-welded.
 - a. When necessary, splice frames too large for shop fabrication or shipping or to fit in available building openings.
 - b. Fit with suitable fasteners.
 - c. Knock-down door perimeter frames are not permitted
 - 2. Field glaze door and frame assemblies.
 - 3. Factory prepare steel door assemblies field mounting of hardware
 - 4. Fabrication Dimensions: Fabricate fire rated assembly to field dimensions.
 - 5. Obtain reviewed Shop Drawings prior to fabrication.

2.8 DOOR HARDWARE FOR PAIRED DOORS

- A. Furnish hardware with 60 minute fire door by the manufacturer. Select hardware from door manufacturer's standard recommended and approved hardware groups as specified in Section 08 71 00 - Door Hardware.
- 1. All hardware BHMA Certified
- B. Provide high traffic areas or areas requiring a door motion force of greater than 20 pounds with power assisted hardware for use with manufacturer's frame system.
- C. Operating hardware for Fireframes® Heat Barrier Series Active-Active Pair of Doors with Exit Device Outswing. Each pair to have the following.

	Item	Description	Manufacturer	Finish*
6	Hanging Devices	Weld on Pivots	Technical Glass Products	PTM
2	Exit Device	F5100 Concealed	Dorma	630
2	Lever Trim	Rectangular lever handles	Technical Glass Products	630
1	Cylinder	ANSI Mortise Schlage C Keyway	Technical Glass Products	626
2	Closing Devices	TS 93 Surface Applied Closer	Dorma	689
1	Coordinator	GSR	Dorma	689
1	Auxiliary Fire Latch	Used with exit device with no bottom rod	Technical Glass Products	630
2	Auto door Bottoms	420APKL Smoke Seal	Pemko	MA

1	Weather Seal	Perimeter Gasket	Technical Glass Products
	Balance of hardware by others		

2.9 FINISHES, GENERAL

- A. Comply with NAAMM's "Metal Finishes Manual for Architectural and Metal Products" for recommendations for applying and designating finishes.
- B. Finish frames after assembly.
- C. Appearance of Finished Work: Variations in appearance of abutting or adjacent pieces are acceptable. Noticeable variations in the same piece are not acceptable.

2.10 INTERIOR STEEL FINISHES

- A. Color-Coated Finish: Apply manufacturer's standard powder coating finish system applied to factory-assembled frames before shipping, complying with manufacturer's written instructions for surface preparation including pretreatment, application, and minimum dry film thickness.
 - 1. Color and Gloss: As selected by Architect from manufacturer's full range.

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Site Verification of Conditions: Verify substrate conditions (which have been previously installed under other sections) are acceptable for product installation in accordance with manufacturer's instructions. Verify openings are sized to receive curtain wall system and sill plate is level in accordance with manufacturer's acceptable tolerances.
 - 1. Field Measurements: Verify actual measurements/openings by field measurements before fabrication; show recorded measurements on shop drawings. Coordinate field measurements, fabrication schedule with construction progress to avoid construction delays.

3.2 INSTALLATION

- A. General: Install curtain wall systems plumb, level, and true to line, without warp or rack of frames with manufacturer's prescribed tolerances and installation instructions. Provide support and anchor in place.
- B. Install fire window framing and fully welded fire doors by a specialty contractor with appropriate experience qualifications; and in strict accordance with the approved shop drawings. Employ experienced mechanics familiar with this type of specialized work.
- C. Glazing: Glass shall be outside glazed and held in place with stainless steel pressure plates anchored to the mullion using stainless steel fasteners spaced no greater than 12-inches on center.
- D. Install glazing in strict accordance with fire resistant glazing material manufacturer's specifications. Field cutting or tampering is not permissible.
- E. Firmly pack perimeter of framing system to rough opening with mineral wool fire stop insulation or appropriately rated intumescent sealant.

3.3 FIELD QUALITY CONTROL

- A. **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 ADJUSTING

- A. Adjust door function and hardware for smooth operation. Coordinate with other hardware suppliers for function and use of any other attached hardware.

3.5 PROTECTION AND CLEANING

- A. **Protection:** Protect installed product's finish surfaces from damage during construction. Protect steel fire-rated glazed curtain-wall system from damage from grinding and polishing compounds, plaster, lime, acid, cement, or other harmful contaminants.
- B. **Cleaning:** Repair or replace damaged installed products. Clean installed products in accordance with manufacturer's instructions prior to owner's acceptance. Remove construction debris from project site and legally dispose of debris.

END OF SECTION

SECTION 08 56 19**PASS-THROUGH WINDOWS****PART 1 – GENERAL****1.1 SUMMARY**

- A. Section includes aluminum pass-through windows as indicated on drawings.
- B. Related Sections:
 - 1. Section 05 40 00 – Cold-Formed Metal Framing: Steel lintels and metal framed openings.
 - 2. Section 06 20 00 – Finish Carpentry: Plastic-laminate clad countertop at pass-through windows.
 - 3. Section 07 90 00 – Joint Protection: Perimeter sealant and back-up materials.

1.2 REFERENCES

- A. ASTM International:
 - 1. ASTM B221 – Standard Specification for Aluminum and Aluminum-alloy Extruded Bars, Rods, Wire, Profiles, and Tubes.
- B. California Building Code (2007 edition):
 - 1. Sections 1104B.3.12, 1104B.4.2, and 1118B.

1.3 SUBMITTALS

- A. Section 01 32 19 – Submittal Procedures: Submittal procedures.
- B. Product Data: Submit Manufacturer's technical product data substantiating that products comply.
- C. Shop drawings: Submit for fabrication and installation of windows. Include details, elevations and installation requirement of finish hardware and cleaning.
- D. Certification: Provide printed data in sufficient detail to indicate compliance with the contract documents.

1.4 REGULATORY REQUIREMENTS

- A. Pass-through windows for ticket booths, cashiers, and food service shall conform to the reach and access requirements of CBC Section 1118B, 1104B.3.12 and 1104B.4.2 for accessible transaction areas. Accessible pass-through shelf shall not exceed 34 inches above finished floor surface.

1.5 DELIVERY, STORAGE, AND HANDLING

- A. Section 01 60 00 – Product Requirements: Requirements for transporting, handling, storing, and protecting products.
- B. Deliver windows crated to provide protection during transit and job storage
- C. Inspect windows upon delivery for damage. Unless minor defects can be made to meet the Architect's specifications and satisfaction, damaged parts should be removed and replaced.

- D. Store windows at building site under cover in dry location.

1.6 FIELD MEASUREMENTS

- A. Field measurements: Check opening by accurate field measurement before fabrication. Show recorded measurements on shop drawings.

1.7 COORDINATION

- A. Coordinate fabrication schedule with construction progress to avoid delay of work.

PART 2 - PRODUCTS

2.1 PASS-THROUGH WINDOWS

- A. Manufacturers:
 - 1. Nissen & Company, Inc.
 - 2. C.R. Laurence Co., Inc.
 - 3. Substitutions: Section 01 60 00 – Product Requirements: Product Options and Substitutions.
- B. Product Description and Basis of Design: Aluminum Pass-Through Window, Series "C" vertical sliding serving windows, without a screen, for installation between mullions; manufactured by Nissen & Company, Inc.

2.2 COMPONENTS

- A. Vertical Sliding Serving Window:
 - 1. Series: Nissen C-3624 Series, Vertical Sliding Serving Window.
- B. Frame Material: Heavy type 6063-T5 extruded aluminum. Overall frame sizes in accordance with drawings.
- C. Glazing: 1/4 inch tempered or laminated.
- D. Lock: Manufacturer's standard sliding bolt.
- E. Weatherseal: Brush type wool pile counter seal.

2.3 FINISH

- A. Aluminum finish: Anodized 204R-1 clear aluminite.

PART 3 – EXECUTION

3.1 INSTALLATION

- A. Install frames and glazing in accordance with manufacturer's printed instructions and recommendations. Repair damaged units as directed (if approved by the manufacturer and the Architect) or replace with new units.

3.2 CLEANING

- A. Section 01 74 00 – Cleaning: Final cleaning.

- B. Clean frame and glazing surfaces after installation, complying with requirements contained in the manufacturer's instructions. Remove excess glazing sealant compounds, dirt or other substances.

3.3 PROTECTION

- A. Institute protective measures required throughout the remainder of the construction period to ensure that all the windows do not incur any damage or deterioration, other than normal weathering, at the time of acceptance.

END OF SECTION

SECTION 08 71 00**DOOR HARDWARE****PART 1 – GENERAL****1.1 SUMMARY**

- A. This Section includes items known commercially as finish or door hardware that are required for swing, sliding, and folding doors, except special types of unique hardware specified in the same sections as the doors and door frames on which they are installed.
- B. This Section includes the following, but is not necessarily limited to:
1. Door Hardware, including electric hardware.
 2. Storefront and Entrance door hardware.
 3. Gate Hardware.
 4. Digital keypad access control devices.
 5. Hold-open closers with smoke detectors.
 6. Wall or floor-mounted electromagnetic hold-open devices.
 7. Power supplies for electric hardware.
 8. Low-energy door operators plus sensors and actuators.
 9. Cabinet locks & padlocks.
 10. Thresholds, gasket and weather-stripping.
 11. Door silencers or mutes.
- C. Related Sections: The following sections are noted as containing requirements that relate to this Section, but may not be limited to this listing.
1. Section 06 20 00 - Finish Carpentry: Finish Hardware Installation.
 2. Section 08 12 14 - Standard Steel Frames.
 3. Section 08 13 14 - Standard Steel Doors.
 4. Section 08 14 16 - Flush Wood Doors.
 5. Section 08 14 33 - Stile and Rail Wood Doors.
 6. Section 08 41 13 - Aluminum-Framed Entrances and Storefronts.
 7. Section 08 41 23 - Fire Rated Glass and Framing Systems.
 8. Section 28 13 00 - Access Control and Alarm Monitoring system (ACAMS).
 9. Section 28 31 00 – Fire Detection and Alarm System.

1.2 REFERENCES (Use date of standard in effect as of Bid date.)

- A. ADAAG - Americans with Disabilities Act (ACT) Accessibility Guidelines for Buildings and Facilities.
- B. BHMA - Builders' Hardware Manufacturers Association.
- C. CCR - California Code of Regulations, Title 24, Part 2, California State Accessibility Standards.
- D. DHI - Door and Hardware Institute.
- E. NFPA - National Fire Protection Association:
1. NFPA 80 - Fire Doors and Windows
 2. NFPA 101 - Life Safety Code
 3. NFPA 105 - Smoke and Draft Control Door Assemblies
- F. CBC – 2007 California Building Code.
- G. UL - Underwriters Laboratories:

1. UL 10C - Fire Tests of Door Assemblies
 2. UL 305 - Panic Hardware
- H. WHI - Warnock Hersey Incorporated.
- I. SDI - Steel Door Institute.

1.3 SUBMITTALS AND SUBSTITUTIONS

- A. General: Submit in accordance with Conditions of the Contract and Division 1 Specification sections.
- B. Submit product data (catalog cuts) including manufacturers' technical product information for each item of door hardware, installation instructions, maintenance of operating parts and finish, and other information necessary to show compliance with requirements.
- C. Submit six (6) copies of schedule organized vertically into "Hardware Sets" with index of doors and headings, indicating complete designations of every item required for each door or opening. Include following information:
1. Type, style, function, size and finish of each hardware item.
 2. Name, part number and manufacturer of each item.
 3. Fastenings and other pertinent information.
 4. Location of hardware set coordinated with floor plans and door schedule.
 5. Explanation of all abbreviations, symbols and codes contained in schedule.
 6. Mounting locations for hardware.
 7. Door and frame sizes and materials.
 8. List of manufacturers used and their nearest representative with address and phone number.
 9. Keying information.
- D. Make substitution requests in accordance with Division 1. Substitution requests must be made prior to bid date. Include product data and indicate benefit to the project. Furnish samples of any proposed substitution.
- E. Keying Schedule: Submit separate detailed schedule indicating clearly how the Owner's final instructions on keying of locks has been fulfilled.
- F. Templates for doors, frames, and other work specified to be factory prepared for the installation of door hardware. Check shop drawings of other work to confirm that adequate provisions are made for locating and installing door hardware to comply with indicated requirements.
- G. Furnish as-built/as-installed schedule with close-out documents, including keying schedule, wiring/riser diagrams, manufacturers' installation, adjustment and maintenance information.

1.4 QUALITY ASSURANCE

- A. Obtain each type of hardware (latch and lock sets, hinges, closers, exit devices, etc.) from a single manufacturer.
- B. Supplier Qualifications: A recognized architectural door hardware supplier, with warehousing facilities in the project's vicinity, that has a record of successful in-service performance for supplying door hardware similar in quantity, type, and quality to that indicated for this project and that employs an experienced architectural hardware consultant (AHC) who is available to Owner, Architect, and Contractor, at reasonable times during the course of the Work, for consultation.

1. Responsible for detailing, scheduling and ordering of finish hardware.
 2. Meet with Owner to finalize keying requirements and to obtain final instructions in writing.
 3. Stock parts for products supplied and be capable of repairing and replacing hardware items found defective within warranty periods.
- C. Hardware Installer: Company specializing in the installation of commercial door hardware with five years documented experience.
- D. Fire-Rated Openings: Provide door hardware for fire-rated openings that complies with NFPA Standard No. 80 and requirements of authorities having jurisdiction. Provide only items of door hardware that are listed and tested by UL or Warnock Hersey for given type/size opening and degree of label. Provide proper latching hardware, door closers, approved-bearing hinges and seals whether listed in the Hardware Schedule or not.
1. Where emergency exit devices are required on fire-rated doors, (with supplementary marking on doors' UL labels indicating "Fire Door to be Equipped with Fire Exit Hardware") provide UL label on exit devices indicating "Fire Exit Hardware".
- E. Exit Doors: Operable from inside with single motion without the use of a key or special knowledge or effort.

1.5 PRE-INSTALLATION CONFERENCE

- A. Convene a pre-installation conference at least one week prior to beginning work of this section.
- B. Attendance: Architect, Construction Manager, Contractor, hardware supplier, installer, key District personnel, and Project Inspector.
- C. Agenda: Review hardware schedule, products, installation procedures and coordination required with related work. Review District's keying standards.

1.6 DELIVERY, STORAGE AND HANDLING

- A. Coordinate delivery of packaged hardware items to the appropriate locations (shop or field) for installation.
- B. Hardware items shall be individually packaged in manufacturers' original containers, complete with proper fasteners. Clearly mark packages on outside to indicate contents and locations in hardware schedule and in work.
- C. Provide locked storage area for hardware, protect from moisture, sunlight, paint, chemicals, etc.
- D. Inventory door hardware jointly with representatives of hardware supplier and hardware installer until each is satisfied that count is correct.
- E. Ship all permanent keys, cylinders and/or cores directly from lock manufacturer to Owner.

1.7 WARRANTY

- A. Provide warranties of respective manufacturers' regular terms of sale from day of final acceptance as follows:
1. Closers: Ten (10) years, except electronic closers which shall be two (2) years.
 2. Exit devices: Three (3) years.
 3. Locksets: Seven (7) years
 4. All other hardware: Two (2) years.

1.8 MAINTENANCE

- A. Maintenance Tools and Instructions: Furnish a complete set of specialized tools and maintenance instructions as needed for Owner's continued adjustment, maintenance, and removal and replacement of door hardware.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

	<u>Item</u>	<u>Manufacturer</u>	<u>Match Existing Standards</u>
A.	Hinges	Hager / Ives	Matches existing standard
B.	Locks, Latches & Cylinders	Schlage	Matches existing standard
C.	Exit Devices	Von Duprin	Matches existing standard
D.	Closers	LCN	Matches existing standard
E.	Push, Pulls & Protection Plates	Ives	Matches existing standard
F.	Flush Bolts	Ives	Matches existing standard
G.	Dust Proof Strikes	Ives	Matches existing standard
H.	Coordinators	Ives	Matches existing standard
I.	Stops	Ives	Matches existing standard
J.	Thresholds	National Guard	Pemko
K.	Seals & Bottoms	National Guard	Pemko

2.2 MATERIALS

- A. Continuous Hinges: As manufactured by Select Products Limited. UL rated as required.
- B. Heavy Duty Cylindrical Locks and Latches: Schlage "ND" Series as scheduled with "Sparta" design fastened with through-bolts.
 1. Chassis: Cylindrical design, zinc plated for corrosion-resistance.
 2. Latch Bolt: Steel, 1/2" (12mm) throw, deadlocking on keyed and exterior functions. 3/4" (19mm) throw anti-friction latch available for pairs of fire doors.
 3. Faceplate: Brass, bronze or stainless steel. 1-1/8" x 2-1/4" square corner, beveled.
 4. Lever Trim: Accessible design, pressure cast zinc, plated to match finish symbols. Roses: brass
 5. Locks shall be of such construction that when locked, the door may be opened from within by using lever and without the use of a key or special knowledge.
 6. Vandlgard Function: 7 year warranty, outside lever is disengaged when in the locked mode.

7. Rosettes: Minimum 3-7/16" diameter for coverage of ANSI/DHI A115.18, 1994 door preparation, through-bolt lugs on both spring cages to fully engage this pattern.
 8. Springs: Full compression type.
 9. Strikes: 16 gage curved steel, bronze or brass with 1" deep box construction, lips of sufficient length to clear trim and protect clothing.
- C. Exit devices: Von Duprin as scheduled with push-through pad design, no exposed touch bar fasteners, no exposed cavities when operated.
1. Provide certificate by independent testing laboratory that device has completed over 1,000,000 cycles and can still meet ANSI/BHMA A156.3 - 1994 standards.
 2. All internal parts shall be of cold-rolled steel with zinc dichromate coating.
 3. Mechanism case shall have an average thickness of 0.140 inch.
 4. Compression spring engineering.
 5. Non-handed basic device design with center case interchangeable with all functions.
 6. All devices shall have quiet return fluid dampeners.
 7. All latchbolts shall be deadlocking with 3/4" throw and have a self-lubricating coating to reduce friction and wear.
 8. Device shall bear UL label for fire and or panic as may be required.
 9. All surface strikes shall be roller type and utilize a plate underneath to prevent movement.
 10. Lever Trim: "Breakaway" design, forged brass or bronze escutcheon with a minimum of 0.130 inch thickness, match lockset lever design.
 11. Removable Mullions: Removable with single turn of building key. Securely reinstalled without need for key.
 12. Furnish glass bead kits for vision lites where required.
 13. All Exit Devices to be sex-bolted to the doors.
 14. Panic Hardware shall comply with UBC Standard 10-4 and shall be mounted between 30" and 44" above the finished floor surface. The unlatching force shall not exceed 15 lbs. applied in the direction of travel. Panic hardware shall comply with CBC Section 1003.3.1.9.
- D. Closers: LCN as scheduled. Place closers inside building, stairs, room, etc.
1. Door closer cylinders shall be of high strength cast iron construction with double heat treated pinion shaft to provide low wear operating capabilities of internal parts throughout the life of the installation. All door closers shall be tested to ANSI/BHMA A156.4 test requirements by a BHMA certified testing laboratory. A written certification showing successful completion of a minimum of 10,000,000 cycles must be provided.
 2. All door closers shall be fully hydraulic and have full rack and pinion action with a shaft diameter of a minimum of 11/16 inch and piston diameter of 1 inch to ensure longevity and durability under all closer applications.
 3. All parallel arm closers shall incorporate one piece solid forged steel arms with bronze bushings. 1-9/16" steel stud shoulder bolts, shall be incorporated in regular arms, hold-open arms, arms with hold open and stop built in. All other closers to have forged steel main arms for strength, durability, and aesthetics for versatility of trim accommodation, high strength and long life.
 4. All parallel arm closers so detailed shall provide advanced backcheck for doors subject to severe abuse or extreme wind conditions. This advanced backcheck shall be located to begin cushioning the opening swing of the door at approximately 45 degrees. The intensity of the backcheck shall be fully adjustable by tamper resistant non-critical screw valve.
 5. Closers shall be installed to permit doors to swing 180 degrees.
 6. All closers shall utilize a stable fluid withstanding temperature range of 120 degrees F. to -30 degrees F. without requiring seasonal adjustment of closer speed to properly close the door.

7. Drop brackets are required at narrow head rails.
 8. Maximum effort to operate doors shall not exceed 5 lbs. for exterior doors and 5 lbs. for interior doors, such pull or push effort being applied at right angles to hinged doors. Compensating devices or automatic door operators may be utilized to meet the above standards. When fire doors are required, the maximum effort to operate the door may be increased to min. allowable by appropriate admin authority not to exceed 15 lbs. (66.72N) 1133B.2.5. All closers shall be adjusted to operate with the minimum amount of opening force and still close and latch the door. Reference CBC Sections 1133B.2.1, 1133B.2.5, 1133B.2.5.1 & 1003.3.1.8. Doors shall take at least 3 seconds to move from an open position of 70 degrees to a point of 3 inches from the latch jamb.
 9. Provide sex-bolted or through bolt mounting for all door closers.
- E. Flush Bolts and Dust Proof Strikes: Ives as scheduled.
1. Automatic Flush Bolts shall be of the low operating force design. Utilize the top bolt only model for interior doors where applicable and as permitted by testing procedures.
 2. Manual flush bolts only permitted on storage or mechanical openings as scheduled.
 3. Provide dust proof strikes at openings using bottom bolts.
- F. Coordinators: Ives as scheduled.
1. Coordinator shall be a 1-5/8" wide by 5/8" high aluminum channel with the length variable to the door opening. It shall have a safety mechanism which will allow the active door to close first if under extreme pressure.
- G. Door Stops: Ives as scheduled.
1. Unless otherwise noted in Hardware Sets, provide wall type with appropriate fasteners. Where wall type cannot be used, provide floor type. If neither can be used, provide overhead type.
 2. Do not install floor stops more than four (4) inches from the face of the wall or partition (Title 24, 1133B.8.6).
 3. Overhead stops shall be made of stainless steel and non-plastic mechanisms and finished metal end caps. Field-changeable hold-open, friction and stop-only functions.
- H. Protection Plates: Fabricate either kick, armor, or mop plates with four beveled edges. Provide kick plates 10" high and 2" LDW. Sizes of armor and mop plates shall be listed in the Hardware Schedule. Furnish with machine or wood screws of bronze or stainless to match other hardware.
- I. Lock Protectors: Lock astragals shall be provided with internally threaded fasteners for flat head machine screws. No hex head or carriage bolt fasteners will be permitted. Must be through bolted to door.
- J. Thresholds: As Scheduled and per details.
1. Thresholds shall not exceed 1/2" in height, with a beveled surface of 1:2 maximum slope.
 2. Set thresholds in a full bed of butyl-rubber or polyisobutylene mastic sealant complying with requirements in Section 07 90 00 – Joint Protection.
 3. Use 1/4" fasteners, red-head flat-head sleeve anchors (SS/FHSL).
 4. Thresholds shall comply with CBC Section 1133B.2.4.1.
- K. Seals: Sponge silicone gasket to meet ASTM E 283-1984 test standards. Provide silicone gasket at all rated and exterior doors. All fire rated openings are to be in compliance with UBC 7.2 and UL 10C.

- L. Rain Drips: Provide rain drips at the heads of all exterior doors where there is not enough overhang to protect the opening.
- M. Door Shoes and Door Top Caps: Provide door shoes at all exterior wood doors and top caps at all exterior out-swing doors.
- N. Silencers: Furnish silencers for interior hollow metal frames, 3 for single doors, 2 for pairs of doors. Omit where sound or light seals occurs, or for fire-resistive-rated door assemblies.

2.3 KEYING

- A. Furnish a Grand Master, Master, keyed alike or keyed different system as directed by the District. The District is to verify the Schlage Primus "EP" Level 3 and existing Classic "E" Keyway locations. Conduct a keying meeting with the District to establish all keying requirements.
- B. Provide construction keying for doors requiring locking during construction; remove temporary cores immediately prior to District occupancy. Permanent cores and keys are to be shipped directly from the factory to the District.
- C. Keys: Supply keys and blanks as follows:
 - 1. Supply 2 cut change keys per lock
 - 2. Supply 50 each "EP" 6 pin key blanks stamped "DO NOT DUPLICATE".
 - 3. Supply 20 construction keys.
 - 4. Supply 3 Cut Construction Control keys and 6 Permanent Cut Control keys.

2.4 FINISHES

- A. Generally to be SATIN CHROME US26D (626) unless otherwise noted.
- B. Furnish push plates, pull plates and kick or armor plates in US 32D(630) unless otherwise noted.
- C. Door closers shall be powder-coated to match other hardware, unless otherwise noted.

2.5 FASTENERS

- A. Screws for strikes, face plates and similar items shall be flat head, countersunk type, provide machine screws for metal and standard wood screws for wood.
- B. Screws for butt hinges shall be flathead, countersunk, full-thread type.
- C. Fastening of closer bases or closer shoes to doors shall be by means of sex bolts and spray painted to match closer finish.
- D. Provide expansion anchors for attaching hardware items to concrete or masonry.
- E. All exposed fasteners shall have a phillips head.
- F. Finish of exposed screws to match surface finish of hardware or other adjacent work.
- G. All Exit Devices and Lock Protectors shall be fastened to the door by the means of sex bolts or through bolts.

PART 3 - EXECUTION**3.1 EXAMINATION**

- A. Verify that doors and frames are square and plumb and ready to receive work and dimensions are as instructed by the manufacturer.
- B. Beginning of installation means acceptance of existing conditions.

3.2 INSTALLATION

- A. Install hardware in accordance with manufacturer's instructions and requirements of DHI.
- B. Use the templates provided by hardware item manufacturer.
- C. Mounting heights for hardware shall be as recommended by the Door and Hardware Institute. Operating hardware will to be located between 30" and 44" AFF. Per CBC Section 1133B.2.5.1.
- D. Set units level, plumb and true to line and location. Adjust and reinforce the attachment substrate as necessary for proper installation and operation.
- E. Drill and countersink units that are not factory-prepared for anchorage fasteners. Space fasteners and anchors in accordance with industry standards.
- F. Set thresholds for exterior doors in full bed of butyl-rubber sealant.
- G. If hand of door is changed during construction, make necessary changes in hardware at no additional cost.

3.3 ADJUST AND CLEAN

- A. Adjust and check each operating item of hardware and each door, to ensure proper operation or function of every unit. Replace units which cannot be adjusted to operate freely and smoothly as intended for the application made.
- B. Clean adjacent surface soiled by hardware installation.
- C. Final Adjustment: Wherever hardware installation is made more than one month prior to acceptance or occupancy of a space or area, return to the work during the week prior to acceptance or occupancy, and make final check and adjustment of all hardware items in such space or area. Clean operating items as necessary to restore proper function and finish of hardware and doors. Adjust door control devices to compensate for final operation of heating and ventilating equipment.
- D. Instruct Owner's Personnel in proper adjustment and maintenance of hardware finishes, during the final adjustment of hardware.
- E. Continued Maintenance Service: Approximately six months after the completion of the project, the Contractor accompanied by the Architectural Hardware Consultant, shall return to the project and re-adjust every item of hardware to restore proper functions of doors and hardware. Consult with and instruct Owner's personnel in recommended additions to the maintenance procedures. Replace hardware items which have deteriorated or failed due to faulty design, materials or installation of hardware units. Prepare a written report of current and predictable problems (of substantial nature) in the performance of the hardware.

3.4 HARDWARE LOCATIONS

- A. Conform to CCR, Title 24, Part 2, and ADAAG for positioning requirements for persons with disabilities. Operating hardware to be mounted between 30" and 44" above finished floor.

3.5 FIELD QUALITY CONTROL

- A. Architectural Hardware Consultant (AHC) to inspect installation and certify that hardware and its installation have been furnished and installed in accordance with manufacturer's instructions and as specified herein.

3.6 SCHEDULE

- A. The items listed in the following schedule shall conform to the requirements of the foregoing specifications.
- B. The Door Schedule on the Drawings indicates which hardware set is used with each door.

General Specification**Manufacturers Abbreviations (Mfr.)**

GLY	=	Glynn-Johnson Corporation	Overhead Stops
HAG	=	Hager	Hinges
IVE	=	Ives	Push, Pulls, Protection Plates, & Stops
LCN	=	LCN	Door Closers, Auto Operators
NGP	=	National Guard Products	Thresholds, Gasket & Weatherstrip
SCH	=	Schlage Lock Company	Locks, Latches & Cylinders
SEL	=	Select	Continuous Hinges
VON	=	Von Duprin	Exit Devices & Mullions

NOTE #1: THIS PROJECT IS TO HAVE A SCHLAGE PRIMUS LEVEL 3 KEYING SYSTEM AT LOCATIONS INDICATED IN THE HARDWARE SCHEDULE. THE BALANCE OF OPENINGS IS TO HAVE A SCHLAGE CLASSIC KEYWAY PER DIRECTION OF THE DISTRICT. ALL PERMANENT CORES AND KEYS ARE TO BE SHIPPED DIRECTLY FROM THE FACTORY TO THE DISTRICT. DURING CONSTRUCTION THE PROJECT IS TO HAVE CONSTRUCTION CORES. VERIFY ALL KEYING REQUIREMENTS WITH DISTRICT.

NOTE # 2: VERIFY THE FINISH OF ALL HARDWARE.

SPECWORKS # 84088-B6VX45KBR

HW SET: 01 EXTERIOR PAIR / ACCESS CONTROL, CARD READER / AUTO OPERATOR

DOOR NUMBER:

6-101

EACH TO HAVE:

2	EA	POWER TRANSFER	EPT-10	313	VON
2	EA	CONTINUOUS HINGE	SL11 EPT	BR	SEL
1	EA	DOGGED EL DEVICE	SD-EL9947NL X 990NL	313	VON
1	EA	PANIC HARDWARE	SD-EL9947DT X 990DT	313	VON
1	EA	IC RIM CYLINDER	20-057T X ICX (CONST CORE)	613	SCH
1	EA	PERMANENT CORE	20-740 (PRIMUS)	606	SCH
2	EA	MORTISE CYLINDER	20-771 (FOR SD DOGGING)	613	SCH
1	EA	SURFACE CLOSER	4041 X 18G TOP JAMB MOUNT	695	LCN
1	EA	AUTO-EQUALIZER	4642 (CS) FLUSH CEILING MOUNT	695	LCN
2	EA	OVERHEAD STOP	100S	613	GLY
1	SET	WEATHER SEAL	SUPPLY WITH DOOR AND FRAME ASSEMBLY		
2	EA	DOOR SWEEP	SUPPLY WITH DOOR AND FRAME ASSEMBLY		
1	EA	THRESHOLD	PER DETAIL	DKB	
1	EA	POWER SUPPLY	PS873 X 2 X AO	GRY	VON
2	EA	DOOR CONTACT	PROVIDED UNDER SECURITY SECTION		
1	EA	KEY PAD/CARD READ	PROVIDED UNDER SECURITY SECTION		
1	EA	REQUEST TO EXIT	PROVIDED UNDER SECURITY SECTION		
2	EA	ACTUATOR, WALL MOUNT	8310-856		LCN
2	EA	FLUSH MOUNT BOX	8310-868F		LCN

HW SET: 01A EXTERIOR / ALUM STOREFRONT / ACAMS

DOOR NUMBER:

6-101A

EACH TO HAVE:

1	EA	DOOR CORD	788-18		SCE
1	EA	CONTINUOUS HINGE	SL11	BR	SEL
1	EA	PANIC HARDWARE	CD99L E996L X 17 FSE	313	VON
1	EA	IC RIM CYLINDER	20-057T X ICX (CONST CORE)	613	SCH
1	EA	PERMANENT CORE	20-740 (PRIMUS)	606	SCH
1	EA	MORTISE CYLINDER	20-771 X XQ11-948 (FOR CD DOGGING)	613	SCH
1	EA	SURFACE CLOSER	4041 EDA	695	LCN
1	EA	FLOOR STOP	FS444	613	IVE
1	SET	WEATHER SEAL	SUPPLY WITH DOOR AND FRAME ASSEMBLY		
1	EA	DOOR SWEEP	SUPPLY WITH DOOR AND FRAME ASSEMBLY		
1	EA	THRESHOLD	PER DETAIL	DKB	
1	EA	DOOR CONTACT	PROVIDED UNDER SECURITY SECTION		
1	EA	REQUEST TO EXIT	PROVIDED UNDER SECURITY SECTION		

HW SET: 01B EXTERIOR PAIR / ACCESS CONTROL, CARD READER

DOOR NUMBER:

5-201

EACH TO HAVE:

2	EA	DOOR CORD	788-18		SCE
2	EA	CONTINUOUS HINGE	SL11	BR	SEL
1	EA	DOGGED EL DEVICE	SD-EL9947NL X 990NL	313	VON
1	EA	PANIC HARDWARE	SD-EL9947DT X 990DT	313	VON
1	EA	IC RIM CYLINDER	20-057T X ICX (CONST CORE)	613	SCH
1	EA	PERMANENT CORE	20-740 (PRIMUS)	606	SCH
2	EA	MORTISE CYLINDER	20-771 (FOR SD DOGGING)	613	SCH
2	EA	SURFACE CLOSER	4041 X 18G TOP JAMB MOUNT	695	LCN
2	EA	OVERHEAD STOP	904S	630	GLY
1	SET	WEATHER SEAL	SUPPLY WITH DOOR		
2	EA	DOOR SWEEP	SUPPLY WITH DOOR		
1	EA	THRESHOLD	PER DETAIL	DKB	
1	EA	POWER SUPPLY	PS873-2	GRY	VON
1	EA	CARD READER	PROVIDED UNDER SECURITY SECTION		
2	EA	DOOR CONTACT	PROVIDED UNDER SECURITY SECTION		
1	EA	REQUEST TO EXIT	PROVIDED UNDER SECURITY SECTION		

HW SET: 01D EXTERIOR PAIR / ACCESS CONTROL, CARD READER

DOOR NUMBER:

5-301C 5-320F

EACH TO HAVE:

2	EA	DOOR CORD	788-18		SCE
2	EA	CONTINUOUS HINGE	SL11	BR	SEL
1	EA	DOGGED EL DEVICE	SD-EL9947NL X 990NL	313	VON
1	EA	PANIC HARDWARE	SD-EL9947DT X 990DT	313	VON
1	EA	IC RIM CYLINDER	20-057T X ICX (CONST CORE)	613	SCH
1	EA	PERMANENT CORE	20-740 (PRIMUS)	606	SCH
2	EA	MORTISE CYLINDER	20-771 (FOR SD DOGGING)	613	SCH
2	EA	SURFACE CLOSER	4041 X 18G TOP JAMB MOUNT	695	LCN
2	EA	OVERHEAD STOP	904S	630	GLY
1	SET	WEATHER SEAL	SUPPLY WITH DOOR		
2	EA	DOOR SWEEP	SUPPLY WITH DOOR		
1	EA	THRESHOLD	PER DETAIL	DKB	
1	EA	POWER SUPPLY	PS873-2	GRY	VON
2	EA	DOOR CONTACT	PROVIDED UNDER SECURITY SECTION		
1	EA	REQUEST TO EXIT	PROVIDED UNDER SECURITY SECTION		

HW SET: 01E EXTERIOR PAIR / ACCESS CONTROL, CARD READER / AUTO OPERATOR

DOOR NUMBER:

5-101 5-301B 5-320D 5-320E

EACH TO HAVE:

2	EA	DOOR CORD	788-18		SCE
2	EA	CONTINUOUS HINGE	SL11	BR	SEL
1	EA	DOGGED EL DEVICE	SD-EL9947NL X 990NL	313	VON
1	EA	PANIC HARDWARE	SD-EL9947DT X 990DT	313	VON
1	EA	IC RIM CYLINDER	20-057T X ICX (CONST CORE)	613	SCH
1	EA	PERMANENT CORE	20-740 (PRIMUS)	606	SCH
2	EA	MORTISE CYLINDER	20-771 (FOR SD DOGGING)	613	SCH
1	EA	SURFACE CLOSER	4041 X 18G TOP JAMB MOUNT	695	LCN
1	EA	AUTO-EQUALIZER	4642 (CS) FLUSH CEILING MOUNT	695	LCN
2	EA	OVERHEAD STOP	904S	630	GLY
1	SET	WEATHER SEAL	SUPPLY WITH DOOR		
2	EA	DOOR SWEEP	SUPPLY WITH DOOR		
1	EA	THRESHOLD	PER DETAIL		
1	EA	POWER SUPPLY	PS873 X 2 X AO	DKB	
2	EA	DOOR CONTACT	PROVIDED UNDER SECURITY SECTION	GRY	VON
1	EA	KEY PAD/CARD READ	PROVIDED UNDER SECURITY SECTION		
1	EA	REQUEST TO EXIT	PROVIDED UNDER SECURITY SECTION		
2	EA	ACTUATOR, WALL MOUNT	8310-856		LCN
2	EA	FLUSH MOUNT BOX	8310-868F		LCN

HW SET: 01F EXTERIOR PAIR / ACCESS CONTROL, CARD READER

DOOR NUMBER:

5-301

EACH TO HAVE:

2	EA	POWER TRANSFER	EPT-10	313	VON
2	EA	CONTINUOUS HINGE	SL11 EPT	BR	SEL
1	EA	DOGGED EL DEVICE	SD-EL9947NL X 990NL	313	VON
1	EA	PANIC HARDWARE	SD-EL9947DT X 990DT	313	VON
1	EA	IC RIM CYLINDER	20-057T X ICX (CONST CORE)	613	SCH
1	EA	PERMANENT CORE	20-740 (PRIMUS)	606	SCH
2	EA	MORTISE CYLINDER	20-771 (FOR SD DOGGING)	613	SCH
2	EA	SURFACE CLOSER	4041 X 18G TOP JAMB MOUNT	695	LCN
2	EA	OVERHEAD STOP	100S	613	GLY
1	SET	WEATHER SEAL	SUPPLY WITH DOOR AND FRAME ASSEMBLY		
2	EA	DOOR SWEEP	SUPPLY WITH DOOR AND FRAME ASSEMBLY		
1	EA	THRESHOLD	PER DETAIL		
1	EA	POWER SUPPLY	PS873-2	DKB	
2	EA	DOOR CONTACT	PROVIDED UNDER SECURITY SECTION	GRY	VON
1	EA	KEY PAD/CARD READ	PROVIDED UNDER SECURITY SECTION		
1	EA	REQUEST TO EXIT	PROVIDED UNDER SECURITY SECTION		

HW SET: 02 EXTERIOR / ALUM STOREFRONT / ACAMS / AUTO OPERATOR

DOOR NUMBER:

6-111 6-112

EACH TO HAVE:

1	EA	DOOR CORD	788-18		SCE
1	EA	CONTINUOUS HINGE	SL11	BR	SEL
1	EA	PANIC HARDWARE	SD-EL99NL X 990NL	313	VON
1	EA	IC RIM CYLINDER	20-057T X ICX (CONST CORE)	613	SCH
1	EA	PERMANENT CORE	20-740 (PRIMUS)	606	SCH
1	EA	MORTISE CYLINDER	20-771 (FOR SD DOGGING)	613	SCH
1	EA	AUTO-EQUALIZER	4642 (CS) FLUSH CEILING MOUNT	695	LCN
1	EA	OVERHEAD STOP	904S	613	GLY
1	SET	WEATHER SEAL	SUPPLY WITH DOOR AND FRAME ASSEMBLY		
1	EA	DOOR SWEEP	SUPPLY WITH DOOR AND FRAME ASSEMBLY		
1	EA	THRESHOLD	PER DETAIL		
1	EA	POWER SUPPLY	PS873 X 2 X AO	DKB	
1	EA	DOOR CONTACT	PROVIDED UNDER SECURITY SECTION	GRY	VON
1	EA	KEY PAD/CARD READ	PROVIDED UNDER SECURITY SECTION		
1	EA	REQUEST TO EXIT	PROVIDED UNDER SECURITY SECTION		
2	EA	ACTUATOR, WALL MOUNT	8310-856		LCN
2	EA	FLUSH MOUNT BOX	8310-868F		LCN

HW SET: 02A

DOOR NUMBER:

6-112A

EACH TO HAVE:

1			EXISTING DOORS, FRAMES, & HARDWARE TO REMAIN		
1	EA	DOOR CONTACT	PROVIDED UNDER SECURITY SECTION		

HW SET: 03 INTERIOR PAIR / RATED

DOOR NUMBER:

6-101B

EACH TO HAVE:

6	EA	HINGE	BB1168 4.5 X 4.5 NRP	640	HAG
1	EA	FIRE EXIT HARDWARE	9927EO-F-LBR	313	VON
1	EA	FIRE EXIT HARDWARE	9927L-F-LBR 996L X 17	313	VON
1	EA	IC RIM CYLINDER	20-057T X ICX (CONST CORE)	613	SCH
1	EA	CORE ONLY	23-030 (CONVENTIONAL CORE)	606	SCH
2	EA	SURFACE CLOSER	4041 EDA	695	LCN
2	EA	KICK PLATE	8400 10" X 2"LDW	613	IVE
2	EA	DOME STOP	FS436	613	IVE
1	SET	GASKET	PER SELECTED DOOR MFGR		

HW SET: 04 EXTERIOR PAIR / PANIC HARDWARE / DOOR CONTACTS

DOOR NUMBER:

6-102

EACH TO HAVE:

2	EA	CONTINUOUS HINGE	SL11	BR	SEL
1	EA	PANIC HARDWARE	CD9947DT	313	VON
1	EA	PANIC HARDWARE	CD9947NL	313	VON
1	EA	IC RIM CYLINDER	20-057T X ICX (CONST CORE)	613	SCH
1	EA	PERMANENT CORE	20-740 (PRIMUS)	606	SCH
2	EA	MORTISE CYLINDER	20-771 X XQ11-948 (FOR CD DOGGING)	613	SCH
2	EA	SURFACE CLOSER	4041 EDA	695	LCN
2	EA	FLOOR STOP	FS444	613	IVE
1	SET	WEATHER SEAL	SUPPLY WITH DOOR AND FRAME ASSEMBLY		
2	EA	DOOR SWEEP	SUPPLY WITH DOOR AND FRAME ASSEMBLY		
1	EA	THRESHOLD	PER DETAIL	DKB	
2	EA	DOOR CONTACT	PROVIDED UNDER SECURITY SECTION		

HW SET: 05 MOVEABLE PARTITION DOOR

DOOR NUMBER:

6-102A 6-102B

EACH TO HAVE:

1	EA	MORTISE CYLINDER	20-061T (FOR PARTITION DOORS)	613	SCH
1	EA	CORE ONLY	23-030 (CONVENTIONAL CORE)	606	SCH
1	SET	HARDWARE	BY DOOR MFG		

NOTE: VERIFY CYLINDER REQUIRED. IT SHOULD HAVE A SCHLAGE 6 PIN IC CORE "E" KEYWAY.

HW SET: 06 EXTERIOR / PANIC HARDWARE / ACCESS CONTROL

DOOR NUMBER:

6-103

EACH TO HAVE:

1	EA	CONTINUOUS HINGE	SL11	BR	SEL
1	EA	PANIC DEVICE	CD99NL X 990NL	613	VON
1	EA	IC RIM CYLINDER	20-057T X ICX (CONST CORE)	613	SCH
1	EA	PERMANENT CORE	20-740 (PRIMUS)	606	SCH
1	EA	MORTISE CYLINDER	20-771 X XQ11-948 (FOR CD DOGGING)	613	SCH
1	EA	SURFACE CLOSER	4041 EDA	695	LCN
1	EA	FLOOR STOP	FS444	613	IVE
1	SET	WEATHER SEAL	SUPPLY WITH DOOR AND FRAME ASSEMBLY		
1	EA	DOOR SWEEP	SUPPLY WITH DOOR AND FRAME ASSEMBLY		
1	EA	THRESHOLD	PER DETAIL	DKB	
1	EA	DOOR CONTACT	PROVIDED UNDER SECURITY SECTION		

HW SET: 07 INTERIOR PAIR / RATED / ACCESS CONTROL, CARD READER

DOOR NUMBER:

6-103A

EACH TO HAVE:

5	EA	HINGE	BB1168 4.5 X 4.5 NRP	640	HAG
1	EA	THRU-WIRE HINGE	BB1168 4.5 X 4.5 ETW 4	640	HAG
1	EA	FIRE EXIT HARDWARE	9927EO-F-LBR	313	VON
1	EA	FIRE EXIT HARDWARE	9927L-F-LBR E996L X 17	313	VON
1	EA	IC RIM CYLINDER	20-057T X ICX (CONST CORE)	613	SCH
1	EA	PERMANENT CORE	20-740 (PRIMUS)	606	SCH
2	EA	SURFACE CLOSER	4041 EDA	695	LCN
2	EA	KICK PLATE	8400 10" X 2"LDW	613	IVE
2	EA	DOME STOP	FS436	613	IVE
1	EA	MAGNETIC HOLD-OPEN	SEM 7830 24V	695	LCN
1	SET	GASKET	PER SELECTED DOOR MFGR		
1	EA	CARD READER	PROVIDED UNDER SECURITY SECTION		
2	EA	DOOR CONTACT	PROVIDED UNDER SECURITY SECTION		
1	EA	REQUEST TO EXIT	PROVIDED UNDER SECURITY SECTION		

NOTE: THIS OPENING HAS ELECTRIFIED TRIM

HW SET: 08 INTERIOR / RATED / ELEC, STORAGE

DOOR NUMBER:

5-227B

5-229

6-104

EACH TO HAVE:

3	EA	HINGE	BB1279	640	HAG
1	EA	STOREROOM LOCK	ND80TD SPA	613	SCH
1	EA	PERMANENT CORE	20-740 (PRIMUS)	606	SCH
1	EA	SURFACE CLOSER	4041	695	LCN
1	EA	DOME STOP	FS436	613	IVE
1	SET	GASKET	PER SELECTED DOOR MFGR		
1	EA	SILL	PER DETAIL		

HW SET: 08A INTERIOR / RATED / TEL, DATA, ELEV MACH

DOOR NUMBER:

5-102

5-104

EACH TO HAVE:

3	EA	HINGE	BB1279 NRP	640	HAG
1	EA	STOREROOM LOCK	ND80TD SPA	613	SCH
1	EA	PERMANENT CORE	20-740 (PRIMUS)	606	SCH
1	EA	SURFACE CLOSER	4041 EDA	695	LCN
1	EA	DOME STOP	FS436	613	IVE
1	SET	SEALS	2525B	BRN	NGP
1	EA	SILL	PER DETAIL		

HW SET: 08B INTERIOR / RATED / ELEV MACH, STORAGE

DOOR NUMBER:

5-111 5-120 5-203 5-204A 5-208 5-231
 5-302 5-342

EACH TO HAVE:

3	EA	HINGE	BB1279 NRP	640	HAG
1	EA	STOREROOM LOCK	ND80TD SPA	613	SCH
1	EA	PERMANENT CORE	20-740 (PRIMUS)	606	SCH
1	EA	SURFACE CLOSER	4041 EDA	695	LCN
1	EA	KICK PLATE	8400 10" X 2"LDW	613	IVE
1	EA	DOME STOP	FS436	613	IVE
1	SET	GASKET	PER SELECTED DOOR MFGR		
1	EA	SILL	PER DETAIL		

HW SET: 08C INTERIOR / RATED / MECH RM

DOOR NUMBER:

5-102A

EACH TO HAVE:

3	EA	HINGE	BB1279	640	HAG
1	EA	STOREROOM LOCK	ND80TD SPA	613	SCH
1	EA	PERMANENT CORE	20-740 (PRIMUS)	606	SCH
1	EA	SURFACE CLOSER	4041	695	LCN
1	EA	DOME STOP	FS436	613	IVE
1	SET	SEALS	2525B	BRN	NGP

HW SET: 08D INTERIOR / RATED / CLOSET

DOOR NUMBER:

5-225

EACH TO HAVE:

3	EA	HINGE	BB1279 NRP	640	HAG
1	EA	STOREROOM LOCK	ND80TD SPA	613	SCH
1	EA	CORE ONLY	23-030 (CONVENTIONAL CORE)	606	SCH
1	EA	SURFACE CLOSER	4041PA	695	LCN
1	SET	GASKET	PER SELECTED DOOR MFGR		
1	EA	SILL	PER DETAIL		

HW SET: 08F INTERIOR / JANITOR

DOOR NUMBER:

5-121A

EACH TO HAVE:

3	EA	HINGE	BB1279	640	HAG
1	EA	STOREROOM LOCK	ND80TD SPA	613	SCH
1	EA	PERMANENT CORE	20-740 (PRIMUS)	606	SCH
1	EA	KICK PLATE	8400 10" X 2"LDW	613	IVE
1	EA	DOME STOP	FS436	613	IVE
3	EA	SILENCER	SR64	GRY	IVE

HW SET: 08G EXTERIOR / ELEV MACH / FRP DOOR

DOOR NUMBER:

5-362

EACH TO HAVE:

1	EA	CONTINUOUS HINGE	SL11	BR	SEL
1	EA	STOREROOM LOCK	ND96TD SPA	613	SCH
1	EA	PERMANENT CORE	20-740 (PRIMUS)	606	SCH
1	EA	SURFACE CLOSER	4041 EDA	695	LCN
1	EA	FLOOR STOP & HOLDER	FS43	613	IVE
1	SET	SEALS	2525B	BRN	NGP
1	EA	DOOR SWEEP	200NA 36"	DKB	NGP
1	EA	SILL	PER DETAIL		

HW SET: 09 INTERIOR / RATED / OFFICE

DOOR NUMBER:

5-224 5-226 6-105

EACH TO HAVE:

3	EA	HINGE	BB1279	640	HAG
1	EA	ENTRANCE LOCK	ND53TD SPA	613	SCH
1	EA	CORE ONLY	23-030 (CONVENTIONAL CORE)	606	SCH
1	EA	SURFACE CLOSER	4041	695	LCN
1	EA	DOME STOP	FS436	613	IVE
1	SET	GASKET	PER SELECTED DOOR MFGR		
1	EA	SILL	PER DETAIL		

HW SET: 10 INTERIOR / RATED / FACILITIES STORAGE

DOOR NUMBER:

6-105A

EACH TO HAVE:

3	EA	HINGE	BB1168 5 X 4.5	640	HAG
1	EA	STOREROOM LOCK	ND80TD SPA	613	SCH
1	EA	PERMANENT CORE	20-740 (PRIMUS)	606	SCH
1	EA	SURFACE CLOSER	4041	695	LCN
1	EA	KICK PLATE	8400 10" X 2"LDW	613	IVE
1	EA	DOME STOP	FS436	613	IVE
1	SET	GASKET	PER SELECTED DOOR MFGR		
1	EA	SILL	PER DETAIL		

HW SET: 11**DOOR NUMBER:**

5-114	5-114A	5-116	5-204	5-212	5-212A
5-320	5-320A	5-320B	5-320C	5-321	5-321A
5-322	5-322A	5-322B	5-323	5-323A	5-323B
5-324	5-325	5-330	5-331	5-332	5-333
5-333A	5-334	5-352A	5-ST-N	5-ST-S	

EACH TO HAVE:

1		EXISTING DOORS, FRAMES, & HARDWARE TO REMAIN
	CYLINDERS	REKEY OR REPLACE LOCK CYLS TO DIST STD

NOTE: IF THE EXISTING LOCK CYLINDERS DO NOT MEET DISTRICT STANDARDS REPLACE OR REKEY. VERIFY EXISTING KEYING WITH DISTRICT.

HW SET: 12 INTERIOR / RATED / ELEVATOR**DOOR NUMBER:**

5-101A	5-117B	5-201A	5-301A
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EACH TO HAVE:

3	EA	HINGE	BB1168 5 X 4.5	640	HAG
1	EA	PASSAGE SET	ND10S SPA 13-048 10-025	613	SCH
1	EA	SURFACE CLOSER	1461 (PULL SIDE MOUNTED)	695	LCN
1	EA	DOME STOP	FS436	613	IVE
1	EA	MAGNETIC HOLD-OPEN	SEM 7830 24V	695	LCN
1		SET SEALS	2525B	BRN	NGP

HW SET: 12A INTERIOR / RATED / ELEVATOR**DOOR NUMBER:**

5-201D	5-EL-S
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EACH TO HAVE:

3	EA	HINGE	BB1168 5 X 4.5	640	HAG
1	EA	PASSAGE SET	ND10S SPA 13-048 10-025	613	SCH
1	EA	SURFACE CLOSER	1461 (PULL SIDE MOUNTED)	695	LCN
1	EA	DOME STOP	FS436	613	IVE
1	EA	MAGNETIC HOLD-OPEN	SEM 7830 24V	695	LCN
1		SET SEALS	2525B	BRN	NGP

HW SET: 13 INTERIOR / RATED / MEETING**DOOR NUMBER:**

5-108	5-202	5-205	5-207
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EACH TO HAVE:

3	EA	HINGE	BB1279	640	HAG
1	EA	CLASSROOM SEC LOCK	ND75TD SPA	613	SCH
2	EA	CORE ONLY	23-030 (CONVENTIONAL CORE)	606	SCH
1	EA	SURFACE CLOSER	4041	695	LCN
1	EA	DOME STOP	FS436	613	IVE
1	EA	MAGNETIC HOLD-OPEN	SEM 7830 24V	695	LCN
1		SET GASKET	PER SELECTED DOOR MFGR		
1	EA	SILL	PER DETAIL		

HW SET: 13A INTERIOR / RATED / MEETING ROOM / OUTSWING DOOR

DOOR NUMBER:

5-112

EACH TO HAVE:

3	EA	HINGE	BB1279 NRP	640	HAG
2	EA	CLASSROOM SEC LOCK	ND75TD SPA	613	SCH
1	EA	CORE ONLY	23-030 (CONVENTIONAL CORE)	606	SCH
1	EA	SURFACE CLOSER	4041 EDA	695	LCN
1	EA	KICK PLATE	8400 10" X 2"LDW	613	IVE
1	EA	DOME STOP	FS436	613	IVE
1	EA	MAGNETIC HOLD-OPEN	SEM 7830 24V	695	LCN
1	SET	GASKET	PER SELECTED DOOR MFGR		
1	EA	SILL	PER DETAIL		

HW SET: 14 INTERIOR PAIR / RATED / CLASSROOM

DOOR NUMBER:

5-115

EACH TO HAVE:

6	EA	HINGE	BB1279 NRP	640	HAG
1	SET	AUTO FLUSH BOLT	FB42	630	IVE
1	EA	CLASSROOM SEC LOCK	ND75TD SPA 14-042	613	SCH
2	EA	CORE ONLY	23-030 (CONVENTIONAL CORE)	606	SCH
1	EA	COORDINATOR	COR X FL X MB	628	IVE
2	EA	SURFACE CLOSER	4041PA	695	LCN
2	EA	KICK PLATE	8400 10" X 2"LDW	613	IVE
2	EA	DOME STOP	FS436	613	IVE
1	EA	MAGNETIC HOLD-OPEN	SEM 7830 24V	695	LCN
1	SET	GASKET	PER SELECTED DOOR MFGR		

HW SET: 14A INTERIOR / RATED / EXISTING DOOR AT VESTIBULE

DOOR NUMBER:

5-117C

EACH TO HAVE:

1	EA	PASSAGE SET	ND10S SPA 13-048 10-025	613	SCH
1	EA	SURFACE CLOSER	4041 SCUSH	695	LCN

HW SET: 15 EXISTING / ADD DOOR CONTACT AND LOCAL ALARM

DOOR NUMBER:

5-117

EACH TO HAVE:

1	EA	FIRE EXIT HARDWARE	99EO W/ "EMERGENCY EXIT ONLY, PUSH TO..."	313	VON
1	EA	MORTISE CYLINDER	20-771 (FOR KEY SWITCH)	613	SCH
1	EA	SURFACE CLOSER	4041 EDA	695	LCN
1	EA	ALARM / HORN	PROVIDED UNDER SECURITY SECTION		
1	EA	DOOR CONTACT	PROVIDED UNDER SECURITY SECTION		
1	EA	KEY SWITCH	PROVIDED UNDER SECURITY SECTION		

NOTE: THIS DOOR IS ALARMED BY DOOR CONTACTS. PANIC HARDWARE IS NOT ELECTRIFIED AND IS TO READ "EMERGENCY EXIT ONLY, PUSH TO OPEN AND SOUND ALARM". ALARM PROVIDED BY SECURITY SECTION. KEY SWITCH TO DISENGAGE ALARM.

HW SET: 15A EXTERIOR / LOADING DOCK / DOOR CONTACT AND LOCAL ALARM

DOOR NUMBER:

5-221A 5-223A

EACH TO HAVE:

1	EA	CONTINUOUS HINGE	SL11	BR	SEL
1	EA	FIRE EXIT HARDWARE	99EO W/ "EMERGENCY EXIT ONLY, PUSH TO..."	313	VON
1	EA	MORTISE CYLINDER	20-771 (FOR KEY SWITCH)	613	SCH
1	EA	SURFACE CLOSER	4041 SCUSH	695	LCN
1	SET	SEALS	2525B	BRN	NGP
1	EA	DOOR SWEEP	200NA 36"	DKB	NGP
1	EA	THRESHOLD	PER DETAIL	DKB	
1	EA	ALARM / HORN	PROVIDED UNDER SECURITY SECTION		
1	EA	DOOR CONTACT	PROVIDED UNDER SECURITY SECTION		
1	EA	KEY SWITCH	PROVIDED UNDER SECURITY SECTION		

NOTE: THIS DOOR IS ALARMED BY DOOR CONTACTS. PANIC HARDWARE IS NOT ELECTRIFIED AND IS TO READ "EMERGENCY EXIT ONLY, PUSH TO OPEN AND SOUND ALARM". ALARM PROVIDED BY SECURITY SECTION. KEY SWITCH TO DISENGAGE ALARM.

HW SET: 16 INTERIOR / RATED / CORRIDOR

DOOR NUMBER:

5-117A

EACH TO HAVE:

3	EA	HINGE	BB1168	640	HAG
1	EA	FIRE EXIT HARDWARE	99L-F 996L-BE X 17	313	VON
1	EA	SURFACE CLOSER	4041 EDA	695	LCN
1	EA	KICK PLATE	8400 10" X 2"LDW	613	IVE
1	EA	DOME STOP	FS436	613	IVE
1	EA	MAGNETIC HOLD-OPEN	SEM 7830 24V	695	LCN
1	SET	GASKET	PER SELECTED DOOR MFGR		

HW SET: 16A INTERIOR / RATED / CORRIDOR

DOOR NUMBER:

5-201B 5-201E 5-201F

EACH TO HAVE:

3	EA	HINGE	BB1168	640	HAG
1	EA	FIRE EXIT HARDWARE	99L-F 996L-BE X 17	313	VON
1	EA	SURFACE CLOSER	4041 EDA	695	LCN
1	EA	KICK PLATE	8400 10" X 2"LDW	613	IVE
1	EA	DOME STOP	FS436	613	IVE
1	SET	GASKET	PER SELECTED DOOR MFGR		

HW SET: 17 INTERIOR PAIR / RATED / CLASSROOM / PANIC HARDWARE

DOOR NUMBER:

5-123

EACH TO HAVE:

6	EA	HINGE	BB1168 4.5 X 4.5 NRP	640	HAG
1	EA	FIRE EXIT HARDWARE	9927EO-F-LBR	313	VON
1	EA	FIRE EXIT HARDWARE	9927L-F-LBR 996L X 17	313	VON
1	EA	IC RIM CYLINDER	20-057T X ICX (CONST CORE)	613	SCH
1	EA	CORE ONLY	23-030 (CONVENTIONAL CORE)	606	SCH
1	EA	SURFACE CLOSER	4041 EDA	695	LCN
1	EA	SENTRONIC CLOSER	4040SE 24V (PUSH SIDE MTD)	689	LCN
2	EA	OVERHEAD STOP	100S	613	GLY
2	EA	KICK PLATE	8400 10" X 2"LDW	613	IVE
1	SET	GASKET	PER SELECTED DOOR MFGR		

HW SET: 18 INTERIOR / RATED / CLASSROOM

DOOR NUMBER:

5-123A

EACH TO HAVE:

3	EA	HINGE	BB1279	640	HAG
1	EA	CLASSROOM SEC LOCK	ND75TD SPA	613	SCH
2	EA	CORE ONLY	23-030 (CONVENTIONAL CORE)	606	SCH
1	EA	SURFACE CLOSER	4041	695	LCN
1	EA	DOME STOP	FS436	613	IVE
1	SET	GASKET	PER SELECTED DOOR MFGR		
1	EA	SILL	PER DETAIL		

HW SET: 18A INTERIOR / RATED / CLASSROOM / ACCESS CONTROL

DOOR NUMBER:

5-221 5-223 5-227

EACH TO HAVE:

2	EA	HINGE	BB1279	640	HAG
1	EA	THRU-WIRE HINGE	BB1279 4.5 X 4.5 ETW 4	640	HAG
1	EA	PERMANENT CORE	20-740 (PRIMUS)	606	SCH
1	EA	EU STOREROOM LOCK	ND80TDEU SPA	613	SCH
1	EA	SURFACE CLOSER	4041	695	LCN
1	EA	DOME STOP	FS436	613	IVE

1	EA	MAGNETIC HOLD-OPEN	SEM 7830 24V	695	LCN
1	SET	GASKET	PER SELECTED DOOR MFGR		
1	EA	SILL	PER DETAIL		
1	EA	KEY PAD/CARD READ	PROVIDED UNDER SECURITY SECTION		
1	EA	POWER SUPPLY	PROVIDED UNDER SECURITY SECTION		
1	EA	REQUEST TO EXIT	PROVIDED UNDER SECURITY SECTION		

HW SET: 18B INTERIOR / RATED / CLASSROOM / ALARMED

DOOR NUMBER:

5-227C

EACH TO HAVE:

3	EA	HINGE	BB1279	640	HAG
1	EA	CLASSROOM SEC LOCK	ND75TD SPA	613	SCH
1	EA	MORTISE CYLINDER	20-771 (FOR KEY SWITCH)	613	SCH
2	EA	CORE ONLY	23-030 (CONVENTIONAL CORE)	606	SCH
1	EA	SURFACE CLOSER	4041	695	LCN
1	EA	DOME STOP	FS436	613	IVE
1	SET	GASKET	PER SELECTED DOOR MFGR		
1	EA	SILL	PER DETAIL		
1	EA	ALARM / HORN	PROVIDED UNDER SECURITY SECTION		
1	EA	DOOR CONTACT	PROVIDED UNDER SECURITY SECTION		
1	EA	KEY SWITCH	PROVIDED UNDER SECURITY SECTION		

HW SET: 19 INTERIOR PAIR / RATED / ACCESS CONTROL, AUTO OPERATOR

DOOR NUMBER:

5-301D

EACH TO HAVE:

2	EA	POWER TRANSFER	EPT-10	313	VON
2	EA	CONTINUOUS HINGE	SL11 EPT	BR	SEL
1	EA	FIRE EXIT HARDWARE	EL9947EO-F	313	VON
1	EA	FIRE EXIT HARDWARE	EL9947NL-F	313	VON
1	EA	IC RIM CYLINDER	20-057T X ICX (CONST CORE)	613	SCH
1	EA	PERMANENT CORE	20-740 (PRIMUS)	606	SCH
1	EA	SURFACE CLOSER	4041 X 18G TOP JAMB MOUNT	695	LCN
1	EA	AUTO-EQUALIZER	4642 (CS) FLUSH CEILING MOUNT	695	LCN
2	EA	OVERHEAD STOP	100S	613	GLY
1	SET	SEALS	2525B	BRN	NGP
1	EA	THRESHOLD	PER DETAIL	DKB	
1	EA	POWER SUPPLY	PS873 X 2 X AO	GRY	VON
2	EA	DOOR CONTACT	PROVIDED UNDER SECURITY SECTION		
1	EA	KEY PAD/CARD READ	PROVIDED UNDER SECURITY SECTION		
1	EA	REQUEST TO EXIT	PROVIDED UNDER SECURITY SECTION		
2	EA	ACTUATOR, WALL MOUNT	8310-856		LCN
2	EA	FLUSH MOUNT BOX	8310-868F		LCN

HW SET: 20 EXTERIOR PAIR / RATED / PANIC HARDWARE / ACCESS CONTROL / CARD READER

DOOR NUMBER:
5-201C

EACH TO HAVE:

1	EA	POWER TRANSFER	EPT-10	313	VON
1	EA	CONTINUOUS HINGE	SL11	BR	SEL
1	EA	CONTINUOUS HINGE	SL11 EPT	BR	SEL
1	EA	MULLION	KR9954 X 154	313	VON
1	EA	FIRE EXIT HARDWARE	99EO-F	313	VON
1	EA	FIRE EXIT HARDWARE	99L-F E996L X 17 FSE	313	VON
1	EA	IC RIM CYLINDER	20-057T X ICX (CONST CORE)	613	SCH
1	EA	PERMANENT CORE	20-740 (PRIMUS)	606	SCH
1	EA	MORTISE CYLINDER	20-771 (FOR MULLION)	613	SCH
1	EA	MULLION SEAL	5100	BLK	NGP
2	EA	SURFACE CLOSER	4041 EDA	695	LCN
2	EA	KICK PLATE	8400 10" X 2"LDW	613	IVE
2	EA	FLOOR STOP	FS444	613	IVE
1	SET	SEALS	2525B	BRN	NGP
2	EA	DOOR SWEEP	200NA 36"	DKB	NGP
1	EA	THRESHOLD	PER DETAIL	DKB	
2	EA	DOOR CONTACT	PROVIDED UNDER SECURITY SECTION		
1	EA	KEY PAD/CARD READ	PROVIDED UNDER SECURITY SECTION		
1	EA	REQUEST TO EXIT	PROVIDED UNDER SECURITY SECTION		

NOTE: THIS OPENING HAS ELECTRIFIED TRIM PANIC HARDWARE AT THE ACTIVE LEAF THE OTHER LEAF IS EXIT ONLY.

HW SET: 20A EXTERIOR PAIR / PANIC HARDWARE / ACCESS CONTROL / CARD READER

DOOR NUMBER:
5-219

EACH TO HAVE:

1	EA	POWER TRANSFER	EPT-10	313	VON
1	EA	CONTINUOUS HINGE	SL11	BR	SEL
1	EA	CONTINUOUS HINGE	SL11 EPT	BR	SEL
1	EA	MULLION	KR4954 X 154	313	VON
1	EA	PANIC HARDWARE	99EO	313	VON
1	EA	PANIC HARDWARE	CD99L E996L X 17 FSE	313	VON
1	EA	IC RIM CYLINDER	20-057T X ICX (CONST CORE)	613	SCH
1	EA	PERMANENT CORE	20-740 (PRIMUS)	606	SCH
1	EA	MORTISE CYLINDER	20-771 (FOR MULLION)	613	SCH
1	EA	MULLION SEAL	5100	BLK	NGP
2	EA	SURFACE CLOSER	4041 EDA	695	LCN
2	EA	KICK PLATE	8400 10" X 2"LDW	613	IVE
2	EA	FLOOR STOP	FS444	613	IVE
1	SET	SEALS	2525B	BRN	NGP
2	EA	DOOR SWEEP	200NA 36"	DKB	NGP
1	EA	THRESHOLD	PER DETAIL	DKB	
2	EA	DOOR CONTACT	PROVIDED UNDER SECURITY SECTION		
1	EA	KEY PAD/CARD READ	PROVIDED UNDER SECURITY SECTION		

1 EA REQUEST TO EXIT PROVIDED UNDER SECURITY SECTION

NOTE: THIS OPENING HAS ELECTRIFIED TRIM PANIC HARDWARE AT THE ACTIVE LEAF THE OTHER LEAF IS EXIT ONLY.

HW SET: 22 INTERIOR / RATED / MULTI-STALL RESTROOM

DOOR NUMBER:

5-121 5-122 5-206 5-210 5-341

EACH TO HAVE:

3	EA	HINGE	BB1168	640	HAG
1	EA	CLASSROOM LOCK	ND70TD SPA	613	SCH
1	EA	CORE ONLY	23-030 (CONVENTIONAL CORE)	606	SCH
1	EA	SURFACE CLOSER	4041	695	LCN
1	EA	KICK PLATE	8400 10" X 2"LDW	613	IVE
1	EA	WALL STOP	WS402CCV	613	IVE
1	SET	GASKET	PER SELECTED DOOR MFGR		
1	EA	SILL	PER DETAIL		

HW SET: 22A INTERIOR / RATED / MULTI-STALL RESTROOM

DOOR NUMBER:

5-343

EACH TO HAVE:

3	EA	HINGE	BB1168	640	HAG
1	EA	CLASSROOM LOCK	ND70TD SPA	613	SCH
1	EA	CORE ONLY	23-030 (CONVENTIONAL CORE)	606	SCH
1	EA	SURFACE CLOSER	4041 SCUSH	695	LCN
1	EA	KICK PLATE	8400 10" X 2"LDW	613	IVE
1	SET	GASKET	PER SELECTED DOOR MFGR		
1	EA	SILL	PER DETAIL		

HW SET: 24 EXISTING / REPLACE LOCKSET

DOOR NUMBER:

5-213

EACH TO HAVE:

1	EA	STOREROOM LOCK	ND80TD SPA	613	SCH
1	EA	PERMANENT CORE	20-740 (PRIMUS)	606	SCH

HW SET: 25 INTERIOR PAIR / RATED / ELECTRICAL

DOOR NUMBER:

5-214

EACH TO HAVE:

6	EA	HINGE	BB1279 NRP	640	HAG
1	SET	AUTO FLUSH BOLT	FB42	630	IVE
1	EA	STOREROOM LOCK	ND80TD SPA 14-042	613	SCH
1	EA	PERMANENT CORE	20-740 (PRIMUS)	606	SCH
1	EA	COORDINATOR	COR X FL X MB	628	IVE
1	EA	SURFACE CLOSER	4041 EDA	695	LCN
2	EA	DOME STOP	FS436	613	IVE
1	SET	GASKET	PER SELECTED DOOR MFGR		
1	EA	SILL	PER DETAIL		

HW SET: 26 EXISTING INTERIOR PAIR / REPLACE LOCKSET

DOOR NUMBER:

5-216 5-218

EACH TO HAVE:

1	EA	STOREROOM LOCK	ND80TD SPA 14-042	613	SCH
1	EA	PERMANENT CORE	20-740 (PRIMUS)	606	SCH

HW SET: 27 INTERIOR / RATED / MAIL ROOM / ACCESS CONTROL, CARD READER, KEYPAD

DOOR NUMBER:

5-220

EACH TO HAVE:

2	EA	HINGE	BB1168 5 X 4.5 NRP	640	HAG
1	EA	THRU-WIRE HINGE	BB1168 5 X 4.5 ETW 4	640	HAG
1	EA	PERMANENT CORE	20-740 (PRIMUS)	606	SCH
1	EA	EU STOREROOM LOCK	ND80TDEU SPA	613	SCH
1	EA	SURFACE CLOSER	4041 EDA	695	LCN
1	EA	KICK PLATE	8400 10" X 2"LDW	613	IVE
1	EA	DOME STOP	FS436	613	IVE
1	SET	GASKET	PER SELECTED DOOR MFGR		
1	EA	SILL	PER DETAIL		
1	EA	DOOR CONTACT	PROVIDED UNDER SECURITY SECTION		
1	EA	KEY PAD/CARD READ	PROVIDED UNDER SECURITY SECTION		
1	EA	REQUEST TO EXIT	PROVIDED UNDER SECURITY SECTION		

HW SET: 27A INTERIOR / RATED / CENTRAL DUPLICATING / ACCESS CONTROL, CARD READERDOOR NUMBER:
5-222

EACH TO HAVE:

2	EA	HINGE	BB1279 NRP	640	HAG
1	EA	THRU-WIRE HINGE	BB1279 4.5 X 4.5 ETW 4	640	HAG
1	EA	PERMANENT CORE	20-740 (PRIMUS)	606	SCH
1	EA	EU STOREROOM LOCK	ND80TDEU SPA	613	SCH
1	EA	SURFACE CLOSER	4041 EDA	695	LCN
1	EA	KICK PLATE	8400 10" X 2"LDW	613	IVE
1	EA	DOME STOP	FS436	613	IVE
1	SET	GASKET	PER SELECTED DOOR MFGR		
1	EA	SILL	PER DETAIL		
1	EA	DOOR CONTACT	PROVIDED UNDER SECURITY SECTION		
1	EA	KEY PAD/CARD READ	PROVIDED UNDER SECURITY SECTION		
1	EA	REQUEST TO EXIT	PROVIDED UNDER SECURITY SECTION		

HW SET: 27B INTERIOR / RATED / ACCESS CONTROL, CARD READER, KEYPADDOOR NUMBER:
5-354

EACH TO HAVE:

2	EA	HINGE	BB1168 NRP	640	HAG
1	EA	THRU-WIRE HINGE	BB1168 4.5 X 4.5 ETW 4	640	HAG
1	EA	PERMANENT CORE	20-740 (PRIMUS)	606	SCH
1	EA	EU STOREROOM LOCK	ND80TDEU SPA	613	SCH
1	EA	SURFACE CLOSER	4041 EDA	695	LCN
1	EA	KICK PLATE	8400 10" X 2"LDW	613	IVE
1	EA	DOME STOP	FS436	613	IVE
1	SET	GASKET	PER SELECTED DOOR MFGR		
1	EA	SILL	PER DETAIL		
1	EA	DOOR CONTACT	PROVIDED UNDER SECURITY SECTION		
1	EA	KEY PAD/CARD READ	PROVIDED UNDER SECURITY SECTION		
1	EA	REQUEST TO EXIT	PROVIDED UNDER SECURITY SECTION		

HW SET: 28 INTERIOR / CENTRAL DUPLICATINGDOOR NUMBER:
5-220A

EACH TO HAVE:

3	EA	HINGE	BB1168 5 X 4.5 NRP	640	HAG
1	EA	CLASSROOM LOCK	ND70TD SPA	613	SCH
1	EA	PERMANENT CORE	20-740 (PRIMUS)	606	SCH
1	EA	OVERHEAD STOP	100S-ADJ	613	GLY
1	EA	KICK PLATE	8400 10" X 2"LDW	613	IVE
1	EA	SILL	PER DETAIL		
3	EA	SILENCER	SR64	GRY	IVE

HW SET: 29 INTERIOR / OFFICE

DOOR NUMBER:

5-222A	5-232	5-305	5-307	5-308	5-309
5-311	5-312	5-313	5-315	5-351	5-355

EACH TO HAVE:

3	EA	HINGE	BB1279	640	HAG
1	EA	ENTRANCE LOCK	ND53TD SPA	613	SCH
1	EA	CORE ONLY	23-030 (CONVENTIONAL CORE)	606	SCH
1	EA	DOME STOP	FS436	613	IVE
3	EA	SILENCER	SR64	GRY	IVE
1	EA	COAT HOOK	571 @ DOORS 5-232	613	IVE

HW SET: 30 INTERIOR / RATED / WORK ROOM

DOOR NUMBER:

5-228	5-230
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EACH TO HAVE:

3	EA	HINGE	BB1279	640	HAG
1	EA	CLASSROOM LOCK	ND70TD SPA	613	SCH
1	EA	CORE ONLY	23-030 (CONVENTIONAL CORE)	606	SCH
1	EA	SURFACE CLOSER	4041	695	LCN
1	EA	DOME STOP	FS436	613	IVE
1	SET	GASKET	PER SELECTED DOOR MFGR		
1	EA	SILL	PER DETAIL		

HW SET: 31 INTERIOR / BREAK ROOM, MEETING ROOM

DOOR NUMBER:

5-228A	5-230A	5-304	5-317A	5-350
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EACH TO HAVE:

3	EA	HINGE	BB1279	640	HAG
1	EA	CLASSROOM LOCK	ND70TD SPA	613	SCH
1	EA	CORE ONLY	23-030 (CONVENTIONAL CORE)	606	SCH
1	EA	DOME STOP	FS436	613	IVE
3	EA	SILENCER	SR64	GRY	IVE

HW SET: 31A INTERIOR / HALLWAY

DOOR NUMBER:

5-310

EACH TO HAVE:

3	EA	HINGE	BB1279	640	HAG
1	EA	CLASSROOM LOCK	ND70TD SPA	613	SCH
1	EA	CORE ONLY	23-030 (CONVENTIONAL CORE)	606	SCH
1	EA	SURFACE CLOSER	4041	695	LCN
1	EA	DOME STOP	FS436	613	IVE
3	EA	SILENCER	SR64	GRY	IVE

HW SET: 31B INTERIOR / RATED / MEETING ROOM

DOOR NUMBER:

5-350A

EACH TO HAVE:

3	EA	HINGE	BB1279 NRP	640	HAG
1	EA	CLASSROOM LOCK	ND70TD SPA	613	SCH
1	EA	CORE ONLY	23-030 (CONVENTIONAL CORE)	606	SCH
1	EA	SURFACE CLOSER	4041 EDA	695	LCN
1	EA	OVERHEAD STOP	100S	613	GLY
1	SET	GASKET	PER SELECTED DOOR MFGR		

HW SET: 31C INTERIOR / RATED / HALLWAY

DOOR NUMBER:

5-352

EACH TO HAVE:

3	EA	HINGE	BB1279 NRP	640	HAG
1	EA	CLASSROOM LOCK	ND70TD SPA	613	SCH
1	EA	CORE ONLY	23-030 (CONVENTIONAL CORE)	606	SCH
1	EA	SURFACE CLOSER	4041 EDA	695	LCN
1	EA	DOME STOP	FS436	613	IVE
1	SET	GASKET	PER SELECTED DOOR MFGR		

HW SET: 32 INTERIOR / TEL/DATA / EXISTING ACAMS TO REMAIN

DOOR NUMBER:

8-113

EACH TO HAVE:

2	EA	HINGE	BB1279 NRP	640	HAG
1	EA	THRU-WIRE HINGE	BB1279 4.5 X 4.5 ETW 4	640	HAG
1	EA	PERMANENT CORE	20-740 (PRIMUS)	606	SCH
1	EA	EU STOREROOM LOCK	ND80TDEU SPA	613	SCH
1	EA	SURFACE CLOSER	4041 EDA	695	LCN
1	EA	KICK PLATE	8400 10" X 2"LDW	613	IVE
1	EA	DOME STOP	FS436	613	IVE
1	SET	SEALS	2525B	BRN	NGP
1	EA	SILL	PER DETAIL		
1	SET	ACCESS CONTROL	EXISTING ACAMS TO REMAIN		

NOTE: VERIFY IF EXISTING HARDWARE IS SUITABLE FOR RE-USE.

HW SET: 33 INTERIOR / RATED / WAITING / AUTO OPERATOR, CARD READER

DOOR NUMBER:

5-303

EACH TO HAVE:

3	EA	HINGE	BB1168	640	HAG
1	EA	STOREROOM LOCK	ND80TD SPA	613	SCH
1	EA	PERMANENT CORE	20-740 (PRIMUS)	606	SCH
1	EA	ELECTRIC STRIKE	6211 FSE 24VDC	613	VON
1	EA	AUTO-EQUALIZER	4631(CS) (REG (PULL SIDE MOUNTED))	695	LCN
1	EA	KICK PLATE	8400 10" X 2"LDW	613	IVE
1	EA	DOME STOP	FS436	613	IVE
1	SET	GASKET	PER SELECTED DOOR MFGR		
1	EA	DOOR CONTACT	PROVIDED UNDER SECURITY SECTION		
2	EA	KEY PAD/CARD READ	PROVIDED UNDER SECURITY SECTION		
1	EA	POWER SUPPLY	PROVIDED UNDER SECURITY SECTION		
1	EA	REQUEST TO EXIT	PROVIDED UNDER SECURITY SECTION		
2	EA	ACTUATOR, WALL MOUNT	8310-856		LCN
2	EA	FLUSH MOUNT BOX	8310-868F		LCN

HW SET: 33A INTERIOR / DSPS DIRECTOR / AUTO OPERATOR

DOOR NUMBER:

5-306

EACH TO HAVE:

3	EA	HINGE	BB1168	640	HAG
1	EA	ENTRANCE LOCK	ND53TD SPA	613	SCH
1	EA	CORE ONLY	23-030 (CONVENTIONAL CORE)	606	SCH
1	EA	ELECTRIC STRIKE	6211 FSE 24VDC	613	VON
1	EA	AUTO-EQUALIZER	4631(CS) (REG (PULL SIDE MOUNTED))	695	LCN
1	EA	KICK PLATE	8400 10" X 2"LDW	613	IVE
1	EA	DOME STOP	FS436	613	IVE
3	EA	SILENCER	SR64	GRY	IVE
1	EA	COAT HOOK	571 @ DOORS 5-306	613	IVE
2	EA	ACTUATOR, WALL MOUNT	8310-856		LCN
2	EA	FLUSH MOUNT BOX	8310-868F		LCN

HW SET: 34 INTERIOR / RESTROOM

DOOR NUMBER:

5-314 5-316

EACH TO HAVE:

3	EA	HINGE	BB1279	640	HAG
1	EA	PRIVACY SET	ND40S SPA 13-048 10-025	613	SCH
1	EA	OVERHEAD STOP	100S-ADJ @ DOOR 5-314	613	GLY
1	EA	KICK PLATE	8400 10" X 2"LDW	613	IVE
1	EA	DOME STOP	FS436	613	IVE
3	EA	SILENCER	SR64	GRY	IVE

HW SET: 35 INTERIOR / ELEC

DOOR NUMBER:

5-353

EACH TO HAVE:

3	EA	HINGE	BB1279 NRP	640	HAG
1	EA	STOREROOM LOCK	ND80TD SPA	613	SCH
1	EA	PERMANENT CORE	20-740 (PRIMUS)	606	SCH
1	EA	DOME STOP	FS436	613	IVE
3	EA	SILENCER	SR64	GRY	IVE

HW SET: 35A INTERIOR / ELEC

DOOR NUMBER:

5-352B

EACH TO HAVE:

3	EA	HINGE	BB1279	640	HAG
1	EA	STOREROOM LOCK	ND80TD SPA	613	SCH
1	EA	PERMANENT CORE	20-740 (PRIMUS)	606	SCH
1	EA	DOME STOP	FS436	613	IVE
3	EA	SILENCER	SR64	GRY	IVE

END OF SECTION

SECTION 08 80 00**GLAZING****PART 1 - GENERAL****1.1 SUMMARY**

- A. Section includes glass and glazing for metal frames, doors and windows.
 - 1. Glass glazing materials and installation requirements are included in this section for other sections referencing this section.

- B. Related Sections:
 - 1. Section 07 27 00 - Air Barriers.
 - 2. Section 07 90 00 - Joint Protection: Sealant and back-up material other than glazing sealants.
 - 3. Section 08 13 14 - Standard Steel Doors: Glazed doors.
 - 4. Section 08 14 16 - Flush Wood Doors: Glazed doors.
 - 5. Section 08 14 13 - Stile and Rail Wood Doors: Glazed doors.
 - 6. Section 08 41 13 - Aluminum-Framed Storefronts.
 - 7. Section 08 41 23 - Steel Framed Entrances and Storefronts.
 - 8. Section 10 80 00 - Toilet Accessories: Metal framed mirrors.

1.2 REFERENCES

- A. American National Standards Institute:
 - 1. ANSI Z97.1 - Safety Glazing Materials Used in Buildings Safety.

- B. American Society of Civil Engineers:
 - 1. ASCE 7 - Minimum Design Loads for Buildings and Other Structures.

- C. ASTM International:
 - 1. ASTM C1036 - Standard Specification for Flat Glass.
 - 2. ASTM C1048 - Standard Specification for Heat-Treated Flat Glass-Kind HS, Kind FT Coated and Uncoated Glass.
 - 3. ASTM C1172 - Standard Specification for Laminated Architectural Flat Glass.
 - 4. ASTM E119 - Fire Tests of Building Construction and Materials.
 - 5. ASTM E330 - Test Method for Structural Performance of Exterior Windows, Curtain Walls, and Doors by Uniform Static Air Pressure Difference.
 - 6. ASTM E773 - Standard Test Methods for Seal Durability of Sealed Insulating Glass Units.
 - 7. ASTM E774 - Standard Specification for Sealed Insulating Glass Units.
 - 8. ASTM E1425 - Standard Practice for Determining the Acoustical Performance of Exterior Windows and Doors.

- D. California Building Code: (2007 CBC).

- E. California State Fire Marshal:
 - 1. CSFM 43-7 - Fire Tests for Doors and Window Assemblies.

- F. Flat Glass Marketing Association (FGMA): Glazing and Sealant Manuals.

- G. Glass Association of North America:
 - 1. GANA - FGMA Sealant Manual.
 - 2. GANA - Glazing Manual.

3. GANA - Laminated Glass Design Guide.
 4. GANA – Bulletin 01-0300 – Proper Procedures for Cleaning Architectural Glass Products.
- H. National Fire Protection Association:
1. NFPA 80 - Standard for Fire Doors, Fire Windows.
 2. NFPA 252 - Fire Tests of Door Assemblies
 3. NFPA 257 - Fire Tests of Window Assemblies.
- I. Laminators Safety Glass Association; (LSGA): Standards Manual.
- J. Sealed Insulating Glass Manufacturers Association; (SIGMA).
- K. Underwriters Laboratories Inc.:
1. UL - Building Materials Directory.
 2. UL 9 - Fire Tests of Window Assemblies.
 3. UL 10B - Fire Tests of Door Assemblies.
 4. UL 10C - Positive Pressure Fire Tests of Door Assemblies.
 5. UL 263 - Fire Resistance Ratings.

1.3 PERFORMANCE REQUIREMENTS

- A. Provide glass and glazing materials for continuity of building enclosure vapor retarder and air barrier:
1. In conjunction with materials described in Section 07 27 00 and 07 90 00.
 2. To utilize inner pane of multiple pane sealed units for continuity of air barrier and vapor retarder seal.
 3. To maintain continuous air barrier and vapor retarder throughout glazed assembly from glass pane to heel bead of glazing sealant.
- B. Fire Rated Glass Type 1:
1. Fire-rated tempered glass clear and wireless glazing material for use in impact safety-rated locations with fire rating requirements of 20 minutes without hose stream test; for use in interior and exterior applications.
 2. Passes positive pressure test standards UL 10C, UBC 7-2 and UBC 7-4.
- C. Fire Rated Glass Type 2: Fire-rated glass ceramic clear and wireless glazing material with surface-applied film listed for use in impact safety-rated locations such as doors, transoms and borrowed lites with fire rating requirements ranging from 20 minutes to 3 hours with required hose stream test.

1.4 SUBMITTALS

- A. Section 01 32 19 – Submittal Procedures: Submittal procedures.
- B. Product Data:
1. Glass: Provide structural, physical and environmental characteristics, size limitations, special handling or installation requirements.
 2. Glazing Sealants, Compounds and Accessories: Provide chemical, functional, and environmental characteristics, limitations, special application requirements. Identify available colors where exposed.
- D. Samples:
1. Glass: Submit two samples 6 inch by 6 inch in size, illustrating each glass type, coloration, and design.

2. Glazing Materials: Submit 12 inch long bead of glazing sealant proposed to be used, installed between sample of the material to be glazed, fully cured. Color as selected by Architect.
- E. Product Test Listings: From UL indicating fire-rated glass complies with requirements, based on comprehensive testing of current product.
- F. Manufacturer's Certificate: Certify sealed insulated glass meets or exceeds specified requirements.
- G. Installation Instructions: Manufacturers' recommended installation procedures which, when approved by the Architect, will become the basis for accepting or rejecting actual installation procedures used on the Work.

1.5 QUALITY ASSURANCE

- A. Perform Work in accordance with GANA Glazing Manual, FGMA Glazing Manual and Sealant Manual, LSGA Standards Manual, and SIGMA Glazing Manual, for glazing installation methods.
- B. Fire Protective Rated Glass: Each lite shall bear permanent, non-removable label of UL or WHI certifying it for use in tested and rated fire protective assemblies.
- C. Fire Protective Glazing Products for Door Assemblies: Products identical to those tested per ASTM E152 and UL 10B, labeled and listed by UL or WHI or other certification agency acceptable to authorities having jurisdiction.
- D. Fire Rated Door Glazing: Tested in accordance with one of the following and complying with NFPA 80.
 1. NFPA 252; with neutral pressure level at 40 inches maximum above sill at 5 minutes into test.
 2. UL 10C.
- E. Apply label from agency approved by authority having jurisdiction to identify each fire rated glass lite.

1.6 QUALIFICATIONS

- A. Installer: Company specializing in performing Work of this section with minimum three year documented experience.

1.7 DELIVERY, STORAGE, AND HANDLING

- A. Section 01 60 00 – Product Requirements.
- B. During storage and handling of glass, provide cushions at edges to prevent impact damage.

1.8 PRE-INSTALLATION MEETING

- A. Section 01 31 19 – Project Meetings: Preinstallation meeting.
- B. Convene minimum one week before starting Work of this section.

1.9 ENVIRONMENTAL REQUIREMENTS

- A. Section 01 60 00 – Product Requirements.
- B. Do not install glazing when ambient temperature is less than 50 degrees F.
- C. Maintain minimum ambient temperature before, during and 24 hours after installation of glazing compounds.

1.10 WARRANTY

- A. Section 01 77 00 – Contract Closeout: Product warranties.
- B. Furnish 5 year warranty to include coverage for sealed glass units from seal failure, interpane dusting or misting, and replacement of same.
- C. Furnish 5 year warranty to include coverage for delamination of laminated glass and replacement of same.

PART 2 - PRODUCTS**2.1 GLAZING**

- A. Manufacturers:
 - 1. Libbey-Owens-Ford.
 - 2. Northwest Industries, Inc.
 - 3. PPG Industries.
 - 4. Old Castle Glass.
 - 5. Technical Glass Products.
 - 6. Substitutions: Section 01 60 00 – Product Requirements: Product Options and Substitutions.
- B. General:
 - 1. For all glass, provide the type and thickness shown on the Drawings or specified herein.
 - 2. Where type or thickness, or both, are not shown on the Drawings or specified herein, provide type and thickness directed by the Architect.
- C. Plate or Float Glass:
 - 1. Clear Float Glass: ASTM C1036, Type 1 transparent flat, Class 1 clear, no tint, Quality q3 glazing select, minimum 3/16-inch thick.
 - 2. Provide safety glass where required by 2001 California Building Code, Section 2406.
 - 3. Where plate glass is called for, plate glass or float glass may be used.
- D. Tempered Glass:
 - 1. Provide tempered glass where indicated on the Drawings, and elsewhere as required by governmental agencies having jurisdiction.
 - 2. Clear Tempered Glass: ASTM C1048, Kind FT fully tempered, Condition A, uncoated, Type 1 transparent flat, Class 1 clear, Quality q³ glazing select.
 - 3. Sizes and cutting:
 - a. Prior to tempering or heat treating, cut glass to required sizes as determined by accurate measurements of the openings to be glazed, making allowances for required edge clearances.

- b. Cut and process edges in accordance with the glass manufacturer's recommendations.
 - c. Do not cut or treat edges in the field.
 4. Fully tempered glass:
 - a. Wherever possible, locate tong marks along an edge which will be concealed in the glazing system.
 - b. Permit minimum warpage practicable.
- E. Clear Laminated Glass: ASTM C1172, Kind LA, clear flat glass, with plastic interlayer.
 1. 2 layers transparent flat 1/8-inch thick, tempered with no gray tint, Quality q³ glazing slect sandwiched around clear plastic film.
 - a. Safety glass shall conform to 2001 CBC Section 2406.
 - b. Tempered glass shall have an etched manufacturer's label on each and every pane of safety glass.
 - c. Provide where shown on drawings and schedules.
- F. Insulated Low-E Glass Units (Type IG): Total unit thickness 1 inch.
 1. Double Pane Insulated Glass Units: ASTM E774, Class A, and E773, with glass elastomer edge seal; purge interpane space with dry hermetic air.
 - a. Manufacturer: PPG Industries, Inc.
 - b. Type: Solor Control Low-E Clear Insulating Glass.
 - c. Product: Solarban® 60 (2) "Clear".
 - d. Visible Light Transmittance: 69 percent.
 - e. U-Value Winter: 0.29.
 - f. U-Value Summer: 0.29.
 - g. SHGC: 0.37.
 - h. Shading Coefficient: 0.44.
 - i. Outer Pane: Low E Clear float glass. Sputter Coated on second surface (2).
 - j. Inner Pane: Clear transparent float glass.
 - k. Outdoor Visible Light Reflectance: 12 percent.
- G. Fire Rated Glass Type 1: Glazing materials to be types approved for used with specified materials in fire rated applications as indicated on Drawings. Minimum 1/4 inch thick unless otherwise indicated.
 1. Product: Fireglass20® as manufactured by J.R. Four Ltd., and distributed by Technical Glass Products, Kirkland, Washington, voice 1-800-426-0279, fax 1-800-451-9857, e-mail sales@fireglass.com, web site www.fireglass.com.
 2. Properties:
 1. Thickness: 1/4 inch.
 2. Weight: 3.0 lbs./sq. ft.
 3. Approximate Visible Transmission: 89 percent.
 4. Approximate Visible Reflection: 8 percent.
 5. Fire-rating: 20 minutes (WITHOUT HOSE STREAM TEST).
 6. Impact Safety Resistance: ANSI Z97.1 and CPSC 16CFR1201 (Cat. I and II).
 3. Labeling: Permanently label each piece of fireglass 20™ with the fireglass 20™ logo, UL logo and fire rating in sizes up to 6,396 sq. in.
 4. Fire Rating: Fire rating listed and labeled by UL for fire rating scheduled at opening locations on drawings, when tested in accordance with ASTM E2074-00; NPFA 252; UL 9, UL 10B and UL10C.
- H. Fire Rated Glass Type 2: Glazing materials to be type approved for used with specified materials in fire rated applications as indicated on Drawings. Minimum 3/16 inch thick unless otherwise indicated.

1. Supplier: FireLite® NT as supplied by Technical Glass Products, Kirkland, Washington, voice 1-800-426-0279, fax 1-800-451-9857, e-mail sales@fireglass.com, web site www.fireglass.com
2. Properties:
 - a. Thickness: 3/16 inch [5 mm] FireLite®.
 - b. Film: Fire-rated surface film as approved by manufacturer.
 - c. Weight: 2.4 lbs./sq. ft.
 - d. Approximate Visible Transmission: 88 percent.
 - e. Approximate Visible Reflection: 9 percent.
 - f. Hardness (Vicker's Scale): 700.
 - g. Fire-rating: 20 minutes to 3 hours for doors; 20 minutes to 90 minutes for other applications.
 - h. Impact Safety Resistance: ANSI Z97.1 and CPSC 16CFR1201 (Cat. I and II).
 - i. Positive Pressure Test: UL 10C, UBC 7-2 and 7-4; passes.
 - j. Surface Finish: Premium (polished).
3. Maximum sheet sizes based on surface finish:
 - a. Premium: 48 inches by 96 inches.
 - b. Standard: 48 inches by 96 inches.
 - c. Obscure: 36 inches by 96 inches.
4. Labeling: Permanently label each piece of FireLite® NT with the FireLite® logo, UL logo and fire rating in sizes up to 3,325 sq. in., and with the FireLite® label only for sizes that exceed the listing (as approved by the local authority having jurisdiction).
5. Fire Rating: Fire rating listed and labeled by UL for fire rating scheduled at opening locations on drawings, when tested in accordance with ASTM E2074-00 and ASTM E2010-01; NPFA 252 and NFPA 257; and UL 9, UL 10B and UL 10C.

2.2 ACCESSORIES

- A. General: Materials recommended by glass or glazing material manufacturer.
- B. Elastomeric Glazing Sealants: Materials compatible with adjacent materials including glass, insulating glass seals, and glazing channels.
 1. Colors: Provide color of exposed sealants, as selected by Architect from manufacturer's standard colors.
 2. Silicone Glazing Sealant: ASTM C920, Type S; Grade NS; Class and Use suitable for glazing application indicated; single component; chemical curing; capable of water immersion without loss of properties; non-bleeding; non-staining, cured Shore A hardness of 15 to 25. Available Products:
 - a. Dow Corning 795 – Dow Corning Corp.
 - b. Silglaze-II 2800 – General Electric Co.
 - c. Spectrum 2 – Tremco Inc.
 - d. Structural Silicone: Furnish high-modulus structural silicone glazing materials where sealant bonds glass to substrate.
- C. Pre-Formed Glazing Tape: Size to suit application.
 1. Glazing Tape: Closed cell polyvinyl chloride foam, coiled on release paper over adhesive on two sides, maximum water absorption by volume of 2 percent, designed for compression of 25 percent to effect an air barrier and vapor retarder seal.
 - a. Type: As recommended by glazing manufacturer.
- D. Setting Blocks and Spacers: Neoprene chemically compatible with specified sealants, unless other specified:
 1. Setting Blocks for Fire Rated Glazing: Neoprene, EPDM, or silicone; tested for compatibility with glazing compound; of 70 to 90 Shore A hardness.

- E. Glazing Points and Spring Wire Clips: Manufacturer's standard type; corrosion resistant.
- F. Fire-Resistant Glazing Materials: Materials used to obtain required fire-resistant rating.
- G. Filler Rod: Compressible synthetic rubber or foam.
- H. Primer-Sealers and Cleaners: As recommended by glass manufacturer.

2.3 GLAZING COMPOUND FOR FIRE-RATED GLAZING MATERIALS:

- A. Glazing Tape: Closed cell polyvinyl chloride (PVC) foam, coiled on release paper over adhesive on two sides, maximum water absorption by volume of 2 percent. Glass panels that exceed 1,393 square inches for 90-minute ratings must be glazed with fire-rated glazing tape supplied by manufacturer.
 - a. Norton #990.
 - b. Accepted equal.
- B. Setting Blocks: Neoprene, EPDM, or silicone; tested for compatibility with glazing compound; of 70 to 90 Shore A hardness.
- C. Cleaners, Primers, and Sealers: Type recommended by manufacturer of glass and gaskets.

2.4 FABRICATION

- A. Fabricate glass and other glazing products in sizes required to glaze openings indicated for Project, with edge and face clearances, edge and surface conditions, and bite complying with recommendations of product manufacturer and referenced glazing standard as required to comply with system performance requirements.

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Verify openings for glazing are correctly sized and within acceptable tolerance.
- B. Verify surfaces of glazing channels or recesses are clean, free of obstructions impeding moisture movement, weeps are clear, and ready to receive glazing.

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. Prime surfaces scheduled to receive sealant.

3.3 INSTALLATION

- A. Perform installation in accordance with GANA Glazing Manual.
 - 1. Glazing Sealants: Comply with ASTM C1193.
 - 2. Fire Rated Openings: Comply with NFPA 80.
- B. Exterior Wet/Dry Method (Preformed Tape and Sealant) Installation:

1. Cut glazing tape to length and set against permanent stops, 3/16 inch below sight line. Seal corners by butting tape and dabbing with compatible butyl sealant.
 2. Apply heel bead of butyl sealant along intersection of permanent stop with frame ensuring full perimeter seal between glass and frame to complete continuity of air and vapor seal.
 3. Place setting blocks at 1/4 points with edge block no more than 6 inches from corners.
 4. Rest glazing on setting blocks and push against tape and heel bead of sealant with sufficient pressure to attain full contact at perimeter of pane or glass unit.
 5. Install removable stops, with spacer strips inserted between glazing and applied stops, 1/4 inch below sight line. Place glazing tape on glazing pane or unit with tape 1/4 inch below sight line.
 6. Fill gap between glazing and stop with elastomeric glazing sealant to depth equal to bite of frame on glazing, but not more than 3/8 inch below sight line.
 7. Apply cap bead of elastomeric glazing sealant along void between stop and glazing, to uniform line, flush with sight line. Tool or wipe sealant surface smooth.
- C. Interior Dry Method (Tape and Tape) Installation:
1. Cut glazing tape to length and set against permanent stops, projecting 1/16 inch above sight line.
 2. Place setting blocks at 1/3 points with edge block no more than 6 inches from corners.
 3. Rest glazing on setting blocks and push against tape for full contact at perimeter of pane or unit.
 4. Place glazing tape on free perimeter of glazing in same manner described above.
 5. Install removable stop without displacement of tape. Exert pressure on tape for full continuous contact.
 6. Knife trim protruding tape.
- D. Set glass in a manner which produces the greatest possible degree of uniformity in appearance.
1. Fire Rated Glass Type 1:
 - a. Glaze vertically into labeled metal frames or partition walls with same fire rating as glass and push against tape for full contact at perimeter of pane or unit.
 - b. Place glazing tape on free perimeter of glazing in same manner as described above.
 - c. Provide minimum edge clearance of > 1/4 inch (+1/8 inch/-1/16 inch) and a minimum edge cover of < 3/8 inch (+1/16 inch/-1/16 inch).
 - d. Install in vision panels in fire-rated doors to requirements of NFPA 80.
 - e. Install so that appropriate UL and Fireglass 20™ markings remain visible.
 2. Fire Rated Glass Type 2:
 - a. Glaze vertically into labeled metal frames or partition walls with same fire rating as glass and push against tape for full contact at perimeter of pane or unit.
 - b. Place glazing tape on free perimeter of glazing in same manner as described above.
 - c. Install removable stop and secure without displacement of tape.
 - d. Install in vision panels in fire-rated doors to requirements of NFPA 80.
 - e. Install so that appropriate UL and Fireglass 20™ markings remain visible.
- E. Do not use two different glazing materials in the same joint system unless the joint use is approved in advance by the Architect.
- F. Glaze exterior openings with PVB layer toward the exterior of the building.

- G. Mask, or otherwise protect, surfaces adjacent to installation of sealants.
- H. Miter-cut and seal the joints of glazing gaskets in accordance with the manufacturer's recommendations, to provide watertight and airtight seal at corners and other locations where joints are required.

3.4 CLEANING

- A. Section 01 74 00 – Cleaning: Final cleaning.
- B. Remove glazing materials from finish surfaces.
- C. Remove labels after Work is complete.
- D. Clean glass and adjacent surfaces.

3.5 PROTECTION OF INSTALLED CONSTRUCTION

- A. Protect glass from breakage after installation by promptly installing streamers or ribbons, suitably attached to the framing and held free from glass. Do not apply warning markings, streamers, ribbons, or other items directly to the glass except as specifically directed by the Architect.

END OF SECTION

SECTION 09 21 16**GYPSUM BOARD ASSEMBLIES****PART 1 - GENERAL****1.1 SUMMARY**

- A. Section Includes: Shaft wall system; gypsum board and joint treatment, exterior gypsum sheathing board, accessories, and textured finish.
- B. Related Sections:
1. Section 05 40 00 - Cold-Formed Metal Framing.
 2. Section 06 10 53 - Miscellaneous Rough Carpentry: Wood blocking for support of wall-mounted equipment and accessories.
 3. Section 07 21 16 - Blanket Insulation: Thermal and acoustic insulation.
 4. Section 07 27 00 - Air Barriers.
 5. Section 07 84 00 - Firestopping: Firestopping at rated walls and partitions.
 6. Section 07 90 00 - Joint Protection: Caulking and sealants.
 7. Section 08 31 13 - Access Doors and Frames: Metal access panels.
 8. Section 09 22 16 - Non-Structural Metal Framing: Building metal framing system.

1.2 REFERENCES

- A. ANSI - American National Standards Institute:
1. A118.9 - Test Methods and Specifications for Cementitious Backer Units.
- B. ASTM International:
1. ASTM C475 - Standard Specification for Joint Compound and Joint Tape for finishing Gypsum Board.
 2. ASTM C840 - Standard Specification for Application and Finishing of Gypsum Board.
 3. 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. to 0.112 in. in Thickness.
 4. ASTM C1002 - Standard Specification for Steel Drill Screws for the Application of Gypsum Board or Metal Plaster Bases.
 5. ASTM C1047 - Standard Specification for Accessories for Gypsum Wallboard and Gypsum Veneer Base.
 6. ASTM C1396 - Standard Specification for Gypsum Board.
 7. ASTM D226 - Standard Specification for Asphalt-Saturated Organic Felt Used in Roofing and Waterproofing.
 8. ASTM E119 - Method for Fire Tests of Building Construction and Materials.
- C. CBC - California Building Code, 2007 Edition; Chapters 7 and 25A.
- D. Division of State Architect:
1. DSA IR 25-3, September 1999.
- E. GA - Gypsum Association:
1. GA 214 - Recommended Levels of Gypsum Board Finish.
 2. GA 216 - Application and Finishing of Gypsum Board.
 3. GA 600 - Fire Resistance Design Manual.
- F. Intertek Testing Services (Warnock Heresy Listed):
1. WH - Certification Listings.
- G. National Fire Protection Association:

1. NFPA 255 – Standard Method of Test of Surface Burning Characteristics of Building Materials.
- H. NWWCB - Northwest Wall and Ceiling Bureau:
1. RS - Recommendations and Specifications.
- I. UL – Underwriters Laboratories, Inc.:
1. UL – Fire Resistance Directory and Building Material Directory.
 2. UL 723 – Tests for Surface Burning Characteristics of Building Materials.

1.3 SYSTEM DESCRIPTION

- A. Design Requirements: Where indicated, provide materials and construction which are identical to those assemblies whose fire resistance rating has been determined in accordance with ASTM E119 by a testing and inspecting organization acceptable to authorities having jurisdiction. Products used in the assembly shall carry a classification label from a testing agency acceptable to the authority having jurisdiction.

1.4 PERFORMANCE REQUIREMENTS

- A. Acoustic Attenuation for Identified Interior Partitions: 35 STC, 39 STC, 45 STC, 49 STC, 53 STC, and 60 STC; in accordance with ASTM E90.
- B. Shaft Wall: Perform to the following:
1. Air Pressure Within Shaft: 5.0 psf with maximum mid-span deflection of L/240 inches.
 2. Acoustic Attenuation: 47 STC in accordance with ASTM E90.

1.5 SUBMITTALS

- A. Section 01 32 19 – Submittal Procedures: Submittal procedures.
- B. Product Data: Submit manufacturer's product data on gypsum board, exterior gypsum sheathing board, joint tape, acoustic accessories, and the following:
1. Fire Resistance Data: Include required fire test results for gypsum board systems on partitions, ceilings and columns. Correlate with supporting metal framing details.
 2. Sound Transmission Data: Include certified evidence that installed gypsum board systems and materials meet required STC levels.
- C. Samples: Submit two samples of gypsum board finished with proposed texture application, 12 by 12 inches in size, illustrating finish color and texture.

1.6 QUALITY ASSURANCE

- A. Perform Work in accordance with GA-214, GA-216, and GA-600.
- B. Fire Rated Wall and Ceiling/Roof Construction: Rating as indicated on Drawings.
1. Tested Rating: Determined in accordance with ASTM E119.
 2. Fire Rated Partitions: Listed assembly by UL, GA; File Numbers as shown on drawings.
 3. Fire Rated Ceiling: Listed assembly by UL, GA; File Numbers as shown on drawings.
 4. Fire Rated Shaft Wall Requirements: One hour in accordance with GA File No. 6800.

1.7 QUALIFICATIONS

- A. Manufacturer: Company specializing in manufacturing products specified in this section with minimum three years documented experience.

- B. Installer: Company specializing in performing Work of this section with minimum three years documented experience.

1.8 DELIVERY, STORAGE, AND HANDLING

- A. Section 01 60 00 – Product Requirements
- B. Acceptance at Site: Deliver materials in original packages, containers or bundles bearing brand name and identification of manufacturer or supplier. Verify board and accessories as undamaged.
- C. Storage and Protection:
 - 1. Store materials inside under cover and keep dry and protected against damage from weather, direct sunlight, surface contamination, corrosion, construction traffic and other causes. Neatly stack gypsum boards flat to prevent sagging.
 - 2. Handle gypsum boards to prevent damage to edges, ends and surfaces.
 - 3. Store and handle steel framing and related accessories in accordance with A.I.S.I Code of Standard Practice.”

1.9 PROJECT CONDITIONS

- A. Environmental Conditions:
 - 1. Establish and maintain environmental conditions for application and finish gypsum board to comply with ASTM C840 and with gypsum board manufacturer's recommendations. Maintain not less than 40 degrees Fahrenheit minimum room temperature.
 - 2. Ventilate building spaces to remove water not required for drying joint treatment materials. Avoid drafts during day, hot weather to prevent materials from drying too rapidly.

1.10 WARRANTY

- A. Section 01 77 00 – Contract Closeout: Product warranties.
- B. Materials Warranty for Exterior Gypsum Sheathing: Provide sheathing manufacturer's standard warranty covering sheathing materials for five years from date of substantial completion.
- C. Weathering Warranty for Exterior Gypsum Sheathing: Provide sheathing manufacturer's standard warranty covering in-place exposure damage to sheathing for six months commencing on date of installation completion.

PART 2 - PRODUCTS

2.1 GYPSUM BOARD ASSEMBLIES

- A. Manufacturers:
 - 1. G-P Gypsum Corporation: www.gp.com/gypsum.
 - 2. National Gypsum Company: www.nationalgypsum.com.
 - 3. United States Gypsum Co.: www.usg.com
 - 4. BPB America Inc.: www.bpb-na.com
 - 5. Pabco Gypsum.
 - 6. Substitutions: Section 01 60 00 – Product Requirements: Product Options and Substitutions.

2.2 COMPONENTS

- A. Shaft Wall Studs and Accessories:
1. Manufacturers:
 - a. United States Gypsum Co. (USG® Cavity Shaft Walls).
 - b. National Gypsum Co. Gold Bond Building Products Division (I-Stud Cavity Shaftwall).
 - c. Georgia-Pacific Corp. (Fireguard® Shaft Liner™).
 2. Steel Framing: ASTM C645.
 - a. Protective Coating: Manufacturer's standard corrosion-resistant coating.
 - b. Studs: Manufacturer's standard CH or CT profile for fire-resistance-rated assembly indicated and in depth and thickness indicated on Drawings, length as required.
 - c. Track (Runner): Manufacturer's standard J-profile track with long-leg length as standard with manufacturer, but at least 2 inches in depth matching studs and in thickness indicated on Drawings.
 - d. Jamb Struts: Manufacturer's standard J-profile strut with long-leg length of 3 inches in depth matching studs, and not less than 0.0329 inch thick.
 - e. Corner and End Members: Manufacturer's standard E-profile framing member for use at corners or where assembly terminates at other work, in depth matching studs and in manufacturer's standard thickness not less than the stud thickness indicated on Drawings; length as required.
- B. Interior Gypsum Board Materials:
1. Panel Size: Provide in maximum lengths and widths available that will minimize joints in each area and correspond with support system indicated.
 2. Fire Rated Gypsum Board: ASTM C1396; fire resistive type, UL rated; 5/8 inch thick unless otherwise indicated, maximum permissible length; ends square cut, tapered and beveled edges.
 3. Moisture Resistant (Fire Rated) Gypsum Board: ASTM C1396; 5/8 inch thick, maximum available length in place; ends square cut, square edges.
 4. Gypsum Shaftliner (Coreboard): ASTM C442, 1 inch thick, maximum available size in place, beveled edges, ends square cut, identified with UL Classification label.
- C. Exterior Gypsum Sheathing Board Materials:
1. Acceptable Products:
 - a. 5/8 inch DensGlass Gold Fireguard sheathing.
 2. Composition: Gypsum sheathing manufactured in accordance with ASTM C1177 with glass mats both sides and long edges, water-resistant treated core.
 3. Fire Resistance:
 - a. Non-combustible when tested in accordance with ASTM E136.
 - b. 5/8 inch DensGlass Gold Fireguard: Sheathing is rated "Type X" as defined in ASTM C36 when tested in according to ASTM E119.
 4. Accessories:
 - a. Joint Tape: 2 inch wide 10 x 10 glass mesh tape.
 - b. Joint Compound: G-P Gypsum setting-type joint compound.
 5. Sealants, Caulk and Tape:
 - a. Sealant: Dow Corning 795 or equivalent; Pecora 895 or equivalent.
 - b. Caulk: Borden HPPG Elmers Siliconized Acrylic Latex Caulk or equivalent; Pecora AC-20 acrylic latex sealant; GE Silicone Silpruf Sealant; Tremco Dymonic.
 - a. Tape: 2 inch wide 10 x 10 glass mesh Quick Tape, or equivalent.

2.3 ACCESSORIES

- A. Fasteners to Steel Members:
 - 1. Screws: ASTM C1002, Type 'S', 0.190 inch diameter steel drill screws for fastening gypsum board to steel framing members less than 0.033-inch thick. ASTM C954 steel self drilling tapping screws for fastening gypsum board to steel framing members 0.033 to 0.112-inch thick; cadmium-plated for exterior locations.
 - 2. Screws: ASTM C954; steel drill screws for application of gypsum board to loadbearing steel studs.
- B. Insulation: As specified in Section 07 21 16.
- C. Gypsum Board Accessories:
 - 1. Corner Beads and Casing Beads: ASTM C1047, sheet steel zinc coated by hot-dip process. Flanges shall be free of dirt, grease and other materials that may adversely affect bond of joint treatment.
- D. Joint Materials: ASTM C475, GA-216, and as recommended by gypsum board manufacturer for project conditions; reinforcing tape, joint compound, adhesive, and water.

2.4 FINISHES

- A. Levels of Gypsum Board Finish as Defined by Gypsum Association:
 - 1. Level 1:
 - a. Ceiling Plenum Areas, Concealed Areas, Storage Rooms, Janitor Closets and Where Indicated: All joints and interior angles shall have tape embedded in joint compound. Surface shall be free of excess joint compound. Tool marks and ridges are acceptable.
 - 2. Level 2:
 - a. Glass Mat Backer Board Substrate for Ceramic Tile; and Where Indicated: All joints and interior angles shall have tape embedded in joint compound and 1 separate coat of joint compound applied over all joints, angles, fastener heads, and accessories. Surface shall be free of excess joint compound. Tool marks and ridges are acceptable.
 - 3. Level 3:
 - a. Areas Which Are to Receive Heavy or Medium Texture (Spray or Hand Applied) Finishes Before Final Painting or Where Heavy Grade Wall Coverings Are to Be Applied as the Final Decoration: All joints and interior angles shall have tape embedded in joint compound and 2 separate coats of joint compound applied over all joints, angles, fastener heads, and accessories. All joint compound shall be smooth and free of tool marks and ridges.
 - 4. Level 4:
 - a. Offices, Work Rooms and Private Areas and Where Indicated to Receive Light Textures: All joints and interior angles shall have tape embedded in joint compound and 3 separate coats of joint compound applied over all joints, angles, fastener heads and accessories. All joint compound shall be smooth and free of tool marks and ridges
 - 5. Level 5:
 - a. Areas to Receive Gloss, Semi-Gloss, Enamel or Nontextured Flat Paints, Where Severe Lighting Conditions Occur, in Lobbies, Waiting Areas and Other Public Spaces and Where Indicated: All joints and interior angles shall have tape embedded in joint compound and 3 separate coats of joint compound applied over all joints, angles, fastener heads and accessories. A thin skim coat of joint compound or a material manufactured especially for this purpose, shall be applied to entire surface. Surface shall be smooth and free of tool marks and ridges.

PART 3 - EXECUTION**3.1 EXAMINATION**

- A. Verify site conditions are ready to receive work and opening dimensions are as indicated on shop drawings.
- B. Examine areas and surfaces to receive gypsum board and verify the following:
 - 1. Proper alignment and spacing of backing and framing support systems.
 - 2. Complete installation of mechanical, electrical or other items to be enclosed in partitions that cannot be installed after installation of board.

3.2 EXISTING WORK

- A. Extend existing gypsum board installations using materials and methods as specified.
- B. Repair and remodel existing gypsum board assemblies which remain or are to be altered.

3.3 PREPARATION

- A. Protect surrounding areas and surfaces to preclude damage.
 - 1. Exercise care to avoid soiling, spatter and damage to work of other trades.
 - 2. Use cover cloths or other means of protection. Remove, clean and repair any soiled or damaged work as required.
 - 3. Protect from damage at all times.

3.4 INSTALLATION

- A. Shaft Wall Framing:
 - 1. General: Install gypsum board shaft-wall assemblies to comply with requirements of fire-resistance-rated assemblies indicated, manufacturer's written installation instructions, and the following:
 - a. GA-600 requirements.
 - b. ASTM C754 requirements for installing steel framing.
 - 2. Position steel runners at floor and ceiling with the short leg toward finish side of wall. Securely attach runners to structural supports with power driven fasteners at both ends and maximum 24 inches on center.
 - 3. Cut liner panels 1 inch less than floor-to-ceiling height and erect vertically between J-Runners. Where shaft walls exceed maximum available panel height, position liner panel end joints within upper and lower third points of wall. Stagger joints top and bottom in adjacent panels. Screw studs to runners on walls over 16 feet.
 - 4. Use steel C-H studs 3/8-inch to not more than 1/2-inch less than floor-to-ceiling height, and install between liner panels with liner inserted in the groove. Install full-length E-Studs over gypsum liner panels both sides of closure panels. For openings, frame with vertical E-Stud or J-Runner at edges, horizontal J-Runner at head and sill, and reinforcing as shown on drawings. Suitably frame all openings to maintain structural support for wall.
 - 5. Install floor-to-ceiling steel E-Studs each side of steel hinged door frames and jamb struts each side of elevator door frames to act as strut-studs. Attach strut-stud to floor and ceiling runners with two 3/8-inch Type S-12 pan screws. Attach strut-studs to jamb anchors with 1/2-inch Type S-12 screws. Over steel doors, install a cut-to-length section of J-Runner and attach to strut-studs with 3/8-inch Type S-12 screws.
 - 6. Install supplementary framing in gypsum board shaft-wall assemblies around openings and as required for blocking, bracing, and support of gravity and pullout loads of fixtures, equipment, services, heavy trim, furnishings, and similar items that cannot be supported directly by shaft-wall assembly framing.

7. At penetrations in shaft wall, maintain fire-resistance rating of shaft-wall assembly by installing supplementary steel framing around perimeter of installation and fire protection behind boxes containing wiring devices, elevator call buttons, elevator floor indicators, and similar items.
 8. Isolate shaft-wall assemblies from building structure to prevent structural movement from transferring to shaft-wall assemblies.
 9. Seal gypsum board shaft-walls with acoustical sealant at perimeter of each assembly where it abuts other work and at joints and penetrations within each assembly. Install acoustical sealant to withstand dislocation by air-pressure differential between shaft and external spaces; maintain an airtight and smoke-tight seal; and comply with manufacturer's written instructions or ASTM C919, whichever is more stringent.
 10. In elevator shafts where gypsum board shaft-wall assemblies cannot be positioned within 2 inches of the shaft face of structural beams, floor edges, and similar projections into shaft, install 1/2- or 5/8-inch thick, gypsum board cants covering tops of projections as follows:
 - a. Slope cant panels at least 75 degrees from horizontal. Set base of panels in adhesive and secure top edges to shaft walls at 24 inches on center with screws fastened to shaft-wall framing.
 - b. Where required to support gypsum board cants, install steel framing spaced at 24 inches on center maximum; extend studs from top of projection to shaft-wall framing behind cant.
- B. Gypsum Board Installation:
1. Install and finish gypsum board to comply with GA-216 and GA-600.
 - a. Single Layer: Install in accordance with ASTM C840, except as amended or required by specific fire resistive or sound isolation system detailed. In that instance, application shall conform to requirements of the manufacturer's tests as reviewed and accepted in the submittal.
 - b. Erect single layer fire rated gypsum board vertically, with edges and ends occurring over firm bearing.
 2. Apply in vertical direction with ends and edges falling on supports. In vertical applications, gypsum board shall be of length required to reach full height of vertical surfaces in one continuous piece.
 3. Position boards so that like edges abut, tapered edges against tapered edges and field cut ends against field cut ends. Do not place tapered edges against cut edges or ends. Stagger vertical joints over different studs on opposite sides of partitions.
 4. Start installation of panels at exterior wall to position butt joints as far away from exterior wall as possible.
 5. Double Layer Application:
 - a. Joints: Stagger 24 inches between layers.
 - b. Sound-rated construction: Tape face layer.
- C. Fire Resistant Assemblies: Wherever fire rated gypsum board construction is indicated, provide materials and installation methods, including types and spacing of fasteners, in accordance with CBC. Apply firestopping at 10 feet on center vertically within walls, at top of wall and at penetrations through fire resistant assembly in accordance with Section 07 84 00.
- D. Sound Retardant Installations:
1. Follow manufacturer's directions and specifications for conditions of installation. Install where indicated. Include around all Toilet Rooms, whether indicated or not. Install from floor surface to bottom side of next floor surface.
 - a. Wrap with insulation and seal electrical or other outlets in sound isolating partitions.
 - b. Install sealant to completely fill void between gypsum board edges and adjacent surface.
 2. Sound-rated edge condition: Stagger (i.e., ship-lap) gypsum board layers at vertical intersections. Provide a 1/4-inch nominal gap around the gypsum board face layer at floor and ceiling intersections. Fill the 1/4-inch gap with acoustical sealant to form an

airtight seal.

- E. Fastenings: Attach gypsum board to framing with screws, lengths and sizes as recommended by manufacturer and in accordance with CBC, Table 25A-G and 25A-H.
 - 1. General: Place not less than 3/8 inch from edges of board, with heads dimpled slightly below surface; do not cut through paper.
 - 2. Ceilings, Non-rated: Screws, 12 inches on center.
 - 3. Walls, Non-rated: Screws, 12 inches on center.
 - 4. Walls, One-hour Rated: As shown.

- F. Access Doors: Install gypsum board into access door frames specified in Section 08 31 13 where required and where indicated on the Drawings. Anchor firmly into position, and align properly to achieve an installation flush with adjacent finished surfaces.

- G. Acoustic Accessories Installation:
 - 1. Install resilient channels at maximum 24 inches on center. Locate joints over framing members.
 - 2. Install acoustic sealant at gypsum board perimeter at:
 - a. Wood Framing: One bead.
 - b. Face Layer.
 - c. Seal penetrations of partitions by conduit, pipe, duct work, and rough-in boxes.

- H. Accessories:
 - 1. Control Joints: Place control joints consistent with lines of building spaces and as follows:
 - a. Not more than 30 feet apart on walls and ceilings over 50 feet long.
 - b. At exterior soffits, not more than 30 feet apart in both directions.
 - 2. Corner Beads: Install at external corners, using longest practical lengths.
 - 3. Casing Beads: Install whenever edge of gypsum board would otherwise be exposed or semi-exposed, or where abutting dissimilar materials.
 - 4. After accessories are installed, correct surface damage and defects.
 - 5. Install trims and expansion joints where required.

- I. Allowable Tolerances:
 - 1. Offset Between Planes of Board Faces: 1/16-inch.
 - 2. Plane, Level, Warp and Bow: 1/8-inch in 8'-0".
 - 3. Shim panels as necessary to comply with tolerances.

3.5 INSTALLATION – EXTERIOR GYPSUM SHEATHING

- A. Provide DensGlass Gold sheathing where indicated on drawings. Install sheathing in accordance with manufacturer's instructions and applicable instructions in GA-253 and ASTM C1280.
- B. Install DensGlass Gold sheathing with gold side out.
- C. Use maximum lengths possible to minimize number of joints.
- D. Metal Framing: Attach DensGlass Gold sheathing to metal framing with screws spaced 8 inches on center at perimeter where there are framing supports; and 8 inches on center along intermediate framing in field.
- E. Drive fasteners to bear tight against and flush with surface of sheathing. Threads of fasteners shall penetrate the steel studs by a minimum of 1/4-inch. Do not countersink.
- F. Locate fasteners minimum 3/8 inch from edges and ends of sheathing panels.

- G. **Air Barrier:** Install air barrier over exterior gypsum sheathing as specified in Section 07 27 00, with flashing around openings.

3.6 FINISHING OF GYPSUM BOARD

- A. Apply joint treatment at gypsum board joints; flanges of corner bead, edge trim and penetrations, fastener heads and surface defects in accordance with ASTM C840 and GA 214 (provide designated level as described in Article 2.4). Number of coats of treatment shall be as specified above.
- B. Apply joint tape at joints between gypsum boards.
- C. Finish interior gypsum board by applying the number of coats of treatment as specified above. Sand between coats and after last coat.
- D. **Texture Finish:** Apply finish texture coating by means of spraying apparatus in accordance with manufacturer's instructions, and to match approved sample.
 - 1. Texture Required: Orange-Peel.
- E. **Finish Painting:** As specified in Section 09 90 00.
- F. **Caulking:**
 - 1. Caulk openings around pipes, fixtures and other items projecting through gypsum board as specified in Section 07 90 00.
 - 2. Caulk top of fire rated walls and partitions and penetrations through fire rated walls and partitions in accordance with Section 07 84 00.
 - 3. Apply caulking material with exposed surface flush with gypsum board.

3.7 FINISHING OF EXTERIOR GYPSUM SHEATHING

- A. Seal fasteners using Dow Corning 795 or Borden HPG Elmers Siliconized Acrylic Latex Caulk or equivalent.
- B. Finish joints using Dow Corning 795 or Borden HPPG Elmers Siliconized Acrylic latex Caulk or equivalent. Reinforce with 2 inch wide 10 x 10 glass mesh Quick Tape or equivalent.

3.8 FIELD QUALITY CONTROL

- A. Installer shall be present at the Architect's inspection of Work. Touch up as required and directed subsequent to finish application.

3.9 ERECTION TOLERANCES

- A. Monitor fabrication and installation tolerance control of products to produce acceptable Work. Do not permit tolerances to accumulate.
- B. Comply with manufacturers' tolerances. When manufacturers' tolerances conflict with Contract Documents, request clarification from Architect/Engineer before proceeding.
- C. Adjust products to appropriate dimensions; position before securing products in place.
- D. **Maximum Variation of Finished Gypsum Board Surface from Flat Surface:** 1/8 inch in 10 feet.

3.10 CLEANING

- A. Clean all beads, screeds, metal base, metal trim, mechanical and electrical items.

1. Wipe clean, leaving work ready for finish specified under other Sections.
2. As work is completed in each space, clean all rubbish, utensils and surplus materials from the space. Leave floors broom clean.

3.11 PROTECTION

- A. Provide protection to gypsum board construction from damage or deterioration.

3.12 FINISH LEVEL SCHEDULE

- A. Finishes in accordance with GA-214 Level:
 1. Level 1: Above finished ceilings concealed from view.
 2. Level 2: Utility areas and areas behind cabinetry.
 3. Level 3: Walls scheduled to receive textured wall finish.
 4. Level 4: Walls and ceilings scheduled to receive flat or eggshell paint finish.
 5. Level 4: Walls and ceilings scheduled to receive semi-gloss or gloss paint finish.

END OF SECTION

SECTION 09 22 16**NON-STRUCTURAL METAL FRAMING****PART 1 - GENERAL****1.1 SUMMARY**

- A. Section includes metal stud framing and accessories at interior locations.
- B. Related Sections:
 - 1. Section 05 40 00 - Cold-Formed Metal Framing: Structural load bearing metal stud framing.
 - 2. Section 05 50 00 - Metal Fabrications: Metal fabrications attached to stud framing.
 - 3. Section 06 10 53 - Miscellaneous Rough Carpentry: Rough wood blocking within stud framing.
 - 4. Section 07 21 16 - Blanket Insulation: Insulation between framing members.
 - 5. Section 07 27 00 - Air Barriers.
 - 6. Section 09 21 16 - Gypsum Board Assemblies: Metal studs for partitioning.

1.2 REFERENCES

- A. ASTM International:
 - 1. ASTM A123/A123M - Standard Specification for Zinc (Hot-Dip Galvanized) Coatings on Iron and Steel Products.
 - 2. ASTM A653/A653M - Standard Specification for Steel Sheet, Zinc-Coated (Galvanized) or Zinc-Iron Alloy-Coated (Galvannealed) by the Hot-Dip Process.
 - 3. ASTM A879/A879M - Standard Specification for Steel Sheet, Electrolytic Zinc-Coated, for Light Coating Mass Applications.
 - 4. ASTM A924: Specification for General Requirements for Steel Sheet Metallic-Coated by the Hot-Dip Process.
 - 5. ASTM A1003/1003M - Standard Specification for Steel Sheet, Carbon, Metallic- and Nonmetallic-Coated for Cold-Formed Framing Members.
 - 6. ASTM A1011 - Specification for Steel, Sheet and Strip, Carbon, Hot- Rolled, Structural Quality.
 - 7. ASTM C645-07 - Standard Specification for Nonstructural Steel Framing Members.
 - 8. ASTM C754 - Standard Specification for Installation of Steel Framing Members to Receive Screw-Attached Gypsum Panel Products.
 - 9. ASTM C1002 - Standard Specification for Steel Drill Screws for the Application of Gypsum Panel Products or Metal Plaster Bases.
 - 10. ASTM D1056: Specification for Flexible Cellular Materials -Sponge or Expanded Rubber.
- B. National Association of Architectural Metal Manufacturers:
 - 1. NAAMM ML/SFA 540 - Lightweight Steel Framing Systems Manual.
- C. SSPC: The Society for Protective Coatings:
 - 1. SSPC Paint 20 - Zinc-Rich Primers (Type I - Inorganic and Type II - Organic).
- D. Steel Stud Manufacturer's Association:
 - 1. ICC ER-49043P - Product Technical Information.

1.3 SYSTEM DESCRIPTION

- A. Interior Walls: Metal stud framing system with batt type acoustic insulation specified in Section 07 21 16, and interior gypsum board specified in Section 09 21 16.
- B. Maximum Allowable Deflection:
 - 1. For interior non-rigid finishes: 1:120.
 - 2. For interior ceramic tile and plaster finishes: 1:360.

1.4 SUBMITTALS

- A. Section 01 32 19 – Submittal Procedures: Requirements for submittals.
- B. Product Data: Submit data describing standard framing member materials and finish, product criteria, load charts, and limitations.
- C. Shop Drawings: Submit shop drawings illustrating standard details and special details.
 - 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.
- D. Manufacturer's Installation Instructions: Submit special procedures, and perimeter conditions requiring special attention.

1.5 QUALITY ASSURANCE

- A. Perform Work in accordance with ASTM C754, and NAAMM ML/SFA 540.
- B. Form, fabricate, install, and connect components in accordance with NAAMM ML/SFA 540.
- C. Furnish framing materials in accordance with SSMA - Product Technical Information.

1.6 QUALIFICATIONS

- A. Manufacturer: Company specializing in manufacturing products specified in this section with minimum three years documented experience.
 - 1. Framing Manufacturer: Current member of Steel Stud Manufacturers Association.
- B. Installer: Company specializing in performing Work of this section with minimum three years documented experience.

1.7 PRE-INSTALLATION MEETING

- A. Section 01 31 19 - Project Meetings: Pre-installation meeting.
- B. Convene minimum one week prior to commencing work of this section.

1.8 COORDINATION

- A. Coordinate placement of components within stud framing system specified in Division 26.

PART2 - PRODUCTS

2.1 METAL FRAMING SYSTEM

- A. **Manufacturers:**
1. Dietrich Industries, Inc.: www.dietrichindustries.com.
 2. California Expanded Metal Products (CEMCO): www.cemco.com.
 3. The Steel Network, Inc (TSN): www.SteelNetwork.com.
 4. Clark Western Building Systems: www.clarkwestern.com
 5. Substitutions: Section 01 60 00 – Product Requirements: Product Options and Substitutions.

2.2 COMPONENTS

- A. **Non-Loadbearing Studs:** ASTM C645-07; galvanized sheet steel, non-load bearing rolled steel, channel shaped, punched for utility access, of size and properties necessary to comply with ASTM C754 for the spacing indicated, and as follows:
1. Subject to compliance with requirements, provide Dietrich UltraSTEEL™ Framing, 20 gauge-equivalent.
 2. Depth: 6 inches, 3-5/8 inches, and as shown.
 2. Thickness: 0.0296 inch (20 gauge); or members that can show independently verified test performance per ASTM C645-07 Section 9.2.
- B. **Loadbearing Studs:** As specified in Section 05 40 00.
- C. **Tracks and Headers:** Same material and thickness as studs, bent leg retainer notched to receive studs with provision for crimp locking to stud. Ceiling Runners: With extended leg retainer.
- D. **Furring and Bracing Members:** Of same material as studs; thickness to suit purpose; complying with applicable requirements of ASTM C754.
- E. **Channels:**
1. **Furring:** 25 gage steel sheet, roll-formed, 2-3/4 inch x 7/8 inch deep with 1/2 inch wide flanges.
 2. **Runners:** 1/2 inch cold formed steel weighing not less than 475 lbs. per 1000 lineal feet, or as indicated.
 3. **Stiffeners:** 3/4 inch cold formed steel weighing not less than 300 lbs. per 1000 lineal feet; rust-inhibitive coated.
 4. **Channel Bridging and Bracing:** U-Channel Assembly; Base metal thickness of 0.0538 inch and minimum 1/2-inch wide flanges. Subject to compliance with requirements provide:
 - a. Dietrich Metal Framing: Spazzer® 9200 Bridging and Bracing Bar.
 - b. U-Channel Assembly: 3/4 inches, 1-1/2 inches, 2 inches, as designated.
 - 1) Dietrich Metal Framing; EasyClip™ U-Series™ Clip Angle, or equivalent.
 5. **Resilient Channel:** 1/2 inch deep, steel sheet members designed to reduce sound transmission, galvanized G40.
 1. Subject to compliance with requirements, provide Dietrich Metal Framing Resilient Cannel (RCSD) or (RCUR) UltraSTEEL™ 20 gauge equivalent.
- F. **Fasteners:** ASTM C1002, self drilling, self tapping screws.
1. **Screws:** Type S bugle head; sizes recommended by gypsum board manufacturer.
- G. **Vertical Deflection Connectors:**
1. Manufacturer's standard (bypass) or (head) clips, capable of accommodating upward and downward vertical displacement of primary structure through positive mechanical attachment to stud web.
 2. Mechanical attachment to structure and screw attachment to stud web using step-bushings to permit frictionless vertical movement; 68 mils minimum thickness, size as required by structural design calculations.

3. Required use of connection products that have a valid ICC ES Report or equivalent complying with ICC Acceptance Criteria AC261.
 - a. The Steel Network, Inc.: VertiClip® and VertiTrack® (ICC #ESR-1903).
 - b. Dietrich Metal Framing; SLP-TRK® Slotted Deflection Track by Brady Innovations.
 - c. Dietrich Deflection clips: Fast Strut™ / Fast Top™ Clips / FastClip™ Slide Clips / QuickClip™/ Slide Clip™ (SD).
- H. Firestop Track:
 1. As specified in Section 07 84 00 – Firestopping: Fire Resistive Joint Systems. Comply with UL 2079.
 2. Available Products: Required use of connection products that have a valid ICC ES Report or equivalent complying with ICC Acceptance Criteria AC261. Subject to compliance with requirements, products that may be incorporated into the Work include, but are not limited to, the following:
 - a. The Steel Network, Inc.: VertiClip® and VertiTrack® (ICC #ESR-1903)
 - b. Dietrich Metal Framing, SLP-TRK® Slotted Deflection Track by Brady Innovations.
- I. Drift Clips:
 1. Manufacturer's standard head clips, capable of isolating wall stud from upward and downward vertical displacement and lateral drift of primary structure.
 2. Available Products: Subject to compliance with requirements, products that may be incorporated into the Work include, but are not limited to, the following:
 - a. The Steel Network, Inc.: DriftClip® and DriftTrack.™
 - b. Approved Equivalent.
- J. Flat Strap and Backing Plate: Sheet for blocking and bracing in length and width indicated, for reinforcement of accessories:
 1. Subject to compliance with requirements, provide Dietrich Metal Framing: Danback™ Fire Treated Wood Backing Plate (D16F) or (D24F).
 2. Galvanized Sheet Steel: 0.0538 inch thick.
- K. Anchorage Devices: Powder Driven Fasteners:
 1. General: Kwik Bolt II manufactured by Hilti, Inc.; 3/16 inch diameter.
 2. Expansion Bolts: FS FF-S-325, Group III, expansion shield (self-drilling tubular expansion shell anchor bolts); Type 1 or 2, unless otherwise shown. .
 3. Alternate Manufacturers: Comparable products with current ICBO.
- L. Acoustic Sealant: As specified in Section 07 90 00.
- M. Touch-Up Primer for Galvanized Surfaces: SSPC-Paint 20 (Type I Inorganic) or Type II Organic, zinc rich.
- N. Neoprene Tape: ASTM D1056. Grade SCE41, soft sponge neoprene with adhesive one side; black; 1/4 inch x 1/2 inch, unless otherwise shown.
- O. Wire Hangers: 8 gage galvanized soft steel wire.

2.3 SHOP FINISHING

- A. Studs and Channels: Non-Structural Members: Meeting requirements of ASTM C645-07; roll-formed from galvanized steel; complying with ASTM A1003 and ASTM A653 G40 or equivalent corrosion-resistant coating.
- B. Tracks and Headers:
 1. Structural Members: ASTM A653/A653M G60 Hot dipped galvanized (ASTM C955).

2. Non-Structural Members: Meeting requirements of ASTM C645-07; roll-formed from galvanized steel; complying with ASTM A1003 and ASTM A653 G40 or equivalent corrosion-resistant coating.
- C. Accessories: Same finish as framing members.

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Verify existing conditions before starting work.
- B. Verify rough-in utilities are in proper location.

3.2 PREPARATION

- A. Examination: Examine conditions of work in place before beginning work; report defects.
- B. Measurements: Take field measurements; report variance between plan and field dimensions.

3.3 INSTALLATION OF STUD FRAMING

- A. General: Install in conformance with referenced standards, manufacturer's written directions, as shown, and as specified.
- B. Metal Framing:
 1. General: ANSI A97.2.
 2. Structural Studs: ML/SFA.
- C. Assemblies:
 1. Fire Rated: Per UL and code requirements. Use one manufacturer for each assembly, unless otherwise permitted by governing authorities.
 2. Sound Controlled: Use one manufacturer for each assembly, unless otherwise permitted by manufacturer.
- D. Metal Stud Partitions:
 1. General: Install complete with matching runner tracks and accessories. Align runner tracks accurately to partition layouts.
 2. Floor Runners: Secure with 1/4 inch diameter expansion bolts or powder driven - fasteners at least 1 inch long, where permitted by code. Space fasteners 4 inches from ends of each piece; maximum 24 inches on center intermediately; minimum of 2 fasteners per piece of runner.
 3. Ceiling Runners: Fasten as shown.
 4. Fit runners under and above openings; secure intermediate studs to same spacing as wall studs.
 5. Studs: Gages, depths, and spacing shown. Where not shown, provide per stud manufacturer's recommendations.
 6. Stiffeners: 2 rows at third points for studs with finish one side only; one row at midpoint for studs with finish both sides. Snap into punched web of each stud; nest laps and wire tie.
 7. Chase Wall Partitions: Cross brace at quarter points with 5/8 inch thick gypsum wallboard; braces 12 inches by width of partition. Fasten to studs with 3 fasteners per edge.
 8. Fabricate corners using minimum of three studs.
 9. Double stud at wall openings, door and window jambs, not more than 2 inches from each side of openings.

10. Brace stud framing system rigid.
 11. Coordinate erection of studs with requirements of door frames; install supports and attachments.
- E. Double Wall Partitions:
1. Do not brace or connect rigid members across separation between stud rows. Use the specified resilient sway bracing only. At fire-rated conditions of 2 hours and less conform to UL Design U493.
 2. Provide two welded 16 gage structural studs at sound-rated door openings, unless otherwise detailed.
- F. Furred Partitions:
1. General: Install furring channels at 24 inches on center; level and plumb with steel shims.
 2. To Concrete: Fasten with powder driven fasteners at 24 inches on center.
 3. To Concrete Block: As specified for concrete.
 4. To Structural Steel: As specified for metal stud partitions.
- G. Blocking: Secure steel channels to studs. Install blocking for support of plumbing fixtures, toilet partitions, casework, toilet accessories, and as required for built-in items.
- H. 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 ceiling runners.
- I. Coordinate placement of insulation in stud spaces after stud frame erection.
- J. Install studs vertically at 16 inches on center.
- K. Align stud web openings horizontally.
- L. Secure studs to tracks using fastener method. Do not weld.
- M. Stud splicing is not permissible.
- N. Coordinate erection of studs with requirements of door frames and window frames; install supports and attachments.
- O. Coordinate installation of bucks, anchors, and blocking with electrical and mechanical work to be placed within or behind stud framing.
- P. Backing: Use steel channels or steel studs secured to studs. Provide backing for support of plumbing fixtures; toilet partitions; wall cabinets; toilet accessories; hardware; and opening frames.

3.4 CEILING AND SOFFIT FRAMING

- A. Comply with requirements for ASTM C754.
- B. Install furring after work above ceiling or soffit is complete. Coordinate location of hangers with other work.
- C. Install furring independent of walls, columns, and above-ceiling work.
- D. Securely anchor hangers to structural members or embed in structural slab. Space hangers as required to limit deflection to criteria indicated.

- E. Space main carrying channels at maximum 4 feet on center, and not more than 6 inches from wall surfaces. Lap splice securely.
- F. Securely fix carrying channels to hangers to prevent turning or twisting and to transmit full load to hangers.
- G. Place furring channels perpendicular to carrying channels, not more than 2 inches from perimeter walls, and rigidly secure. Lap splices securely.
- H. Reinforce openings in suspension system which interrupt main carrying channels or furring channels with lateral channel bracing. Extend bracing minimum 24 inches past each opening.
- I. Laterally brace suspension system.

3.5 CLEANING

- A. General: Keep premises free from accumulation of waste and rubbish. At the completion of work remove surplus materials, rubbish, and debris.

3.6 ERECTION TOLERANCES

- A. Maximum Variation From Indicated Position: 1/8 inch in 10 feet.
- B. Maximum Variation From Plumb: 1/8 inch in 10 feet.
- C. Maximum Variation of any Member from Plane: 1/4 inch.

END OF SECTION

SECTION 09 25 13**ACRYLIC-MODIFIED PORTLAND CEMENT PLASTER****PART 1 - GENERAL****1.1 SUMMARY**

- A. Section includes acrylic-modified Portland cement plaster system for installation over metal lath and over framed substrates; and acrylic-modified Portland cement plaster system as substrate for stone veneer.
- B. Related Sections:
1. Section 03 30 00 – Cast-in-Place Concrete.
 2. Section 04 42 00 – Stone Veneer.
 3. Section 05 40 00 – Cold-Formed Metal Framing: Metal studding and framing behind plaster base.
 4. Section 07 27 00 – Air Barriers.
 5. Section 07 90 00 – Joint Sealers.
 6. Section 08 31 00 – Access Doors and Panels: Access panels.
 9. Section 09 21 16 – Gypsum Board Assemblies: Exterior gypsum sheathing substrate.

1.2 REFERENCES

- A. ASTM International:
1. ASTM B117 – Standard Practices for Operating Salt Spray (Fog) Apparatus.
 2. ASTM C109 – Standard Test Methods for Compressive Strength of Hydraulic Cement Mortars (Using 2-in. Cube Specimens).
 3. ASTM C190 - Standard Test Method for Tensile Strength of Hydraulic Cement Mortars.
 4. ASTM C348 – Standard Test Method for Flexural Strength of Hydraulic Cement mortars.
 5. ASTM C641 – Standard Test Method for Iron Staining Materials in Lightweight Concrete Aggregates.
 6. ASTM C926 - Standard Specification for Application of Portland Cement-Based Plaster.
 7. ASTM C1002 – Standard Specification for Steel Drill Screws for the Application of Gypsum Panel Products or Metal Plaster Bases to Wood Studs or Steel Studs.
 8. ASTM C1032 - Standard Specification for Woven Wire Plaster Base.
 9. ASTM C1063 – Standard Specification for Installation of Lathing and Furring to Receive Interior and Exterior Portland Cement-Based Plaster.
 10. ASTM D968 – Standard Test Methods for Abrasion Resistance of Organic Coatings by Falling Apparatus.
 11. ASTM E72 – Standard Test Methods for conducting Strength Tests of Panels for Building Construction.
 12. ASTM E119 – Standard Test methods for Fire Tests of Building Construction and Materials.
 13. ASTM E514 – Standard Test Methods for Water Penetration and Leakage Through Masonry.
 14. ASTM G155 – Standard Practice for Operating Xenon Arc Light Apparatus for Exposure of Non-Metallic Materials.
- B. CBC - California Building Code, 2007 Edition, Chapter 25A.
- C. CLPCA - California Lathing and Plastering Contractors Association, Inc.

1. Plaster/Metal Framing Systems; Lath Manual, 1977 edition. Lathing and Plastering Reference Specifications.
- D. DSA Circular 25-1: Self-Furring Lath.
- E. FS - Federal Specifications:
1. UU-B-790A - Building Paper, Vegetable Fiber (Kraft, Waterproofed, Water Repellent and Fire Resistant).
- F. ICC Evaluation Services:
1. ESR-2017 – Structalath No. 17 SFCR II, No. 17 SFCR Twin Trac, Mega and Rib Lath and Structa-Corners.
 2. ER-5550 – Structalath Welded-Wire Fabric Lath and Structa-Corners.
- G. Intertek Testing Services (Warnock Hersey Listed):
1. WH - Certification Listings.
- H. ITS (DIR) - Directory of Listed Products; Intertek Testing Services NA, Inc..
- I. Military Standard:
1. MIL STD 810B - Mildew Fungus Resistance.
- I. ML/SFA - Metal Lath/Steel Framing Association:
1. Specifications for Metal Lathing and Furring, and Metal Lath Technical Bulletins.
- J. Northwest Wall and Ceiling Bureau (Plastering Industry Bureau, Inc.):
1. Stucco Resource Guide.
- K. Portland Cement Association:
1. PCA – Portland Cement Plaster (Stucco) Manual.
- L. Underwriters Laboratories Inc.:
1. UL - Fire Resistance Directory.
- M. Manufacturer's specifications and recommendations.

1.3 SYSTEM DESCRIPTION

- A. Design Requirements:
1. Extend complete plaster assembly behind surface installed fixtures and trim.
 2. One layer of air barrier and one layer of building paper beneath lath at all locations.
- B. Products provided under this section shall exhibit the following characteristics when tested as follows:
1. ASTM C109: Compressive Strength: 2020 psi.
 2. ASTM C348: Flexural Strength: 570 psi.
 3. ASTM C190: Tensile Strength: 180 psi.
 4. ICBO Procedure: Freeze/Thaw cycling: No cracking, checking or delamination.
 5. ASTM E514: Water Vapor Permeability: 7.2 Perms.
 6. ASTM E72: Transverse Load Strength: Wood Studs – 96 psf; Metal Studs – 138 psi.
 7. ASTM E119: Fire Resistive Wall Assembly, acceptable as part of One-Hour Assembly.
 8. MIL STD 810B: Mildew Fungus Resistance – Passed.
 9. ASTM B117: Salt Spray Resistance – 300 hrs, no deleterious effects.
 10. ASTM D968: Abrasion Resistance – 132 gal, no deleterious effects.
 11. ASTM G155: Accelerated Weathering – 3000 hrs, Passed.

- C. Performance Requirements:
 - 1. Finish surfaces flat, true, and plumb to plus or minus 1/8-inch in 10 feet.
 - 2. Provide weather tight assembly.

1.4 SUBMITTALS

- A. Section 01 32 19 – Submittal Procedures: Submittals procedures.
- B. Product Data: Provide data on plaster materials, accessories, characteristics and limitations of products specified. Include mix design for each coat.
- C. Samples:
 - 1. Submit two samples, 12 x 12 inch in size illustrating finish color and texture.
 - 2. Submit color samples of sealants in manufacturer's standard colors for selection by Architect.
 - 3. Submit physical samples of each type of fastener and anchorage.

1.5 QUALITY ASSURANCE

- A. Perform Work in accordance with ASTM C926; Northwest Wall and Ceiling Bureau (Plastering Industry Bureau, Inc.) - Stucco Resource Guide; and PCA Portland Cement Plaster (Stucco Manual).
- B. Regulatory requirements: Perform plaster work in accordance with requirements of Chapter 25A, California Building Code; Section 2506A - Exterior Lath; and Section 2508A - Exterior Plaster.
- C. Conform to California Building Code for fire rated assemblies as indicated on drawings.

1.6 QUALIFICATIONS

- A. Manufacturer: Company specializing in manufacturing products of this section with minimum five (5) years of documented experience.
- B. Installer: Installer shall be listed with Acrylic-Modified Portland Cement Plaster Systems Manufacturer as a trained contractor and shall possess a current Manufacturer-trained contractor certificate.

1.7 MOCK-UP

- A. Construct mock-up, minimum 4 feet long by 4 feet wide, including exterior wall system, illustrating surface finish color and texture, foundation sill screed, and control joints.
- B. Locate where directed by Architect.
- C. Accepted mock-up may remain as part of the Work.

1.8 PRE-INSTALLATION MEETINGS

- A. Section 01 31 19 – Project Meetings: Pre-installation meeting.
- B. Convene minimum one week prior to commencing work of this section.

1.9 ENVIRONMENTAL REQUIREMENTS

- A. Do not apply plaster when substrate or ambient air temperature is outside the

manufacturer's recommended ranges

- B. Maintain manufacturer's recommended minimum ambient temperature during installation of plaster and until cured.
- C. Application of materials shall not take place during inclement weather unless appropriate protection is provided. Protect materials from inclement weather until they are dry.
- D. Protect the materials from uneven and excessive evaporation in warm windy weather. Always work the shady side of the wall.

1.10 WARRANTY

- A. Section 01 77 00 – Contract Closeout: Requirements for warranties.
- B. Provide a Single Source Warranty. Assist the Owner to properly execute the warranty request forms.
- C. Furnish minimum 5 year manufacturer's warranty for acrylic finish.

PART 2 - PRODUCTS

2.1 MANUFACTURER

- A. Portland Cement Plaster Products specified:
 - 1. BMI 690 Base, manufactured by BMI Products Inc., 990 Ames Avenue, Milpitas, CA 95035-6303, (408) 293-4008, www.bmi-products.com, Jerry L. Pozo, CSI, CDT, BS.
 - 2. Substitutions: Section 01 60 00 – Product Requirements: Product Options and Substitutions.

2.2 PLASTER MATERIALS

- A. Plaster Base Coat: "BMI 690 Base": A premium pre-blended cement-lime-sand mixture, with fiber that has been specially formulated for the scratch and brown coat. This pre-blended product assures consistent quality throughout the project; OR:
- B. Traditional field-mixed Portland cement plaster for scratch and brown coat per ASTM C926 standard.
- C. Water: Clean, fresh, potable and free of mineral or organic matter which can affect plaster.
- D. Option - Leveling Coat: Apply in thin layer over Portland Plaster Base Coat to embed reinforcing mesh and provide uniform substrate for finish application.
 - 1. Fiber-reinforced proprietary 100 percent acrylic-based admixture for Portland cement.
 - 2. Fiber-reinforced proprietary dry-blend cementitious product to be field-mixed with water.
- E. Reinforcing Mesh: "Standard Reinforcing Mesh": Open-weave fiberglass mesh, 4.3 oz/sq. yd. with integral compatibility treatment for related materials.
- F. Primer: 100 percent acrylic color primer: Water-based, pigmented acrylic primer applied over the cured plaster base coat, minimum 7 days, to improve adhesion and provide more uniform finish appearance.

- G. Plaster Finish Coat: 100 percent acrylic finish with integral color and texture as selected by Architect from manufacturer's standard colors and textures. Multiple colors as selected by Architect, and as indicated on exterior elevations.
 - 1. Acceptable manufacturers: BMI Products, Dryvit Systems Inc., Senergy, or Sto.
- H. Warranties available with BMI basecoat of 5-10 years: BMI Products, Dryvit, Senergy, and Sto.

2.3 METAL LATH

- A. Air Barrier: As specified in Section 07 27 00 – Air Barriers.
- B. Weather-Resistive Barrier: 15 lb. Asphalt impregnated building paper, Federal Specification UU-B790a, Type 1, Grade D, Style 2, UBC Standard 17-1, average water resistance of 30 minutes.
 - 1. Fortifiber Building Systems Group; Model: "Jumbo Tex - Classic"; or accepted equal.
- C. Flexible Flashing: As specified in Section 07 27 00 – Air Barriers.
- D. Lath:
 - 1. General: ASTM C847 and Table 25A-B, 2001 CBC.
 - 2. Sheathed stud walls: No. 17 Gage Structalath SFCR II; as manufactured by Structa Wire Corp;
 - a. Reference: ICBO 5550 2.1.3.1.
 - b. Reference: ITS Report #483-1606.
 - 3. Framed soffits: Expanded metal lath, 3.4 pound, expanded, galvanized 3/8-inch rib.
 - a. Western Metal Lath: Spray Rib, 3.4 lbs./Sq.Yd.
- E. Anchorage: Nails, staples, or other metal supports conforming to requirements of referenced standards, of type and size to suit application and conforming to requirements of 2007 CBC, Table 25A-C for conditions indicated, galvanized, to rigidly secure lath and associated metal accessories in place.
 - 1. Screws: ASTM A954 or ASTM C1002 self-drilling, self-tapping screws, with a 7/16 inch pan wafer head and 0.120 inch diameter shank.
 - 2. Install woven wire metal lath on sheathed stud walls using self furring fasteners.
 - 3. Anchors for installation of lath to concrete: Acceptable product: Powers Trak-It Fasteners. Pin fastener installed with gas fuel powered setting tool.
 - a. Part No. 55024 or Part No. 55033, 1-inch zinc coated pins, smooth shank with rolled point; with Part No. 55040 Stick-E Lathing Washer.
 - b. Reference: ICC ER-6157 Evaluation Report.
- F. Tie Wire: 18 gauge galvanized and annealed low-carbon steel in compliance with ASTM A 641 with Class I coating.

2.4 ACCESSORIES

- A. Corner and Strip Reinforcement: Expanded large-mesh diamond metal lath fabricated from welded wire mesh fabricated from 0.0475-inch diameter zinc-coated (galvanized) wire.
- B. Corner Bead: Formed sheet steel, depth governed by plaster thickness, maximum possible lengths, expanded metal flanges with radiused edge; galvanized.
 - 1. Interior Corners: No. 30
 - 2. Exterior Corners: Structa-Corners, as manufactured by Structa Wire Corp.

3. Arches: Structa-Corner Arch, as manufactured by Structa Wire Corp.
- C. Casing Bead: Per Plaster and Drywall System Manual, size and profile as indicated on the Drawings and as necessary to suit application. Formed sheet steel, depth governed by plaster thickness, maximum possible lengths, expanded metal flanges with square edges; galvanized.
- a. Western Metal Lath #66 Expanded Metal Casing Bead.
 - b. Cemco #66 Short Flange Casing Bead.
 - b. Accepted equal.
- D. Control Joints:
1. One-Piece Expansion Control Joint:
 - a. Prefabricated, galvanized steel, minimum 0.0172-inch thick, vented and non-vented. Provide removable protective tape on plaster face of control joints.
 - b. Manufacturer: Western Metal Lath – XJ15 Control Joint, or equal.
 2. Two-Piece Control Screed:
 - a. Material: Aluminum, extruded alloy 6063 T5, with clear anodized finish.
 - b. Product: Fry Reglet 2-Piece Plaster Control Screed; Model PCS-75-150 2-PC; as manufactured by Fry Reglet Corporation.
 - c. Reveal Width: 1-1/2 inches.
 - d. Reveal Depth: 3/4 inches.
- E. Foundation Sill (Weep) Screed: Formed sheet steel, depth governed by plaster thickness, maximum possible lengths, galvanized, with weep holes 2 inches on center.
1. Western Metal Lath #7 Foundation Sill Screed; Superior Metal Trim SWS Superior Weep Screed (#7 sill screed); or equal.
- F. Stucco Drip Screed:
1. Vented and non-vented, zinc coated galvanized steel, 7/8-inch thick for thick and thin set Portland cement plaster.
 2. Manufacturer: Fry Reglet Corp., "Stucco Drip Screed" and "Thin Stucco Drip Screed"; Superior Metal Trim SSC Superior Soffit Corner (#5 drip mould); or equal.
- G. Foam Shapes: Fabricated from virgin expanded polystyrene (EPS); typical density of 1 pound per cubic foot.
1. Rigid, closed cell insulation material.
 2. Color: White.
 3. Flame Spread Rating: Class 1, Flame spread of 25 or less.
 4. Fiberglass Reinforcing Mesh: 4 ounce minimum.
- H. Adhesive for attaching Foam Shapes to Plaster:
1. OSI Sealants, Inc.: PL Premium Polyurethane Construction Adhesive.
 - a. Polyurethane based, one-component, moisture curing adhesive.
 - b. VOC compliant.

2.5 SEALANT

- A. "Spectrum 3" or "Spectrum 4" low-modulus silicon sealant, as manufactured by Tremco, Inc., type as recommended by wall finish manufacturer for conditions indicated, and as required to maintain single-source warranty continuity.
1. Color: As selected by Architect from manufacturers standards.

2.6 PLASTER MIXES

- A. Base coat: BMI 690 basecoat is a pre-blended product and, therefore can be mixed in a

continuous mixer as well as a mechanical plaster mixer.

- B. Mix for three minutes, but never more than five minutes. DO NOT OVERMIX.
- C. Double-back method of application is acceptable.
- C. Protect mixtures from freezing, frost, contamination, and excessive evaporation.
- D. Do not re-temper mixes after initial set has occurred.

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Verify the suitability of existing conditions before starting work.
- B. Mechanical and Electrical: Verify services within walls have been tested and accepted.

3.2 INSTALLATION OF AIR BARRIER

- A. Install air barrier over exterior gypsum sheathing substrate in accordance with Section 07 27 00 – Air Barriers.

3.3 INSTALLATION OF BUILDING PAPER AND FLASHINGS

- A. Install in accordance with referenced standards. Fasten securely in place.
- B. Building Paper and Flashings:
 - 1. Apply one layer building paper over air barrier substrate in accordance with manufacturer's recommendations, laid smooth without holes, tears, gaps, folds or bunches of material. Secure end laps at supports.
 - 2. Install building paper continuously behind applied accessories.
 - 3. Lap horizontal edges 4-inches minimum, shingle fashion to weather.
 - 4. Lap vertical edges 6-inches minimum and seal with tape.
 - 5. Double bottom layer at corners, extending 6-inches around corner from each side.
 - 6. Lap sheet metal flashings. Lap felt flashing strips at door frames and windows; lap over head and jamb strips and under sill strip.
 - 7. Extend no part of metal lath under building paper or flashing. Weather all laps to exterior.
- C. Flexible Flashing: Install as specified in Section 07 27 00. Install in locations indicated and underlying horizontal and sloped areas of plaster, in inset wall opening sills and similar locations; in accordance with the manufacturer's recommendations and as follows;
 - 1. Substrate Preparation:
 - a. Smooth, clean, dry and free of voids, spalled areas, loose substrate, loose nails, sharp protrusions or other matter that will hinder the adhesion or regularity of installation.
 - b. Clean loose dust or dirt by wiping with a clean dry cloth or brush. Prime substrate with compatible primer in conditions recommended by flashing manufacturer.
 - 2. Flashing Application:
 - a. Coordinate installation with other paper and metal flashings, interleave as required to weather all laps to drain, directing water to exterior.
 - b. Peel release paper from roll to expose rubberized asphalt and position

- flashing to center over joint location before application. Ensure flashing is centered over joint opening. Avoid fishmouths.
- c. Press flashing firmly into place, ensure continuous and intimate contact with the substrate. Cut out wrinkles or other affected areas and replace.
 - d. Flashing shall be continuously supported by the substrate without spanning or bridging joints, gaps or voids in excess of 1/4 inch (6.4 mm). Minimum End Laps 2 inch.
3. Install metal lath over flexible flashing.

3.4 INSTALLATION OF ACCESSORIES

- A. Install accessories in accordance with ASTM C1063.
- B. Set straight, plumb and level, and shim as required to proper grounds. Coordinate, trim or cope screeds and accessories to lap, or be lapped with flashings and work provided by other sections. Ensure all laps of accessories and flashings weather to exterior.
- C. Neatly miter or cope, corners and intersections of accessories to fit exposed edges. Make tight hairline joints.
- E. Lap and caulk drip screeds and other exterior accessories at joints and intersections.
- F. Continuously reinforce angles and fasten only at perimeter edges.
- G. Place casing beads at terminations of plaster finish. Butt and align ends. Secure rigidly in place.
- H. Extend screeds and accessories into niches and recesses, around interior and exterior wall corners, and around all sides of columns and similar building elements. Continue control joint patterns and molding alignments on walls of arcades, passages and all similar locations to match or extend those shown on exterior elevations, whether or not individual conditions are specifically shown, noted or elevated.

3.5 INSTALLATION OF LATH

- A. General: Install Structa Lath No. 17 Gage in accordance with Section 2.2 of ER-5550.
- B. Apply metal lath taut, with long dimension perpendicular to supports. Attach at maximum 6-inch intervals conforming to requirements of CBC Table 25A-C. Fasteners to penetrate into framing support studs by 1/4 inch minimum.
 - 1. At concrete substrate: Attach metal lath at nominal 6 inches on center vertical, and 16 inches on center horizontal.
- C. Stagger ends of lath to differing supports. Lap all ends at supports.
- D. Lap sides 1-1/2-inch and ends 1-inch, as a minimum. Nest ribs of ribbed lath together.
- E. Reinforce internal and external corners with lath.
 - 1. Continuously reinforce internal angles with corner mesh, return metal lath 3-inches from corner to form the angle reinforcement; Fasten only at perimeter edges.
- F. Apply strip reinforcement diagonally at corners of lathed openings. Secure rigidly in place.
- G. Place 4-inch wide strips of metal lath centered over junctions of dissimilar backing materials. Secure rigidly in place.

- H. Attach at soffits with either hook staples or provide supplementary tying in accordance with the Referenced Standard and CBC Section 2504A.

3.6 INSTALLATION OF FOAM SHAPES

- A. Install in accordance with manufacturer's installation instructions and Northern California Lath and Plaster Association.
- B. Apply fiberglass reinforcing mesh embedded in acrylic modified cementitious basecoat over foam shape. Back wrap foam shape minimum of 1 inch to 1-1/2 inches with reinforcing mesh.
- C. Adhere foam shape to building substrate using manufacturer's recommended method.
- D. Apply brown coat and finish coat of cement plaster over foam shape per Article 3.7.

3.7 PLASTERING

- A. Apply BMI 690 premixed plaster in accordance with manufacturer's instructions.
- B. One-Coat Application Over Metal Lath as Substrate for Stone Veneer:
1. Apply one coat to a nominal thickness of 3/8 inch. Apply plaster scratch coat to embed lath completely so that no lath is visible.
 3. Float surface with a wood or hard rubber float to promote densification and ensure a surface with adequate "tooth" receptive to bonding of the thin-brick veneer.
- C. Three-Coat Application Over Metal Lath:
1. Apply first coat to a nominal thickness of 3/8 inch. Apply plaster scratch coat to embed lath completely so that no lath is visible. Scratch or score vertical surfaces horizontally at even intervals for mechanical key.
 2. Apply second coat to a nominal thickness of 3/8 inch once the first coat is sufficiently rigid to accept the application without being disturbed. Apply evenly, using a rod, darby or other straightedge, bring surface to a true, even plane, flush with plaster grounds.
 3. Float surface with a wood or hard rubber float to promote densification and ensure a surface with adequate "tooth" receptive to bonding of the finish coat.
 4. Apply acrylic primer and finish coat to a nominal thickness of 1/8 inch. Apply evenly over brown coat and 7 days after application of preceding coat.
- D. Curing: Base requires adequate moisture to allow continuous hydration of the cement.
1. Minimum four (4) days of moist curing shall be provided.
 2. Provide additional moist curing to conform to code requirements, manufacturer recommendations, local practices and climatic conditions and as otherwise required to provide acceptable substrate for finish coat.
 3. Base coat shall be allowed to cure for a minimum of 7 days prior to installation of stone veneer.
- E. Reinforced Leveling Coat:
1. Ensure that the surface of the wall is cured, clean, dry and free of efflorescence, oil or other contaminants that would impair adhesion.
 2. Apply mixture in continuous layer approximately 3/32 inch thick.
 3. Apply a layer of reinforcing mesh into the wet mixture and trowel smooth until mesh is fully embedded. Lap adjoining pieces of mesh 2-1/2 inches minimum and as described in the manufacturer's written instructions and technical bulletins.

4. Cure for a minimum of 24 hours, until dry, or longer as required by weather conditions.
- F. Primer Application: Colored Primer;
1. Ensure that the surface of the wall is cured, clean, dry and free of efflorescence, oil or other contaminants that would impair adhesion.
 2. Primer color shall closely match that of the selected finish.
 3. Stir to a smooth homogeneous consistency and apply to the wall using a roller, brush or airless spray equipment. Refer to published Colored Primer data sheet for more complete instructions.
 4. Allow to completely dry.
- G. 100 Percent Acrylic Textured Finish Application:
1. Ensure that the surface of the wall is clean, dry and free of any contaminants that may impair the adhesion of surface finish.
 2. Spray, or trowel-apply textured finish to dried primer.
 3. Apply finish to natural breaks to avoid visible cold joints.
 4. Always work the shady side of the wall or provide temporary shading to avoid application in direct sunlight.
 5. Apply in accordance with manufacturer directions for the specific finish and texture being used.

3.8 ERECTION TOLERANCES

- A. Maximum Variation from True Flatness: 1/8-inch in 10 feet, with maximum inward and outward allowance not occurring in less than 20 feet.

3.9 ADJUSTING

- A. Remove and replace material that is stained, damaged or that does not match specified finishes. Provide new matching finish as specified, without evidence of replacement.

3.10 CLEANING AND PROTECTION

- A. Clean installed surfaces in accordance with manufacturer's instructions; do not clean surfaces with products not specified in manufacturer's instructions. Clean as work progresses, remove residue without delay.
- B. Protect metal surfaces and plumbing fixtures. Flush surfaces with clean water before and after cleaning.
- C. Protect finished work from damage until acceptance by Owner.

END OF SECTION

SECTION 09 30 00**TILING****PART 1 - GENERAL****1.1 SUMMARY**

- A. Section includes ceramic and ceramic mosaic tile for floor and wall applications; using thin-set application method; glass mat backer board as tile substrate; and thresholds at door openings.
- B. Related Sections:
 - 1. Section 03 30 00 - Cast-in-Place Concrete: Troweling of floor slab for tile application.
 - 2. Section 07 90 00 - Joint Protection.
 - 3. Section 09 21 16 - Gypsum Board Assemblies.

1.2 REFERENCES

- A. General: Refer to Section 01 42 00 – References and Definitions for reference standards, applicable codes and definitions.
- B. American National Standards Institute:
 - 1. ANSI A108.1 - Glazed Wall Tile, Ceramic Mosaic Tile, Quarry Tile and Paver Tile Installed with Portland Cement Mortar.
 - 2. ANSI A108.3 – Quarry and Paver Tile Installed with Portland Cement Mortar.
 - 3. ANSI A108.5 - Ceramic Tile Installed with Dry-set Portland Cement Mortar or Latex-Portland Cement Mortar.
 - 4. ANSI A108.10 - Installation of Grout in Tilework.
 - 5. ANSI A118.1 - Dry-Set Portland Cement Mortar.
 - 6. ANSI A118.3 – Chemical Resistant, Water Cleanable, Tile Setting and Grouting Epoxy and Water Cleanable Tile-Setting Epoxy Adhesive.
 - 7. ANSI A118.4 - Latex-Portland Cement Mortar.
 - 8. ANSI A118.6 – Ceramic Tile Grouts.
 - 9. ANSI A118.7 - Polymer Modified Cement Grouts for Tile Installation.
 - 10. ANSI A118.10 – Load Bearing, Bonded, Waterproof Membranes for Thin-Set Ceramic Tile and Dimension Stone Installation.
 - 11. ANSI A118.11 - EGP (Exterior Glue Plywood) Latex-Portland Cement Mortar.
 - 12. ANSI A136.1 - Organic Adhesives for Installation of Ceramic Tile.
 - 13. ANSI A137.1 - Ceramic Tile.
- C. ASTM International:
 - 1. ASTM C144 - Standard Specification for Aggregate for Masonry Mortar.
 - 2. ASTM C150 - Standard Specification for Portland Cement.
 - 3. ASTM C206 - Standard Specification for Finishing Hydrated Lime.
 - 4. ASTM C207 - Standard Specification for Hydrated Lime for Masonry Purposes.
 - 5. ASTM C1028 – Static Coefficient of Friction of Ceramic Tile and Other Like Surfaces by the Horizontal Dynamometer Poull Meter Method.
 - 6. ASTM C1178 – Standard Specification for Glass Matt Gypsum Substrate Used as Sheathing.
 - 7. ASTM E119 – Standard Test Methods for Fire Tests of Building Construction and Materials.
- D. Portland Cement Association (PCA): Plaster Manual.
- E. TCA - Tile Council of North America:

1. TCA – Handbook for Ceramic Tile Installation.

1.3 SUBMITTALS

- A. Section 01 32 19 – Submittal Procedures: Submittal procedures.
- B. Shop Drawings: Submit drawings indicating tile layout, color arrangement, perimeter conditions, junctions with dissimilar materials, control and expansion joints, thresholds, and setting details.
- C. Product Data: Submit manufacturer's data completely describing products. Submit instructions for using grouts and adhesives.
- D. Samples: Submit samples of tile set in grouted joints mounted on plywood panels for each color and type of tile, showing color range, size and texture.
 - a. Interior Floor and Wall Tile: Minimum 4 tiles per panel.
 - b. Trim Shapes: 1 for each color type and shape upon request.
- E. Manufacturer's Certificate: Certify products meet or exceed specified requirements.
- F. Manufacturer's Instructions: Submit manufacturer's installation instructions, including instructions for using mortars, bond coats and grouts.

1.4 CLOSEOUT SUBMITTALS

- A. Section 01 77 00 – Contract Closeout: Closeout procedures.
- B. Operation and Maintenance Data: Submit recommended cleaning methods, cleaning materials, stain removal methods, and polishes and waxes.

1.5 QUALITY ASSURANCE

- A. Perform Work in accordance with TCA Handbook and ANSI A108 Series/A118 Series.

1.6 QUALIFICATIONS

- A. Manufacturer: Company specializing in manufacturing products specified in this section with minimum three years documented experience.
- B. Installer: Company specializing in performing Work of this section with minimum three years documented experience.

1.7 PRE-INSTALLATION MEETINGS

- A. Section 01 31 19 – Project Meetings: Pre-installation meeting.
- B. Convene minimum one week prior to commencing work of this section.

1.8 DELIVERY, STORAGE AND HANDLING

- A. Section 01 60 00 – Product Requirements: Product storage and handling requirements.
- B. Packing and Shipping:
 - 1. Deliver containers with grade-seals unbroken. Containers having broken seals will not be accepted. Immediately remove rejected containers from job site.

- 2. Provide manufactured mortars and grouts in containers having identification certifying compliance with referenced standards. Product shall be as recommended by tile manufacturer for intended application.
- C. Storage and Protection: Deliver and store packaged materials in original containers with seals unbroken and labels intact until time of use.

1.9 ENVIRONMENTAL REQUIREMENTS

- A. Section 01 60 00 – Product Requirements.
- B. Do not install adhesives and grouts in unventilated environment.
- C. Maintain ambient and substrate temperature of not less than 50 degrees Fahrenheit during installation of mortar materials.

1.10 EXTRA MATERIALS

- A. Section 01 77 00 – Contract Closeout: Spare parts and maintenance products.
- B. Extra Materials:
 - 1. Supply 5 sq ft of each size, color, and surface finish of tile specified.
 - 2. Provide in original unbroken containers plainly marked with type and quantity of contents, and area of installation.

PART 2 - PRODUCTS

2.1 TILE

- A. Manufacturers:
 - 1. Dal-Tile International, "Keystones™" Series and "Keystones™ Select" Series Tile.
 - 2. Dal-Tile International, "Semi-Gloss™" Tile.
 - 3. Dal-Tile International, "Matte™" Tile.
 - 4. Alternate Manufacturer: American Olean Tile Co.
 - 5. Substitutions: Section 01 60 00 – Product Requirements: Product Options and Substitutions.

2.2 COMPONENTS

- A. Unglazed Ceramic Mosaic Floor Tile ANSI A-137.1, conforming to the following:
 - 1. Manufacturer: Dal-Tile, Corp.
 - 2. Series: Keystones and Keystones Select.
 - 3. Factory mounted flat tile complying with these requirements:
 - a. Type: Porcelain (less than 1/2 percent absorption).
 - b. Wearing Surface: 7.5 percent abrasive content.
 - c. Nominal Facial Dimensions: 2 inch by 2 inch.
 - d. Nominal Thickness: 1/4 inch.
 - a. Minimum coefficient of friction: 0.6 per ASTM C1028.
 - 4. Colors: Randomly mixed as indicated in table below:

Application	Reference	Color	Color Code	Mix
Field	MT-1/A	Gold Dust	D138	10%
Field	MT-1/B	Mottled Med. Brown	D050	65%
Field	MT-1/C	Brownstone Range	D156	15%
Field	MT-1/D	Ebony	D311	10%
Border	MT-2	Ebony	D311	All

- B. Glazed Wall Tile: ANSI A-137.1, conforming to the following:
 - 1. Manufacturer: Dal-Tile, Corp.
 - 2. Series: Semi-Gloss, or Matte.
 - 3. Flat tile complying with these requirements:
 - a. Type: Non-Vitreous (no more than 80 percent absorption.)
 - b. Nominal Face Dimensions: 6 inch by 6 inch.
 - c. Nominal Thickness: 5/16 inch.
 - 4. Colors: As shown in table below.

Application	Reference	Color	Color Code	Note
Built-up Base	T-4	Ebony	D311	Mfg style: MB-5A
Field	T-1	Arctic White	190	
Liners	T-2	Arctic White	190	1" x 6" size
Accent	T-3	Arctic White	190	Matte Finish
Bullnose	T-5	Arctic White	190	

- C. Trim:
 - 1. Provide tile trim units to match characteristics of adjoining flat tile and to comply with the following requirements:
 - a. Same type, color, thickness, face size and finish as tile specified.
 - b. Base for Portland Cement Mortar Installations: Coved to tile, same size as adjacent floor tile.
 - c. Wainscot for Thin-Set Mortar Installations: Surface cap.
 - d. Wainscot for Flush Installations: Regular flat tile for conditions where tile wainscot is shown flush with wall surface above.
 - e. External Corners for Portland Cement Mortar Installations: Bullnose shape with a radius of at least 3/4 inches, unless otherwise noted.
 - f. Internal Corners: Field-Butted square corners, except for coved base and cap angle pieces designed to member with stretcher shapes.

- D. Accent Band at Wall:
 - 1. Wall tiles start above a built-up cove tile base.
 - 2. An accent band in tile is set 6 full field tile units above the base. Accent band consists of two 1" x 6" liner binds bracketing a single run of standard 6" x 6" wall tiles. Arrange liners so that joint lines are offset from field tiles in a 25/75% arrangement. Both top and bottom liners shall have offsets which oppose each other. Horizontally offset the 6" x 6" tile in the middle of the accent band from the field by 50%.

2.3 ACCESSORIES

- A. Adhesive Materials:
 - 1. Organic Adhesive: ANSI A136.1, thin-set bond type.
 - a. Type I at wet areas and Type I or Type II at dry areas.
 - 2. Tile Setting Adhesive: Elastomeric, waterproof, liquid applied.

- B. Mortar Materials:
 - 1. Dry-set mortar: ANSI A118.1
 - 2. Latex-portland cement mortar: ANSI 118.4. (MegaFlex Crack Isolation Mortar by Custom Building Products) or (MegaLite Lightweight Non-Sag Ultra High Bond Crack Isolation Mortar by Custom Building Products. Contributes to LEED Certification).
 - 3. Thin Set Mortar: ANSI A118.4 and A118.11. (Megaflex™ Crack Prevention Mortar by Custom Building Products.).

- C. Grout Materials:
 - 1. Standard Grout: ANSI A118.6, A118.7, or A118.3.

- a. Fast setting, high early strength, low shrinkage polymer-modified proprietary mixture of cementitious compounds, select quartz aggregates and color fast pigments.
 - b. Manufacturer: Custom Building Products Polyblend (ANSI A118.6) or PRISM SureColor Grout (ANSI A118.7). (Contributes to LEED Certification), Mapei, Ultra/Color Grout, or approved equal. Sanded or Unsanded per manufacturer's recommendations.
 - c. PolyBlend Grout by Custom Building Products. Available in 48 Colors.
 - d. Supplier: Dal-Tile Corporation.
 - e. Color: Equal to Bostik Findley Hydroment x125/U210 "Taupe 117".
- D. Trim: Sheet steel zinc-coated by hot-dip process.
- E. Metal framing fasteners: Screws: Light-gauge metal framing, Type S, bugle or wafer head, self-tapping, rust resistant. Heavy-gauge metal framing, Type S-12, bugle or wafer head, rust resistant.
- F. Cleavage Membrane: No. 15 asphalt saturated felt, or 4 mil thick polyethylene film.
- G. Waterproofing Membrane (at Floors): ANSI A118.10, RedGuard Waterproofing and Crack Prevention Membrane by Custom Building Products.
- H. Reinforcing Mesh: 2 x 2 inch size weave of 16/16 wire size; welded fabric, galvanized.
- I. Neutralizers, Primers and Sealers: As recommended by adhesive manufacturer.
- I. Expansion Joint Sealant: Polyurethane type complete with back-up and bond breaker materials as necessary. Product: MONO 555 by Tremco. Conform to requirements of Section 07 90 00.
- J. Thresholds: Marble type; color selected by Architect; honed finish; 4 inch wide by 1/2 inch thick by full width of wall or frame opening; beveled both sides, radiused edges from bevel to vertical face; without holes, cracks or open seams.
- 1. Applications: Provide at the following locations:
 - a. At doorways where tile terminates.
 - b. At open edges of floor tile where adjacent finish is a different height.
- K. Accessories:
- 1. Cleaning, finishing and Sealing Materials: As recommended by tile manufacturer.

2.4 GLASS MAT BACKER BOARD

- A. Acceptable products: Georgia-Pacific Corporation, Dens-Shield Fireguard Type X.
- B. Characteristics:
- 1. Size: Dens-Shield Fireguard Type X: 5/8 inch thick; board size 32 inches by 5 feet and 4 feet by 8 feet.
 - 2. Composition: Water-resistant treated core with glass mat moisture protectant coating and embedded glass mats, both sides. Face side: Surfaced with heat-cured copolymer water- and vapor-retardant coating.
 - 3. Fire Resistance: 5/8 inch Dens-Shield Fireguard Type X: Type X when tested in accordance with ASTM E119, UL classified.
- C. Reference Standard: ASTM C1178.

2.5 JOINT TREATMENT MATERIALS

- A. Joint tape:

1. 2 inch wide, 10 by 10 glass mesh tape.
 2. Reinforcing fabric: Balanced, alkali-resistant, open-weave, glass fiber fabric, made from continuous multi-end strands with tensile strength of not less than 120 lbs. and 140 lbs. in warp and fill directions, respectively, per ASTM D 1682 and complying with ASTM D 578, and of 4.30 oz./sq. yd. minimum weight.
- B. Setting-type joint compound: Untiled, non-wet areas: Georgia-Pacific setting compounds.
- C. Tile setting material: Mastic or mortars, organic adhesive ANSI A136.1, dry set ANSI A118.1, latex portland cement mortar ANSI A118.4, ANSI A118.4 only for floors specified.

2.6 MIXES

- A. Mortar, Bond Coat and Grout Mix: Mix and proportion setting bed, bond coats and grout materials in accordance with applicable ANSI or TCA standards or manufacturer's instructions where cited.

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Examine surfaces to receive tile and verify that:
1. Surfaces are free of defects that would adversely affect tile work.
 2. Surfaces are firm, level or plumb, dry, clean and free of oily or waxy film.
 3. Inserts, accessories, plumbing and membranes are placed or provided for.
- B. Do not start work until unsatisfactory conditions are corrected.

3.2 PREPARATION

- A. Protection:
1. Comply with closing of spaces to traffic and protection requirements of ANSI A108.1, Article 1.5, Sub-articles A-1.5.1, A-1.5.2 and A-1.5.2.1.
 2. Protect adjacent work, surfaces and equipment from effects of tile installation procedures.
- B. Tile Layout:
1. General: Comply with ANSI A108.1, Article A-3.3, unless otherwise specified herein.
 2. Center fields and patterns on areas so that no tile is less than half size.
 3. For heights stated in feet and inches, maintain full courses to nearest attainable height without cutting tile.
 4. Locate precisely expansion joints and accessories before tile is installed.
- C. Surface Preparation:
1. Vacuum clean surfaces and damp clean.
 2. Seal substrate surface cracks with filler.
 3. Install cementitious backer board. Tape joints and corners, cover with skim coat of dry-set mortar to feather edge.
 4. Prepare substrate surfaces for adhesive installation.
 5. Prevent rapid evaporation of moisture from mortar beds. Cure mortar beds in accordance with applicable requirements of ANSI A108.1, Article A-3.2.

3.3 INSTALLATION

- A. General Requirements:
1. Install tile, thresholds, and grout in accordance with applicable requirements of ANSI A108.1 through A108.10, and TCA Handbook requirements.

2. Provide glass mat backer board where indicated on drawings using fastening systems specified.
 3. Lay tile to pattern as shown on approved shop drawings. Do not interrupt tile pattern through openings.
 4. Place thresholds at locations indicated or as scheduled.
 5. Cut and fit tile to penetrations through tile, leaving sealant joint space. Fit tile closely around outlets, pipes, fixtures and fittings so that plates, escutcheons and collars overlap cuts. Form corners and bases neatly. Align floor, base, and wall joints. No staggered joints will be permitted.
 6. Place tile with joints uniform in width, subject to variance in tolerance allowed in tile size. Make joints watertight, without voids, cracks, excess mortar, or excess grout.
 - a. Ceramic Tile: 1/16 inch.
 7. Form internal angles coved and external angles bullnosed.
 8. Install ceramic accessories rigidly in prepared openings.
 9. Sound tile after setting. Replace hollow sounding units.
 10. Keep expansion and control joints free of adhesive or grout. Apply sealant to joints.
 11. Allow tile to set for a minimum of 48 hours prior to grouting.
 12. Grout tile joints. Use standard grout unless otherwise indicated.
 13. Apply sealant to junction of tile and dissimilar materials and junction of dissimilar planes.
- B. Installation – Floors - Mortar Bed Method:
1. First Floor: Over interior concrete substrates, install in accordance with TCA Handbook Method F112, unless otherwise directed.
- C. Installation – Floors - Mortar Bed with Cleavage Membrane Method:
1. Second and Third Floor: Over interior concrete substrates, install in accordance with TCA Handbook Method F11, unless otherwise directed.
- D. Installation - Wall Tile – Coated Glass Mat Water-Resistant Gypsum Backer Board Method:
1. Over coated glass mat backer board on metal studs install in accordance with TCA Handbook Method W245, thin-set with dry-set mortar or latex-portland cement mortar.
 2. At walls, install glass mat backer board panels vertically or horizontally.
 3. Finishing:
 - a. Substrate for Tile: Apply glass mesh joint tape over joints. Embed tape in setting material indicated for specified tile finishes. Allow joints to dry prior to installing tile systems.
 - b. Substrate for Paint, Dry area (untiled): Apply glass mesh joint tape over joints. Embed tape in setting-type joint compound specified. Apply skim coat of setting-type joint compound over surface of tile backer for smooth finish.
 4. Accessories: Install accessories where indicated and in accordance with tile backer manufacturer's instructions.
- E. Place thresholds at locations indicated.
- F. Joint Treatment:
1. Thoroughly clean joints of debris or other foreign material before proceeding with grouting.
 2. Grouting: Install grout in accordance with manufacturer's recommendations, standards as specified herein, ANSI A108.10.
 3. Align floor tile joints with wall tile joints.
- G. Expansion and Control Joints: Provide expansion and control joints conforming to the following requirements: ANSI A108.1, Article AN-3.8.3, TCA's Handbook Installation Method EJ171 and as indicated on the Drawings.

- H. Wall imperfections, holes, gaps after removal of existing fixtures and accessories: Patch walls with appropriate caulking or grout or repair with tile where necessary.

3.4 CLEANING

- A. Section 01 74 00 – Cleaning: Final Cleaning.
- B. Clean entire new tile installation with neutral, non-alkaline chemical cleaner free from lye or caustics. Do not use acid or acid containing cleaners.
- C. Seal tile with materials and methods as recommended by tile manufacturers.

3.5 PROTECTION OF INSTALLED CONSTRUCTION

- A. Do not permit traffic over finished floor surfaces for 4 days after installation.

END OF SECTION

SECTION 09 51 13**ACOUSTICAL PANEL CEILINGS****PART 1 - GENERAL****1.1 SUMMARY**

- A. Section includes suspended metal grid ceiling system and perimeter trim and acoustic panels.
- B. Related Sections:
 - 1. Section 07 90 00 - Joint Protection.
 - 2. Section 23 37 00 - Air Outlets and Inlets: Air diffusion devices in ceiling system.
 - 3. Section 26 50 00 - Lighting: Light fixtures in ceiling system.
 - 4. Section 28 31 00 - Fire Detection and Alarm System: Fire alarm components in ceiling system.

1.2 REFERENCES

- A. ASTM International:
 - 1. ASTM A641 - Standard Specification for Zinc-Coated (Galvanized) Carbon Steel Wire.
 - 2. ASTM A653 - Standard Specification for Steel Sheet, Zinc-Coated (Galvanized) by the Hot-Dip Process.
 - 3. ASTM C635 - Standard Specification for the Manufacture, Performance, and Testing of Metal Suspension Systems for Acoustical Tile and Lay-in Panel Ceilings.
 - 4. ASTM C636 - Practice for Installation Metal Ceiling Suspension Systems for Acoustical Tile and Lay-in Panels.
 - 5. ASTM E84 - Standard Test Method for Surface Burning Characteristics of Building Materials.
 - 6. ASTM E580 - Practice for Application of Ceiling Suspension Systems for Acoustical Tile and Lay-in Panels in Areas Requiring Seismic Restraint.
 - 7. ASTM E795 - Practices for Mounting Test Specimens During Sound Absorption Tests.
 - 8. ASTM E1264 - Classification of Acoustical Ceiling Products.
- B. CBC - California Building Code, 2007 Edition.
- C. Ceilings and Interior Systems Construction Association:
 - 1. CISCA - Acoustical Ceilings, Use and Practice.
- D. Division of the State Architect - Interpretations of Regulations:
 - 1. IR 25-2: Metal Suspension Systems for Lay In Panel Ceilings.
- E. ICBO - International Conference of Building Officials:
 - 1. UBCS - Uniform Building Code Standards.
 - a. 25 - 2 - Metal Suspension Systems for Acoustical Tile and for Lay-In Panel Ceilings.
- F. Intertek Testing Services (Warnock Hersey Listed):
 - 1. WH - Certification Listings.
- G. Underwriters Laboratories, Inc:
 - 1. UL - Fire Resistance Directory.
 - 2. UL723 - Tests for Surface Burning Characteristics of Building Materials.

1.3 SYSTEM DESCRIPTION

- A. Design Requirements:
1. Plumb, true, straight and rigid framing for support of attached materials.
 2. Design system to accommodate construction tolerances, deflection of building structural members, support of attached materials and clearances of intended openings in accordance with CBC.
 3. Seismically anchor ceiling in accordance with UBC Standard 25-2 for heavy-duty structural classification.

1.4 SUBMITTALS

- A. Section 01 32 19 – Submittal Procedures: Submittal procedures.
- B. Shop Drawings: Submit shop drawings showing suspension system details and reflected ceiling plans indicating location of light fixtures, mechanical air supply and return outlets and other items affecting ceiling construction. Identify locations of types of suspension systems and types of panels or tile including access panels, where required.
- C. Product Data: Submit manufacturer's product data for each type of product specified.
- D. Samples: Submit samples for verification of each type of exposed finish required, prepared on samples of size indicated below. Where finishes involve normal color and texture variations, include sample sets showing the full range of variations expected.
1. Submit 6 inch by 12 inch samples of each panel type, pattern, and color.
 2. Set of 12 inch long samples of concealed suspension system members.
 3. Set of 12 inch long samples of exposed moldings for each color and system type required.
- E. Certificates: Manufacturer's certifications that products comply with specified requirements, including laboratory reports showing compliance with specified tests and standards. For acoustical performance, each carton of material must carry an approved independent laboratory classification of NRC, CAC, and AC.
- F. Research reports or evaluation reports of ICBO acceptable to authorities having jurisdiction that show compliance of components with DSA IR 25-2 and CBC.
- G. Closeout:
1. General: Refer to Section 01 77 00 – Contract Closeout: Contract Closeout.
 2. Maintenance Data: Manufacturer's instructions.
 3. Guarantee: Provide in required form for a period of one (1) from date of final acceptance by Owner.

1.5 QUALITY ASSURANCE

- A. Conform to Cisca requirements.
- B. Single-Source Responsibility: Provide acoustical panel units and grid components by a single source manufacturer.
- C. Fire Performance Characteristics: Identify acoustical ceiling components with appropriate markings of applicable testing and inspecting organization.
1. Surface Burning Characteristics: As follows, tested per ASTM E 84 and complying with ASTM E 1264 for Class A products.
 - a. Flame Spread: 25 or less
 - b. Smoke Developed: 50 or less
- D. Coordination of Work: Coordinate acoustical ceiling work with installers of related work

including, but not limited to building insulation, gypsum board, light fixtures, mechanical systems, electrical systems, and sprinklers.

- E. Suspended ceilings will be subject to special inspection.

1.6 QUALIFICATIONS

- A. Manufacturer: Company specializing in manufacturing products specified in this section with minimum three (3) years documented experience.
- B. Installer: Company specializing in performing Work of this section with minimum three (3) years documented experience.

1.7 PRE-INSTALLATION MEETING

- A. Section 01 31 19 - Administrative Requirements: Pre-installation meeting.
- B. Convene one week prior to commencing work of this section.

1.8 DELIVERY, STORAGE, AND HANDLING

- A. Acceptance at Site: Deliver acoustical panels and suspension system components to Project site in original, unopened packages.
- B. Storage and Protection:
 - 1. Store acoustical panels and suspension components in fully enclosed space where they will be protected against damage from moisture, direct sunlight, surface contamination, and other causes.
 - 2. Before installing acoustical panels, permit them to reach room temperature and a stabilized moisture content.
 - 3. Handle acoustical panels carefully to avoid chipping edges or damaging units in any way.

1.9 ENVIRONMENTAL REQUIREMENTS

- A. Section 01 60 00 – Product Requirements.
- B. Maintain uniform temperature of minimum 60 degrees F, and maximum humidity of 40 percent prior to, during, and after acoustic unit installation.

1.10 SEQUENCING AND SCHEDULING

- A. Sequence Work to ensure acoustic 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.

1.11 EXTRA MATERIALS

- A. Section 01 77 00 – Contract Closeout: Spare parts and maintenance products.
- B. Furnish extra materials described below that match products installed, are packaged with protective covering for storage, and are identified with labels clearly describing contents.
 - 1. Acoustical Ceiling Panel: Furnish quantity of full-size units equal to 10 percent of each type panel installed.

PART 2 - PRODUCTS**2.1 SUSPENDED ACOUSTICAL CEILINGS**

- A. Manufacturer:
1. USG Interiors; www.usg.com.
 2. Substitutions: Not permitted. USG Interiors is District standard.
- B. Grid:
1. General: Heavy Duty System manufactured by USG Interiors, Inc.; Donn.
 2. Substitutions: Not permitted. USG, Donn/DX is District standard.
- C. Non Fire-Rated Grid: ASTM C6355 heavy duty exposed tees, all components die cut and interlocking, commercial quality, cold rolled steel with galvanized coating.
1. Non Fire-Resistance Rated, Direct-Hung, Double-Web Suspension System, DSA Approved Ceiling System Donn DX/DXL24: USG Interiors, 'Donn DX/DXL24 for main runner, with DX-216, 416, 424, or 524 cross runners, "Intermediate Duty".

2.2 COMPONENTS

- A. General: Provide manufacturer's standard panels of configuration indicated that comply with ASTM E1264 classifications as designated by types, patterns, acoustical ratings, and light reflectances, unless otherwise indicated.
1. Mounting Method for Measuring Noise Reduction Coefficient (NRC): Type E-400 (plenum mounting in which face of test specimen is 15-3/4 inches away from the test surface) per ASTM E795.
- B. Acoustical Panel Colors and Patterns: Match appearance characteristics indicated for each product type.
1. Acoustical Panel: USG Millenia® ClimaPlus™; Illusion Two/24 Panels; Item No. 78780.
 - a. ASTM E1264, Type III, Form 1 or 2, Pattern G.
 - b. Material: Mineral fiber.
 - c. Surface Texture: Smooth texture.
 - d. Surface Finish: White.
 - e. Size: 24 inches by 48 inches.
 - f. Thickness: 3/4 inch.
 - g. Density: 1.04 pounds per square foot.
 - h. Edge Profile: SLT Reveal, beveled edge for lay-in.
 - i. Noise Reduction Coefficient: 0.70.
 - j. Ceiling Attenuation Class: 35.
 - k. Flame Spread: ASTM E1264; Class A; Flame spread 25; Smoke developed 25; (UL labeled).
 - l. Light Reflectance: 85 percent.
 - m. Recycled Content: 80 percent.
 - n. Durability: Washable, Impact-Resistant, Scratch-Resistant, Soil-Resistant."

2.3 CEILING SUSPENSION SYSTEM

- A. Components: All main beams and cross tees shall be commercial quality hot dipped galvanized steel as per ASTM A653. Main beams and cross tees are double-web steel construction with 15/16 inch type exposed flange design. Exposed surfaces chemically cleansed, capping prefinished galvanized steel in baked polyester paint. Main beams and cross tees shall have rotary stitching.
1. Structural Classification: ASTM C 635, Heavy Duty.
 2. Color: White and match the actual color of the selected ceiling tile, unless noted otherwise.
 3. Acceptable Product: USG Donn/DX.

- B. Attachment Devices: Size for five times design load indicated in ASTM C 635, Table 1, Direct Hung unless otherwise indicated.
- C. Wire for Hangers and Ties: ASTM A 641, Class 1 zinc coating, soft temper, prestretched, with a yield stress load of at least three times design load, but not less than 12 gauge.
- D. Edge Moldings and Trim: Metal or extruded aluminum of types and profiles indicated or, if not indicated, manufacturer's standard moldings for edges and penetrations, including light fixtures, that fit type of edge detail and suspension system indicated. Provide moldings with exposed flange of the same width as exposed runner.
 - 1. Perimeter wall molding: Minimum 2 inch flange.
- E. Accessories:
 - 1. Light Fixture Protection and Hold Down Clips: Provide light fixture protection panels, fasteners and hold down clips as required by UL listing; manufacturer's standard types.
 - 2. Stabilizer bars, furring clips, splices, edge moldings, and seismic compression posts as required for suspended grid system.
- F. Finish: Baked enamel finish on exposed surfaces. Flame spread: 76-200.
- G. Carrying Channels and Hangers: Of black steel; size and type to suit application, seismic requirements, ceiling system flatness requirements, and to rigidly secure the complete acoustic unit ceilings with maximum deflection of 1/360.
- H. Hanger Wires and Brace Wires: Size and location as specified and noted on drawings.
- I. Hold Down Clips: Manufacturer's standard, use at all 24 by 24 inch acoustical panels.
- J. Compression Struts: "Donn Compression Posts" manufactured by USG Interiors, Inc. Alternate Manufacturers: No known equal.

2.4 ACOUSTICAL SEALANT

- A. As recommended by acoustical material manufacturer, for application shown.

2.5 METAL SUSPENSION SYSTEMS

- A. Provide 12 gauge minimum hanger wires for use up to and including 4 feet by 4 feet grid spacing along main runners.

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Verify layout of hangers will not interfere with other work.
- B. Examine substrates and structural framing to which acoustical panel ceilings attach or abut, with installer present, for compliance with requirements specified in this and other Sections that affect ceiling installation and anchorage.
- C. Do not proceed with installation until unsatisfactory conditions have been corrected.

3.2 PREPARATION

- A. Environmental Requirements: Maintain temperature approximating operational conditions, before, during and after installation; humidity not more than 70 percent.
- B. Coordination: Furnish layouts for preset inserts, clips, and other ceiling anchors whose installation is specified in other Sections.
- C. Measure each ceiling area and establish the layout of acoustical panel to balance border widths at opposite edges of each ceiling. Avoid using less than half width units at borders, and conform to the layout shown on reflected ceiling plans.

3.3 EXISTING WORK

- A. Extend existing acoustical ceiling installations using materials and methods as specified.
- B. Clean and repair existing acoustical ceilings which remain or are to be installed.

3.4 INSTALLATION

- A. General: Install in conformance with referenced standards, manufacturer's written directions, as shown, and as specified.
- B. Lay-In Grid Suspension System: Complying with IR 25-2:
 - 1.1 #12 gage (min.) hanger wires may be used for up to and including 4 ft by 4 ft grid spacing and shall be attached to main runners.
 - 1.2 Provide #12 gage hanger wires at the 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, for the perimeter of the ceiling area. End connections for runners which are designed and detailed to resist the applied horizontal forces may be used in lieu of the #12 gage hanger wires subject to Division of the State Architect (DSA) review and approval.
 - 1.3 Provide trapeze or other supplementary support members at obstructions to main hanger spacing. Provide additional hangers, struts or braces as required at all ceiling breaks, soffits or discontinuous areas. Hanger wires that are more than 1 in 6 out of plumb are to have counter-sloping wires.
 - 1.4 Ceiling grid members may be attached to not more than 2 adjacent walls. Ceiling grid members should be at least 1/2 inch clear of other walls. If walls run diagonally to ceiling grid system runners, one end of main and cross runners should be free, and a minimum of 1/2 inch clear of wall.
 - 1.5 At the perimeter of the ceiling area where main or cross runners are not connected to the adjacent wall, provide interconnection between the runners at the free end to prevent lateral spreading. A metal strut or a #16 gage wire with a positive mechanical connection to the runner may be used. Where the perpendicular distance from the wall to the first parallel runner is 12 inches or less, this interlock is not required.
 - 1.6 Provide bracing assemblies consisting of a compression strut and four #12 gage splayed bracing wires oriented 90 degrees from each other at the following spacing:
 - a. Place sets of bracing wires at a spacing not more than 12 feet by 12 feet on center.
 - b. Provide bracing assemblies at locations not more than 1/2 the spacing given in paragraph 1.6.a above, from each perimeter wall and at the edge of vertical ceiling offsets.

The slope of these wires shall not exceed 45 degrees from the plane of the ceiling and shall be taut. Splices in bracing wires are not to be permitted without special DSA approval.

- c. Suspended acoustical ceiling systems with a ceiling area of 144 square feet or less, and fire rated suspended acoustical ceiling systems with a ceiling area of 96 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.
 - c. Provide a compression strut, steel section with L/R ratio of 200 maximum at each set of splayed wires, attach to main runner with 1/2 inch diameter machine bolt and to structure with #12 x 4 inch long. Compression strut shall not replace hanger wire.
- 1.7 Fasten hanger wires with not less than 3 tight turns. Fasten bracing wires with 4 tight turns. Make all tight turns within a distance of 1-1/2 inches. Hanger or bracing wire anchors to the structure should be installed in such a manner that the direction of the anchor aligns as closely as possible with the direction of the wire. Note: Wire turns made by machine where both strands have been deformed or bent if wrapping can waive the 1-1/2 inch requirement, but the number of turns should be maintained, and be as tight as possible.
- 1.8 Separate all ceiling hanging and bracing wires at least 6 inches from all unbraced ducts, pipes, conduit, etc.
- 1.9 When drilled-in concrete anchors or shot-in concrete anchors are used in reinforced concrete for hanger wires, 1 out of 10 must be field tested for 200 lbs. in tension. When drilled-in concrete anchors are used for bracing wires, 1 out of 2 must be field tested for 440 lbs. in tension. Shot-in anchors in concrete are not permitted for bracing wires. If any shot-in or drilled-in anchor fails, see CBC, Section 1023A.3.5.
- 1.10 Attach all light fixtures and ceiling mounted air terminals, to the ceiling grid runners to resist a horizontal force equal to the weight of the fixtures. Screws or approved fasteners are required.
- 1.11 Flush or recessed light fixtures and air terminals, weighing less than 56 pounds, may be supported directly on the runners of a heavy duty grid system but, in addition, they must have minimum of two #12 gage slack safety wires attached to the fixture at diagonal corners and anchored to the structure above. All 4 ft by 4 ft. light fixtures must have slack safety wires at each corner.
- a. All flush or recessed light fixtures and air terminals weighing 56 pounds or more must be independently supported by not less than 4 taut #12 gage wires each attached to the fixture and to the structure above regardless of the type of ceiling grid system used.
 - b. The 4 taut #12 ga. wires including their attachment to the structure above must be capable of supporting 4 times the weight of the unit.
- 1.12 All fixtures and air terminals supported on intermediate duty grid systems must be independently supported by not less than 4 taut #12 gage wires each attached to the fixture or terminal, and to the structure above.
- 1.13 Support surface mounted light fixtures by at least two positive devices which surround the ceiling runner and which are each supported from the structure above by a #12 gage wire. Spring clips or clamps that connect only to the runner are not acceptable.
- a. Provide additional supports when light fixtures are 8 feet or longer.

- 1.14 Support pendant mounted light fixtures directly from the structure above with hanger wires or cable passing through each pendant hanger and capable of supporting 4 times the weight of the fixture. A bracing assembly, per Figure 1 in IR 25-2, is required where the pendant hanger penetrates the ceiling. Specialty details are required to attach the pendant hanger to the bracing assembly to transmit horizontal forces.
- C. Additional Requirements for Fire Rated Ceilings:
1. Provide Underwriter Laboratory (U.L.) design number or State Fire Marshal (SFM) listing number. The components and installation details must conform in every respect with the U.L. or SFM approval for the design number specified. Custom designs which combine components from different approved designs but have not been tested as a complete assembly are not acceptable.
 2. For Schools and Essential Services Buildings, bracing assemblies are required for each 96 square feet. The first bracing assembly is required not more than 4 feet from each wall. A minimum of one bracing assembly is required between any two adjacent expansion cut-outs on runners being braced.
 3. Pop rivets, screws, or other attachments are not acceptable unless specifically detailed on the drawings and approved by U.L. and SFM.
- D. Additional Requirements for Metal Panels:
1. Metal panels and panels weighing more than 1/2 psf, other than acoustical tile, are to be positively attached to the ceiling suspension runners.
- E. Acoustical Panels: Install acoustical panels in coordination with suspension system. Place splines or suspension system flanges into kerfed edges so that panel-to-panel joints are closed by double lap of material.
1. Fit adjoining panel to form flush, tight joints. Scribe and cut panel for accurate fit at borders and around penetrations through panel.
 2. Hold panel field in compression by inserting leaf-type, spring-steel spacers between panel and moldings, spaced at 12 inches on center.
 3. Ceiling installer shall protect lighting fixtures and air ducts to comply with requirements indicated for fire resistance rated assembly.
 4. Install hold-down clips within 20 feet of exterior doors to retain panels tight to grid system.
- F. Edge Moldings and Trim: Unless otherwise noted, install edge moldings and trim of type indicated at perimeter of acoustical panel ceiling area and where necessary to conceal edges of acoustical units.
1. Apply acoustical sealant in a continuous ribbon concealed on back of vertical legs of moldings before they are installed.
 2. Screw attach moldings to substrate at intervals not over 16 inches on center and not more than 3 inches from ends, leveling with ceiling suspension system to a tolerance of 1/8-inch in 12 feet. Miter corners accurately and connect securely.
 3. Do not use exposed fasteners, including pop rivets, on moldings and trim.

3.5 ADJUSTMENT

- A. General: Adjust sags or twists which develop in ceiling systems; replace improperly installed or damaged suspension system components and acoustical panels, as directed by the Architect.

3.6 ERECTION TOLERANCES

- A. Maximum Variation from Flat and Level Surface: 1/8 inch in 10 feet.

- B. Maximum Variation from Plumb of Grid Members Caused by Eccentric Loads: 2 degrees.

3.7 CLEANING

- A. Section 01 74 00 – Cleaning: Final cleaning.
- B. General: Upon completion, thoroughly clean exposed surfaces per manufacturer's instructions.

END OF SECTION

SECTION 09 65 00
RESILIENT FLOORING

PART 1 - GENERAL**1.1 SUMMARY**

A. Section includes the following:

1. Linoleum Sheet Flooring
2. Sheet Vinyl Safety Flooring
3. Resilient base
4. Installation accessories
5. Calcium chloride concrete moisture testing.

B. Related Sections:

1. Section 03 30 00 - Cast-in-Place Concrete
2. Section 07 26 00 - Concrete Vapor Control Barrier: Moisture Remediation

1.2 REFERENCES

A. ADAAG - Americans with Disabilities Act (ADA):

1. Accessibility Guidelines for Buildings and Facilities.

B. ASTM International:

1. ASTM C662 - Smoke Density Test.
2. ASTM D2047 - Static coefficient of friction of Polish-Coated Floor Surfaces as Measured by the James Machine.
3. ASTM E648-97/NFPA 253 – Standard Test Method for Critical Radiant Flux of Floor-Covering Systems using a Radiant Heat Energy Source.
4. ASTM E662 - Test Method for Specific Optical Density of Smoke Generated by Solid Materials.
5. ASTM F710 – Standard Practice for Preparing Concrete Floors and other Monolithic Floors to receive Resilient Flooring.
6. ASTM F970 – Standard Test Method for Static load limit.
7. ASTM F1066 - Specification for Vinyl Composition Floor Tile.
8. ASTM F1303, Standard Specification for Sheet Vinyl Floor Covering with Backing.
9. ASTM F1861 - Wall Base: Rubber and Vinyl Plastic.
10. ASTM F1869 - Standard test Method for Measuring Moisture Vapor Emission Rate of Concrete Subfloor Using Anhydrous Calcium Chloride.
11. ASTM F2034 - Standard Specification for Sheet Linoleum Floor covering.
12. ASTM F2170 - Standard Test Method for Determining Relative Humidity in Concrete Floor Slabs Using In Situ Probes
13. ASTM F2195 – Standard Specification for Linoleum Floor Tile.

C. Bay Area Air Quality Management District: www.baaqmd.gov

1. BAAQMD 8-51 – Regulation 8, Rule 51 – Adhesive and Sealant Products.

D. Calcium Chloride Test developed by the Rubber Manufacturer's Association.

E. CCR - California Code of Regulations, Title 24, Part 2, California State Accessibility Standards.

- F. Federal Specifications:
 - 1. FS RR-T-650 – Treads, Metallic and Non-metallic, Non-skid.
 - 2. FS SS-T-312b – Tile, Floor: Asphalt, Rubber, Vinyl, Vinyl Composition.
- G. International Standards Organization:
 - 1. ISO 9001: 2000 Certification.
 - 2. ISO 14001: 2004 Certification.
- H. National Fire Protection Association:
 - 1. NFPA 253 – Test Method for Critical Radiant Flux of floor covering Systems Using a Radiant Energy Source.
 - 2. NFPA 258 – Recommended Practice for Determining Smoke Generation of Solid Materials.
- I. Resilient Floor Covering Institute (RFCI)
 - 1. RFCI Standard Slab Moisture Test Method (Calcium Chloride Method).
- J. South Coast Air Quality Management District:
 - 1. SCAQMD Rule 1168 - Adhesive and Sealant Applications.

1.3 SYSTEM DESCRIPTION

- A. Performance Requirements: Provide slip resistant sheet vinyl safety flooring which has been manufactured and installed to maintain performance criteria stated by manufacturer without defects, damage or failure.

1.4 SUBMITTALS

- A. Section 01 32 19 – Submittal Procedures
- B. Shop Drawings: Seaming Diagrams as required.
 - 1. Submit a cut diagram indicating seam locations and roll direction. Use mitered seam layouts for corners when changing directions 180 degrees (e.g. when running material down corridors which bisect at a right angle), unless approved otherwise.
- C. Product Data: Submit manufacturer's product data and installation instructions for each type of resilient flooring and accessories as proof of specification compliance.
- D. Samples: Submit 3 sets of samples of each type, color and finish of resilient flooring and accessory required, indication full range of color and pattern variation as proof of specification compliance.
 - 1. Submit duplicate sample pieces of 12-inch long cap strip and cover former.
- E. Quality Assurance Submittals: Submit the following:
 - 1. Test Reports: Certified test reports showing compliance with specified performance characteristics and physical properties.
 - 2. Manufacturer's Instructions: Current published manufacturer's installation and maintenance instructions.
- F. Flame Spread Certification: Submit manufacturer's certification that resilient flooring furnished for areas indicated to comply with required flame spread rating has been tested and meets or exceeds indicated standard.

1.5 CLOSEOUT SUBMITTALS

- A. Section 01 77 00 - Contract Closeout: Closeout procedures.

- B. Operation and Maintenance Data: Submit maintenance procedures, recommended maintenance materials, and suggested schedule for cleaning, stripping, and re-waxing. Include precautions against cleaning materials and methods detrimental to finishes and performance.
- C. Warranty: Warranty documents specified herein.

1.6 QUALITY ASSURANCE

- A. Regulatory Requirements: Provide slip resistant sheet vinyl safety flooring in compliance with the following:
 - 1. Americans with Disabilities Act Architectural Guidelines (ADAAG).
 - 2. Occupational Safety & Health Administration (OSHA).

1.7 QUALIFICATIONS

- A. Manufacturer: Whenever possible, provide each type of resilient flooring and accessories as provided by a single manufacturer, including recommended primers, adhesives, sealants, finish accessories and leveling compounds.
- B. Flooring Contractor:
 - 1. The Awarded Contractor shall be an established firm, experienced in the installation of the specified product and shall have access to all manufacturer's required technical, maintenance, specifications and related documents.
 - 2. The Flooring Contractor shall have completed at least three projects of similar magnitude, material and complexity, and must provide project reference details including contact names and telephone numbers.
- C. Installer: Installer experienced in performing work of this section who is specialized in installation of work similar to that required for this project.

1.8 MOCKUP

- A. Standard of Quality: For the purpose of evaluating the quality of workmanship, a mockup installation of the specified floor covering shall be provided by the flooring contractor in an area designated by the Architect.
- B. Construct mockup, 10 feet by 10 feet.
- C. Locate where directed by Architect.
- D. Upon approval, this test installation shall then be considered the standard of quality and basis of comparison for the balance of the project.
- E. Incorporate accepted mockup as part of Work.
- F. Areas found to be deficient by specification standards or application procedures shall be repaired/replaced at contractor's expense.

1.9 PRE-INSTALLATION MEETINGS

- A. Section 01 31 19 – Project Meetings.
- B. Convene minimum one week prior to commencing work of this section.
- C. Conduct pre-installation meeting to verify project requirements, substrate conditions, manufacturer's installation instructions, and manufacturer's warranty requirements.

1.10 DELIVERY, STORAGE, AND HANDLING

- A. Section 01 60 00 – Product Requirements: Product storage and handling requirements.
- B. Delivery: Deliver materials in manufacturer's original, unopened, undamaged containers with identification labels intact.
- C. Storage and Protection: Store materials protected from exposure to harmful weather conditions and at a temperature and humidity conditions recommended by manufacturer.
 - 1. Move resilient flooring and installation accessories into spaces where they will be installed at least 48 hours before installation, unless longer conditioning periods are recommended in writing by the manufacturer.
- D. Store rolls in dry locations. Stand rolls on end. Protect and secure rolls from falling.

1.11 PROJECT CONDITIONS

- A. Substrate Conditions: Use the method described below to determine the dryness as required to ensure initial and long term success.
 - 1. ASTM F1869 - Standard Test Method for Measuring Moisture Vapor Emission Rate of Concrete Subfloor Using Anhydrous Calcium Chloride:
 - a. This test method covers the quantitative determination of the rate of moisture vapor emitted from below-grade, on-grade, and above-grade (suspended) concrete floors.
 - b. Conduct one calcium chloride test for every 1,000 square feet (minimum 3 tests) to ensure concrete moisture emissions do not exceed 3 lbs per 1,000 square feet within a 24-hour period.
 - 2. ASTM F2170 - Standard Test Method for Determining Relative Humidity in Concrete Slab Using in situ Probes:
 - a. This test method covers the quantitative determination of percent relative humidity in concrete slabs for field or laboratory test.
 - b. Conduct one test for every 1,000 square feet (minimum 3 tests) to ensure concrete does not exceed 85% internal relative humidity.
 - 3. Alkalinity Testing: ASTM F710 Maximum pH of 9.0.
- B. General Contractor shall be responsible for insuring independent inspection of items 1, 2 and 3 above. Contractor shall verify in writing to the Owner, Architect, and subcontractor, a minimum of thirty (30) days prior to scheduled resilient flooring installation, the following substrate conditions: Reference Section 01 45 23.
- C. Contingency for High Moisture Readings: If at the time of testing the moisture readings are in excess of manufacturer's recommendations, the Contractor shall proceed with application of concrete vapor control barrier as specified in Section 07 26 00.
- D. Moisture Remediation: Basic Steps as follows:
 - 1. Removal of all floor coverings, adhesive residue, curing compounds, parting compounds or other surface contaminants by mechanical means (shot-blasting, or other suitable method).
 - 2. Identification and treatment of all cracks and joints, by the sealer manufacturer's approved methods.
 - 3. Application of the sealer (Must be a product designed and warranted for the purpose of controlling excessive concrete moisture vapor emission and the alkali it may carry).
 - 4. Application of a sacrificial cementitious topping to act as a substrate for the installation of resilient floor coverings.

- E. Environmental Requirements/Conditions: In accordance with manufacturer's recommendations. Areas to receive flooring shall be clean, fully enclosed, weather tight with the permanent HVAC set at a uniform temperature of at least 68 degrees F, 72 hours prior to and during and for not less than 48 hours after installation. The flooring material should be conditioned in the same manner.
 - 1. Maintain air temperature and structural base temperature at flooring installation area between 68 degrees F and 80 degrees F for 48 hours before, during and 48 hours after installation.
- F. Close spaces to traffic during resilient flooring installation and for time period after installation recommended in writing by the manufacturer.
- G. Install resilient flooring material and accessories after other finishing operations, including painting, have been completed.
- H. Where demountable partitions and other items are indicated for installation on top of sheet resilient flooring material, install flooring material before these items are to be installed.

1.12 WARRANTY

- A. Section 01 77 00 – Contract Closeout: Requirements for warranties.
- B. Manufacturer's Warranty: Submit manufacturers standard warranty document.
- C. Warranty Period:
 - 1. Five (5) year warranty commencing on date of substantial completion, for linoleum sheet flooring.
 - 2. Seven (7) year warranty commencing on date of substantial completion, for sheet vinyl safety flooring.

1.13 MAINTENANCE

- A. Maintenance of finished flooring to be conducted per manufacturer's maintenance guide.

1.14 EXTRA MATERIALS

- A. Section 01 77 00 – Contract Closeout: Spare parts and maintenance products.
- B. Extra Materials: Deliver to owner extra materials from same production run as Products installed. Package products with protective covering and identify with descriptive labels.
 - 1. Quantity: Furnish 25 square feet of flooring and 10 LF of base of each type and color specified.
 - 2. Delivery, storage and protection: Comply with owner's requirements for delivery, storage and protection of extra materials.

PART 2 - PRODUCTS

2.1 LINOLEUM SHEET FLOORING

- A. Manufacturer:
 - 1. Johnsonite, Inc., www.johnsonite.com. Model: Harmonium xf™, Style: Veneto; as supplied by Compass Flooring (South San Francisco, CA 94080) and Butler-Johnson (San Jose, CA 95133).
 - 2. Substitutions: Not permitted; Johnsonite is District Standard.

2.2 LINOLEUM SHEET FLOORING - MATERIALS

- A. Product Description: Homogenous Harmonium xf™ floor covering, single layer on jute backing with xf™ for reduced maintenance.

1. Construction: Harmonium xf™ consists of one homogenous layer of oxidized linseed oil and natural resins mixed with wood or cork flour, limestone and pigments affixed to a jute backing. The marbled pattern extends evenly throughout the total thickness. Surface has xf™ treatment for reduced maintenance.
 2. Style: Veneto.
 3. Roll Size: 2.0 meters wide (6' - 7") by 25-40 meters long (65' - 100').
 4. Thickness/wear layer: 2.5 mm (0.10 inch).
 5. Product Performance and Technical Data:
 - a. Meets ASTM F2034, Type 1 performance standards for sheet linoleum floor covering.
 - b. Static Coefficient of Friction: > 0.5, per ASTM D 2047.
 - c. Static load limit: 650 psi, per ASTM F 970.
 - d. Fire Performance: Flooring Radiant Panel: ASTM E648 – Class 1.
 - e. Smoke density: Less than 450 per ASTM E-662.
- B. Colors and Patterns:
1. Veneto 600 – “Limestone”.
 2. Veneto 602 – “Luminary”.
 3. Veneto 624 – “Azurite”.
- C. Upon request by Architect, Flooring manufacturing to provide independent testing labs verification of all applicable test results.

2.3 SAFETY FLOORING

- A. Manufacturer:
1. Altro; 467 Forbes Boulevard, South San Francisco CA 94080 Toll-free: 800.941.1696 Tel: 650.941.1696 Fax: 650.941.2961; www.altrofloors.com.
 2. Substitutions: Not permitted; Altro is District Standard.

2.4 SAFETY FLOORING - MATERIALS

- A. Slip Resistant Sheet Vinyl: To ASTM F1303, Type 2, Grade 1, sheet vinyl flooring with moisture resistant backing Class A. Static coefficient of slip resistance in excess of 0.6 when tested in accordance with ASTM D2047, AltroSan™ integrated bacteriostat, color selected by Architect.
- B. Product Description: Altro Suprema (measurements and product weights given below are approximate):
1. Color: SU2009 Minerva.
 2. Thickness: 0.08 inch (2.0 mm).
 3. Roll Width: 6' - 7" (2 m).
 4. Roll Length: 66 feet (20 m).
 5. Roll Weight: 220 lb (100 kg).
 6. Slip Resistance (Dry): 0.6.

2.5 RESILIENT BASE

- A. Manufacturer:
1. Burke Mercer.
 2. Substitutions: Not permitted. Burke is District Standard.
- B. Base: ASTM F1861, Group 1 rubber; Type TP, coved, as shown on drawings; top set.
1. Height: 4 inch.
 2. Thickness: 0.125 thick.

3. Finish: Matte.
4. Length: Roll.
5. Accessories: Premolded external corners, internal corners, and end stops.
6. Color: 523 – Black Brown.

2.6 EDGING STRIPS

- A. General: Specified products are manufactured by BurkeMercer Products Co., Inc.; color as selected by Architect.
- B. Alternate Manufacturer: Comparable products manufactured by the Johnsonite Division of Duramax, Inc.
- C. Resilient Flooring to Carpet: Model No. 152 or Model 710.
- D. Resilient Flooring to Concrete: Model No. 170.
- E. Resilient Flooring to Ceramic Tile Transition: Model No. 365 Cerco Edge T, with No. 970/980/990 Track.
- F. Ceramic Tile to Carpet: Model No. 150 Tile-Carpet Joiner.
- G. Tile Reducer: Model No. 633 Tile Reducer.

2.7 ACCESSORIES – LINOLEUM SHEET FLOORING

- A. Trowelable Underlayments and Patching Compounds: Latex modified, portland cement based formulation provided or approved by resilient flooring manufacturer for applications indicated.
- B. Primers: Waterproof; types recommended by flooring manufacturer.
- C. Linoleum Sheet Flooring Welding Thread: Johnsonite Linoweld welding thread, in color matching field color.
- D. Adhesives: Provide manufacturers recommended adhesive as required by project conditions.
 1. Adhesive for Linoleum Sheet Flooring: Johnsonite 450 Linoleum Adhesive.
- E. Adhesives (Cements): Moisture and alkali resistant, type recommended by tile manufacturer to suit resilient floor tile products and substrate conditions indicated.
- F. Metal Edge Strips: Of width shown and of required thickness to protect exposed edge of resilient flooring. Provide units of available length, to minimum number of joints.
- G. Filler for Coved Base: Plastic.
- H. Sealer and Wax: Types recommended by flooring manufacturer.

2.8 ACCESSORIES – SAFETY FLOORING

- A. Vinyl welding rod: Acceptable material:
 1. Altro weld rod
- B. Cove former: Acceptable material, sized to suit application:
 1. Altro Cove former 20R - 24 mm (1") radius.
- C. Cap strip: Acceptable material, sized to suit application, stainless steel:
 1. Altro Cap Strip C7.
- D. Joint cover strip: Acceptable material, vinyl, sized to suit application:
 1. Altro Joint Cover Strip EJC50/20.
- E. Acrylic Adhesive: For dry areas with no spillage, use Ecofix, a one-part, water-based, acrylic adhesive as recommended by manufacturer.

- F. Polyurethane Adhesive: For areas subjected to spillage, extreme temperature changes or heavy rolling loads, use Altrofix 30 or 300, a two-part resin-based polyurethane adhesive.
- G. Subfloor Filler and Leveler: Use only gray Portland cement-based underlayments, and patching compounds. Use for filling cracks, holes or leveling. White gypsum materials are not acceptable. Contact Altro for more information and recommendations.
- H. Transitions to a different material: Altro Maxis Visedge VR, vinyl edge securing strip, heat welded.

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Installer must examine areas and conditions under which resilient flooring and accessories are to be installed and must notify General Contractor in writing of conditions detrimental to proper and timely completion of work.
- B. Do not proceed with work until unsatisfactory conditions have been corrected in manner acceptable to Owner and Architect.

3.2 PREPARATION

- A. Subfloor Preparation – Linoleum Sheet Flooring:
 - 1. Concrete floors shall be constructed in accordance with the American Concrete Institute (ACI) 302.1 R-95 Guide for concrete floor and slab construction.
 - 2. Floors must be finished and cured according to ACI with a minimum compressive strength of 3500 psi.
 - 3. Floors must be clean, dry and smooth. Any surface materials, such as paint, wax, grease, oil, adhesive residues, etc. must be removed. Floors must be free of any sealers, curing, hardening or parting compounds that would adversely affect the adhesive used with the flooring. Refer to ASTM F 710 standard practice for preparing concrete floors and other monolithic floors to receive resilient flooring.
 - 4. A moisture barrier shall be installed prior to pouring of on- or below-grade slabs. Moisture vapor transmission shall not exceed 3 lbs./1,000 sq. ft./24hours, per ASTM F1869 Calcium Chloride Test.
 - 5. Maintain room temperature, adhesive and flooring material at 68 – 72 Degrees F for 72 hours before during and after installation.
 - 6. Broom clean or vacuum surfaces to be covered and inspect subfloor. Start of flooring installation indicates acceptance of subfloor conditions and full responsibility for completed work.
- B. Subfloor Preparation – Safety Flooring:
 - 1. General:
 - a. Remove ridges and bumps.
 - b. Apply subfloor filler to low spots and cracks to achieve floor level to a tolerance of 1:1000, allow to cure. Never install safety flooring over gypsum-based toppings, underlayments, leveling or patching compounds.
 - c. Prepare and seal porous and powdery concrete surfaces in accordance with flooring manufacturer's written instructions.
 - 2. Install Safety flooring over subfloors conforming to ASTM F710 for concrete.
 - 3. Maintain air temperature and structural base temperature at flooring installation area between 65 degrees F and 80 degrees F for 48 hours before, during and 24 hours after installation.
 - 4. Perform moisture tests on concrete floors regardless of the age or grade level. Verify concrete substrate is dry in accordance with the RFCI Industry Standards Slab Moisture Test Method (Calcium Chloride Method), in strict accordance with instructions.

5. Perform moisture condition test in each major area. A minimum of 1 test per 1000 sq.ft. prior to installation. Moisture emissions from concrete subfloors must not exceed 3 lbs per 1000 sf per 24 hours for acrylic adhesive and 5 lbs for polyurethane adhesive via the Calcium Chloride Test Method (ASTM F1869). If subfloor moisture exceeds the allowable maximum for installing safety flooring, contact the local safety flooring distributor for advice.
6. Conduct moisture tests around room perimeter, at columns, and where moisture may be evident.
7. Perform alkali tests to ensure pH levels of concrete subfloor surface do not exceed pH 9.9. Concrete must be neutralized if above pH 9.9.
8. Do not proceed with work until results of moisture condition and/or pH tests are acceptable.
9. Underlayment and Patching Compounds: Use only grey colored Portland cement based underlayments; patching compounds are used for filling cracks, holes and leveling. White gypsum materials are not acceptable.

3.3 INSTALLATION – LINOLEUM SHEET FLOORING

- A. General: Install in accordance with manufacturers written instructions.
- B. Lay flooring with joints and seams [in accordance with seaming plan] [parallel to longer room dimensions, to produce minimum number of seams]. Lay out seams to avoid widths less than 1/3 of roll width; match patterns carefully at seams.
- C. Double cut sheet; provide heat welded seams.
- D. Where floor finishes are different on opposite sides of door, terminate flooring under centerline of door.
- E. Install edge strips at unprotected or exposed edges, where flooring terminates, and where indicated. Secure resilient strips by adhesive.
- F. Scribe flooring to walls, columns, cabinets, floor outlets, and other appurtenances to produce tight joints.
- G. Install flooring in recessed floor access covers. Maintain floor pattern.

3.4 INSTALLATION – SAFETY FLOORING

- A. Safety Flooring Installation: Install Altro safety flooring in accordance with the current published Altro Installation Guide. Seams shall be heat welded with Altro Weldrod™ only. Failure to install Altro safety flooring in accordance with recommended procedures will void the Altro Limited Product Warranty.
- B. Coved Installation: Where Altro safety flooring is coved up wall surfaces and other abutments, install in accordance with Altro safety flooring Installation Guide using the following accessories:
 1. At standard wall finishes: Use Altro C7 vinyl cap strip to accommodate sheet vinyl to a height as indicated; adhere with contact adhesive.
 2. At 0.75 inch radius coving at juncture of vertical and horizontal surfaces: Use Altro Vinyl Cove Former 20R. Install with contact adhesive.
 3. Reducer strip: Reducer strip GE25RE/GE35RE where Altro safety flooring will not adjoin other materials or surfaces.

3.5 INSTALLATION - BASE

- A. Fit joints tight and make vertical. Maintain minimum measurement of 18 inches between joints.
- B. Miter internal corners. At external corners, use premolded units. At exposed ends, use premolded units.
- C. Install base on solid backing. Bond tight to wall and floor surfaces.
- D. Scribe and fit to door frames and other interruptions.

- E. Install base at casework where occurs in rooms scheduled for rubber base.

3.6 FIELD QUALITY REQUIREMENTS

- A. Manufacturer's Field Services: Upon Owner and Architect's requests, and with sufficient notice, provide manufacturer's field service consisting of product use recommendations and periodic site visits for inspection of product installation in accordance with manufacturer's instructions.

- 1. Site Visits: (Minimum one site visit of 1 hour duration).

3.7 CLEANING

- A. Section 01 74 00 – Cleaning: Final cleaning.
- B. Dispose of all containers in a legal manner.
- C. Follow manufacturers written recommendations for cleaning and routine maintenance.

3.8 PROTECTION

- A. Protection: Protect installed product and finish surfaces from damage during construction. Remove and legally dispose of protective covering at time of substantial completion.

END OF SECTION

SECTION 09 68 16**SHEET CARPETING****PART 1 – GENERAL****1.1 SUMMARY**

- A. Section Includes carpet direct glued to substrate; carpet; and accessories.
- B. Related Sections:
 - 1. Section 09 65 00 – Resilient Flooring: Base finish.
 - 2. Section 09 65 00 – Resilient Flooring: Termination edging of adjacent floor finish.
 - 3. Section 26 01 00 – Basic Materials and Methods: Electrical floor cover plate with recess for carpet.

1.2 REFERENCES

- A. American Association of Textile Chemists and Colorists (AATCC):
 - 1. AATCC 16 – Test Method for Colorfastness to Light
 - 2. ATCC 134 – Test Method for Electrostatic Propensity of Carpets.
- B. ASTM International:
 - 1. 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.
 - 2. ASTM D1335 – Standard Test Method for Tuft Bind of Pile Yarn Floor Coverings.
 - 2. ASTM D1667 – Standard Specification for Flexible Cellular Materials – Vinyl Chloride Polymers and Copolymers (Closed-Cell Foam).
 - 3. ASTM D3936 – Standard Test Method for Resistance to Delamination of the Secondary Backing of Pile Yarn Floor Covering.
 - 4. ASTM D5116 – Standard Guide for Small-Scale Environmental Chamber Determinations of Organic Emissions From Indoor Materials/Products.
 - 5. ASTM D5417 – Standard Practice for Operation of the Vetterman Drum Tester.
 - 6. ASTM E648 – Test Method for Critical Radiant Flux of Floor Covering Systems using a Radiant Heat Energy Source.
 - 7. ASTM E662 – Test Method for Specific Optical Density of Smoke Generated by Solid Materials.
- C. Consumer Products Safety Commission:
 - 1. CPSC FF 1-70.
 - 2. CPSC 16 CFR 1630 - Standard for the Surface Flammability of Carpets and Rugs.
- D. National Fire Protection Association:
 - 1. NFPA 253 – Standard Method of Test for Critical Radiant Flux for Floor Covering Systems Using a Radiant Heat Energy Source.
 - 2. NFPA 258 – Standard Method of Test for Smoke Density.
- E. South Coast Air Quality Management District:
 - 1. SCAQMD Rule 1168 - Adhesive and Sealant Applications.

1.3 SUBMITTALS

- A. Section 01 32 19 – Submittal Procedures: Submittal procedures.
- B. Shop Drawings: Indicate the extent of carpet, seam direction of carpet, and accessories. Indicate columns, doorways, enclosing walls or partitions, built-in cabinets, and locations where cutouts are required in carpet. Copy of approved shop drawings to be available on job site during installation.
- C. Carpet schedule using same room designations indicated on drawings.
- D. Product Data: Submit data on specified products, describing physical and performance characteristics, sizes, patterns, colors available, and method of installation.
- E. Selection Samples: Submit manufacturer's complete set of color samples for Architect's initial color selection.
- F. Verification Samples: Submit two 18" x 18" samples illustrating color and pattern for each carpet material specified.
- G. Manufacturer's Installation Instructions: Indicate special procedures and perimeter conditions requiring special attention.
- H. Warranty.

1.4 CLOSEOUT SUBMITTALS

- A. Section 01 77 00 – Contract Closeout: Closeout procedures.
- B. Maintenance Data: Include maintenance procedures, recommendations for maintenance materials and equipment, and suggested schedule for cleaning.

1.5 QUALIFICATIONS

- A. Manufacturer:
 - 1. Company specializing in manufacturing specified carpet/backing with minimum 5 years documented experience.
 - 2. Upon request, manufacturer to provide representative to assist in project start-up and to inspect installation while in process and upon completion. Representative will notify designated contact if any installation instructions are not followed.
 - 3. Single Source Responsibility: Obtain each type of carpet from one source and by a single manufacturer.
- B. Installer:
 - 1. Flooring contractor must be certified by the carpet manufacturer prior to bid.
 - 2. Flooring contractor to be a specialty contractor normally engaged in this type of work and shall have prior experience in the installation of these types of materials.
 - 3. Flooring contractor possessing Contract for the carpet installation shall not sub-contract the labor without written approval of the Project Manager.
 - 4. Flooring contractor will be responsible for proper product installation, including floor testing and preparation as specified by the carpet manufacturer and PROJECT CONDITIONS herein.
 - 5. Flooring contractor to provide Owner a written installation warranty that guarantees the completed installation to be free from defects in materials and workmanship for a period of one year after job completion.

1.6 PRE-INSTALLATION MEETINGS

- A. Section 01 31 19 – Project Meetings: Pre-installation meeting.
- B. Convene minimum one week prior to commencing work of this section.

1.7 DELIVERY, STORAGE, AND HANDLING

- A. Deliver materials to the site in manufacturer's original packaging listing manufacturer's name, product name, identification number, and related information.
- B. Store in a dry location, between 60 degrees F and 80 degrees F and a relative humidity below 65 percent. Protect from damage and soiling. Stack carpet rolls horizontally on a flat surface, stacked no higher than two rolls.
- C. Make stored materials available for inspection by the Owner's representative.
- D. Store materials in area of installation for minimum period of 48 hours prior to installation.

1.8 PROJECT CONDITIONS

- A. Sub-floor preparation is to include all required work to prepare the existing floor for installation of the product as specified in this document and Manufacturer's installation instructions.
- B. The maximum permissible amount of water vapor emission from the floor is 3.0 pounds per 1,000 square feet in 24 hours. The acceptable pH level of the substrate is between 7.0 and 9.0. Flooring contractor is responsible for floor testing.
- C. All material used in sub-floor preparation and repair shall be recommended by the carpet manufacturer and shall be chemically and physically compatible with the carpet system being bid.
- D. Maintain minimum 65 degrees F ambient temperature and 65 percent Relative Humidity for 72 hours prior to, during, and 48 hours after installation.
- E. Do not install carpet until space is enclosed and weatherproof, wet-work in space is completed and nominally dry, work above ceilings is complete, and ambient temperature and humidity conditions are and will be continuously maintained at values near those indicated for final occupancy.

1.9 EXTRA MATERIALS

- A. Provide additional 3 percent of each type, color, and pattern furnished; product to be rolled and bound. Coordinate storage location with owner.
- B. Deliver all unused carpet and large scraps to Owner for "attic stock." Dispose of scraps less than 2 square foot in area or less than 8 inches in width.

1.10 WARRANTY

- A. Section 01 77 00 – Contract Closeout: Requirements for warranties.
- B. Warranty to be sole source responsibility of the Manufacturer. Second source warranties and warranties that involve parties other than the carpet manufacturer are unacceptable.

- C. If the product fails to perform as warranted when properly installed and maintained, the affected area will be repaired or replaced at the discretion of the Manufacturer.
- D. Chair Pads are not required for carpet warranty coverage.
- E. Warranty shall not exclude carpet product installed on stairs provided it is properly installed and maintained.
- F. Warranty shall be for a minimum non-prorated period of twenty-five years and shall cover against
 - 1. Excessive Surface Wear: More than 15 percent loss of pile fiber weight.
 - 2. Excessive Static Electricity: More than 3.0 kV per AATCC 134.
 - 3. Resiliency Loss of the Backing: More than 10 percent loss of backing resiliency.
 - 4. Delamination.
 - 5. Edge Ravel.
 - 6. Zippering.
- G. Tuft Bind warranty in lieu of edge ravel and zippering is not acceptable.
- H. Provide certification and warranty that product is fully or partially recyclable through manufacturer's or aligned partner's recycling program. Include information regarding what portions of the product will be recycled into other recyclable/non-recyclable products, down-cycled, landfilled, and/or incinerated.

PART 2 – PRODUCTS

2.1 CARPET

- A. Manufacturers:
 - 1. Collins & Aikman Floorcoverings.
 - 2. Substitutions: Not permitted. Specified product is District Standard.

2.2 FIBER

- A. Nylon Fiber: Bulked Continuous Filament Type 6,6 Nylon.
- B. Mill-extruded fibers are not allowed.
- C. Blends of Solutia fibers are not allowed. Solutia LXI fibers alone are not allowed.
- D. Durable stain inhibitor should be applied to the fiber during product manufacturing to resist fiber staining and soiling. Minimum average of three fluorine analyses of a single composite sample per CRI TM-102: 500 ppm.
- E. Fiber to contain carbon-core filament for permanent static control. Topical treatments not allowed.

2.3 BACKING CHARACTERISTICS

- A. Thermoplastic vinyl composite.
- B. Primary Backing: Synthetic Non-Woven.

- C. Pre-Coat (Fusion Coat): Sealant Vinyl
- D. Secondary Backing: Closed-Cell, Vinyl Cushion backing system.
 - 1. Density (ASTM D-1667): 18.5 lbs/cu ft +/- 5%.
 - 2. Compression Set (ASTM D-1667): Max 10%.
 - 3. Compression Deflection (ASTM D-1667): Min. 7 psi @ 25%; Max. 25 psi @ 25%
 - 4. Impermeable to moisture and airflow.
 - 5. Provide for a chemically welded seam that is also impermeable to moisture and airflow.
 - 6. 6 feet Width Roll Goods.
- E. Product to be installed with a mill-applied releasable "dry" adhesive system to securely attach product to sub-floor in compliance with ADA guidelines (Section 4.5.3) if available from Manufacturer. Free-lay, grid system, and stretch-in installations not allowed.

2.4 PERFORMANCE CHARACTERISTICS

- A. Test reports for the following performance assurance testing to be submitted upon request. Submitted results shall represent average results for production goods of the referenced style.
- B. Requirements listed below must be met by all products.
 - 1. Flooring Radiant Panel:
ASTM E-648 / NFPA 253: Class 1 (CRF: 0.45 watts/sq cm or greater).
 - 2. Federal Flammability:
CPSC FF 1-70: Passes.
 - 3. Smoke Density:
ASTM E-662 / NFPA 258: < 450 Flaming Mode.
 - 4. Electrostatic Propensity:
AATCC 134 (Step & Scuff): 3.0 kV or less.
 - 5. Static Coefficient of Friction:
ASTM C-1028: Passes ADA Guidelines for Accessible Routes (Minimum 0.60).
 - 6. Delamination of Secondary Backing of Pile Floor Coverings:
ASTM D-3936: No Delamination.
 - 7. Lightfastness:
AATCC 16E: > 4 at 100 hours.
 - 8. Vetterman Drum:
ASTM D-5417: Minimum 3 at 22,000 cycles.
 - 9. Moisture Barrier:
Moisture Penetration by Impact at 10 psi: No Penetration of backing and seam after 10,000 impacts.
 - 10. Air Flow Barrier:
Air Permeability of Textile Fabrics: No Air Flow (0.0 ft³/min) through backing and seam.

11. Seam Integrity:
Seam to remain intact after 50,000 cycles per Phillips Chair Test.
12. VOC Chamber Testing:
ASTM D-5116: Product inclusive of "dry" adhesive system meets criteria established by the State of Washington Indoor Air Quality Specification for Carpet and/or Carpet & Rug Institute's (CRI) Indoor Air Quality Carpet Testing Program. If "dry" adhesive (2.02E) not available from manufacturer and "wet" adhesive is used to install the product, carpet and adhesive to meet CRI's Green Label requirements.

2.5 MANUFACTURING SPECIFICATIONS

- A. Style: Odyssey Vinyl Cushion RS/ (Vinyl Cushion) - Mark I.
1. Colors: 14520 – Ganymede (Carpet #1).
14510 – Kaleidoscope (Carpet #2).
 2. Construction: Loop
 3. Gauge: 1/13 inch
 4. Pile Units per Inch: 8.4
 5. Pile Height Average: 0.117 inch
 6. Pile Yarn Weight: 20.0 oz/sq yd
 7. Density Factor: 10,000
 8. Yarn Size: 1245/2
 9. Fiber System: 75% TDX SDN 25% TDX Nylon with Static Control and Ensure
 10. Interliner: Spun Synthetic
 11. Powerbond Backing System: 6 ft
 - Fusion Coat: Sealant Vinyl
 - Backing: Closed cell vinyl cushion
 - Weight: 35.5 oz/sq yd
 - Density: 18.5 lbs/cu ft
 - Thickness: 0.156 inch
 12. Total Weight: 81.0 oz/sq yd +/- 5 percent
 13. Electrostatic Propensity: 1.4 K.V. or lower
 14. Flooring Radiant Panel Test: Mean average critical radiant flux: 0.45 w/sq cm or higher
 15. Smoke Density: Flaming: Mean average: 450 or lower
 16. Flammability: Passes
 17. Warranties: 25 year wear, delamination, edge ravel, static, zippering, loss of resiliency

2.6 ACCESSORIES

- A. Materials recommended by Manufacturer for patching, priming, chemically welding the seams, etc.
- B. Adhesives: Products to be supplied with a pre-cured, mill-applied or other "dry" adhesive system (2.02E) when available. Otherwise, adhesive should be full spread, extremely low VOC in compliance with CRI Indoor Air Quality Adhesive Testing Program requirements, compatible with materials being adhered, as recommended by the Manufacturer.
- C. Base, Carpet Edge, and Transition Strips: As specified in Section 09 65 00.

PART 3 - EXECUTION**3.1 EXAMINATION**

- A. Verify that sub-floor is smooth and flat within specified tolerances and ready to receive carpet.
- B. Verify that substrate surface is dust-free and free of substances that would impair bonding of product to the floor.
- C. Verify that concrete surfaces are ready for installation by conducting moisture and pH testing. Results must be within limits recommended by Manufacturer.
- D. There will be no exceptions to the provisions stated in the Manufacturer's installation instructions.

3.2 PREPARATION

- A. Prepare sub-floor to comply with criteria established in Manufacturer's installation instructions. Use only preparation materials that are acceptable to the Manufacturer.
 - 1. Remove all deleterious substances from substrate(s) that would interfere with or be harmful to the installation. (i.e. floor wax).
 - 2. Remove sub-floor ridges and bumps. Fill cracks, joints, holes, and other defects.

3.3 INSTALLATION - GENERAL

- A. Install product in accordance with Manufacturer's installation instructions.
- B. Verify carpet match before cutting to ensure minimal variation between dye lots.
- C. Layout carpet and locate seams in accordance with shop drawings.
 - 1. Locate seams in area of least traffic, out of areas of pivoting traffic, and parallel to main traffic. Minimize cross seams.
 - 2. Do not locate seams perpendicular through door openings.
 - 3. Align run of pile in same direction as anticipated traffic and in same direction on adjacent pieces.
 - 4. Locate change of color or pattern between rooms under door centerline.
 - 5. Provide monolithic color, pattern, and texture match within any one area.
 - 6. Check pattern repeat, if any, for matching during installation and possible waste factors in ordering required amounts.
- D. Install carpet tight and flat on sub-floor, well-fastened at edges, with a uniform appearance.
- E. Double-cut carpet seams with accurate pattern match. Make cuts straight, true, and unfrayed.
- F. Chemically weld all seams with manufacturer's recommended seam sealer as stated in installation instructions. Make sure the seam is fully sealed.
- G. Roll with appropriate roller for complete contact of carpet with mill-applied adhesive to sub-floor.
- H. Trim carpet neatly at walls and around interruptions.

- I. Completed carpet is to be smooth and free of bubbles, puckers, and other defects.

3.4 CLEANING

- A. Section 01 74 00 – Cleaning: Final cleaning.
- B. Remove excess adhesive and/or seam sealer from floor and wall surfaces without damage.
- C. Remove all rubbish, wrappings, debris, trimmings, etc. from site and dispose of properly.
- D. Clean and vacuum carpet surfaces using a beater brush/bar commercial vacuum.

3.5 PROTECTION

- A. After each area of carpet is installed, protect from soiling and damage by other trades.

END OF SECTION

SECTION 09 84 00**ACOUSTICAL WALL TREATMENT****PART 1 – GENERAL****1.1 SUMMARY**

- A. Section includes the following types of panels as shown of drawings:
 - 1. Acoustical wall panels.
 - 2. Required exposed trim and support channels.

1.2 REFERENCES

- A. ASTM International:
 - 1. ASTM C423 – Standard Test Method for Sound Absorption and Sound Absorption Coefficients by the Reverberation Room Method.
 - 2. ASTM E84 – Standard Test method for Surface Burning Characteristics of Building Materials.
 - 3. ASTM E1264 – Standard Classification for Acoustical Ceiling Products.

1.3 SUBMITTALS

- A. Section 01 32 19 – Submittal Procedures: Requirements for submittals.
- B. Shop Drawings: Indicate schedule of sizes; interior elevations and reflected ceiling plans showing showing how panels are to laid out, details of trim members, and width of panels. Width of panels and vertical seams are critical.
- C. Product Data: Manufacturer's technical data for each type of panel and baffle including fire-resistive characteristics, finishes, and details of installation.
- D. Samples: Submit 2 samples minimum 8 inch by 8 inch in size, of each type of acoustical panel as shown on drawings. Submit 2 fabric selector cards from manufacturer's standard finishes, or designer specified finishes. Submit minimum 4 inch long samples of attachment method, including trim.
- E. Certifications: Submit manufacturer's certifications that products comply with specified requirements, including laboratory reports showing compliance with specified tests and standards.
- F. Manufacturer's Installation Instructions: Submit manufacturer's installation instructions.

1.4 CLOSEOUT SUBMITTALS

- A. Section 01 77 00 – Contract Closeout: Requirements for submittals.
- B. Operating and Maintenance Manual, including cleaning and maintenance instructions.
- C. Material Safety Data Sheets (MSDS).

1.5 QUALITY ASSURANCE

- A. Single-Source Responsibility: Provide acoustical wall panel units and trim components by a single manufacturer.

- B. Fire Performance Characteristics: Identify acoustical wall panels with appropriate markings of applicable testing and inspecting organization.
 - 1. Surface Burning Characteristics: As follows per ASTM E84 and complying with ASTM E1264 for Class A Products:
 - a. Flame Spread: 25 or less.
 - b. Smoke Developed: 50 or less.

1.6 QUALIFICATIONS

- A. Manufacturer: Company specializing in manufacturing Products specified in this section with minimum five years documented experience.
- B. Installer: Company specializing in performing work of this section with minimum three years documented experience.

1.7 PRE-INSTALLATION MEETING

- A. Section 01 31 19 – Project Meetings: Pre-installation meeting.
- B. Convene minimum one week prior to commencing work of this section.

1.8 DELIVERY, STORAGE, AND HANDLING

- A. Section 01 60 00 – Product Requirements: Requirements for transporting, handling, storing, and protecting products.
- B. Deliver materials in manufacturer's unopened packages; suitably store to protect against exposure to moisture, sunlight, surface contamination, and other unacceptable conditions.
- C. Prior to their installation, allow acoustical panel units to reach room temperature and have a stabilized moisture content within the acoustical panel unit manufacturer's recommended limitations.
- D. Handle components to prevent panel edge damage or any other damage to components.

1.9 ENVIRONMENTAL REQUIREMENTS

- A. Section 01 60 00 – Product Requirements: Environmental conditions affecting products on site.
- B. Do not install when humidity or temperature conditions do not meet manufacturer's recommendations for installation.
- C. Building shall be properly enclosed and under standard occupancy conditions (temperature of 60-85 degrees F and not more than 70 percent relative humidity) before installation begins.

1.10 FIELD MEASUREMENTS

- A. Verify field measurements prior to fabrication.

1.11 COORDINATION

- A. Coordinate acoustical wall panel work with installers of related work including, but not necessarily limited to, building insulation, gypsum drywall, finish carpentry, acoustical ceiling systems, mechanical systems, and electrical systems.

1.12 WARRANTY

- A. Section 01 77 00 – Contract Closeout: Requirements for warranties.
- B. Furnish manufacturer's 10 year warranty against warping and delamination of the wall material as a direct result of defects in material or factory workmanship. The warranty does not extend to any failure or defect of any adhesive or other component of any attachment system or accessory used in the installation of the product.

PART 2 - PRODUCTS

2.1 ACOUSTICAL WALL PANELS

- A. Manufacturers:
 - 1. Armstrong World Industries, Inc.; www.armstrong.com.
 - 2. illbruck Architectural Products, Inc.; www.illbruck-archprod.com.
 - 3. USG; www.usg.com
 - 4. Substitutions: Section 01 60 00 – Product Requirements: Product Options and Substitutions.

2.2 COMPONENTS

- A. Wall Acoustic Treatment: Armstrong Optima Acoustical Wall Panel, Item #3154.
 - 1. Surface Texture: Smooth.
 - 2. Composition: Fiberglass.
 - 3. Color: White.
 - 4. Size: 48 inches x 96 inches x 1 inch.
 - 5. Edge Profile: Square cut edge.
 - 6. Noise Reduction Coefficient (NRC) :
 - a. D mounting (On nominal 1x3 furring strips) – Optima (0.90).
 - 7. Composite Flame Spread: Class A
 - 8. Trim Accessories:
 - 1. "H" Channel, 1-5/8 inches x 8 feet x 1 inch, Item #3108.
 - 2. "C" Channel, 1 inch x 8 feet x 1 inch, Item #3107.

2.3 ACCESSORIES

- A. Adhesive: Non-toxic, water-based adhesive, for use with foam products.
 - 1. 3M 77N contact adhesive.

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Verify existing conditions before starting work.
- B. Examine substrate surfaces and conditions and verify their acceptance prior to installation of acoustical panels.
- C. Do not proceed until unsatisfactory conditions have been corrected.

3.2 PREPARATION

- A. Prior to installing acoustical panels, make certain that surfaces to which adhesive will be applied are clean and free of dust, dirt, and other residues that would inhibit a proper bond.

3.3 INSTALLATION

- A. General Installation:
 - 1. Coordinate with mechanical and electrical installers in locating and spacing fixtures, diffusers, and similar items located in ceiling.
 - 2. Lay out pattern in compliance with reflected ceiling plans. Where not otherwise indicated, lay out in such manner that margins on opposite sides or rooms or bays are equal or greater than 1/2 tile in width.
- B. Acoustical Panels:
 - 1. Refer to manufacturer's written installation instructions.
 - 2. Apply adhesive to panels per manufacturer's recommended pattern and press panel firmly into place per manufacturer's installation requirements.
 - 3. Install panels true to lines and plane indicated.
- C. Trim and Furring Strips:
 - 1. Attach "C" channels that will carry the weight of the panels using mechanical fasteners appropriate for the wall structure or furring strips. Adhesive may be used in conjunction with the mechanical fasteners, but should not be used as the sole means of support at the base of the installation.
 - 2. Space horizontal furring strips at 12 inches on center when panels are installed below 5 feet from the finished floor, and 24 inches on center when installed above 5 feet from finished floor.
 - 3. Field paint exposed edges of furring strips.
 - 4. Install fasteners used to attach "C" and "H" channels at no more than 24 inches on center.
 - 5. Install "H" Channels at locations where two panels butt against one another.
 - 6. Install "C" Channels at the perimeters of the installation and to frame any openings that may have to be cut through a panel.

3.4 ADJUSTING

- A. Remove and reinstall improperly installed material.
- B. Remove damaged or discolored material, or material that cannot be properly cleaned, and install new material.

3.5 CLEANING

- A. Section 01 74 00 – Cleaning: Final cleaning.
- B. Use a clean, dry, soft, white cloth to wipe off any dirt or greasy fingerprints. If this does not clean the panel, use a damp, clean, soft, white cloth or sponge with a mild detergent to wipe the panel.

END OF SECTION

SECTION 09 90 00**PAINTING AND COATING****PART 1 - GENERAL****1.1 SUMMARY**

- A. Section includes surface preparation and field application of paints, stains, varnishes, and other coatings.
- B. Related Sections:
 - 1. Section 05 50 00 - Metal Fabrications: Shop primed items.
 - 2. Section 06 20 00 - Finish Carpentry.
 - 3. Section 08 12 14 - Standard Steel Frames.
 - 4. Section 08 13 14 - Standard Steel Doors.
 - 5. Section 08 31 13 - Access Doors and Frames.
 - 6. Section 09 21 16 - Gypsum Board Assemblies.
 - 7. Section 23 00 00 - Basic HVAC Requirements.
 - 8. Section 26 00 00 - Basic Electrical Requirements.

1.2 REFERENCES

- A. Air Quality Management District:
 - 1. AQMD – Air Quality Regulations.
- B. ASTM International:
 - 1. ASTM D16 - Standard Terminology Relating to Paint, Varnish, Lacquer, and Related Products.
 - 2. ASTM D4442 - Standard Test Methods for Direct Moisture Content Measurement of Wood and Wood-Base Materials.
- C. Master Painters and Decorators Association:
 - 1. MPI (APL) – Master Painters Institute Approved Products List; current edition, www.paintinfo.com.
 - 2. MPI (APSM) – Master Painters Institute Architectural Painting Specification Manual; 2004.
- D. Painting and Decorating Contractors of America:
 - 1. PDCA - Architectural Painting Specification Manual.
- E. South Coast Air Quality Management District:
 - 1. SCAQMD Rule 1113 – Architectural Coatings.
- F. SSPC: The Society for Protective Coatings:
 - 1. SSPC - Steel Structures Painting Manual.
- G. U.S. Environmental Protection Agency:
 - 1. 40 CFR 59, Subpart D – National Volatile Organic Compound Emission Standards for Architectural Coatings; current edition.

1.3 DEFINITIONS

- A. Conform to ASTM D16 for interpretation of terms used in this section.

1.4 SUBMITTALS

- A. Section 01 32 19 – Submittal Procedures: Submittal procedures.
- B. Product Data: Submit manufacturer's printed product data on all coatings specified, including preparation and application instructions.
- C. Certification by manufacturer that products comply with Contract Documents and are compatible with applicable substrates and with each other.
- D. Certification: By manufacturer that all paints and coatings comply with VOC limits specified.
- E. Certification: By manufacturer that all paints and coatings do not contain any of the prohibited chemicals specified. GreenSeal GS-11 certification is not required but if provided shall constitute acceptable certification.
- F. Samples:
 - 1. Submit two paper chip samples, 3 inch by 5 in size illustrating range of colors and textures available for each surface finishing product scheduled.
 - 2. Submit two painted samples, illustrating selected colors and textures for each color and system selected. Submit on white card stock, 8 inch by 10 inch in size.
- G. Manufacturer's Installation Instructions: Submit special surface preparation procedures, and substrate conditions requiring special attention.

1.5 CLOSEOUT SUBMITTALS

- A. Section 01 77 00 – Contract Closeout: Closeout procedures.
- B. Operation and Maintenance Data: Submit data on cleaning, touch-up, and repair of painted and coated surfaces.

1.6 QUALIFICATIONS

- A. Manufacturer: Company specializing in manufacturing products specified in this section with minimum three (3) years documented experience.
- B. Applicator: Company specializing in performing work of this Section with minimum three (3) years documented experience.
- C. Volatile Organic Compounds (VOC): Use only products in compliance with VOC content limits required by state and local regulations.

1.7 PRE-INSTALLATION MEETINGS

- A. Section 01 31 19 – Project Meetings: Pre-installation meeting.
- B. Convene minimum one week prior to commencing work of this section.

1.8 DELIVERY, STORAGE, AND HANDLING

- A. Section 01 60 00 - Product Requirements: Product storage and handling requirements.
- B. Deliver products to site in sealed and labeled containers; inspect to verify acceptability.

- C. Container Label: Include manufacturer's name, type of paint, brand name, lot number, brand code, coverage, surface preparation, drying time, cleanup requirements, color designation, and instructions for mixing and reducing.
- D. Paint Materials: Store at minimum ambient temperature of 45 degrees F and maximum of 90 degrees F in ventilated area, and as required by manufacturer's instructions.

1.9 ENVIRONMENTAL REQUIREMENTS

- A. Section 01 60 00 - Product Requirements.
- B. Do not apply materials when surface and ambient temperatures are outside temperature ranges required by paint product manufacturer.
- C. Do not apply exterior coatings during rain or snow when relative humidity is outside humidity ranges, or moisture content of surfaces exceed those required by paint product manufacturer.
- D. Minimum Application Temperatures for Latex Paints: 65 degrees F for interiors; 50 degrees F for exterior; unless required otherwise by manufacturer's instructions.
- E. Minimum Application Temperature for Varnish Finishes: 65 degrees F for interior or exterior, unless required otherwise by manufacturer's instructions.
- F. Provide lighting level of 80 ft candles measured mid-height at substrate surface.

1.10 SEQUENCING

- A. Sequence application to the following:
 - 1. Do not apply finish coats until paintable sealant is applied.
 - 2. Back prime wood trim before installation of trim.

1.11 EXTRA MATERIALS

- A. Section 01 77 00 – Contract Closeout: Spare parts and maintenance products.
- B. Supply 1 percent (1%) or a minimum of one (1) gallon of each color, type, and surface texture of paint installed. Store where directed.
- C. Label each container with color, type, texture, and room locations, in addition to manufacturer's label.

PART 2 - PRODUCTS

2.1 MANUFACTURER

- A. Products listed in Schedule establish a standard of quality and are manufactured by Kelly Moore, which is the District Standard.
- B. Substitutions: Not permitted.

2.2 COMPONENTS

- A. Coatings: Ready mixed, except field catalyzed coatings. Prepare coatings:

1. To soft paste consistency, capable of being readily and uniformly dispersed to homogeneous coating.
 2. For good flow and brushing properties.
 3. Capable of drying or curing free of streaks or sags.
- B. Accessory Materials: Linseed oil, shellac, turpentine, paint thinners and other materials not specifically indicated but required to achieve finishes specified; commercial quality.
- C. Patching Materials: Latex fillers as recommended by coatings manufacturer.
- D. Fastener Head Cover Materials: Latex filler as recommended by coatings manufacturer.

PART 3 - EXECUTION

3.1 SCOPE – SURFACES TO BE FINISHED

- A. Paint all exposed surfaces except where indicated not to be painted or to remain natural; the term "exposed" includes areas visible through permanent and built-in fixtures when they are in place.
- B. Paint the surfaces described in Article 3.9 and 3.10, indicated on the Drawings, and as follows:
1. If a surface, material, or item is not specifically mentioned, paint in the same manner as similar surfaces, materials, or items, regardless of whether colors are indicated or not.
 2. Paint surfaces behind movable equipment and furnishings the same as similar exposed surfaces.
 3. Paint surfaces to be concealed behind permanently installed fixtures, equipment, and furnishings, using primer only, prior to installation of the permanent item.
 4. Paint back sides of access panels and removable and hinged covers to match exposed surfaces.
 5. Paint all insulated and exposed pipes; conduit; boxes; insulated and exposed ducts; angles, brackets, collars and supports; mechanical equipment; electrical equipment occurring in finished areas, to match background surfaces, unless otherwise indicated.
 6. Paint equipment, piping, conduit, and exposed duct work.
 - a. Refer to Division 22, Division 23 and Division 26 for schedule of color coding of equipment, duct work, piping, and conduit.
 7. Paint all mechanical and electrical equipment, including that which is factory-finished, exposed to weather or to view on the roof or outdoors.
 8. Paint shop-primed mechanical and electrical items occurring in finished areas.
 9. Remove unfinished louvers, grilles, covers, and access panels on mechanical and electrical components and paint separately.
 10. Paint interior surfaces of air ducts with flat, nonspecular black paint where visible through registers, grilles, or louvers.
 11. Paint dampers exposed behind louvers, grilles to match face panels.
 12. Paint both sides and edges of plywood backboards for electrical and telephone equipment before installing equipment.
- B. Do Not Paint or Finish the Following Items:
1. Items fully factory-finished unless specifically noted; factory-primed items are not considered factory-finished.
 2. Items indicated to receive other finish.
 3. Items indicated to remain naturally finished.
 4. Fire rating labels, equipment serial number and capacity labels, and operating parts of equipment.

5. Anodized aluminum.
6. Polished and brushed stainless steel items.
7. Polished and brushed stainless steel, anodized aluminum, bronze, terne, and lead.
8. Acoustical materials.
9. Concealed piping, ductwork, and conduit.

3.2 EXAMINATION

- A. Verify surfaces are ready to receive Work as instructed by product manufacturer.
- B. Examine surfaces scheduled to be finished prior to commencement of work. Report conditions capable of affecting proper application.
- C. Test shop applied primer for compatibility with subsequent cover materials.
- D. Measure moisture content of surfaces using electronic moisture meter. Do not apply finishes unless moisture content of surfaces are below the following maximums:
 1. Plaster and Gypsum Wallboard: 12 percent.
 2. Masonry, Concrete, and Concrete Unit Masonry: 12 percent.
 3. Interior Wood: 15 percent, measured in accordance with ASTM D4442.
 4. Exterior Wood: 15 percent, measured in accordance with ASTM D4442.
 5. Concrete Floors: 8 percent.
- E. Measure the pH factor of concrete, masonry, and mortar before starting any finishing process, using the method specified in the MPI Architectural Painting Manual.
 1. Report results to Architect before starting work.
 2. If results of tests indicates need for remedial action, provide written description of remedial action. If a different primer or paint system is required, state the total cost of the change. Do not proceed with remedial action without receiving written authorization from Architect.

3.3 PREPARATION

- A. Remove or mask electrical plates, hardware, light fixture trim, and similar fittings prior to beginning painting operations.
- B. Correct defects and clean surfaces affecting work of this section. Sand all gloss finishes to sheen. Remove existing coatings that are flaking or otherwise in unacceptable condition to receive paint. Preparation or removal of coatings containing lead must be performed in accordance with all EPA and OSHA guidelines.
- C. Seal with shellac or other coating acceptable to paint manufacturer any marks or defects that might bleed through paint finishes.
- D. Remove mildew from impervious surfaces by scrubbing with solution of trisodium phosphate and bleach. Rinse with clean water and allow substrate to dry.
- E. Concrete, Cement Plaster and Unit Masonry Surfaces to be Painted: Remove dirt, loose mortar, scale, salt or alkali powder, and other foreign matter. Remove oil and grease with a solution of tri-sodium phosphate; rinse well and allow to dry. Remove stains caused by weathering of corroding metals with a solution of sodium metasilicate after thoroughly wetting with water. Allow to dry.
 1. Prepare concrete, concrete masonry block, cement plaster, and mineral fiber-reinforced cement panel surfaces to be painted. Remove efflorescence, chalk, dust, dirt, grease, oils, and release agents. Roughen as required to remove

- glaze. If hardeners or sealers have been used to improve curing, use mechanical methods if recommended by paint manufacturer.
2. Use abrasive blast-cleaning methods if recommended by paint manufacturer.
 3. Determine alkalinity and moisture content of surfaces by performing appropriate tests as specified in the MPI Manual. If surfaces are sufficiently alkaline to cause the finish paint to blister and burn, correct this condition before application. Do not paint surfaces where moisture is present.
 4. Etch concrete as specified in MPI manual.
- F. Concrete Floors to be Painted: Remove contamination, acid etch, and rinse floors with clear water. Verify required acid-alkali balance is achieved. Allow to dry.
- G. Asphalt Concrete Surfaces to be Painted: All surfaces must be cleaned free from grease, oil, dirt, mildew, stains and other contaminants that would cause adhesion problems. Remove loose, peeling or chalky paint by high-pressure washing or other appropriate methods. Surfaces must be completely dry before application.
- H. Aluminum Surfaces to be Painted: Remove surface contamination by steam or high pressure water. Remove oxidation by acid etching and solvent washing. Apply specified primer as soon as cleaned surfaces are dry.
- I. Galvanized Surfaces to be Painted: Remove surface contamination and oils and wash with solvent. Apply coat of etching primer.
1. Clean galvanized surfaces with nonpetroleum-based solvents so surface is free of oil and surface contaminants. Remove pretreatment from galvanized sheet metal fabricated from coil stock by mechanical or chemical methods as recommended as best practice by primer manufacturer.
- J. Uncoated Steel and Iron Surfaces to be Painted: Remove grease, mill scale, weld splatter, dirt, and rust. Where heavy coatings of scale are evident, remove by hand wire brushing or sandblasting; clean by washing with solvent. Apply treatment of phosphoric acid solution, ensuring weld joints, bolts, and nuts are similarly cleaned. Prime paint entire surface; spot prime after repairs.
1. Use solvent or mechanical cleaning methods that comply with the Steel Structures Painting Council's (SSPC) recommendations. Touch up bare areas and shop-applied prime coats that have been damaged. Wire-brush, clean with solvents recommended by paint manufacturer, and touch up with the same primer as the shop coat.
- K. Shop-Primed Steel Surfaces to be Finish Painted: Sand and scrape to remove loose primer and rust. Feather edges to make touch-up patches inconspicuous. Clean surfaces with solvent. Prime bare steel surfaces. Re-prime entire shop-primed item.
- L. Interior Wood Items to Receive Opaque Finish: Wipe off dust and grit prior to priming. Seal knots, pitch streaks, and sappy sections with sealer. Fill nail holes and cracks after primer has dried; sand between coats. Back prime concealed surfaces before installation.
- M. Interior Wood Items to Receive Transparent Finish: Sand wood to obtain a uniform appearance before immediately starting work. Wipe off dust and grit prior to sealing, seal knots, pitch streaks, and sappy sections with sealer. Fill nail holes and cracks after sealer has dried; sand lightly between coats. Prime concealed surfaces with gloss varnish reduced 25 percent with thinner.
- N. Exterior Wood to Receive Opaque Finish: Remove dirt and foreign matter. Patch knots, pitch pockets, and other surface imperfections with patching compound and seal with sealer recommended by paint manufacturer.

- O. Wood Doors to be Field-Finished: Seal wood door top and bottom edge surfaces with tinted primer.
- P. Metal Doors to be Field-Finished: Prime metal door top and bottom edge surfaces.

3.4 EXISTING WORK

- A. Extend existing paint and coatings installations using materials and methods compatible with existing installations and as specified.

3.5 APPLICATION

- A. Do not apply finishes to surfaces that are not dry. Allow applied coats to dry before next coat is applied.
- B. Apply each coat to uniform appearance. Apply each coat of paint slightly darker than preceding coat unless specified otherwise.
- C. Sand wood and metal surfaces lightly between coats to achieve required finish.
- D. Vacuum clean surfaces of loose particles. Use tack cloth to remove dust and particles just prior to applying next coat.
- E. Where clear finishes are required, tint fillers to match wood. Work fillers into grain before set. Wipe excess from surface.
- F. Prime concealed surfaces of interior and exterior woodwork with primer paint.
- G. Prime concealed surfaces of interior wood surfaces scheduled to receive stain or varnish finish with gloss varnish reduced 25 percent with thinner.
- H. Finishing Mechanical And Electrical Equipment:
 - 1. Refer to Division 22, Division 23, and Division 26 for schedule of color coding and identification banding of equipment, duct work, piping, and conduit.
 - 2. Paint shop primed equipment.
 - 3. Remove unfinished louvers, grilles, covers, and access panels on mechanical and electrical components and paint separately.
 - 4. Prime and paint insulated and exposed pipes, conduit, boxes, insulated and exposed ducts, hangers, brackets, collars and supports, except where items are shop finished.
 - 5. Paint interior surfaces of air ducts (and convector and baseboard heating cabinets) visible through grilles and louvers with one coat of flat black paint to visible surfaces. Paint dampers exposed behind louvers, grilles to match face panels.
 - 6. Paint exposed conduit and electrical equipment occurring in finished areas.
 - 7. Paint both sides and edges of plywood backboards for electrical and telephone equipment before installing equipment.
 - 8. Color code equipment, piping, conduit, and exposed duct work in accordance with requirements indicated. Color band and identify with flow arrows, names, and numbering.
 - 9. Reinstall electrical cover plates, hardware, light fixture trim, escutcheons, and fittings removed prior to finishing.

3.6 FIELD QUALITY CONTROL

- A. Inspect and test questionable coated areas in accordance with MPI Architectural Painting Specification manual.

3.7 CLEANING

- A. Section 01 74 00 – Cleaning: Final cleaning.
- B. Collect waste material which may constitute fire hazard, place in closed metal containers, and remove daily from site.

3.8 SCHEDULE - SHOP PRIMED ITEMS FOR SITE FINISHING

- A. Metal Fabrications - Section 05 50 00 and 05 12 00: Exposed structural steel.

3.9 SCHEDULE - EXTERIOR SURFACES

- A. Cast-in-Place Concrete:
 - 1. Acrylic Latex, Satin:
 - a. 247 Acry-Shield 100% Acrylic Masonry Primer.
 - b. 1245 Acry-Shield 100% Acrylic Exterior Low Sheen Finish.
 - 2. Elastomeric Coating:
 - a. 247 Acry-Shield 100% Acrylic Masonry Primer.
 - b. 1128 Kel-Seal 100% Acrylic Elastomeric Coating, Smooth.
- B. Ferrous Metals (Steel – Shop Primed):
 - 1. Industrial Alkyd Finish:
 - a. 1710 Kel-Guard Alkyd Rust-Preventative Primer.
 - b. 1700 Kel-Guard Alkyd Rust-Preventative Gloss Enamel.
- C. Galvanized Metal:
 - 1. Industrial Gloss Alkyd Finish:
 - a. 1725 Acry-Shield 100% Acrylic Metal Primer.
 - b. 1700 Kel-Guard Alkyd Rust-Preventative Gloss Enamel.
- D. Galvanized Metal:
 - 1. Industrial Urethane Finish:
 - a. KM-15 Chemical Mastic High Build Epoxy.
 - b. KM-375 High Build Gloss Polyurethane Enamel.
- E. Aluminum, Brass, other non-ferrous metals:
 - 1. Acrylic Finish:
 - a. 1725 Acry-Shield 100% Acrylic Metal Primer.
 - b. 1680 Dura-Poxy+ 100% Acrylic Gloss Enamel.
- F. Pipes, Boilers and Stacks:
 - 1. Heat Resistant Aluminum Coating (minimum 1000 degree F).
 - a. Thurmalox 245C Primer.
 - b. Thurmalox 280C Aluminum Air Dry VOC Compliant Silicone Coating.

3.10 SCHEDULE – INTERIOR SURFACES

- A. Gypsum Board:
 - 1. Flat Acrylic Latex Finish:
 - a. 971 Acry-Plex Interior PVA Primer/Sealer.

- b. 550 Acry-Plex Interior Acrylic Flat Wall Paint.
- 2. Low-Lustre Acrylic Latex Finish:
 - a. 971 Acry-Plex Interior PVA Primer/Sealer.
 - b. 1010 KM Professional Int. Acrylic Eggshell Enamel.
- 3. Semi-Gloss Acrylic Latex Finish:
 - a. 971 Acry-Plex Interior PVA Primer/Sealer.
 - b. 1650 Acry-Plex 100% Acrylic Semi-Gloss Enamel.
- B. Wood Doors and Trim (natural finish):
 - 1. Acrylic Varnish Finish.
 - a. 2094 Kel-Thane II Waterborne Interior Clear Semi-Gloss Finish.
 - b. 2094 Kel-Thane II Waterborne Interior Clear Semi-Gloss Finish.
 - c. 2094 Kel-Thane II Waterborne Interior Clear Semi-Gloss Finish.
- C. Ferrous Metal (doors, frames and miscellaneous metal):
 - 1. Industrial Enamel.
 - a. 5725 DTM Acrylic Primer/Finish.
 - b. 5780 DTM Acrylic Gloss Enamel.
- D. Ferrous Metal (exposed structural steel joists, beams and metal decks):
 - 1. Industrial Semi-Gloss Acrylic Enamel:
 - a. KM-15 Chemical Mastic High Build Epoxy.
 - b. KM-375 High Build Gloss Polyurethane Enamel.
- E. Galvanized Metals Including Ductwork:
 - 1. Industrial Semi-Gloss Acrylic Enamel:
 - a. 5725 DTM Acrylic Primer/Finish.
 - b. 5785 DTM Acrylic Semi-Gloss Enamel.

3.10 . SCHEDULE - COLORS

- A. Paint colors to be from District standard color scheme.
 - 1. Standard interior field paint color: Kelly Moore #27 Bone Semi-Gloss.
- B. Scope includes 15 percent to 20 percent accent colors.

Canada College Interior Paint Color Palette					
Color Description	Name	Kelly-Moore Control #	Product	Sheen	Notes
White	Bone	OW-27	1685 Durapoxy	Eggshell	Wall field color
White	Bone	OW-27	1685 Durapoxy	Semi-Gloss	Wall field color
Light green	Khaki Green	06-439-SMT	1010-333	Eggshell	Accent color
Dusty orange	Terra Cotta	06-442-SMT	1010-333	Eggshell	Accent color
Medium Purple	Wisteria	99-1976-SSF	1686 Durapoxy	Eggshell	Accent color; no 333 base in 1686.
Light Gray	Putty	06-435-SMT	1686-222 Durapoxy	Eggshell	Accent color
Medium Yellow	Indian Corn	06-437-SMT	1010-333	Eggshell	Accent color
Dark Brown	Bronzetone		Rustoleum	Semi-gloss	Interior/exterior door trim, other metal surfaces as approved.

END OF SECTION

SECTION 10 11 00**VISUAL DISPLAY BOARDS****PART 1 - GENERAL****1.1 SUMMARY**

- A. Section includes fixed markerboards, tackboards and accessories.
- B. Related Sections:
 - 1. Section 06 10 53 - Miscellaneous Rough Carpentry: Wood grounds.
 - 2. Section 06 20 00 - Finish Carpentry.
 - 3. Section 09 22 16 - Non-Structural Metal Framing.

1.2 REFERENCES

- A. American National Standards Institute:
 - 1. ANSI A135.4 - Basic Hardboard.
 - 2. ANSI A208.1 - Mat-Formed Wood Particleboard.
 - 3. ANSI H35.1-Alloy and Temper Designation for Aluminum.
- B. ASTM International:
 - 1. ASTM A424 - Standard Specification for Steel, Sheet, for Porcelain Enameling.
 - 2. ASTM B221 - Standard Specification for Aluminum and Aluminum-Alloy Extruded Bars, Rods, Wire, Profiles, and Tubes.
 - 3. ASTM C208 - Standard Specification for Cellulosic Fiber Insulating Board.
 - 4. ASTM C282 - Standard Test Method for Acid Resistance of Porcelain Enamels
 - 5. ASTM C523 - Standard Test Method for Specular Gloss.
 - 6. ASTM C538 - Atmospheric Corrosion Color Test (no change)
 - 7. ASTM C614 - Test Method for Alkali Resistance of Porcelain Enamel.
 - 8. ASTM C448 - Standard Test Methods for Abrasion Resistance of Porcelain Enamels
 - 9. ASTM D2244 - Practice for Calculation of Color Tolerances and Color Differences from Instrumentally Measured Color Coordinates.
 - 10. ASTM D4060 - Standard Test Method for Abrasion Resistance of Organic Coatings by Taber Abraser (C501 - $\leq 0.1g$)
- C. BYK-Gardner Wavescan 5+.
- D. Porcelain Enamel Institute (PEI):
 - 1. PEI-1002, Manual and Performance Specifications for Porcelain Enamel Writing Surfaces (Whiteboards and Chalkboards).
- E. Federal Specification Unit:
 - 1. FS CCC-W-408 - Wall Covering, Vinyl-Coated.
 - 2. FS L-P-1040 - Plastic Sheets and Strips (Polyvinyl Fluoride).

1.3 SYSTEM DESCRIPTION

- A. Performance Requirements:
 - 1. Reflectivity: Not to exceed specified range when tested at 60 degrees with a gloss meter in accordance with ASTM C523.
 - 2. Contrast for marker boards (Light and Dark Effects): not more than 11.7 when tested with a BYK-Gardner Wave Scan 5+ Measurement Device showing visual acuity to the human eye at distances greater than 3 meters (10 feet).

3. Contrast for chalkboards (Light and Dark Effects): no less than 30 when tested with the contrast measurement test with 773 gram load on chalk.
4. Wet Ghost measurements on chalkboard surfaces before and after wet cleaning shall not exceed a factor of 0.35 (using a 60 degree gloss meter).

1.4 SUBMITTALS

- A. Section 01 31 19 - Submittal Procedures: Submittal procedures.
- B. Shop Drawings:
 1. Include types of units provided, location within each room, and length of each unit.
 2. Include dimensioned elevation drawings of each board assembly indicating joint locations and type of joint where required, and board mounting distances from floors.
 3. Include cross-section details showing each type of product and components; trim, pen/chalk tray, face, core, backing materials and thickness, and key to elevations.
 4. Show locations and quantities of accessories.
 5. Show anchorage details and necessary grounds.
 6. Show installation details.
- C. Product Data: Submit data on markerboards, trim and accessories. Include Material Safety Data Sheets, when applicable.
- D. Samples and color charts: Submit Manufacturer's color charts and composition samples of face, core, and backing to illustrate finish, color and texture of markerboards, tackboards, and tackboard surfacing, where required.
 1. Aluminum Trim and Accessories: Samples of each finish type and color, on 6 inch long sections of extrusions and not less than 4 inch squares of sheet or plate, showing the full range of colors available.
- E. Manufacturer's Instructions: Provide manufacturer's installation instructions.

1.5 CLOSEOUT SUBMITTALS

- A. Section 01 77 00 – Contract Closeout: Closeout procedures.
- B. Maintenance Data: Submit Manufacturer's cleaning and maintenance instructions covering both routine (daily or weekly) and long-term (yearly or longer) operations.

1.6 QUALITY ASSURANCE

- A. Conform to applicable code for flame/smoke rating of Flame Spread 75 and Smoke Density 450, for vinyl fabric covered tackboards in accordance with ASTM E84.
- B. Single Source Responsibility: Obtain visual display boards of each type from a single source with resources to produce products of consistent quality in appearance and physical properties without delaying the work.
- C. Provide certification from a GREENGUARD Environmental InstituteSM approved laboratory stating all representative components of the product as well as the complete product have been tested and evaluated, and the product have been determined to meet the GREENGUARDTM Emissions Standards as well as validating the products are subject to ongoing testing requirements.

1.7 QUALIFICATIONS

- A. Manufacturer: Company specializing in manufacturing products specified in this section with minimum ten years documented experience.
- B. Installer: Company specializing in performing work of this section, with minimum three years documented experience, acceptable to manufacturer.

1.8 FIELD MEASUREMENTS

- A. Verify field measurements prior to fabrication.

1.9 DELIVERY, STORAGE AND HANDLING

- A. Section 01 60 00 – Product Requirements: Requirements for transporting, handling, storing, and protecting products.
- B. Deliver materials in original, unopened, undamaged containers with identification labels intact.
- C. Storage and Protection:
 - 1. Store factory-framed units vertically with packing materials between each unit to prevent damage.
 - 2. Store materials in dry areas at temperatures above 55 degrees F.

1.10 PROJECT CONDITIONS

- A. Section 01 60 00 – Product Requirements: Environmental conditions affecting products onsite.
- B. Comply with manufacturer's recommendations for climatizing area for interior moisture and temperature to approximate normal occupied conditions.
- C. Install units only when building is enclosed and interior air and substrate temperatures are stable and approximate design conditions.

1.11 WARRANTY

- A. Section 01 77 00 – Contract Closeout: Product warranties.
- B. Submit a "Life of the Building" warranty, stating that under normal usage and maintenance and when installed in accordance with manufacturer's instructions and recommendations, porcelain enamel steel markerboards are guaranteed for the life of the building. Warranty covers replacement of defective boards.
- C. Warranty Period: 50 years.

PART 2 - PRODUCTS**2.1 VISUAL DISPLAY BOARDS**

- A. Manufacturers:
 - 1. PolyVision Corporation, Suwanee, Georgia 30024, Phone: 800-620-POLY.
 - 2. Claridge Products and Equipment, Inc.
 - 3. Greensteel Division Information Display Technology, Inc.

4. AARCO Products, Inc.
5. ADP Lemco, Inc.
6. Substitutions: Section 01 60 00 – Product Requirements: Product Options and Substitutions.

2.2 MATERIALS

- A. Steel for Porcelain Enameling: ASTM A424.
- B. Aluminum Extrusions: ASTM B221, 6063 Alloy, T5 temper.
- C. Cork: Natural cork, homogenous composition.
- D. Particleboard: ANSI A208.1.
- E. Cellulosic Fiberboard: ASTM C208.
- F. Tempered Hardboard: ANSI A135.4.
- G. Foil Backing: Aluminum foil sheet, minimum 0.015 inch thickness.

2.3 MARKERBOARDS

- A. General: Visual display boards: Polyvision 100 Series; factory laminated and factory framed markerboards.
- B. Face Sheet: Enameled grade cold rolled steel 0.016 inch thick for boards without joints, 0.025 inch thick for boards with spline joints.
 1. Facing Sheet: P³ Ceramicsteel® Markerboard 91 to 97 percent gloss (high gloss surface).
 2. Color: White.
- C. Core: 1/2-inch thick formaldehyde free particleboard.
- D. Moisture Backer: 0.015-inch thick aluminum foil, laminated to core..

2.4 TACKBOARDS

- A. General: Visual display boards: Polyvision 100 Series; factory laminated and factory framed tackboards.
- B. Construction: Type II vinyl factory-laminated to 1/8 inch cork and 3/8 inch fiberboard.
- C. Vinyl: Manufacturer: Koroseal Wallcoverings, a Division of RJF International Corporation.
 1. Pattern and Color: Selected by Architect from Koroseal Wallcovering Tackable Vinyl Selection:
 - a. Price Group II.
 - b. Pattern: "Spellbound", "Muratone", or equal; as selected by Architect.
 - c. Color: As Selected by Architect.
 2. Width: 54 inches.
 3. Fabric Backing: Type II: Osaburg.
 4. Fire Rating: Class 1 or A.
 5. Weight: Type II: 21 ounces per linear yard.
 6. Formulation:
 - a. Mildew inhibitorized.

- b. Stain resistant coating: Delustered acrylic resin topcoating applied as and integral part of the fabric backed vinyl covering manufacturing process.
 - c. Early Warning Effect formulation.
- D. Cork: Comprised of premium quality, pure grain, natural cork. It's smooth, resilient surface allows pushpins, tacks, or staples to be easily inserted, yet still hold firmly.
- 1. Thickness: 1/8 inch.
- E. Fiberboard: Manufacturer's standard. Thickness: 3/8 inch.

2.5 TRIM

- A. Polyvision 100 Series Trim: Type 6063 alloy grade aluminum with T5 tempering treatment with type 201-R1 satin anodized finish. Type C-4, 3/4-inch extruded aluminum, and CRC-2B, 2-3/4-inch blade type tray with 3/4-inch radius safety corners.
- B. Extend the pen/chalk tray the entire length of the visual display board.
- C. Extend the pen/chalk tray the entire length of each chalk/tack board or marker/tack board when these boards are shown side by side.
- D. Where two panels of unlike kind meet, provide clear anodized finish, D-2N, "H" bar from bottom trim/tray to top trim/display rail.
- E. Where two writing surface panels meet, provide a continuous writing surface free of obstruction. Laminate face sheet onto particleboard core and apply moisture backer at rear. Rout each panel to receive a continuous steel spline. Joint shall be even and not have more than a hairline gap.
- F. Where two tack board panels of like kind meet, provide clear anodized finish, D-2N, "H" bar from bottom trim/tray to top trim/display rail.
- G. Join vinyl covered tack boards with D-2N, aluminum "H" bar from bottom trim/tray to top trim/display rail. Glue and fold matching vinyl over exposed "H" bar concealing all aluminum edges of "H" bar.

2.6 ACCESSORIES

- A. Map Rail:
- 1. Height: 2.2 inches.
 - 2. Insert: Linoleum grade cork, 1/4-inch thick, 43 pounds per cubic foot density, minimum, with burlap backing.
- B. Combination Map Hook/Paper Clip:
- 1. Height: H-2, 2 inches.
 - 2. Quantity: One every 2 feet of board.
- C. Flag Holders:
- 1. Height: FH-2, 2 inches.
 - 2. Quantity: One per classroom.
- D. Display Rail End Stops:
- 1. Height: ES-2, 2 inches.
 - 2. Quantity: 2 per board/display rail.
- E. Attachment Devices: As recommended by the manufacturer for the boards specified.

- F. Mounting Adhesive: As recommended by manufacturer.
- G. Fasteners: Tamper-proof type screws; manufacturer's standard.
- H. Cleaning Instructions Plate: Provide instructions for markerboard cleaning on metal plate fastened to perimeter frame near chalkrail.

2.7 FABRICATION

- A. General: In accordance with PEI-1002.
- B. Lamination: Use factory machines only and use environmentally friendly adhesives formulated for machine lamination.
- C. Shop/Factory Finishing of Facing Sheet:
 - 1. Apply ground coat of porcelain enamel to both surfaces of continuously coiled pre-cleaned and treated enameling grade steel base metal, fused to the metal in a firing operation used exclusively for ground coat application. Apply a color cover coat of porcelain enamel to one surface of the ground coat and fuse by a firing operation used exclusively for color coat application. Machine-apply all P³ Ceramicsteel™ "slip" with automatic spray or roll-coat equipment.
 - 2. Ground Coat: 1.7 to 2.5 mils enamel, minimum
 - 3. Cover (Color) Coat for Marker boards: 3.0 to 4.0 mils enamel, minimum.
 - 4. Ground Coat on Back of Facing: 1.7 to 2.5 mils enamel, minimum.
 - 5. Firing Temperature for Marker boards: 1475 to 1500 degrees F, minimum.
- D. Trim:
 - 1. Factory notch and bend perimeter trim to form wrapped corners without seams and hairline miters along face of the visual display board.
 - 2. Fasten factory applied trim at rear of visual display board to conceal all trim fasteners.
 - 3. Ship chalk/marker trays loose for field installation. Install trays prior to installation of visual display boards, concealing all fasteners.
 - 4. Finish shall be thoroughly and uniformly applied, covering all surfaces and edges. Replace unacceptable trim prior to owner acceptance.

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Verify moisture and temperature levels of substrate and environment have stabilized.
- B. Verify internal wall blocking is ready to receive Work and positioning dimensions are as indicated on shop drawings.
- C. Verify surfaces to receive boards are true and plumb. Report unsuitable conditions for correction prior to installation.

3.2 INSTALLATION

- A. General:
 - 1. Install units as recommended by the manufacturer.
 - 2. Provide all necessary installation accessories.
 - 3. Apply manufacturer's recommended adhesive behind each fixed board using egg sized gobs at 16 inches on center.

4. Provide fasteners for perimeter trim at 16 to 24 inches on center and for pen/chalk trays at 12 to 16 inches on center.

B. Mounting Height: As indicated on the drawings.

3.3 CLEANING

A. Section 01 74 00 - Cleaning: Requirements for final cleaning.

B. At completion of work, clean surfaces and trim in accordance with manufacturer's recommendations, leaving all materials ready for use.

3.4 PROTECTION OF FINISHED WORK

A. Cover chalkboard surfaces with protective cover, taped to frame.

B. Remove temporary protective cover at date of Substantial Completion. Clean boards using manufacturer's recommended procedures and install cleaning labels for each room.

END OF SECTION

SECTION 10 11 16.53
ELECTRONIC WHITEBOARDS

PART 1 - GENERAL**1.1 SUMMARY**

- A. Section includes electronic whiteboards system; Smart Audio System, and related components and accessories.
- B. Related Sections:
 - 1. Section 26 00 00 - Basic Electrical Requirements.

1.2 SUBMITTALS

- A. Section 01 32 19 - Submittal Procedures: Requirements for submittals.
- B. Shop Drawings:
 - 1. Include types of units provided, location within each room, and length of each unit.
 - 2. Include dimensioned elevation drawings of each board assembly and board mounting distances from floors.
 - 3. Include cross-section details showing each type of product and components; trim, pen/chalk tray, face, core, backing materials and thickness, and key to elevations.
 - 4. Show locations and quantities of accessories.
 - 5. Show anchorage details and necessary grounds.
 - 6. Show installation details.
- C. Product Data: Submit data on electronic whiteboards, trim and accessories. Include Material Safety Data Sheets, when applicable.
- D. Samples and color charts: Submit Manufacturer's color charts and composition samples of face, core, and backing to illustrate finish, color and texture of markerboards, tackboards, and tackboard surfacing, where required.
 - 1. Aluminum Trim and Accessories: Samples of each finish type and color, on 6 inch long sections of extrusions and not less than 4 inch squares of sheet or plate, showing the full range of colors available.
- E. Manufacturer's Instructions: Provide manufacturer's installation instructions.

1.3 CLOSEOUT SUBMITTALS

- A. Section 01 77 00 – Contract Closeout Requirements: Requirements for submittals.
- B. Project Record Documents: Record actual locations of installed electronic whiteboards.
- C. Operation and Maintenance Data: Submit manufacturer's cleaning and maintenance instructions covering both routine (daily or weekly) and long-term (yearly or longer) operations.

1.4 QUALIFICATIONS

- A. Manufacturer: Company specializing in manufacturing products specified in this section with minimum three years documented experience.

- B. Installer: Preferred Vendor/Installer is Oliver Worldclass Labs, Inc., P.O. Box 1686, Benicia, CA 94510; 707-747-1537; Fax: 707-747-5681; www.oliverlabs.com.

1.5 PRE-INSTALLATION MEETINGS

- A. Section 01 31 19 – Project Meetings: Pre-installation meeting.
- B. Convene minimum one week prior to commencing work of this section.

1.6 DELIVERY, STORAGE AND HANDLING

- A. Section 01 60 00 - Product Requirements: Requirements for transporting, handling, storing, and protecting products.
- B. Deliver materials in original, unopened, undamaged containers with identification labels intact.
- C. Storage and Protection:
 - 1. Store factory-framed units vertically with packing materials between each unit to prevent damage.
 - 2. Store materials in dry areas at temperatures above 55 degrees F.

1.7 PROJECT CONDITIONS

- A. Comply with manufacturer's recommendations for climatizing area for interior moisture and temperature to approximate normal occupied conditions.
- B. Install units only when building is enclosed and interior air and substrate temperatures are stable and approximate design conditions.

1.8 FIELD MEASUREMENTS

- A. Verify field measurements prior to preparation of shop drawings and fabrication to ensure proper fit.

1.9 WARRANTY

- A. Section 01 77 00 – Contract Closeout: Requirements for warranties.
- B. Furnish three-year manufacturer's equipment warranty for projector and extended control panel (ECP).
- C. Furnish five-year manufacturer's equipment warranty for interactive whiteboard.
- D. Furnish 2-year manufacturer's warranty for SMART Audio system components.

PART 2 - PRODUCTS

2.1 INTERACTIVE WHITE BOARDS

- A. Manufacturers:
 - 1. Smart Technologies; www.smarttech.com; Model 680i.
 - 2. Substitutions: Section 01 60 00 - Product Requirements: Product options and substitutions.

- B. Product Description: SMART Board 680i3 interactive whiteboard system including a SMART Board 680i3 interactive whiteboard integrated with a UF55 projector.

2.2 COMPONENTS

- A. SMART Board™ 680i3 Interactive Whiteboard:
1. Physical Specifications:
 - a. Size: 65-1/4 inches W x 49-1/2 inches H x 5-1/8 inches D.
 - b. Active Screen Area: 61-5/8 inches W x 46-1/8 inches H; 77 inches diagonal.
 - c. Weight: 30 lbs.
 2. Pen Tray: Optical sensors in the pen tray detect when you lift a pen or the eraser from the tray. LED lights show the active tool.
 3. Pens and Eraser: Black, blue, red and green pens and a rectangular eraser.
 4. Resolution: Touch resolution is approximately 4000 x 4000.
 5. Screen Surface: Hard coated polyester surface is tear proof, optimized for projection, compatible with dry erase markers and easily cleaned with whiteboard cleaner.
 6. Digitizing Technology: Resistive technology.
 7. Frame Finish: Two-tone gray (approximates Pantone® Charcoal Gray 18-0601 TPX) and Ultrasonic Chrome (approximates metallic Pantone 877 C).
 8. Wall-Mount Bracket: 32 inch wide with five screws and drywall anchors to support a wall-mounted interactive whiteboard.
- B. UF55 Projector:
1. Physical Specifications:
 - a. Size: 18-1/2 inches W x 15-1/2 inches H x 47-1/4 inches D (Max).
 - b. Remote Control: 1-5/8 inches W x 3-3/8 inches H x 1/4 inches D.
 - c. Extended Control Panel: 11 inches W x 7-5/8 inches H x 2-3/8 inches D.
 - d. Weight: 33 lbs, 14 oz.
 2. System Components: UF55 projector, boom mount with a limit strap (including a controlled-collapse feature), extended control panel (ECP), remote control and all necessary input cables from the ECP to the projector.
 3. Image Adjustment: The mounting boom includes three mechanical adjustments for aligning the projector image with your interactive whiteboard. The projector also has focus lever and a digital on-screen menu for brightness, contrast, and other image-related attributes.
 4. Display Type: True XGA (1024 x 768) projector.
 5. Display Technology: The projection engine uses DLP® technology by Texas Instruments®, providing Brilliant Color™ performance and quality Gamma 2.2 correction with Bright Classroom, Dark Classroom, sRGB and User modes.
 6. Brightness: Estimate at 2000 lumens (typical) at a CCT of 6500 degrees K by the IEC method.
 7. Lamp Life: 3000 hours (Standard 200 W mode); or 4000 hours (Economy 160 W mode).
 8. Aspect Ratio: 4:3 native, with support for 16:9, 16:10 and 4:5 ratios.
 9. Contrast Ratio: 2000:1.
 10. Video System Compatability: NTSC, NTSC 4.43, PAL, PAL-N, PAL-M, SECAM.
 11. Video Interface Compatability: Composite, S-video, and VESA RGB, with additional interface support for Component YPbPr and component YCbCR inputs with the proper adapters (not included).
 12. Video Format Compatability: Native 4:3 aspect ratio XGA projector resolution. With scaling, VGA, SVGA, SXGA, QuadVGA, SCGA+ and UXGA formats are supported.
 13. Synchronization: Auto image synchronization (auto tracking, frequency, position adjustment, source detect, and phase detect).
 14. Mounting Hardware: Hardware supplied for mounting the UF55 projector and the ECP to framed and solid walls. A safety tether and limit strap are included.

15. Input/Output Connections:
 - a. Two HD DB15F connectors - RGB video input from computer and/or ECP via VGA connectors.
 - b. HD DB15F connector – video output passthrough of Video Input 1 signal.
 - c. 4-pin mini-DIN connector – S-video input.
 - d. One pair of audio jacks (RCA, stereo) reserved for use with S-video.
 - e. Composite video connector – RCA-style video input.
 - f. One pair of audio jacks (RCA-stereo) reserved for use with composite video.
 - g. 3.5 mm stereo jack – audio input from computer.
 - h. 3.5 mm stereo jack – audio output to connect speakers.
 - i. DB9M – serial (RS-232) for power and communication to the ECP.
 - j. RJ-45 – network connection for SNMP management and control, and for sending e-mail alerts.
 16. Projector Fan:
 - a. Standard fan speed: 0 to 6000', 5 degrees C to 35 degrees C.
 - b. High fan speed: 6000' to 6800', 5 degrees C to 30 degrees C.
 17. Projector Noise: 36 dBA (high fan speed) or 31 dBA (standard fan speed) measured using JIS method.
 18. Power Requirements: 100V AC to 240V AC, at 50 Hz to 60 Hz.
 19. Power Switch: Master power control switch.
 20. Power Cable: One 14'-9" power cable included.
 21. External Control: The RS-232 connector is configured to accept control codes from your computer or room control system.
 22. Power Consumption: 285 W (standard mode) to 504 W maximum. 5 W in Standby mode.
 23. Remote Control: Provides an alternate method of controlling the UF55 projector settings.
 24. Theft Protection: The UF55 projector system features optional security screws on the projector plate and an optional padlocked ring to safeguard the adjustment knob. The projector won't function if it is separated from the ECP and can't be operated without the remote control. A Kensington security lock slot is provided to affix the system to a wall as a visual and physical theft deterrent.
- C. Extended Control Panel (ECP) Features:
1. Input/Output Connections:
 - a. HD DB15F connector - RGB video from computer (supports component video CAV, YPbPr or YUV).
 - b. HD DB15F connector – RGB to projector.
 - c. DB9F – serial (RS-232) computer or room control connection.
 - d. DB25M – provides input signals and control signals to the projector.
 - e. 4-pin mini-DIN connector – S-video input.
 - f. One pair of audio jacks (RCA, stereo) reserved for use with S-video.
 - g. Composite video connector – RCA-style video input.
 - h. One pair of audio jacks (RCA-stereo) reserved for composite video.
 - i. 3.5 mm stereo jack – PC audio input.
 2. Power Button: Turns the projector on and off.
 3. Input Selection Buttons: Provide control for the following input types:
 - a. S-video and associated audio (RCA jacks).
 - b. composite video and associated audio (RCA jacks).
 - c. Computer 2 VGA input and associated 3.5 mm audio stereo jack.

2.3 SMART AUDIO SYSTEM

- A. Manufacturers:
1. Smart Technologies; www.smarttech.com; Model: SMART Audio.
 2. Substitutions: Section 01 60 00 - Product Requirements: Product options and substitutions.

- B. Teacher Microphone:
1. Frequencies: 2.06 MHZ and 2.56 MHZ (switchable).
 2. Battery Type: 2 AA rechargeable NiMH (1.2V x 2) included.
 3. Size: 2.75 inches L x 1-1/8 inches W x 3-1/16 inches H.
 4. Microphone Element Type: Uni-directional electret (x2).
 5. Frequency Response: 50 Hz – 9 kHz \pm 3dB.
 6. External Mic Input Impedance: 2.2k ohms.
 7. External Microphone Input Jack: 3.5 mm.
 8. External Microphone Voltage/Current: 3.5V DC at 1mA.
- C. Student Microphone:
1. Frequencies: 2.06 MHZ and 2.56 MHZ (switchable).
 2. Battery Type: 2 AA rechargeable NiMH (1.2V x 2) included.
 3. Size: 2.17 inches L x 9.65 inches H.
 4. Microphone Element Type: Uni-directional dynamic.
 5. Frequency Response: 50 Hz – 8 kHz \pm 3dB.
- D. Receiver:
1. Frequencies: 2.06 MHz and 2.56 MHz.
 2. Audio output: 5W x 4 at 4 ohms.
 3. Size: 8 inches L x 9 3/16 inches W x 1-11/16 inches H.
 4. Receiver Type: Super heterodyne, crystal controlled.
 5. Modulation: FM.
 6. Signal to Noise: > 75 dBA weighted.
 7. Reception Sensitivity: > 25 ohms \pm 15.
 8. Audio Output: 5 W x 4 at 4 ohms.
 9. Power Requirements: 15V DC at 2.7A.
- E. Ceiling Speakers:
1. Power rating: 20 W RMS, 50 W peak.
 2. Size: 9.5 inches diameter x 5.4 inches H.
- F. Ceiling Infrared Sensor:
1. Size: 3.94 inches diameter x 1.18 inches H.
 2. Output: F-type Connector.
 3. Power: 24V at 14mA (powered by receiver).
 4. Cable Requirement: Plenum rated RG-59 75 ohms coaxial.

2.4 SOFTWARE

- A. SMART Notebook software included. See the SMART Notebook software specifications for a complete list of system requirements. Software upgrades are available at www2.smarttech.com/st/en-US/Support/SBS/.

2.5 ACCESSORIES

- A. Provide Video Raceway.

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Verify existing conditions before starting work.
- B. Verify electrical power is available in the proper voltage, with outlet at the required height.

3.2 INSTALLATION

- A. Install electronic whiteboards in accordance with manufacturer's written instructions.

3.3 MANUFACTURER'S FIELD SERVICES

- A. Perform onsite System Assembly and configuration of SMART Board and Projector.
- B. Run cabling and perform system test.

3.4 DEMONSTRATION AND INSTRUCTIONS

- A. Demonstrate operation and maintenance of electronic whiteboards to Owner's personnel one week prior to date of Substantial Completion.
- B. Demonstrate electronic whiteboards equipment, instructed by qualified manufacturer's representative who is knowledgeable about the Project.
- C. Utilize operation and maintenance manuals as basis for instruction. Review contents of manual with Owner's personnel in detail to explain all aspects of operation and maintenance.
- D. Demonstrate start-up, operation, control, adjustment, trouble-shooting, servicing, maintenance, and shutdown of each item of equipment at agreed time, at equipment location.
- E. Prepare and insert additional data in operations and maintenance manuals when need for additional data becomes apparent during instruction.
- F. Required instruction time for each item of equipment and system is specified in individual sections.

END OF SECTION

SECTION 10 14 00**SIGNAGE****PART 1 - GENERAL****1.1 SUMMARY**

- A. Section includes interior signs.

1.2 REFERENCES

- A. ADA Standards for Accessible Design:
1. ADA Accessibility Guidelines for Building and Facilities (ADAAG), (28CFR Part 36, Appendix A.)
- B. American National Standards Institute:
1. ANSI A-117.1.
- C. CBC - California Building Code, 2007 Edition:
2. CBC 1115B.6 – Identification Symbols: Restroom Door Signs.
 3. CBC 1117B.5 – Signs and Identification.
 4. CBC 1011.3 – Tactile Exit Signs.

1.3 SYSTEM DESCRIPTION

- A. Design Requirements: Design Accessible Entrance Signs, Room Identification Signs, Toilet Room signs, Tactile Exit signs, Room Capacity Signs, and Miscellaneous Signs, as required by CBC.
1. International Symbol of Accessibility: CBC 1117B.5.1 and sections as follows:
 - a. Design: CBC 1117B.5.8.1 and Figure 11B-6.
 - b. Color of Symbol: CBC 1117B.8.1.1.
 2. Braille: California Braille Grade 2, per CBC 1117B.5.6.
 3. Proportions of Letters and Numbers: CBC 1117B.5.3.
 4. Character Height: CBC 1117B.5.4.
 5. Contrast and Finish of Symbols: CBC 1117B.5.2.
 6. Raised Characters and Pictorial Symbol Signs: CBC 1117B.5.5.
 - a. Letter Type: CBC 1117.B.5.5.1.
 - b. Symbol Size: CBC 1117B.5.5.2.
 - c. Pictorial Symbol Signs (Pictograms Nongeometric): CBC 1117B.5.5.3.
 7. Information Posted: CBC 1117B.5.8.1.3: Lobby signs.
 8. Mounting Location and Height: CBC 1117B.5.7.
 9. Doors to Men's and Women's Sanitary Facilities: Provide signs that comply with CBC 1115B.6.

1.4 QUALITY ASSURANCE

- A. Regulatory Requirements:
1. Comply with CBC and ADAAG requirements for signage.

1.5 SUBMITTALS

- A. Section 01 32 19 – Submittal Procedures: Submittal procedures.
- B. Shop Drawings: Indicate sign styles, lettering font, foreground and background colors, locations, overall dimensions of each sign.

1. Sign Location: Provide Graphic Schedule and location plans to identify and locate all signs. Item numbers listed in the Graphic Schedule shall be found on location plans and shall identify locations of specific sign items.
- C. Samples: Submit two full size sample signs of type, style, and color specified. If approved, the samples may be installed as part of the Work.
 - a. Submit supplier's standard color chart for selection purposes and selected colors for verification purposes for dimensional letters.
 - b. Submit one each full size sample of cut metal dimensional letters and cast metal dimensional letters, in selected color and finish.
- D. Product Data: Submit manufacturer's product data describing materials and signs.
- E. Manufacturer's Installation Instructions: Submit installation template and attachment devices.
- F. Operation and Maintenance: Provide the Owner with proper cleaning instructions required for continued maintenance of signs.

1.6 QUALIFICATIONS

- A. Manufacturer: Company specializing in manufacturing Products specified in this section with minimum three years documented experience.

1.7 PRE-INSTALLATION MEETINGS

- A. Section 01 31 19 Project Meetings: Pre-installation meeting.
- B. Convene minimum one week prior to commencing work of this section.
- C. Pre-Installation Conferences: Sign locations shown on the location plans are for general information only. Prior to installation and as required, arrange meetings with the Architect at the site for final location for all sign items.

1.8 DELIVERY, STORAGE, AND HANDLING

- A. Section 01 60 00 – Product Requirements: Requirements for transporting, handling, storing, and protecting products.
- B. Package signs, labeled in name groups.
- C. Store adhesive attachment tape at ambient room temperatures.

PART 2 - PRODUCTS

2.1 SIGNS

- A. Manufacturers:
 1. Mohawk Sign Systems Inc. Model: Series 200A Sand-Carved®.
 2. ASI/Modulex. Model: InCast™ Plaque Sign System.
 3. Substitutions: Section 01 60 00 – Product Requirements: Product Options and Substitutions.

2.2 GRAPHIC PROCESS

- A. Manufacture signs using Graphic Process Series 200A – Sand Carved® using Format D.

2.5 TACTILE EXIT SIGNS

- A. General: Per CBC 1011.3; Typical 1/8 inch thick.
- B. Size: As shown on drawings.
- C. Text and Symbols: As shown on drawings.

2.6 ASSISTIVE LISTENING SYSTEM SIGNS

- A. General: Per CBC 1117B.5.8.4 with eased edges; Typical 1.8 inch thick.
- B. Size: As shown on drawings.

2.7 ACCESSORIES

- A. Fasteners: As recommended by manufacturer; tamper-proof torx head screws; anchors where required.
- B. Adhesives: As recommended by manufacturer.

PART 3 – EXECUTION**3.1 EXAMINATION**

- A. Verify existing conditions before starting work.

3.2 PREPARATION

- A. Environmental Requirements: Do not install plastic signs when temperature is below 70 degrees F.
- B. Examination: Examine conditions of work in place before beginning work; report defects.

3.3 INSTALLATION

- A. General: Install in conformance with referenced standards, manufacturer's written directions, as shown, and as specified.
- B. Locations: Install signs after doors and surfaces are finished, in locations indicated on Drawings, or as directed by Architect.
- C. If sign must be affixed to glass, provide a back-up panel the same size as the sign and holder on the other side to hide adhesive.
- D. Surface Mounted:
 - 1. Toilet Room Signs: As directed, per CBC 1117B.5.
 - 2. Room Name Signs: As directed, per CBC 1117B.5.
 - 3. Tactile Exit Signs: As directed, per CBC 1003.2.8.6.
- E. Install with reviewed manufacturer's adhesive or mechanical fasteners after application of finish painting at heights noted.

3.4 CLEANING

1. Tactile characters shall be raised 1/32 inch from sign face. Glue-on letters or etched backgrounds are not acceptable.
 2. Provide California Grade 2 Braille whenever Braille symbols are specifically required. Dot spacing: 1/10 inch on center within each cell with 2/10 inch space between cells. Dot height: raised 1/40 inch above background. Separate braille 1/2 inch from the corresponding raised characters or symbols. Signage manufacturer to provide Grade 2 braille translation. Refer to CBC 1117B.5.6.
 3. Perimeter borders: 3/8 inch.
 4. Letters, numbers and/or symbols shall contrast 70 percent minimum with their background, either light characters on a dark background or dark characters on a light background. Characters and background shall have a non-glare finish.
- B. Plaque material: Melamine plastic laminate, approximately 1/8 inch thick with contrasting core color. The melamine shall be non-static, fire-retardant and self-extinguishing. The plastic laminate will be impervious to most acids, alkalis, alcohol, solvents, abrasives, and boiling water.
1. Color: As selected by Architect.
- C. Letterform: Myriad Roman where indicated, 3/4 inch high, minimum. Uppercase characters only on all Tactile Signs. (SANS SERIF)
- D. Size of letters and numbers as follows:
1. Lettering for Room identification signs: 3/4 inch.
 2. Numbers for Room Number signs: 3/4 inch.
 3. Pictogram Symbol size: 4 inches, International Style.
 4. Overall field dimension for Pictogram Symbol: 6 inches.
- E. Copy Position:
1. Room Identification Signs: Left Top – LT.
 2. Toilet Room Side Mounted Signs: Centered Bottom – CB.
 3. Other sign types: As shown on drawings.

2.3 TOILET ROOM SIGNS

- I.I.S.B.C
- A. Door-Mounted: Per CBC 1117B.6; 1/4 inch thick with eased edges.
1. Women: 12 inch diameter circle; with International Symbol of Accessibility
 2. Men: Equilateral triangle with sides 12 inches long, vertex up; with International Symbol of Accessibility.
 3. Unisex Toilets: Superimposed triangle on 12 inch circle, with International Symbol of Accessibility.
 4. Product: Mohawk Series 200 – Dimensional, similar to MCA-VM-3 (Women); MCA-VM-4 (Men); and Unisex (Unisex).
- B. Jamb-Mounted Signs: Per CBC 1117B.5.
1. Product: Mohawk ADA-4 Regulatory Symbol Signs.
 2. Dimensions: 8 inch by 6 inch, with a 4 inch gender symbol, and the verbal description placed directly below followed by contracted Grade 2 California braille.
 3. Corners: Square.

2.4 BUILDING ENTRANCE SIGNS

- A. General: Per CBC 1117B.5.8.1.2; Typical 1/8 inch thick, with I.S.A. (only), ~~size as shown on drawings.~~
- B. Product: Mohawk Series 200A – Sand Carved process.
1. Dimensions: 6 inch x 6 inch minimum pictogram.
 2. Corners: Radiused.
 3. Lettering: Helvetica, Uppercase, 3/4 inch height.

- A. Section 01 77 00 – Contract Closeout: Requirements for final cleaning.
- B. General: Upon completion, thoroughly clean exposed surfaces per manufacturer's instructions.
- C. Repair scratches and other damage which might have occurred during installation. Replace components where repairs were made but are still visible to the unaided eye from a distance of 10 feet.
- D. Remove temporary coverings and protection to adjacent work areas.
- E. Clean installed products in accordance with manufacturer's instructions prior to Owner's acceptance. Remove construction debris from project in accordance with provisions in Division 1.

END OF SECTION

SECTION 10 21 13.20**SOLID COLOR REINFORCED COMPOSITE TOILET PARTITIONS****PART 1 - GENERAL****1.1 SUMMARY**

- A. Section includes solid color reinforced composite toilet compartments.
- B. Related Sections:
 - 1. Section 05 50 00 - Metal Fabrications: Support for floor-anchored compartments.
 - 2. Section 09 22 16 - Non-Structural Metal Framing: Wall backing required to secure mounting brackets.
 - 3. Section 10 28 00 - Toilet Accessories.

1.2 REFERENCES

- A. ADA, *Accessibility Guidelines for Buildings and Facilities*, Federal Register Volume 56, Number 144, Rules and Regulations.
- B. American National Standards Institute:
 - 1. ANSI A117.1-1998 Specifications for Making Buildings and Facilities Accessible to and Usable by Physically Handicapped People.
- C. ASTM International:
 - 1. ASTM E84-01 Standard Test Method for Surface Burning Characteristics of Building Material.
 - 2. ASTM D2794-93(1999)e1 Standard Test Method for Resistance of Organic Coatings to the Effects of Rapid Deformation (Impact).
 - 3. ASTM D2197-98(2002) Standard Test Method for Adhesion of Organic Coatings by Scrape Adhesion.
 - 4. ASTM D6578-00 Standard Practice for Determination of Graffiti Resistance.
- D. Fair Housing Amendments Act of 1988, *Accessibility Guidelines*, Federal Register Volume 56, Number 44.
- E. International Code Council, *International Building Code*, 2000 Edition, Chapters 5, 7 and 8.
- F. National Fire Protection Association 101 *Life Safety Code* 2000 Edition, Chapters 5, 6, 8-30.
- G. Title 24, California Code of Regulations, Parts 2, 3, and 5.
- H. US Green Building Council (USGBC):
 - 1. Leadership in Energy and Environmental Design (LEED) Program, Version 2.1.

1.3 PERFORMANCE REQUIREMENTS

- A. Graffiti Resistance: Partition material shall have the following graffiti removal characteristics when tested in accordance with ASTM D6578-00 Standard Practice for Determination of Graffiti Resistance in accordance with Section 9, "Graffiti Removal Procedure Using Manual Solvent Rubs":
 - 1. Cleanability: Five (5) required staining agents shall be cleaned off material.

- B. Scratch Resistance: Partition material shall have the following characteristics when tested in accordance with ASTM D2197-98(2002) Standard Test Method for Adhesion of Organic Coating by Scrape Adhesion, using Gardner Stock #P A- 2197/ST pointed stylus attachment on scrape tester:
1. Scratch Resistance: Maximum Load Value shall exceed 10 kilograms.
- C. Impact Resistance: Partition material shall have the following characteristics when tested in accordance with ASTM D2794-93(1999)e1 Standard Test Method for Resistance of Organic Coating to the Effects of Rapid Deformation (Impact), using 0.625 inch hemispherical indenter with 2-lb impact weight:
1. Impact Resistance: Maximum Impact Force value shall exceed 30 inch-lbs.
- D. Fire Resistance: Partition material shall comply with the following requirements, when tested in accordance with ASTM E 84: Standard Test Method for Surface Burning Characteristics of Building Materials:
1. Smoke Developed Index: Not to exceed 450.
 2. Flame Spread Index: Not to exceed 75.
 3. Material Fire Ratings:
 - a. National Fire Protection Association (NFPA): Class B.
 - b. International Code Council (ICC): Class B.
- E. LEEDs Contribution: Partition material shall contribute to the following US Green Building Council's Leadership in Energy and Environmental Design Program Credits (USGBC LEED Version 2.1):
1. Recycled Content (MR Credit 4.1): Shall contain a minimum of 5% recycled content.
 2. Recycled Content (MR Credit 4.2): Shall contain a minimum of 10% recycled content.
 3. Low Emitting Materials (EQ Credit 4.4): Shall not contain urea-formaldehyde resins.
 4. Rapidly Renewable Materials (MR Credit 6.0): More than 5% of material's value shall be harvested from plants harvested within a ten-year cycle.

1.4 SUBMITTALS

- A. Section 01 32 19 – Submittal Procedures: Submittal procedures.
- B. Manufacturer's Data:
1. Provide required number copies of:
 - a. Product data sheets.
 - b. Installation instructions.
 - c. Cleaning and maintenance instructions.
 - d. Replacement parts information.
- C. Shop Drawings:
1. Provide required number of copies of all shop drawings.
 2. Show fabrication and erection of compartment assemblies, to extent not fully described by manufacturer's data sheets.
 3. Show anchorage, accessory items and finishes.
 4. Provide location drawings for bolt hole locations in supporting members for attachment of compartments.
- D. Samples:
1. Furnish scale model of compartments, including stile, shoe, door, door hardware, divider panel, and mounting brackets.
 2. Furnish sections showing stile anchoring and leveling devices, concealed threaded inserts, panel, stile, and edge construction.

1.5 COORDINATION

- A. Coordinate Work with placement of support framing and anchors in walls and ceilings.

1.6 PRODUCT DELIVERY, STORAGE, AND HANDLING

- A. Deliver items in manufacturer's original unopened protective packaging.
- B. Store materials in original protective packaging to prevent physical damage or wetting.
- C. Handle so as to prevent damage to finished surfaces.

1.7 WARRANTY

- A. Section 01 77 00 – Contract Closeout: Requirements for warranties.
- B. Furnish ten-year limited warranty for panels, doors, and stiles against breakage, corrosion, delamination, and defects in factory workmanship.
- C. Furnish one-year guarantee against defects in material and workmanship for stainless steel door hardware and mounting brackets.

PART 2 - PRODUCTS**2.1 SOLID COLOR REINFORCED COMPOSITE TOILET PARTITIONS**

- A. Manufacturers:
 - 1. Model numbers for toilet partitions manufactured by Bobrick Washroom Equipment, Inc. represented by R.E. Edwards & Associates (925-829-2942) are listed to establish a standard of quality for design, function, materials, workmanship, and appearance.
 - 2. Other manufacturers may be submitted for evaluation by the architect by following the conditions of the substitution language in Section 00 11 19 - Instructions to Bidders or Section 01 60 00 – Product Requirements: Product Options and Substitutions.
- B. Toilet partitions shall be the product(s) of a single manufacturer.

2.2 MOUNTING CONFIGURATIONS

- A. Toilet Partitions: Floor-Anchored and Overhead-Braced (1092.67 Sierra™ Series).
- B. Urinal Screens: Wall-Hung (1095 Sierra™ Series).

2.3 COMPONENTS

- A. Stiles, Panels, Doors, and Screens:
 - 1. Stiles, Panels, Doors, and Screens: Manufactured from Solid Color Reinforced Composite material.
- B. Toilet Partition Material:
 - 1. Toilet partitions: Constructed of Solid Color Reinforced Composite material, which is composed of dyes, organic fibrous material, and polycarbonate/phenolic resins. Material shall have a non-ghosting, graffiti-resistant surface integrally bonded to core through a series of manufacturing steps requiring thermal and mechanical pressure. Edges of material: Same color as the surface. Color: SC04 – Forest Green.

3. Toilet partitions constructed of High Density Polyethylene (HDPE) or High Density Polypropylene will not be acceptable.
- C. Finish Thickness:
1. Stiles and doors: 3/4 inch.
 2. Panels and benches: 1/2 inch.
- D. Door Width:
1. 24 inches at standard stalls.
- E. Height: 58 inches.
- F. Accessible Door Width:
1. 32 inches minimum clear width for front entry accessible stalls when door is open 90 degrees.
 2. 34 inches minimum clear width for side entry accessible stalls when door is open 90 degrees.

2.4 ACCESSORIES

- A. Hardware:
1. All hardware: 18-8, type-304 stainless steel with satin finish.
 2. Hardware of chrome-plated "Zamak", aluminum, or plastic is unacceptable.
- B. Vandal Resistant Latch Hardware - Option (.67):
1. Sliding door latch: 14 gauge (2 mm) and shall slide on nylon track.
 2. Sliding door latch: Requires less than 5-lb force to operate. Twisting latch operation will not be acceptable.
 3. Attach latch track to door by machine screws into factory-installed threaded brass inserts.
 4. Factory install threaded brass inserts for door hinge and latch connections and shall withstand a direct pull exceeding 1,500 lbs. per insert.
 5. Use through bolted, stainless steel, pin-in-head Torx sex bolt fasteners at latch keeper-to-stile connections and shall withstand direct pull force exceeding 1,500 lbs. per fastener.
- C. Vandal Resistant Hinges - Option (.67):
1. Hinge: 16-gauge (1.6-mm) continuous piano hinge.
 2. Equip doors with self-closing hinge.
 3. Attach continuous piano hinge to door and stile by theft-resistant, pin-in-head Torx stainless steel machine screws into factory- installed, threaded brass inserts.
 4. Fasteners secured directly into the core are not acceptable. .
 5. Furnish doors with two 11-gauge stainless steel door stop plates with attached rubber bumpers to resist door from being kicked in/out beyond stile.
 6. Secure door stops and hinges with stainless steel, pin-in-head Torx machine screws into threaded brass inserts.
 7. Threaded brass inserts shall withstand a direct pull force exceeding 1,500 lbs per insert.
- D. Mounting Brackets – Vandal-Resistant Option (.67): Through bolted, stainless steel, pin-in-head Torx sex bolt fasteners shall be used for panel-to-stile connections.
1. Mounting brackets: 18-gauge stainless steel and extend full height of panel.
 2. Furnish U-channels to secure panels to stiles.
 3. Furnish angle brackets to secure stiles to walls and panels to walls.
 4. Fasteners at locations connecting panels-to-stiles shall utilize through bolted, stainless steel, pin-in-head Torx sex bolt fasteners. Through-bolted fasteners shall withstand direct pull force exceeding 1,500 lbs. per fastener.

5. Wall mounted urinal screen brackets: 11 gauge double thickness.
- E. Leveling Device: 7-gauge, 3/16 inch hot rolled steel bar; chromate- treated and zinc-plated; through-bolted to base of solid color reinforced composite stile.
- F. Stile Shoe: One-piece, 4 inch high, type-304, 22-gauge stainless steel with satin finish. Top shall have 90 degree return to stile. Shoe is composed of one-piece of stainless steel and capable of being fastened (by clip) to stiles starting at wall line.
- G. Headrail (Overhead Braced): Satin finish, extruded anodized aluminum (0.125 inch) with anti-grip profile.
- H. Compartment Hooks: In each toilet compartment, provide one Bobrick B212 Clothes Hook and Bumper at 38 to 40 inches above finished floor for a barrier-free installation. Utilize through-bolted, stainless steel, pin-in-head Torx sex bolt fasteners.
- I. U-shaped Pulls at Accessible Stall Doors: Equip doors at accessible stalls with inside and outside pulls: Jacknob Corp. Model 6253 Door Pull, 3-inch high, ADA model; cast stainless steel. Equip outswinging doors with wall stop.

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Check areas scheduled to receive compartments for correct dimensions, plumbness of walls, and soundness of surfaces that would affect installation of mounting brackets.
- B. Verify spacing of plumbing fixtures to assure compatibility with installation of compartments.
- C. Do not begin installation of compartments until conditions are satisfactory.

3.2 INSTALLATION

- A. Install compartments rigidly, straight, plumb, and level and in accordance with manufacturer's installation instructions.
- B. Installation methods shall conform to manufacturer's recommendation for backing and proper support.
- C. Conceal evidence of drilling, cutting, and fitting to room finish.
- D. Maintain uniform clearance at vertical edge of doors.
- E. Mount door latches and pulls at 30 inches to 44 inches above finish floor.
- F. Maintain 3/8 inch to 1/2 inch space between wall and panels and between wall and end pilasters.
- G. Attach panel brackets securely to walls using anchor devices.
- H. Attach panels and pilasters to brackets. Locate head rail joints at pilaster center lines.
- I. Field touch-up of scratches or damaged finish will not be permitted. Replace damaged or scratched materials with new materials.

3.3 ADJUSTMENT AND CLEANING

- A. Adjust hardware for proper operation after installation.
- B. Set hinge cam on in-swinging doors to hold doors open when unlatched.
- C. Set hinge cam on out-swinging doors to hold unlatched doors in closed position.
- D. Clean exposed surfaces of compartments, hardware, and fittings.

END OF SECTION

SECTION 10 22 27**OPERABLE PANEL PARTITIONS****PART 1 - GENERAL****1.1 SUMMARY**

- A. Section includes manually operated, paired panel partitions.
- B. Related Sections:
 - 1. Section 05 12 00 - Structural Steel Framing: Overhead track structural support framing.
 - 2. Section 05 50 00 - Metal Fabrications: Miscellaneous metal framing and supports.
 - 2. Section 06 10 53 - Miscellaneous Rough Carpentry: Wood blocking and track support shimming.
 - 3. Section 09 22 16 - Non-Structural Metal Framing: Door pocket construction.

1.2 REFERENCES

- A. ASTM International:
 - 1. ASTM E84 - Standard Test Method for Surface Burning Characteristics of Building Materials.
 - 2. ASTM E90 - Standard Test Method for Laboratory Measurement of Airborne Sound Transmission Loss of Building Partitions and Elements.
 - 3. ASTM E119 - Standard Test Methods for Fire Tests of Building Construction and Materials.
 - 4. ASTM E413 - Standard Classification for Rating Sound Insulation.
 - 5. ASTM E557 - Standard Practice for Architectural Application and Installation of Operable Partitions.
- B. Federal Specification Unit:
 - 1. FS CCC-W-408 - Wall Covering, Vinyl-Coated.
- C. National Fire Protection Association:
 - 1. NFPA 255 - Standard Method of Test of Surface Burning Characteristics of Building Materials.
 - 2. NFPA 265 - Standard Methods of Fire Tests for Evaluating Room Fire Growth Contribution of Textile Coverings on Full Height Panels and Walls.
 - 3. NFPA 286 - Standard Methods of Fire Tests for Evaluating Contribution of Wall and Ceiling Interior Finish to Room Fire Growth.
- D. Underwriters Laboratories Inc.:
 - 1. UL - Fire Resistance Directory.
 - 2. UL 723 - Tests for Surface Burning Characteristics of Building Materials.

1.3 PERFORMANCE REQUIREMENTS

- A. Anchorage to the supporting structure must meet the load requirements of 2007 CBC, Section 1611A.5.
- B. Sound Transmission Classification (STC): As specified, calculated in accordance with ASTM E413, based on tests performed in accordance with ASTM E90, on partition size of 100 sq ft.

- C. Acoustical Performance: Provide operable panel partitions tested by a qualified independent testing agency for the following acoustic properties according to following test method:
1. Sound Transmission Requirements: Operable panel partition assembly tested in a full-scale opening (168 by 108 inches) for laboratory sound transmission loss performance according to ASTM E90, determined by ASTM E 413 and rated for an STC plus or minus 1 as follows: STC 50.

1.4 SUBMITTALS

- A. Section 01 32 19 - Submittal Procedures: Submittal procedures.
- B. Shop Drawings:
1. Show location and extent of operable partitions.
 2. Indicate plans, elevations, sections, details, attachments to other construction and accessories.
 3. Indicate dimensions, weights, conditions at openings, and at storage areas, and required installation, storage, and operating clearances.
 4. Indicate location and installation requirements for hardware and track, including floor tolerances required and direction of travel.
 5. Indicate blocking to be provided by others.
 6. Setting Drawings: Show imbedded items and cutouts required in other work, including support beam punching template.
- C. Product Data: Submit data on partition operation, hardware and accessories, colors and finishes available.
- D. Samples for Review: Submit color samples demonstrating full range of finishes available for Architect selection. Submit two samples of surface finish, 12 x 12 inches size, illustrating quality, colors selected, and texture.
- E. Manufacturer's Instructions: Submit special procedures, perimeter conditions requiring special attention, and installation sequence.
- F. Certificates: Certify partition system meets or exceeds specified acoustic requirements.

1.5 CLOSEOUT SUBMITTALS

- A. Section 01 77 00 - Contract Closeout: Closeout procedures.
- B. Operation and Maintenance Data: Submit recommended cleaning methods, cleaning materials, and stain removal methods. Describe cleaning materials detrimental to vinyl fabric surfaces and hardware finish.

1.6 QUALITY ASSURANCE

- A. Acoustical Performance: Test operable partitions in an independent acoustical laboratory in accordance with ASTM E90 test procedure to attain no less than the STC rating specified. Provide a complete and unedited written test report by the testing laboratory upon request.
- B. Preparation of the opening shall conform to the criteria set forth per ASTM E557.
- C. Surface Burning Characteristics: Provide panel finish face with the following surface-burning characteristics as determined by testing identical products per ASTM E84 by UL or other testing and inspecting agencies acceptable to authorities having jurisdiction:
1. Flame Spread: 24 or less.

- 2. Smoke Developed: 450 or less.

1.7 QUALIFICATIONS

- A. Manufacturer: Company specializing in manufacturing products specified in this section with minimum three years documented experience.
- B. Installer: Company specializing in performing work of this section with minimum 3 years documented experience, certified by manufacturer.

1.8 DELIVERY, STORAGE AND HANDLING

- A. Section 01 60 00 – Product Requirements: Requirements for transporting, handling, storing, and protecting products.
- B. Clearly mark packages and panels with numbering systems used on Shop Drawings. Do not use permanent markings on panels.
- C. Protect panels during delivery, storage, and handling to comply with manufacturer's direction and as required to prevent damage.

1.9 COORDINATION

- A. Coordinate Work with other sections providing panel finish materials to this section.

1.10 WARRANTY

- A. Section 01 77 00 – Contract Closeout: Requirements for warranties.
- B. Furnish two year manufacturer's warranty for repair or replacement of any components with manufacturing defects.

PART 2 - PRODUCTS

2.1 OPERABLE PANEL PARTITIONS

- A. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
 - 1. Modernfold, Inc. Acousti-Seal 932 operable wall, paired panels.
 - 2. Hufcor/AirWall.
 - 3. Substitutions: Section 01 60 00 – Product Requirements: Product Options and Substitutions.
- B. Product Description and Basis of Design: Acoustic-Seal 932: Series of pared flat panels hinged together in pairs, manually operated, top supported with operable floor seals.

2.2 COMPONENTS

- A. Panel Configuration: Operable panels as follows:
 - 1. Manually operated, paired panels.
- B. Panel Construction: Top reinforcing as required to support suspension components and as follows:
 - 1. Horizontal and vertical framing elements: Minimum 18-gauge formed steel with overlapped and welded corners for rigidity.
 - 2. Top channel is reinforced to support suspension system components.

3. Frame is designed so that full vertical edges of panels are of formed steel and provide concealed protection of edges of panel skin.
 4. Panel Skin: 1/2-inch tackable gypsum board, class A rated single material continuously bonded to panel frame.
- C. Panel Thickness: 3-1/4 inches.
 - D. Panel Width: Standard 48 inch width.
 - E. Panel Weight: 5 to 11 psf.
 - F. Panel Skin: 0.5-inch tackable moisture resistant gypsum board, class "A" rated single material or composite layers continuously bonded to panel frame. Acoustical rating of panels with this construction: 50 STC.
 - G. Hinges for Panels, Closure Panels, Pass Doors: Full leaf butt hinges, attached directly to panel frame. Welded hinge anchor plates within panel shall further support hinge mounting to frame. Hinges mounted into panel edge or vertical astragal are not acceptable.
 - H. Panel Trim: No vertical trim required or allowed on edges of panels; minimum groove appearance at panel joints.
 - I. Panel Weights:
 1. Non-steel skin; 50 STC: 8 lbs/square foot.
 - J. Hardware: Manufacturer's standard, finished to match exposed hardware on partition.
 - K. Single Pass Doors: Matching pass door same thickness and appearance as panels. ADA compliant passdoor to be trimless and equipped with friction latch and flush pulls for panic operation. No threshold will be permitted.
 - L. Pocket Doors: Acousti-Seal Pocket Doors by Modernfold, Inc., with same construction, finish, and appearance as the adjacent panels.

2.3 SUSPENSION SYSTEM

- A. #17 Suspension System.
 1. Suspension Tracks: Minimum 11 gauge, 0.12 inch roll-formed steel track; suitable for either direct mounting to a wood header or supported by adjustable steel hanger brackets, supporting the load-bearing surface of the track, connected to structural support by pairs of 0.38 inch diameter threaded rods. Aluminum track is not acceptable.
 - a. Exposed track soffit: Steel, integral to track, and pre-painted off-white.
 2. Carriers: One all-steel trolley with steel tired ball bearing wheels per panel (except hinged panels). Non-steel tires are not acceptable.

2.4 PANEL FINISH SURFACE

- A. Panel Finish: Factory applied, Class "A" rated material.
 1. Manufacturer's standard reinforced heavy-duty vinyl with woven backing weighing not less than 27 ounces per lineal yard.
 2. Color/Pattern: As selected by Architect from manufacturer's full range of colors produced for panel face materials specified.
- B. Panel Trim: Exposed panel trim of one consistent color (Smoke Gray or Dark Bronze) as selected by Architect.

2.5 SOUND SEALS

- A. Vertical Interlocking Sound Seals Between Panels: Roll-formed steel astragals, with reversible tongue and groove configuration in each panel edge for universal panel operation. Rigid plastic astragals or astragals in only one panel edge are not acceptable.
- B. Horizontal Top Seals: Continuous contact extruded vinyl bulb shape with pairs of non-contacting vinyl fingers to prevent distortion and no mechanically operated parts.
- C. Horizontal Bottom Seals: Modernfold IA2 Bottom Seal. Automatic operable seals providing 2-inch operating clearance with an operating range of plus 0.5 inch to -1.50 inch and which automatically drop as panels are positioned; without the need for tools or cranks.

PART 3 - EXECUTION

3.1 EXAMINATION

- A. General: Examine flooring, structural support, and opening, with Installer present, for compliance with requirements for installation tolerances and other conditions affecting performance of operable partitions. Proceed with installation only after unsatisfactory conditions have been corrected.
- B. Verify field measurements are as indicated on shop drawings.
- C. Verify track supports are laterally braced and will permit track to be level within 1/4 inch of required position and parallel to floor surface.
- D. Verify floor flatness of 1/8 inch in 10 feet, non-cumulative.
- E. Verify wall plumbness of 1/8 inch in 10 feet, non-cumulative.

3.2 INSTALLATION

- A. General: Comply with ASTM E557, operable partition manufacturer's written installation instructions, Drawings and approved Shop Drawings.
- B. Install operable partitions and accessories after other finishing operations, including painting have been completed.
- C. Match operable partitions by installing panels from marked packages in numbered sequence indicated on Shop Drawings.
- D. Broken, cracked, chipped, deformed or unmatched panels are not acceptable.
- E. Fit and align partition assembly and pocket doors level and plumb.
- F. Lubricate moving components.
- G. Apply acoustic sealant to achieve required acoustic performance.

3.3 ADJUSTING

- A. Adjust operable partitions to operate smoothly, easily, and quietly, free from binding, warp, excessive deflection, distortion, nonalignment, misplacement, disruption, or

malfunction, throughout entire operational range. Lubricate hardware and other moving parts.

- B. Do not over-compress acoustic seals.
- C. Visually inspect partition in full extended position for light leaks to identify potential acoustical leak.
- D. Adjust partition assembly to achieve lightproof seal.

3.4 CLEANING

- A. Section 01 74 00 - Cleaning: Requirements for final cleaning.
- B. Clean partition surfaces upon completing installation of operable partitions to remove dust, dirt, adhesives and other foreign materials according to manufacturer's written instructions.

3.5 DEMONSTRATION AND TRAINING

- A. Demonstrate proper operation and maintenance procedures to Owner's representative. Identify potential operational problems.

END OF SECTION

SECTION 10 26 23**PROTECTIVE WALL COVERING****PART 1 - GENERAL****1.1 SUMMARY**

- A. Section includes rigid vinyl sheet protective wall covering and wall guards.
1. Corner guards.

1.2 REFERENCES

- A. ASTM International:
1. ASTM E84 – Standard Test Method for Surface Burning Characteristics of Building Materials.
 2. ASTM D635 – Standard Test Method for Rate of Burning and/or Extent and Time of Burning of Plastics in a Horizontal Position.
 3. ASTM D256 – Standard Test Methods for Determining the Izod Pendulum Impact Resistance of Plastics.
 4. ASTM G21 – Standard Practice for Determining Resistance of Synthetic Polymeric Materials to Fungi.
- B. National Fire Protection Association (NFPA).
- C. Society of Automotive Engineers (SAE):
1. SAE J-1545.
- D. Underwriters Laboratory (UL):
1. UL 723 – Tests for Surface Burning Characteristics of Building Materials.
- E. Uniform Building Code (UBC):
1. UBC 52-4.

1.3 SYSTEM DESCRIPTION – PROTECTIVE WALL COVERING

- A. Performance Requirements: Provide rigid vinyl sheet systems that conform to the following requirements of regulatory agencies and the quality control of IPC Door and Wall Protection Systems, InPro Corporation.
1. Fire Performance Characteristics: Provide UL Classified Sanparrel Rigid Vinyl Sheet conforming with the NFPA Class A fire rating. Surface burning characteristics as determined by UL-723 (ASTM E-84), for Sanparrel Rigid Vinyl Sheet installed with 3M Fastbond 30, InPro Bond Adhesive, or Formulated Solutions, LLC "XT- 2000+" Adhesive shall be a maximum flame spread of 20 and a maximum smoke developed of 350 for 0.060 inch thick material.
 2. Self Extinguishing: Provide rigid vinyl sheet with a CC1 classification, as tested in accordance with the procedures specified in ASTM D635, as referenced in UBC 52-4.
 3. Impact Strength: Provide Sanparrel Rigid Vinyl Sheet that has an Impact Strength of 30.4 ft-lbs/ inch of thickness as tested in accordance with the procedures specified in ASTM D256.
 4. Chemical and Stain Resistance: Provide rigid vinyl sheet that show resistance to stain when tested in accordance with applicable provisions of ASTM D543.
 5. Fungal and Bacterial Resistance: Provide rigid vinyl that does not support fungal or bacterial growth as tested in accordance with ASTM G21.

6. Color Consistency: Provide components matched in accordance with SAE J-1545 - (Delta E) with a color difference no greater than 1.0 units using CIE Lab, CIE CMC, CIE LCh, Hunter Lab or similar color space scale systems.

1.4 SYSTEM DESCRIPTION – WALL GUARDS

- A. Performance Requirements: Provide wall guard systems that conform to the following requirements of regulatory agencies and the quality control of IPC Door and Wall Protection Systems, InPro Corporation.
 1. Fire Performance Characteristics: Provide UL Classified wall guards conforming with NFPA Class A fire rating. Surface burning characteristics, as determined by UL-723 (ASTM E84), shall be flame spread of 10 and smoke development of 350 - 450.
 2. Self Extinguishing: Provide wall guards with a CC1 classification, as tested in accordance with the procedures specified in ASTM D635, as referenced in UBC 52-4-1988.
 3. Impact Strength: Provide rigid vinyl profile materials that have an Impact Strength of 30.2 ft-lbs/inch of thickness as tested in accordance with the procedures specified in ASTM D256.
 4. Chemical and Stain Resistance: Provide wall guards that show resistance to stain when tested in accordance with applicable provisions of ASTM D543.
 5. Fungal and Bacterial Resistance: Provide rigid vinyl that does not support fungal or bacterial growth as tested in accordance with ASTM G-21.
 6. Color Consistency: Provide components matched in accordance with SAE J-1545 - (Delta E) with a color difference no greater than 1.0 units using CIE Lab, CIE CMC, CIE LCh, Hunter Lab or similar color space scale systems.

1.5 SUBMITTALS

- A. Section 01 32 19 – Submittal Procedures: Requirements for submittals.
- B. Product Data: Manufacturer's printed product data for each type of Sanparrel Rigid Vinyl Sheet and each type of wall guard specified.
- C. Detail Drawings:
 1. Rigid vinyl sheet: Mounting details with the appropriate adhesives for specific project substrates,
 2. Wall guards: Mounting details with the appropriate fasteners for specific project substrates.
- D. Samples:
 1. Rigid vinyl sheet: Verification samples of Sanparrel Rigid Vinyl Sheet, 8 inch x 8 inch, of each type and color indicated.
 2. Wall guards: Verification samples of wall guard, 8 inch long, in full size profiles of each type and color indicated.
- E. Manufacturer's Installation Instruction: Printed installation instructions for Sanparrel Rigid Vinyl Sheet and wall guard.

1.6 CLOSEOUT SUBMITTALS

- A. Section 01 78 39 – Project Record Documents: Operation and Maintenance Manuals.
- B. Submit manufacturer's maintenance instructions for protective wallcovering, corner guards, and wall guards.

- C. Include precautions against cleaning materials and methods that may be detrimental to finishes and performance.

1.7 QUALITY ASSURANCE

- A. Single Source Responsibility: Obtain protective wallcovering system components from a single source.

1.8 DELIVERY, STORAGE AND HANDLING

- A. Deliver materials in unopened factory packaging to the jobsite
- B. Inspect materials at delivery to assure that specified products have been received.
- C. Store in original packaging in a climate controlled location away from direct sunlight.

1.9 PROJECT CONDITIONS

- A. Environmental Requirements: Products must be installed in an interior climate controlled environment.

1.10 WARRANTY

- A. Section 01 77 00 - Contract Closeout: Requirements for warranties.
- B. Furnish standard IPC Limited Lifetime Warranty against material and manufacturing defects.

1.11 EXTRA MATERIALS

- A. Furnish one 3 feet x 8 feet sheet; or minimum 2 percent of each type, color and pattern of wall surface protection materials and components. Include accessory components as required. Replacement materials shall be from the same production run as installed materials. Package with protective coverings and appropriate labels.

PART 2 - PRODUCTS

2.1 PROTECTIVE WALL COVERING AND WALL GUARDS

- A. Manufacturers:
 - 1. IPC Door and Wall Protection Systems, InPro Corporation, www.inprocorp.com.
 - 2. Koroseal Wall Protection Systems; www.korogard.com
 - 3. Substitutions: Section 01 60 00 – Product Requirements: Product options and substitutions.
- B. Product Description and Basis of Design: InPro Corporation, Sanparrel Rigid Vinyl Sheet protective wall covering.
- C. Product Description and Basis of Design: InPro Corporation, 500 Wall Guard.

2.2 COMPONENTS

- A. Rigid Vinyl Sheet:
 - 1. Sanparrel, Rigid Vinyl Sheet Options:

Item #	Dimensions	Thickness
305	3 feet x 8 feet	0.040 inch (1mm).

Also available:

- a. 3 feet x 10 feet sheets 0.040 inch (1mm).
- b. 3 feet x 120 feet rolls 0.040 inch (1mm).
- 2. Backing: Unbacked.
- 3. Accessories:
 - a. Top Cap: #407.
 - 1) Length: 8 feet, standard, 10 feet, available.
 - b. Inside Corner: #409.
 - 1) Length: 8 feet standard, 10 feet available.
 - c. Outside Corner: 3448, 3496, 11248 or 11296.
 - e. Color Matched Caulk: 580 Color matched VinylSeal.
- B. Wall Guards:
 - 1. 500 Wall Guard Profile: 3 inch height x 1 inch depth.
- C. Wall Guard Components:
 - 1. 502 Series End caps, outside corners and brackets: Injection molded thermoplastics.
 - 2. Fasteners: Provide all mounting system accessories appropriate for substrates indicated on the drawings.

2.3 MATERIALS

- A. Vinyl: Sanparrel shall be manufactured from chemical and stain resistant polyvinyl chloride with the addition of impact modifiers. No plasticizers shall be added (plasticizers may aid in bacterial growth).
- B. Vinyl for Wall Guards: Snap on cover of 0.080 inch thickness, extruded from chemical and stain resistant polyvinyl chloride with the addition of impact modifiers. No plasticizers shall be added (plasticizers may aid in bacterial growth).
- C. Aluminum: Continuous aluminum retainer of 0.080 inch thickness, fabricated from 6063-T5 aluminum, with a mill finish.

2.4 ACCESSORIES

- A. Top caps, inside corners, and outside corners: Extruded PVC.

2.5 FINISHES – PROTECTIVE WALL COVERING

- A. Color: Clam Shell.
 - 1. Surface Texture: Haircell texture.
- B. Accessories: Top caps, inside corners, divider bars and outside corners shall be of a color matching the Sanparrel.

2.6 FINISHES – WALL GUARDS

- A. Vinyl Covers Color: Clam Shell.
 - 1. Surface Texture: Pebblette texture.
- B. Molded Components: End caps, outside corners and brackets shall be of a color matching the wall guards.
 - 1. Surface: Pebblette texture.

PART 3 - EXECUTION**3.1 EXAMINATION**

- A. Examine areas and conditions in which the rigid vinyl sheet and wall guard systems will be installed.
 - 1. Complete all finishing operations, including painting, before beginning installation of rigid vinyl sheet materials and wall guard system materials.
- B. Wall surface shall be dry and free from dirt, grease and loose paint.

3.2 PREPARATION

- A. General: Prior to installation, clean substrate to remove dust, debris and loose particles.

3.3 INSTALLATION – RIGID VINYL SHEET

- A. General: Locate the rigid vinyl sheet as indicated on the approved detail drawing for the appropriate substrate and in compliance with the IPC installation instructions. Install level and plumb at the height indicated on the drawings.
- B. Installation of Sanparrel Rigid Vinyl Sheet with manufacturer's recommended adhesive:
 - 1. Adhere to substrate with InPro Bond, a freeze-thaw stable, nonflammable, high strength, water based adhesive that trowels on and allows approximately 20 minutes working time before firming.
 - 2. Adhere to substrate with XT-2000+, a freeze-thaw stable, nonflammable, high strength, water based adhesive that trowels on and allows approximately 20 minutes working time before firming.
 - 3. Adhere to substrate with Fastbond 30, a nonflammable, high strength, water-dispersed contact adhesive, with very little odor.
 - 4. Smooth roll surface.
- C. Do not use materials with chips, cracks, voids, stains, or other defects that might be visible in the finished work.
- D. Install aluminum retainers, mounting brackets, and other accessories in strict accordance with the manufacturer's instructions.
- E. Where splices occur in horizontal runs of over 20 feet, splice aluminum retainer and plastic cover at same locations along the run.
- F. Install corner guards to walls securely in accordance with manufacturer's written instructions.
- G. Install corner guards accurately in location, alignment, and elevation.
- H. Install protective wallcovering to walls in accordance with manufacturer's written instructions.
- I. Install protective wallcovering sheets with texture running in the same direction for uniform appearance.
- J. Wainscot Joints: Butt joint panels, leaving a 1/16 inch gap between vinyl panels to allow for expansion. Seal joint with color matched VinylSeal.

3.4 INSTALLATION – WALL GUARDS

- A. General: Locate the wall guard as indicated on the approved detail drawing for the appropriate substrate and in compliance with the IPC installation instructions. Install wall guard level and plumb at the height indicated on the drawings.
- B. Installation of 500 Wall Guard:
1. Cut the aluminum retainer to the desired length, allowing 1-9/16 inch for each end cap, and 9/16 inch for each outside corner.
 2. Using a 1/4-inch drill bit, drill holes in the centerline of the aluminum retainer 4 inches from each end and spaced evenly over the entire length (6 anchors per 12 feet length).
 3. Position and level the aluminum retainer on the wall, allowing for end caps and outside corners, and transfer mounting holes to the wall with a marker. Drill 1/4-inch holes at each mark and position the ALLIGATOR anchors into the holes on the wall. Mount the retainer with #10 x 1-3/4" Phillips pan head screws and tighten the screws to secure the retainer.
 4. Slide the end caps and outside corners onto the aluminum, leaving a 1/16-inch gap for adjustments, and secure them by using one 1-1/4 inch self-tapping screw per end cap or two per outside corner.
 5. Cut the vinyl cover to the distance between the end caps/outside corners. NOTE: Trim all factory edges square before installation. Position the vinyl cover on the aluminum retainer starting at one end and working to the other end by pushing the cover over the aluminum until it snaps into place.

3.5 CLEANING

- A. Section 01 74 00 – Cleaning: Requirements for final cleaning.
- B. At completion of the installation, clean surfaces in accordance with the IPC clean-up and maintenance instructions.

END OF SECTION

SECTION 10 28 00**TOILET ACCESSORIES****PART 1 – GENERAL****1.1 SUMMARY**

- A. Section includes toilet accessories, and utility room accessories.
- B. Related Sections:
 - 1. Section 09 21 16 - Gypsum Board Assemblies: Gypsum board finishes.
 - 2. Section 09 22 16 - Non-Load Bearing Metal Framing System: In-wall framing and plates.
 - 3. Section 10 21 13.20 - Solid Color Reinforced Composite Toilet Compartments: Factory installed openings for toilet accessories.
 - 4. Section 26 01 00 – Basic Materials and Methods: Electrical supply, conduit, wiring, boxes, and wiring devices for hand dryers.

1.2 REFERENCES

- A. Americans with Disabilities Act:
 - 1. ADA – Accessibility Guidelines.
- B. International Code Council/American National Standards Institute:
 - 1. ICC/ANSI A117 – Standard on Accessible and Useable Buildings and Facilities.
- C. ASTM International:
 - 1. ASTM A167 - Stainless and Heat-Resisting Chromium-Nickel Steel Plate, Sheet and Strip.
 - 2. ASTM A269 - Seamless and Welded Austenitic Stainless Steel Tubing for General Service.
 - 3. ASTM A366 - Cold-Rolled Carbon Steel Sheets, Commercial Quality.
 - 4. ASTM B456 - Electro deposited Coatings of Copper plus Nickel plus Chromium and Nickel plus Chromium.
- D. Federal Specification Unit:
 - 1. FS A-A-3002 – Mirrors, Glass.
- E. CBC - California Building Code, 2001 edition.

1.3 NOT USED**1.4 SUBMITTALS**

- A. Section 01 32 19 – Submittal Procedures: Submittal procedures.
- B. Shop Drawings: Indicate methods of backing, installation and fastening.
- C. Product Data: Submit data on accessories describing size, finish, details of function, and attachment methods. Include detailed description of hand dryer explaining operating protocol, drying method, and performance. Provide blocking diagram of basic components.
- D. Electrical wiring diagrams for connection of hand dryers.

- E. Manufacturer's Installation Instructions: Submit special procedures, and conditions requiring special attention.
- F. Test reports from independent company showing compliance with Article 1.3.

1.4 REGULATORY REQUIREMENTS

- A. Comply with requirements of CBC Section 1109A.

1.5 QUALITY ASSURANCE

- A. Manufacturer: Company specializing in manufacturing electric hand dryers with 10 years minimum experience.
- B. Hand dryers shall be certified by Underwriters Laboratory (UL), Inc. and shall bear UL labels.
- C. Hand dryers shall be provided and installed in compliance with ICC/ANSI A117.1.

1.6 DELIVERY, STORAGE AND HANDLING

- A. Section 01 60 00 – Product Requirements: Requirements for transporting, handling, storing, and protecting products.
- B. Deliver products to site, store, handle and protect in accordance with manufacturer's instructions and recommendations.
- C. Do not deliver accessories to site until rooms in which they are to be installed are ready to receive them.
- D. Pack accessories individually in a manner to protect accessory and its finish.
- E. Deliver products in original containers with seals unbroken and labels intact until time of use. Label with name of accessory, catalog number and finish.
- F. Store delivered products in clean, secure and dry area.

1.7 FIELD MEASUREMENTS

- A. Verify that field measurements are as indicated on product data.

1.8 COORDINATION

- A. Coordinate the work with the placement of internal wall reinforcement and reinforcement of toilet partitions to receive anchor attachments.

1.9 WARRANTY

- A. Section 01 77 00 – Contract Closeout: Product warranties.
- B. Furnish manufacturer's standard warranty against silver spoilage in glass mirrors for a period of 15 years from date of Substantial Completion.
- C. Furnish manufacturer's 5 year warranty for hand dryer to be free of defects.

PART 2 - PRODUCTS

2.1 TOILET ACCESSORIES

- A. Manufacturers:
 - 1. Bobrick Washroom Equipment.
 - 2. ~~Bradley Corporation.~~
 - 3. ~~American Specialties, Inc.~~
 - 4. ~~Excel Driver, Inc. www.exceldriver.com~~
- 2. Substitutions: Not permitted. Bobrick is District Standard.

2.2 MATERIALS

- A. Sheet Steel: ASTM A366, cold rolled stretcher leveled; 125 oz/sq ft galvanized coating.
- B. Stainless Steel Sheet: ASTM A167, Type 304.
- C. Tubing: ASTM A269, stainless steel, seamless welded.
- D. Adhesive; Epoxy type contact cement.
- E. Fasteners:
 - 1. Accessories Mounted In or On Metal Framed Walls:
 - a. Grab Bars Secured to Concealed Anchor Plates: Phillips round head machine screws; 1/4-20 x 1-1/2 inch; stainless steel.
 - b. Other Accessories: Torx round head self-tapping sheet metal screws; minimum #10 by length sufficient to penetrate through framing minimum 3/8 inches; zinc plated steel at concealed locations, stainless steel at exposed locations.
 - 2. Accessories Mounted on Toilet Partitions:
 - a. Grab Bars: Phillips panhead machine screws; 1/4 - 20 by 1/2 inch; stainless steel.
 - b. Other Accessories:
 - 1) Screws: Torx pan head machine screws; #10-32 by 3/4 inch; zinc plated steel at concealed locations, stainless steel at exposed locations.
 - 2) Connectors: Internally threaded bolt; #10-32 by 3/4 inch; stainless steel.

2.3 FABRICATION

- A. Weld and grind smooth joints of fabricated components.
- B. Form exposed surfaces from one sheet of stock, free of joints. Form surfaces flat without distortion. Maintain flat surfaces without scratches or dents.
- C. Fabricate grab bars of tubing free from visible joints. Return to wall with attachment flanges.
- D. Hot dip galvanize ferrous metal anchors and fastening devices.
- E. Shop assemble components and package complete with anchors and fittings.
- F. Provide steel anchor plates, adapters, and anchor components for installation.

2.4 KEYING

- A. Supply two keys for each accessory to District.

- B. Key every accessory alike and to match existing toilet accessory locks.

2.5 FINISHES

- A. Chrome/Nickel Plating: ASTM B456, satin finish.
- B. Stainless Steel: No.4 satin luster finish.
- C. Shop Primed Ferrous Metals: Pre-treat and clean, spray apply one coat primer and bake.
- D. Enamel: Pre-treat to clean condition, apply one coat primer and minimum two coats epoxy baked enamel.
- E. Back paint components where contact is made with building finishes to prevent electrolysis.

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Verify existing conditions before starting work.
- B. Verify that site conditions are ready to receive work and dimensions are as instructed by the manufacturer.
- C. Verify that blocking has been provided for surface mounted units not specified to be furnished with anchor plates.
- D. Verify that toilet compartments to receive accessories have been properly installed and correctly prepared.
- E. Notify Architect in writing of conditions detrimental to installation or operation of accessories.
- F. Do not begin installation until unsatisfactory conditions have been corrected.

3.2 PREPARATION

- A. Deliver inserts and rough-in frames to site for timely installation.
- B. Provide templates and rough in measurements as required.
- C. Verify with Architect exact location of accessories.

3.3 INSTALLATION

- A. Install fixtures, accessories and items in accordance with manufacturer's instructions and recommendations and in accordance with final reviewed shop drawings.
- B. Conform to CBC Section 1115B for positioning requirements for persons with disabilities. Mount toilet accessories required to be accessible at heights according to CBC Section 1118B, as detailed on Drawings.
- C. Toilet paper and feminine napkin dispensers located on the grab bar side of an accessible toilet room or stall shall not project more than 3 inches from finished wall surface nor be located closer than 1-1/2 inches clear of the tangent point of the grab bar.

- D. Install true, plumb, and level, securely and rigidly anchored to substrate.
- E. Attach accessories securely with concealed fasteners unless otherwise noted. Ensure true alignment.
 - 1. Secure wall mounted grab bars to concealed anchor plates with machine screws. Tap anchor plates for machine screws.
 - 2. Secure other wall mounted accessories to metal framing or blocking with self-tapping sheet metal screws.
 - 3. Secure grab bars mounted to toilet partitions with machine screws to internally threaded partition anchors.
 - 4. Secure other accessories mounted to toilet partitions with internally threaded through bolted fasteners.
 - 5. Secure hand dryers to supporting substrate so that fixtures are level and aligned with each other. Use type and length of fastener as recommended by manufacturer for type of substrate.
- F. Install pipe wrap insulation at wheelchair accessible piping assemblies.

3.4 ADJUSTING

- A. Adjust accessories for smooth and correct operation.

3.5 CLEANING

- A. Section 01 74 00 – Cleaning: Final cleaning.
- B. Clean toilet accessories in accordance with manufacturer's instructions and recommendations.
- C. Ensure that cleaned portions of surfaces do not differ from uncleaned portions.
- D. Leave areas designated to receive toilet accessories free of stains, blemishes and other foreign material.

3.6 PROTECTION

- A. Protect toilet accessories and grab bars from damage or defacement until final acceptance.

3.7 SCHEDULE

- A. Stainless Steel Grab Bars:
 - 1. Product: Bobrick B-6806.99; x 36; x 42.
 - 2. Grab Bar: 18-8 S, type 304, 18 gauge stainless steel tubing, satin finish with peened gripping surface. 1-1/2 inch outside diameter. Ends are heliarc welded to flanges. Clearance between grab bar and wall is 1-1/2 inch.
 - 3. Flanges: 18-8 S, type 304, 1/8 inch thick stainless steel plate with satin finish. 3 inch diameter with three screw holes for attachment to wall.
 - 4. Concealed Mounting Flange: 1/8 inch thick 18-8 alloy type 304 stainless steel; 3-1/8 inch outside diameter; heliarc welded to tubing with continuous concealed bead; two 3/8 inch diameter screw holes; 3 locking dimples.
 - 5. Snap Flange Cover: 22 gauge 18-8 alloy type 304 stainless steel: 3-3/16 inch diameter. Each cover snaps over mounting flange to conceal mounting screws.
 - 6. Wall Anchor: 1/8 inch thick steel plate; 4 inches wide; length to be determined according to specification of grab bar.
 - 7. Partition Anchor: 1/8 inch thick 18-8 alloy type 304 stainless steel; 3 inch diameter; two 1/4-20 internally threaded studs welded to concealed side; #4 satin finish on exposed surfaces.

- B. Recessed, Toilet-Seat-Cover Dispenser, Sanitary Napkin Disposal, and Toilet Tissue Dispenser.
1. Product: Bobrick B-3574.
 2. Cabinet: 18-8 S, type 304, heavy-gauge stainless steel. All welded construction. Exposed surfaces: Satin finish.
 3. Flange: 18-8 S, type 304, 22-gauge stainless steel with satin finish. Drawn and beveled, one-piece, seamless construction.
 4. Door: 18-8 S, type 304, 18-gauge stainless steel with satin finish. One-piece, seamless construction. Door is secured to cabinet with a full-length stainless steel piano-hinge and equipped with two tumbler locks keyed like other Bobrick washroom accessories.
 5. Toilet Tissue Dispensers (2): 0.100 inch thick ABS., 18-8 S, type-304, 26-gauge stainless steel waste deflector attached to the top toilet tissue dispenser only. Continuous flow type dispenser. Equipped with two theft-resistant, high-impact polystyrene spindles, each with a heavy-duty internal spring and concealed locking mechanism.
 6. Disposal Panel: 18-8, type 304, 22-gauge stainless steel with hemmed edges; exposed surface has satin finish. Secured to door with spring-loaded, full-length stainless steel piano hinge. Equipped with international graphic symbol identifying napkin disposal.
 7. Waste Receptacle: Leak-proof molded polyethylene. Removable for servicing. Capacity: 0.8 gallons.
- C. Recessed Combination Sanitary Napkin/Tampon Vendor:
1. Product: Bobrick Model B-3500 25, 25¢ single-coin operation.
 2. Cabinet: 18-8 S, type-304, 22-gauge stainless steel. All-welded construction.
 3. Door: 18-8 S, type-304, 18-gauge stainless steel with satin finish. 7/8 inch 90 degree return edges for maximum rigidity. Secured to cabinet with a concealed, full-length stainless steel piano hinge. Equipped with a stainless steel cable door-swing limiter and two tumbler locks keyed like other Bobrick washroom accessories. International graphic symbols identify product dispensed and coin denomination.
 4. Coin Mechanisms (2): Impact-resistant ABS with satin-finish aluminum pull knobs. Coin mechanisms can be converted in the field to any standard coin denomination without having to purchase new coin mechanisms (no-coin, single-coin, or double-coin operation). Each coin box is equipped with a tumbler lock that open with different key than furnished for door locks. Coinage is designated by symbols on metal plate, which can be changed only from inside the door.
- D. Recessed Paper Towel Dispenser and Waste Receptacle:
1. Product: Bobrick B-3944.
 2. Cabinet: 18-8 S, type-304, heavy-gauge stainless steel. All-welded construction. Exposed surfaces have satin finish.
 3. Flange: 18-8 S, type-304, 22-gauge stainless steel with satin finish. Drawn and beveled, one-piece, seamless construction.
 4. Door: 18-8 S, type-304, 22-gauge stainless steel with satin finish. Double-pan back construction. Secured to cabinet with full-length stainless steel piano hinge and equipped with a concealed tumbler lock keyed like other Bobrick washroom accessories.
 5. Paper Towel Dispenser: 18-8 S, type-304, 22-gauge stainless steel with satin finish. Rounded towel tray has hemmed opening to dispense paper towels without tearing. Dispenses 600 C-fold or 800 multifold paper towels.
 6. Removable Waste Receptacle: 18-8 S, type-304, 22-gauge stainless steel with satin finish. Secured to cabinet with tumbler lock. Front and side edges of bottom and top edges hemmed for safe handling. Secured to cabinet with a tumbler lock keyed like other Bobrick washroom accessories. Equipped with interior hooks for optional vinyl liner. Capacity: 12 gallons.

- E. Soap Dispenser for Liquid and Lotion Soaps and Detergents:
1. Product: Bobrick B-40.
 2. Valve: Grey, high-impact-resistant ABS push button and spout. Soap head-holding mushroom valve. Stainless steel spring. U-packing seal and duckbill.
 3. Wall Bracket: Grey, high-impact-resistant ABS. Equipped with a concealed locking device to secure the lid and a removable plastic key to disengage locking device.
 4. Container: Black, translucent ABS. Capacity: 40 fl oz.
 5. Lid: Grey, high-impact-resistant ABS.
 6. Dimensions: 5-13/16 inches wide by 6-7/8 inches high by 3-3/8 inches deep.
- F. Mirror with Stainless Steel Channel Frame and Shelf:
1. Product: Bobrick B-166 Series.
 2. One-piece stainless steel channel frame, 1/2 inch by 1/2 inch by 3/8 inch, with 90 degree mitered corners. All exposed surfaces have bright polished finish.
 - a. Shelf: Type 304, 22-gauge stainless steel with satin finish. 3/8 inch return edges on front and sides with front edge hemmed for additional safety. Shelf is welded to mirror frame and reinforced by concealed stainless steel brackets.
 - b. Mirror: No. 1 quality, 1/4-inch select float glass, selected for silvering, electrolytically copper-plated by the galvanic process. Guaranteed for 10 years against silver spoilage. Corners are protected by friction-absorbing filler strips and the back is protected by full-size, shock-absorbing, water-resistant, nonabrasive, 3/16 inch thick polyethylene padding.
 - c. Galvanized steel back has integral horizontal hanging brackets located near top for mounting on concealed wall hanger and near bottom to prevent the bottom of mirror from pulling away from wall when locking screws are not accessible.
 3. Concealed Wall Hanger: 20-gauge galvanized steel. Incorporates lower support member, forming rigid rectangle, which engages lower backplate louvers to keep bottom of mirror against wall.
 4. Dimensions: 18 inches wide by 30 inches tall.
- G. Surface-Mounted Stainless Steel Shelf:
1. Product: Bobrick B-683.
 2. Flanges and Support Arms (2): 18-8 S, type-304, 22-gauge stainless steel. Each flange has a concealed, 16-gauge stainless steel mounting bracket. All-welded construction. Secured to wall plates with stainless steel setscrews.
 3. Concealed Wall Plates (2): 18-8 S, type-304, 16-gauge stainless steel.
 4. Shelf: 18-8 S, type-304, 22-gauge stainless steel with roll-formed edges.
 5. Dimensions: 24 inches long by 5-3/4 inches deep.
- H. Surface-Mounted Utility Hook:
1. Product: Bobrick Model B-670.
 2. Flange and Support Arm: 1808 S, type-304, 22-gauge stainless steel. Concealed, 16-gauge stainless steel mounting bracket. All-welded construction, Secured to wall plate with a stainless steel setscrew.
 3. Concealed Wall Plate: 18-8 S, type-304, 16-gauge stainless steel.
 4. Cap: 18-8 S, type-304, 10-gauge stainless steel. Welded to support arm.
 5. Finish: Bright polished stainless steel.
 6. Projection: 2 inches.
 7. Install two wall-mounted hooks near sink area at single stall restrooms.
 8. Mount at 48 inches maximum above finish floor.
- I. Pipe Insulation Wrap:
1. Product: Procar Products Inc., Kit C500R and Kit C500H (for offset P-trap) insulation wraps.

2. Burning Characteristics: In accordance with ASTM D635, no burn rates could be determined since the specimens extinguished prior to reaching the 100 mm mark.
3. Verify configurations prior to installation.

END OF SECTION

SECTION 10 44 00**FIRE PROTECTION SPECIALTIES****PART 1 - GENERAL****1.1 SUMMARY**

- A. Section includes fire extinguishers, fire extinguisher cabinets; and brackets for wall mounting.
- B. Related Sections
 - 1. Section 05 40 00 – Cold-Formed Metal Framing: Roughed-in wall openings.
 - 2. Section 09 22 16 – Non-Structural Metal Framing System: Roughed-in wall openings.

1.2 REFERENCES

- A. ADA - Americans with Disabilities Act.
 - 1. Maximum 4 inch cabinet projections for corridors.
- B. American National Standards Institute:
 - 1. ANSI/UL 711 – Rating and Fire Testing of Fire Extinguishers.
- C. ASTM International:
 - 1. ASTM C1048 - Standard Specification for Heat-Treated Flat Glass - Kind HS, Kind FT Coated and Uncoated Glass.
 - 2. ASTM E814 – Standard Test Method for Fire Tests of Through-Penetration Fire Stops.
- D. National Association of Architectural Metal Manufacturers
 - 1. MFM - Metal Finishes Manual.
- E. National Fire Protection Association:
 - 1. NFPA 10 – Standard for Portable Fire Extinguishers.
- F. Underwriters' Laboratories, Inc.
 - 1. UL (FPED) – Fire Protection Equipment Directory.
 - 2. UL 299 – Dry Chemical Fire Extinguishers.

1.3 SUBMITTALS

- A. Section 01 32 19 – Submittal Procedures: Submittal procedures.
- B. Shop Drawings: Indicate cabinet physical dimensions, rough-in measurements for recessed cabinets, wall bracket mounted measurements, location, fire ratings, relationship of box and trim to surrounding construction, and signage.
- C. Product Data: Submit manufacturer's product data for cabinets including door hardware, cabinet type and materials, trim style, door construction, panel style and materials.
- D. Manufacturer's Installation Instructions: Submit special criteria and wall opening coordination requirements.
- E. Manufacturer's Certificate: Certify products meet or exceed specified products.

1.4 CLOSEOUT SUBMITTALS

- A. Section 01 77 00 – Contract Closeout: Closeout procedures.
- B. Operation and Maintenance Data: Submit test, refill or recharge schedules and re-certification requirements.

1.5 QUALITY ASSURANCE

- A. Provide extinguishers conforming with ANSI/UL 711 and NFPA 10.
- B. Provide fire extinguishers, cabinets and accessories by a single manufacturer.

1.6 REGULATORY REQUIREMENTS

- A. Conform to ASNS/NFPA 10 for requirements for extinguishers.
- B. Provide extinguishers classified and labeled by Underwriters Laboratories Inc. for purpose specified and indicated.
- C. Provide fire extinguisher cabinets classified and labeled by Underwriters Laboratories Inc. for purposes specified and indicated.
- D. Conform to ADA on maximum cabinet projection of cabinet in corridors where necessary.
- E. Conform to ASTM E814 for fire resistive wall performance.
- F. Conform to ADAAG 4.25.4, 4.27.4 and CBC 1133B.2.5.2, CBC 1118B.5, CBC 1133B.8.6 and CBC 1118B.6 for the following:
 - 1. Latching and locking hardware to be operable with a single effort by lever-type hardware, panic bars, push-pull activating bars or other hardware designed so as not to require the ability to grasp the opening hardware and not require a force greater than 5 lbs. to open.
 - 2. Force required to activate controls shall not exceed 5 lbs.
 - 3. Mounted between 15-48 inches A.F.F. for forward approach.
 - 4. Mounted between 9-54 inches A.F.F. for side approach.

1.7 ENVIRONMENTAL REQUIREMENTS

- A. Section 01 60 00 – Product Requirements: Environmental conditions affecting products on site.
- B. Do not install extinguishers when ambient temperatures are capable of freezing extinguisher ingredients.

PART 2 - PRODUCTS

2.1 FIRE EXTINGUISHERS

- A. Manufacturers:
 - 1. J.L. Industries, Inc.;
 - 2. Larsen's Manufacturing Co.
 - 3. Potter Roemer, Inc.
 - 4. Seton Identification Products. (Fire Extinguisher Signs).
 - 5. Substitutions: Section 01 60 00 – Product Requirements: Product Options and Substitutions.

- B. Fire Extinguishers:
 - 1. Multipurpose under pressure, dry chemical type bearing UL rating of 2A-10B:C, 5 pounds nominal capacity, with valid certification tag attached, in enameled steel container, equivalent to J.L. Industries Cosmic Model 5E.

2.2 FIRE EXTINGUISHER CABINETS

- A. Manufacturers:
 - 1. J.L. Industries, Inc.;
 - 2. Larsen's Manufacturing Co.
 - 3. Potter Roemer, Inc.
 - 4. Substitutions: Section 01 60 00 – Product Requirements: Product Options and Substitutions.
- B. Cabinets:
 - 1. Tub: Semi-recessed 18 gauge steel box with electrostatic white epoxy primer finish. Weld joints and grind smooth. Miter and weld perimeter door frames.
 - a. Inside Box Dimensions: 24 inches high by 10-1/2 inches wide by 6 inches deep.
 - 2. Door /Frame Style: JL Industries "Academy" design, V – Vertical Duo with pull handle, ADA compliant in aluminum, #180 clear anodized aluminum finish.
 - a. 1-3/4 inch wide face trim on frame and door.
 - b. Rolled edge construction on 3-inch return trim.
 - c. U-shaped pull handle.
 - d. 5 pound effort to open door (maximum).
 - e. Door Hardware: Continuous hinge, zinc plated pull handle/roller latch.
 - 3. Door Glazing: Laminated clear safety glass.
- C. Fire Rated Cabinets: UL listed with UL listing mark with fire resistance rating of wall where it is installed.
- D. Identify fire extinguisher in cabinet with FIRE EXTINGUISHER lettering applied to door. Provide lettering to comply with authorities having jurisdiction for letter style, color, size, spacing and location.
 - 1. Application Process: Silk screen.

2.3 ACCESSORIES

- A. Mounting Brackets: For use with portable fire extinguishers when additional security is required due to vibration, and for wall mounting.
 - 1. J.L. Industries, Model MB818 for Cosmic 5E.
 - 2. Furnished with 16 gauge glossy polyester coated steel bracket with spring-type band and/or rubber strap.
- B. Graphic Identification: Seton Identification Products, Model 65028.
 - 1. Heavy-duty 40-mil aluminum with mounting holes.
 - 2. Red letters on white arrowhead on red background.
 - 3. Overall Dimensions: 4 inch wide by 18 inches high.
 - 4. Letters spell "FIRE EXTINGUISHER".

2.4 FINISHES FOR CABINETS, GENERAL

- A. Comply with NAAMM MFM for recommendations relative to applying and designating finishes.
- B. Protect mechanical finishes on exposed surfaces from damage by applying temporary strippable protective covering prior to shipping.

- C. Extinguisher: Red enamel.
- D. Cabinet Trim and Door: Aluminum, #180 clear anodized finish.

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Verify rough openings for cabinets are correctly sized and located. Examine walls and partitions for thickness and framing for cabinets to verify cabinet depth and mounting prior to cabinet installation.
- B. Do not proceed until unsatisfactory conditions have been corrected.

3.2 INSTALLATION

- A. Install cabinets plumb and level in wall openings at mounting height indicated or, if not indicated, at heights to comply with applicable regulations of governing authorities.
- B. Secure cabinets rigidly in place.
- C. Install fire extinguishers on wall brackets typical, at each location shown. Fire extinguisher handle shall be +48 inches maximum above finish floor. Secure rigidly in place in accordance with manufacturer's instructions.
- D. Position signage as required by authorities having jurisdiction.

3.3 SCHEDULE

- A. Provide rated cabinets at all recessed locations in 1-hour rated walls. Reference floor plans for locations and wall ratings. Provide recessed non-rated cabinets at all other non-rated wall locations.
- B. Provide Cosmic Model 5E fire extinguisher at all locations as shown on drawings.

END OF SECTION

SECTION 11 52 13**PROJECTION SCREENS****PART 1 - GENERAL****1.1 SUMMARY**

- A. Section Includes:
 - 1. Electrically operated exposed mounted projection screens.
 - 2. Manually operated exposed mounted projection screens.
 - 3. Related accessories.
- B. Related Sections:
 - 1. Section 26 01 00 – Basic Electrical Materials and Methods: Electrical characteristics and wiring connections.

1.2 REFERENCES

- A. National Fire Protection Association:
 - 1. NFPA 701 - Standard Methods of Fire Tests for Flame Propagation of Textiles and Films.
- B. Underwriters Laboratories Inc.:
 - 1. UL - Electrical Appliance and Utilization Equipment Directory.

1.3 DEFINITIONS

- A. Gain: Indication of screen's luminance or brightness measured perpendicular to screen center and relative to magnesium carbonate block, which serves as standard for 1.0 gain. Higher numbers indicate greater brightness.
- B. Viewing Angle: Horizontal angle from perpendicular center of screen at which gain or brightness decreases by 50%.
- C. Format: Proportion of projection screen viewing area expressed as a ratio of height to width.
 - 1. Square: 1.0 to 1.0.
 - 2. Cinemascope or Anamorphic Format: 1.0 to 2.35.
 - 3. HDTV Format: 1.0 to 1.78.
 - 4. Letterbox: 1.0 to 1.85.
 - 5. NTSC or Video Format: 1.0 to 1.33.
 - 6. Wide Format: 1.0 to 1.6.

1.4 SUBMITTALS

- A. Section 01 32 19 – Submittal Procedures: Requirements for submittals.
- B. Product Data: Submit manufacturer's product data on materials, finishes, operation of unit, and electrical requirements.
- C. Shop Drawings: Submit manufacturer's wiring diagram for electrically operated controls.
- D. Samples: If specifically requested for specified products; required for alternate products. Submit manufacturer's standard colors.

- E. Manufacturer's Installation Instructions: Submit detailed installation instructions.
- F. Manufacturer's Certificate: Certify products comply with specified performance characteristics, criteria and physical requirements.

1.5 CLOSEOUT SUBMITTALS

- A. Section 01 77 00 – Contract Closeout: Closeout procedures.
- B. Operation and Maintenance Data:
 - 1. Submit parts catalog with complete list of equipment replacement parts; identify each entry with equipment description and identifying code.
 - 2. Submit technical information for servicing operating equipment.

1.6 QUALITY ASSURANCE

- A. Flame Resistant Fabrics: Passes when tested in accordance with NFPA 701, Test 1 or Test 2.
- B. Products Requiring Electrical Connection: Listed and classified by Underwriters Laboratories, Inc., as suitable for purpose specified and indicated.

1.7 QUALIFICATIONS

- A. Manufacturer: Company specializing in manufacturing Products specified in this section with minimum three years documented experience.
- B. Installer: Company specializing in performing work of this section with minimum three years documented experience, approved by manufacturer.

1.8 DELIVERY, STORAGE, AND HANDLING

- A. Section 01 60 00 – Product Requirements: Requirements for transporting, handling, storing, and protecting products.
- B. Deliver projection screens after building is enclosed, other work within spaces where screens are to be installed is substantially complete, and installation of screens is ready to take place.
- C. Protect projection screens from damage before, during and after installation.

1.9 FIELD MEASUREMENTS

- A. Verify field measurements prior to fabrication.

1.10 COORDINATION

- A. Coordinate installation of walls, electric service power characteristics, and location.

PART 2 - PRODUCTS

2.1 PROJECTION SCREEN – MANUALLY OPERATED – METAL CASE

- A. Manufacturers:
 - 1. Da-Lite Screen Company, Inc.; Model: B™ with CSR (Controlled Screen Return).
 - 2. Draper Shade and Screen Co.
 - 3. Substitutions: Section 01 60 00 – Product Requirements: Product Options and Substitutions.

- B. Description:
1. Size: 72 inches high by 84 inches wide.
 2. Viewing Surface: Matte White, with masking borders standard on flame retardant and mildew resistant seamless fabric. Fabric mounted into a metal strip in a metal Camlok roller system without tape, glue, staples or cords so that fabric may be easily replaced yet cannot be pulled from roller.
 3. Mounting: Wall mounting type.
 4. CSR: Controlled Screen Return to control the return speed of the screen into the case. Return speed is adjustable by means of an adjustment knob on right endcap of screen case.
 5. Bottom of fabric is mounted into a metal strip in a tubular steel slat finished in baked enamel.
 6. Ends of slat are protected by plastic caps.
- C. Screen Case: 22-gauge octagonal steel case with flat back design with baked enamel finish. Case fitted with slotted screw holes.

2.2 PROJECTION SCREENS – ELECTRICALLY OPERATED EXPOSED

- A. Manufacturers:
1. Da-Lite Screen Company, Inc.; Model: Cosmopoliton® Electrol®, automatic electric projection screen.
 2. Draper Shade and Screen Co.
 3. Substitutions: Section 01 60 00 – Product Requirements: Product Options and Substitutions.
- B. Type: Wall Mounted Electrically Operated Projection Screen Systems.
1. Screen Operation: Electrically operated, UL listed, retractable, with rigid metal roller
 2. Motor:
 - a. 120 V, 60 Hz, 3-wire, permanently lubricated, reversal type designed for mounting inside roller and to suit project requirements.
 - b. Amperage: 2.4 amps maximum.
 - c. Include automatic thermal overload protection, integral gears, capacitor and electric brake to prevent coasting.
 - d. Include preset, adjustable limit switches to automatically stop viewing surface in UP or DOWN positions.
 - e. Housing: Inside metal roller.
 3. Controls:
 - a. Electric Screen Control Switch:
 - 1) Integral junction box incorporated into screen housing.
 4. Screen Mounting: Wall.
 - a. Include mounting hardware.
 5. Screen Case: Designed to receive mounting hardware and is sized to suit projection screen.
 - a. Material: 21 gage (0.8 mm) steel.
 - b. Design: Hexagonal flat-backed case with heavy duty end caps concealing roller ends.
 - c. Length: As required to fit screen width.
 - d. Finish: Powder coated white.
 6. Screen Size:
 - a. Viewing Area: Height (65 inches) x Width (116 inches).
 7. Product Description: Da-Lite Screen Company, Inc. Cosmopolitan Electrol Projection Screen.
 - a. Non-Tensioned Screen Material:
 - 1) Front projection, flame retardant, mildew resistant fiberglass, black backing with standard black borders, easily cleaned with mild soap and water solution.

- 2) Bottom of fabric to form a pocket holding a metal rod.
- 3) Seams: Seamless in all standard sizes.
- b. Gain: To SMPTE RP 94-2000, 1.0.
- c. Viewing Angle: 60 degrees.
- d. Format: HDTV – 1.0 to 1.78.
- e. Material: Easily cleaned with mild soap and water solution.
- f. Acceptable Materials: Da-Lite Screen Company, Inc.:
 - 1) Matte White viewing surface with GREENGUARD Certification #90068-3.

2.3 ACCESSORIES – MANUAL PROJECTION SCREENS

- A. No. 6 Wall Bracket – 6 inches non-adjustable extension brackets. Option: Provide T-bar scissors clips designed for attachment to acoustical ceiling grid.
- B. Tilt-Lock for Keystone Elimination. Holds back bottom of screen in tilted position to eliminate keystoneing.

2.4 ACCESSORIES – ELECTRICALLY OPERATED PROJECTION SCREENS

- A. Single Low Voltage Control (LVC): Internal.
 - 1. Wireless Remote Control for LVC: Radio Frequency Remote, 3-button handheld remote control for UP, DOWN and STOP functions with single motor, low voltage control unit.
- B. Silent Motor with Integrated LVC for sizes to 9 feet x 12 feet.
- C. Installation Hardware: Fasteners and other components of type, size and spacing recommended by manufacturer for complete, functional and secure installation of electric screen.
- D. Floating Mounting Bracket: White, recommended for drywall applications.

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Verify rough-in opening and conditions are acceptable.
- B. Verify existing conditions before starting work.
- C. Verify electrical power is available and of correct characteristics.

3.2 INSTALLATION

- A. General: Install in conformance with manufacturer's written directions.
- B. Install projection screens at locations indicated on Drawings.
- C. Securely anchor to supporting substrate.
- D. Install to produce smoothly operating screen with plumb and straight vertical edges and plumb and flat viewing surfaces when lowered.
- E. Accessories: Install in conformance with manufacturer's written directions.
- F. Test electrically-operated units to verify screen controls, limit switches, closure and other operating components are in optimum functioning conditions.

3.3 ADJUSTING

- A. Adjust installed unit for smooth and balanced operation.

3.4 CLEANING

- A. Section 01 74 00 – Cleaning: Requirements for final cleaning.
- B. Remove protective coverings from finished surfaces. Clean surfaces and components ready for inspection.

3.5 DEMONSTRATION

- A. Demonstrate electrically operated projection screens to Owner.

3.6 PROTECTION OF FINISHED WORK

- A. Do not permit use of projection screens after installation.

END OF SECTION

SECTION 11135

LCD PROJECTOR MOUNTS

PART 1 - GENERAL

1.1 SUMMARY

- A. Section includes mounting brackets for LCD ceiling projectors.
- B. Related Sections:
 - 1. Section 09 51 13 - Acoustical Panel Ceilings: Interface with suspended acoustical panel ceiling.
 - 2. Division 26 – Electrical: Electrical and Data Outlets.
- C. Products Installed But Not Supplied Under This Section:
 - 1. LCD ceiling projectors are Owner-Furnished, Contractor Installed.

1.2 SUBMITTALS

- A. Section 01 32 19 – Submittals: Submittal procedures.
- B. Product Data: Submit manufacturer's product data completely describing products.
- C. Manufacturer's Installation Instructions: Submit manufacturer's installation instructions, and special procedures.

1.3 QUALITY ASSURANCE

- A. Requirements of Regulatory Agencies: Conform to State Accessibility Regulations.

1.4 PROJECT CONDITIONS

- A. Coordinate work with related work of other Sections. Verify internal ceiling reinforcement prior to installation of items.

1.5 WARRANTY

- A. Section 01700 – Execution Requirements: Requirements for warranties.
- B. Furnish 5-year manufacturer's warranty for LCD Projector Mounts.

PART 2 - PRODUCTS

2.1 LCD CEILING PROJECTOR MOUNTS

- A. Manufacturers:
 - 1. Peerless Industries, Inc., 800-574-8921.
 - 2. Substitutions: Section 01 63 00 – Product Options and Substitutions.

2.2 MANUFACTURED UNITS

- A. LCD Projector Mount:
 - 1. Manufacturer: Peerless Industries, Inc.
 - 2. Model: PJF2-UNV Vector Pro II Projector Mount.

3. Load Capacity: 50 lbs.
 4. Kitted with universal spider adapter plate.
 5. Features:
 - a. Roll: 30 degrees; Pitch 30 degrees; Yaw: 360 degrees. All with positive lock at any degree.
 - b. Theft-resistant Armor Lock™ security for complete, integrated security from projector to ceiling.
 - c. Two thumb screws allow for easy projector removal.
 - d. Features a 1-1/2 inch cord access hole.
 - e. ships fully assembled, easily attaches to projector adapter plate with a partial rotation and engages into place with spring loaded screw.
 - f. Designed to route cords internally through the extension column.
 - g. Ceiling plate included.
 6. Product Weight: 2.4 lbs.
 7. Finish: Scratch resistant fused epoxy.
 8. Color: Black.
- B. Ceiling Plate for LCD Projector:
1. Manufacturer: Peerless Industries, Inc.
 2. Model: CMJ455 Lightweight Suspended Ceiling Plate for Projector Mounts.
 3. Maximum Load: 50 lbs.
 4. Dimensions:
 - a. Ceiling Tray: 15.75 inches by 24 inches by 1 inch height.
 - b. Filler Tray; 8 inches by 24 inches by 1 inch height.
 5. Ceiling Tray: Features a 1-1/2-11.5 NPS center threaded fitting and a knockout panel for outlet boxes (Raco 445 or Appleton 383 recommended) and antenna leads.
 6. Includes a tie wire support system to transfer the load to four attachment points (in true structural ceiling/roof above) with turnbuckles to fine tune the level of the ceiling tray.
 7. U.L. listed.
 8. Finish: White Fused Epoxy.
- C. Adjustable Extension Column:
1. Manufacturer: Peerless Industries, Inc.
 2. Model: ADJ0507.
 3. 1-1/2 inch, 11.5 NPT schedule 40 pipe threaded on both ends. Notched for use with screw to provide safety and security.
 4. Height adjustment at 1 inch increments.
 5. Total drop: 5'-7".
 6. Maximum Load: 900 lbs.
 7. Color: Black.
- D. Unistrut and Structural Ceiling Plate:
1. Manufacturer: Peerless Industries, Inc.
 2. Model: CMJ310.
 3. Features:
 - a. 8 gauge cold rolled steel construction.
 - b. Dimensions: 8 inch x 8 inch x 0.66 inch height.
 - c. Attaches directly to standard Unistrut (1-5/8" x 1-5/8") or to solid structural ceiling.
 - d. Unitstrut fittings and attachment hardware are not included.
 - e. Unit has 1-1/2 inch, 11.5 NPT fitting for attachment of extension column.

2.3 ACCESSORIES

- A. Provide fittings, attachment hardware, and anchor components as required for installation.

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Verify that site conditions are ready to receive work and dimensions are as instructed by the manufacturer, or as shown on Drawings.

3.2 INSTALLATION

- A. Install LCD Ceiling Projector Mounts in accordance with manufacturers' instructions, in locations shown on Drawings.
- B. Install plumb and level, securely and rigidly anchored to substrate.
- C. Install Owner-furnished LCD Projectors in the ceiling projector mounts.

END OF SECTION

SECTION 12 24 13**SOLAR ROLLER SHADES****PART 1 - GENERAL****1.1 SUMMARY**

- A. Section includes sunscreen roller shades.

1.2 REFERENCES

- A. ASTM International:
1. ASTM E84 - Flame Spread.
 2. ASTM G21 - Standard Practice for Determining Resistance of Synthetic Polymeric Materials to Fungi.
- B. Federal Specifications Unit:
1. FS CCC-C-521E - Fire Retardency.
- C. National Fire Protection Association:
1. NFPA 701 - Large Scale/Small Scale Requirements.

1.3 SYSTEM DESCRIPTION

- A. Horizontal solar roller shades installed at window openings, manual control of raising and lowering by chain.

1.4 SUBMITTALS

- A. Section 01 32 19 – Submittal Procedures: Requirements for submittals.
- B. Product Data : Manufacturer's data sheets on each product to be used, including:
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.
 4. Mounting details and installation methods.
- C. Shop Drawings: Plans, elevations, sections, product details, installation details, operational clearances, and relationship to adjacent work.
- D. Window Treatment Schedule: For all roller shades. Use same room designations as indicated on the Drawings and include opening sizes and key to typical mounting details.
- E. Selection Samples: For each finish product specified, one set of shade cloth options and aluminum finish color samples representing manufacturer's full range of available colors and patterns.
- F. Verification Samples: For each finish product specified, one complete set of shade components, unassembled, demonstrating compliance with specified requirements. Shadecloth sample and aluminum finish sample as selected. Mark face of material to indicate interior faces.
- G. Maintenance Data: Methods for maintaining roller shades, precautions regarding cleaning materials and methods, instructions for operating hardware and controls.

1.5 QUALITY ASSURANCE

- A. Fire-Test-Response Characteristics: Passes NFPA 701 small and large-scale vertical burn. Materials tested shall be identical to products proposed for use.
- B. Anti-Microbial Characteristics: 'No Growth' per ASTM G21 results for fungi ATCC9642, ATCC 9644, ATCC9645.

1.6 QUALIFICATIONS

- A. Manufacturer: Obtain roller shades through one source from a single manufacturer with a minimum of twenty years experience in manufacturing products comparable to those specified in this section.
- B. Installer: Installer trained and certified by the manufacturer with a minimum of ten years experience in installing products comparable to those specified in this section.

1.7 DELIVERY, STORAGE, AND HANDLING

- A. 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 and in the Window Treatment Schedule.

1.8 PROJECT CONDITIONS

- A. Environmental Limitations: Install roller shades after finish work including painting is complete and ambient temperature and humidity conditions are maintained at the levels indicated for Project when occupied for its intended use.

1.9 FIELD MEASUREMENTS

- A. Verify field measurements prior to fabrication.

1.10 WARRANTY

- A. Section 01 77 00 – Contract Closeout: Requirements for warranties.
- B. Furnish manufacturer's standard non-depreciating 25 year warranty for roller shade hardware and chain.
- C. Furnish manufacturer's standard 25 year warranty for roller shade fabric.
- D. Roller Shade Installation: One year from date of Substantial Completion, not including scaffolding, lifts or other means to reach inaccessible areas.

PART 2 - PRODUCTS**2.1 SOLAR ROLLER SHADES**

- A. Manufacturers:
 - 1. Mecho Shade Systems, Inc.; www.mechoshade.com
 - 2. Levolor.
 - 3. Substitutions: Not permitted. Mecho Shade Systems, Inc. and Levolor are District standard.

2.2 ROLLER SHADE TYPES

- A. Manually Operated Shades:
1. Mounting: Surface mounted with fascia.
 2. Configuration: Single solar shade cloth.
 3. Shade Fabric: MechoShade 1000 Series Dense Vertical Weave Shade Cloth with 2-3 percent Openness Factor.
 - a. Elegant 1x4 twill weave of thin yarn.
 - b. Clean uniform control of light and heat.
 - c. Color: 1004 Black/Brown."

2.3 SHADE CLOTH

- A. Visually Transparent Shade Cloth: MechoShade Systems, Inc., EuroTwill series: 0.010 diameter non-raveling vinyl/polyester yarn, fabric thickness 0.025 inches.

2.4 SHADE BAND

- A. Shade Bands: Construction of shade band includes the fabric, the hem weight, hem-pocket, shade roller tube, and the attachment of the shade band to the roller tube. Sewn hems and open hem pockets are not acceptable.
1. Hem Pockets and Hem Weights: Fabric hem pocket with RF-welded seams (including welded ends) and concealed hem weights. Hem weights shall be of appropriate size and weight for shade band. Hem weight shall be continuous inside a sealed hem pocket. Hem pocket construction and hem weights shall be similar, for all shades within one room.
 2. Shade Band and Shade Roller Attachment:
 - a. Use extruded aluminum shade roller tube of a diameter and wall thickness required to support shade fabric without excessive deflection. Roller tubes less than 1.55 inch in diameter for manual shades, and less than 2.55 inches for motorize shades are not acceptable.
 - b. Provide for positive mechanical engagement with drive/brake mechanism.
 - c. Provide for positive mechanical attachment of shade band to roller tube; shade band shall be made removable/replaceable with a "snap-on" snap-off" spline mounting, without having to remove shade roller from shade brackets.
 - d. Mounting spline shall not require use of adhesives, adhesive tapes, staples, and/or rivets.
 - e. Any method of attaching shade band to roller tube that requires the use of: adhesive, adhesive tapes, staples, and/or rivets are not acceptable.

2.5 SHADE FABRICATION

- A. Fabricate units to completely fill existing openings from head to sill and jamb-to-jamb, unless specifically indicated otherwise.
- B. Provide battens in standard shades as required to assure proper tracking and uniform rolling of the shadebands. Contractor shall be responsible for assuring the width-to-height (W:H) ratios shall not exceed manufacturer's standards or, in absence of such standards, shall be responsible for establishing appropriate standards to assure proper tracking and rolling of the shade cloth within specified standards. Battens shall be roll-formed stainless steel or tempered steel, as required.
- C. For railroaded shadebands, provide seams in railroaded multi-width shadebands as required to meet size requirements and in accordance with seam alignment as acceptable to Architect. Seams shall be properly located. Furnish battens in place of

plain seams when the width, height, or weight of the shade exceeds manufacturer's standards. In absence of such standards, assure proper use of seams or battens as required to, and assure the proper tracking of the railroaded multi-width shadebands.

- D. Provide battens for railroaded shades when width-to-height (W:H) ratios meet or exceed manufacturer's standards. In absence of manufacturer's standards, be responsible for proper use and placement of battens to assure proper tracking and roll of shadebands.

2.6 COMPONENTS

- A. Access and Material Requirements:
1. Provide shade hardware allowing for the removal of shade roller tube from brackets without removing hardware from opening and without requiring end or center supports to be removed.
 2. Provide shade hardware that allows for removal and re-mounting of the shade bands without having to remove the shade tube, drive or operating support brackets.
 3. Use only Delrin engineered plastics by DuPont for all plastic components of shade hardware. Styrene based plastics, and /or polyester, or reinforced polyester will not be acceptable.
- B. Manual Operated Chain Drive Hardware and Brackets:
1. Provide for universal, regular and offset drive capacity, allowing drive chain to fall at front, rear or non-offset for all shade drive end brackets. Universal offset shall be adjustable for future change.
 2. Provide hardware capable for installation of a removable fascia, for both regular and/or reverse roll, which shall be installed without exposed fastening devices of any kind.
 3. Provide shade hardware system that allows for removable regular and/or reverse roll fascias to be mounted continuously across two or more shade bands without requiring exposed fasteners of any kind.
 4. Provide shade hardware system that allows for operation of multiple shade bands (multi-banded shades) by a single chain operator, subject to manufacturer's design criteria. Connectors shall be offset to assure alignment from the first to the last shade band.
 5. Provide shade hardware system that allows multi-banded manually operated shades to be capable of smooth operation when the axis is offset a maximum of 6 degrees on each side of the plane perpendicular to the radial line of the curve, for a 12 degrees total offset.
 6. Provide positive mechanical engagement of drive mechanism to shade roller tube. Friction fit connectors for drive mechanism connection to shade roller tube are not acceptable
 7. Provide shade hardware constructed of minimum 1/8-inch (3.18 mm) thick plated steel or heavier as required to support 150 percent of the full weight of each shade.
 8. Drive Bracket / Brake Assembly:
 - a. MechoShade Drive Bracket Model M5 shall be fully integrated with all MechoShade accessories, including, but not limited to: SnapLoc fascia, center supports and connectors for multi-banded shades.
 - b. M5 drive sprocket and brake assembly shall rotate and be supported on a welded 3/8 inch steel pin.
 - c. The brake shall be an over-running clutch design which disengages to 90 percent during the raising and lowering of a shade. The brake shall withstand a pull force of 50 lbs. in the stopped position.
 - d. The braking mechanism shall be applied to an oil-impregnated hub on to which the brake system is mounted. The oil impregnated hub design includes an articulated brake assembly, which assures a smooth, non-

- jerky operation in raising and lowering the shades. The assembly shall be permanently lubricated. Products that require externally applied lubrication and or not permanently lubricated are not acceptable.
- e. The entire M5 assembly shall be fully mounted on the steel support bracket, and fully independent of the shade tube assembly, which may be removed and reinstalled without effecting the roller shade limit adjustments.
 - f. Drive Chain: #10 qualified stainless steel chain rated to 90 lb. minimum breaking strength. Nickel plate chain shall not be accepted.

2.7 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 shall not be acceptable.

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Verify that surfaces and window openings are ready to receive the work.
- B. Do not commence fabrication until field measurements are confirmed.
- C. Ensure head rail supports are correctly placed.
- D. Beginning of installation means installer accepts existing surfaces.
- E. If substrate preparation is the responsibility of another installer, notify Architect of unsatisfactory preparation before proceeding.

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 roller shades level, plumb, square, and true according to manufacturer's written instructions, and located so shade band is not closer than 2 inches to interior face of glass. Allow proper clearances for window operation hardware.

3.4 ADJUSTING

- A. Adjust and balance roller shades to operate smoothly, easily, safely, and free from binding or malfunction throughout entire operational range.

3.5 CLEANING

- A. Section 01 74 00 – Cleaning: Requirements for final cleaning.
- B. Clean roller shade surfaces after installation, according to manufacturer's written instructions.

3.6 DEMONSTRATION

- A. Engage Installer to train Owner's maintenance personnel to adjust, operate and maintain roller shade systems.

3.7 PROTECTION

- A. Protect installed products until completion of project.
- B. Touch-up, repair or replace damaged products before Substantial Completion.

3.8 SCHEDULE

- A. Refer to Drawings for location of solar roller shades.

END OF SECTION

SECTION 14 24 23**HYDRAULIC PASSENGER ELEVATORS****PART 1 - GENERAL****1.1 SUMMARY**

- A. Section includes: Hydraulic passenger elevators as shown and specified. Elevator work includes:
1. Standard pre-engineered hydraulic passenger elevators.
 2. Elevator car enclosures, hoistway entrances and signal equipment.
 3. Jack(s).
 4. Operation and control systems.
 5. Accessibility provisions for physically disabled persons.
 6. Equipment, machines, controls, systems and devices as required for safely operating the specified elevators at their rated speed and capacity.
 7. Materials and accessories as required to complete the elevator installation.
- B. Products Installed But Not Supplied Under This Section:
1. Elevator contractor shall install pinned cylinders furnished by Owner.
- C. Related Sections:
1. Section 03 33 00 – Cast-in-Place Concrete: Installing inserts, sleeves and anchors in concrete.
 2. Section 05 50 00 – Metal Fabrications:
 - a. Providing hoist beams, pit ladders, steel framing, auxiliary support steel and divider beams for supporting guide-rail brackets.
 - b. Providing steel angle sill supports and grouting hoistway entrance sills and frames.
 3. Section 09 65 00 – Resilient Flooring: Providing elevator car finish flooring.
 4. Section 09 90 00 – Painting and Coating: Field painting unfinished and shop primed ferrous materials.
 5. Division 22 - Plumbing: Sump pit and oil interceptor.
 6. Division 23 - Heating, Ventilation and Air Conditioning: Heating and ventilating hoistways and machine rooms.
 7. Division 26 – Electrical:
 - a. Providing electrical service to elevators, including fused disconnect switches.
 - b. Emergency power supply, transfer switch and auxiliary contacts.
 - c. Heat and smoke sensing devices.
 - d. Convenience outlets and illumination in machine room, hoistway and pit.
- D. General contractor shall provide the following in accordance with the requirements of the Model Building Code and ANSI A17.1 Code. For specific rules, refer to ANSI A17.1, Section 300 for hydraulic elevators. State or local requirements must be used if more stringent.
1. Provide elevator hoist beam at top of elevator shaft. Beam must be able to accommodate proper loads and clearances for elevator installation and operation.
 2. Supply in ample time for installation by other trades, inserts, anchors, bearing plates, brackets, supports and bracing including all setting templates and diagrams for placement.
 3. Hatch walls require a minimum two hours of fire rating. Hoistway should be clear and plumb with variations not to exceed 1/2" at any point.
 4. Elevator hoistways shall have barricades, as required.
 5. Install bevel guards at 75 degrees on all recesses, projections or setbacks over 2 inches (4 inches for A17.1 2000 areas) except for loading or unloading.
 6. Provide rail bracket supports at pit, each floor and roof. For guide rail bracket

- supports, provide divider beams between hoistway at each floor and roof.
7. Pit floor shall be level and free of debris. Reinforce dry pit to sustain normal vertical forces from rails and buffers.
 8. Where pit access is by means of the lowest hoistway entrance, provide a vertical ladder of non-combustible material extending 42" minimum, (48" minimum for A17.1-2000 areas) at the same height, above sill of access door or handgrips.
 9. Machine room to be enclosed and protected.
 10. Machine Room temperature must be maintained between 55 degrees and 90 degrees F.
 11. If machine room is remote from the elevator hoistway, clear access must be available above the ceiling or metal/concrete raceways in floor for oil line and wiring duct from machine room.
 12. Access to the machinery space and machine room must be in accordance with the governing authority or code.
 13. Provide an 8" x 16" cutout through machine room wall, for oil line and wiring duct, coordinated with elevator contractor at the building site.
 14. All wire and conduit should run remote from either the hoistways or the machine room.
 15. When heat, smoke or combustion sensing devices are required, connect to elevator machine room terminals. Contacts on the sensors should be sided for 120 volt D.C.
 16. Install and furnish finished flooring in elevator cab.
 17. Finished floors and entrance walls are not to be constructed until after sills and door frames are in place. Consult elevator contractor for rough opening size. Supply drywall framing so that the wall fire resistance rating is maintained, when drywall construction is used.
 18. Where gypsum board construction is used for front walls, it shall be of sufficient strength to maintain the doors in true lateral alignment. Gypsum board contractor to coordinate with elevator contractor.
 19. Before erection of rough walls and doors; erect hoistway sills, headers, and frames. After rough walls are finished; erect fascias and toe guards. Set sill level and slightly above finished floor at landings.
 20. To maintain legal fire rating (masonry construction), anchor door frames to walls and properly grouted in place.
 21. Elevator wall shall interface with the hoistway entrance assembly and be in strict compliance with the elevator contractor's requirements.
 22. Fill and grout around entrances, as required.
 23. Provide elevator sill supports at each opening.
 24. All walls and sill supports must be plumb where openings occur.
 25. For applications with jack hole, free and clear access to the elevator pit area for the jack hole-drilling rig is required.
 26. Where jack hole is required, remove all spoils from jack hole drilling.
 27. When not provided by Elevator Contractor, jack hole shall accommodate the jack unit. If required the jack hole is to be provided in strict accordance with the elevator contractor's shop drawings.
 28. Locate a light fixture and convenience outlet in pit with switch located adjacent to the access door.
 29. Provide a light switch and fused disconnect switch for each elevator, located inside the machine room adjacent to the door, where practical, per the National Electrical Code (NFPA No. 70).
 30. Provide a light outlet for each elevator, in center of hoistway (or in the machine room).
 31. For signal systems and power operated door: provide ground and branch wiring circuits, including main line switch. For car light and fan: provide a feeder and branch wiring circuits, including main line switch.
 32. Wall thickness may increase when fixtures are mounted in drywall. These requirements must be coordinated between the general contractor and the elevator contractor.

33. Provide supports, patching and recesses to accommodate hall button boxes, signal fixtures, etc.
34. Locate telephone and convenience outlet on control panel.

1.2 REFERENCES

- A. ADAAG - Americans with Disabilities Act (ADA):
 1. Accessibility Guidelines for Buildings and Facilities.
- B. American Society of Mechanical Engineers:
 1. ASME A17.1 - Safety Code for Elevators and Escalators.
 2. ASME A17.2.2 - Inspector's Manual for Hydraulic Elevators.
- C. APA/EWA - American Plywood Association/The Engineered Wood Association.
- D. ASTM International:
 1. ASTM A36 - Standard Specification for Carbon Structural Steel.
 2. ASTM A366 - Steel Sheet, Carbon, Cold-Rolled Commercial Quality.
 3. ASTM A139 - Standard Specification for Electric-Fusion (Arc)-Welded Steel Pipe (NPS 4 and Over).
 4. ASTM A167 - Stainless and Heat-Resisting Chromium-Nickel Steel Plate, Sheet, and Strip.
 5. ASTM B221 - Standard Specification for Aluminum and Aluminum-Alloy Extruded Bar, Rod, Wire, Shape, and Tube.
 6. ASTM E2074 - Standard Test Method for Fire Tests of Door Assemblies, Including Positive Pressure Testing of Side-Hinged and Pivoted Swinging Door Assemblies.
- E. American Welding Society:
 1. AWS D1.1 - Structural Welding Code, Steel.
- F. CCR - California Code of Regulations, Title 24, Part 2 and 7.
- G. IEEE C2 - National Electrical Safety Code.
- H. Federal Specifications:
 1. FS TT-P-641 - Primer Coating, Zinc Dust/Zinc Oxide (for Galvanized Surfaces).
 2. FS TT-P-645 - Primer, Paint, Zinc Chromate, Alkyd Type.
- I. National Electrical Manufacturers Association:
 1. NEMA LD-3 - High Pressure Decorative Laminates.
- J. National Fire Protection Association:
 1. NFPA 70 - National Electrical Code.
 2. NFPA 80 - Standard for Fire Doors and Windows.
 3. NFPA 252 - Standard Methods of Fire Tests of Door Assemblies.
 4. NFPA 255 - Standard Method of Test of Surface Burning Characteristics of Building Materials.
- K. UBC - Uniform Building Code.
- L. Underwriters Laboratories Inc.:
 1. UL 10B - Fire Tests of Door Assemblies.

1.3 PERFORMANCE REQUIREMENTS

- A. Performance:
 1. Contract Speed: Maximum ten percent (10%) speed variation under any loading

- condition in either direction.
 2. Hydraulic Pressure: Hydraulic components shall be factory tested for 600 PSI. Maximum operating pressure shall be 425 PSI.
 3. Door Open Times: 2.3 to 2.5 Seconds.
 4. Door Close Times: 3.0 Seconds or minimum without exceeding kinetic energy and closing force allowed by code.
 5. Door Dwell Times: Separate adjustable timers with initial settings at 5.0 seconds for both car and hall calls. Door dwell times shall be canceled by registration of car calls or by pressing the "door close" button.
 6. Leveling: Within three-eighths (3/8) inch under any loading condition. Level into floor at all times, do not overrun floor and level back.
- B. Operating Qualities:
1. Transition: Starting and stopping shall be smooth and comfortable. Slowdown, stopping, and leveling shall be without jars or bumps.
 2. Full Speed: Riding shall be free from vibration and sway.
- C. Vibration Control:
1. Provide effective sound isolation materials to isolate pumping plant from building structure to prevent objectionable noise and vibration transmission to occupied building spaces.
- D. Sound Control:
1. Maximum acoustical output level shall not exceed:
 - a. 80 dBA measured 3 feet from any piece of equipment in machine room.
 - b. 50 dBA measured in center of elevator cars and 5 feet above the cab floor during all sequences of operation.
 - c. 45 dBA measured in elevator lobbies 10 feet from the elevator doors.

1.4 SUBMITTALS

- A. Section 01 32 19 – Submittal Procedures: Submittal procedures.
- B. Product data: When requested, the elevator contractor will provide standard cab, entrance and signal fixture data to describe product for approval.
- C. Shop drawings:
1. Show equipment arrangement in the machine room/control space, pit and hoistway. Provide plans, elevations, sections and details of assembly, erection, anchorage, and equipment location.
 2. Indicate elevator system capacities, sizes, performances, safety features, finishes and other pertinent information.
 3. Show floors served, travel distances, maximum loads imposed on the building structure at points of support and all similar considerations of the elevator work.
 4. Indicate electrical power requirements and branch circuit protection device recommendations.
- D. Submit structural details and calculations for support of the retainer plates, guiderails, and support brackets; prepared and stamped by a structural engineer licensed in the State of California for submittal to DSA.
- E. Baked enamel selection: Submit manufacturer's standard selection charts for exposed finishes and materials.
- F. Plastic laminate selection: Submit manufacturer's standard selection charts for exposed finishes and materials.
- G. Metal Finishes: Upon request, standard metal samples provided.

- H. Operation and maintenance data. Include the following:
 - 1. Owners Manual and Wiring Diagrams.
 - 2. Parts list, with recommended parts inventory.

1.5 CLOSEOUT SUBMITTALS

- A. Section 01700 – Execution Requirements: Closeout procedures.
- B. Operation and Maintenance Data:
 - 1. Owner's Manual.
 - 2. Include parts catalog with complete list of equipment replacement parts; identify each entry with equipment description and identifying code.
 - 3. Include technical information for servicing operating equipment.
 - 4. Include legible schematic of hydraulic piping and wiring diagrams of installed electrical equipment and changes made in the Work. List symbols corresponding to identity or markings on machine room and hoistway apparatus.
 - 5. Include one copy of master electric and hydraulic schematic and one copy of lubrication chart.

1.6 QUALITY ASSURANCE

- A. Manufacturer Qualifications: An approved manufacturer with minimum fifteen years experience in manufacturing, installing, and servicing elevators of the type required for the project.
 - 1. Must be the manufacturer of the power unit, controller, signal fixtures, door operators cab, entrances, and all other major parts of the elevator operating equipment.
 - a. The major parts of the elevator equipment shall be manufactured in the United States, and not be an assembled system.
 - 2. The manufacturer shall have a documented, on-going quality assurance program.
 - 3. ISO-9001:2000 Manufacturer Certified
- B. Installer Qualifications: The manufacturer or an authorized agent of the manufacturer with not less than fifteen years of satisfactory experience installing elevators equal in character and performance to the project elevators.
 - 1. Installer must be a licensed Elevator Contractor in the State of California and must:
 - a. Show evidence of successful experience in complete installation and maintenance of proposed manufacturer's elevator equipment.
 - b. Directly employ sufficient competent personnel within 50 miles of San Mateo, California to handle construction and maintenance duties.
 - c. Maintain local stock of parts adequate for replacement on permanent or emergency basis.
 - d. Respond to trouble calls within one hour.
- C. Regulatory Requirements:
 - 1. ASME/ANSI A17.1 Safety Code for Elevators and Escalators, latest edition or as required by the local building code.
 - 2. Building Code: National.
 - 3. NFPA 70 National Electrical Code.
 - 4. NFPA 80 Fire Doors and Windows.
 - 5. Americans with Disabilities Act Accessibility Guidelines (ADAAG).
- D. Fire-rated Entrance Assemblies: Opening protective assemblies including frames, hardware, and operation shall comply with ASTM E2074, UL10(B), and NFPA 80. Provide entrance assembly units bearing Class B or 1 1/2 hour label by a Nationally Recognized Testing Laboratory..

- E. Inspection and testing: Elevator Installer shall obtain and pay for all required inspections, tests, permits and fees for elevator installation.
 - 1. Arrange for inspections and make required tests.
 - 2. Deliver to the Owner upon completion and acceptance of elevator work.

1.7 REGULATORY REQUIREMENTS

- A. The hydraulic passenger elevators require Deferred Approval from Division of the State Architect.
- B. Fabrication of the hydraulic passenger elevator systems shall not be started until Contractor's Deferred Approval Submittal, including Shop Drawings, Specifications, and Engineering Calculations for the actual system to be installed have been accepted and signed by the Architect or Structural Engineer and approved by DSA.
- C. Contractor is responsible for arranging and paying for inspections by governing authorities and obtaining permits. The operating permit shall list as the owner: San Mateo County Community College District, 3401 CSM Drive, San Mateo, CA 94402.

1.8 PRE-INSTALLATION MEETINGS

- A. Section 01 31 19 – Project Meetings: Pre-installation meeting.
- B. Convene minimum one week prior to commencing work of this section.
- C. Require attendance of persons directly involved with Work of this section.
- D. Review schedule of installation, installation procedures and conditions, and coordination with related Work.
- E. Review temporary use of elevator for construction purposes, hours of use, scheduling of its use, cleanliness of cab, employment of operator, maintenance of system.

1.9 FIELD MEASUREMENTS

- A. Verify field measurements prior to fabrication.

1.10 DELIVERY, STORAGE AND HANDLING

- A. Manufacturing will deliver elevator materials, components and equipment and the contractor is responsible to provide secure and safe storage on job site.

1.11 PROJECT CONDITIONS

- A. Prohibited Use: Elevators shall not be used for temporary service or for any other purpose during the construction period before Substantial Completion and acceptance by the purchaser unless agreed upon by Elevator Contractor and General Contractor with signed temporary agreement.
- B. Provide the hole for the jack unit (if required by the type of jack provided), based on excavation through normal soil or clay which can be removed by manual digging or by standard truck-mounted regular drilling unit. Provide a casing if required to retain the walls of the hole. General contractor shall remove excavation spoils deposited in the elevator pit.
 - 1. If a physical obstruction or hindrance is encountered below the ground surface, including boulders, rock, gravel, wood, metal, pilings, sand, water, quick sand, caves, public utilities or any other foreign material, obtain written authorization to proceed with excavating using special excavation equipment.

2. Maintain a daily log of time and material costs involved.
3. Elevator contractor will be compensated on a time and material basis for additional costs incurred after encountering the physical obstruction or hindrance, including the cost of the special excavation equipment.

1.12 WARRANTY

- A. Section 07 77 00 – Contract Closeout: Requirements for warranties.
- B. Warranty: Submit elevator manufacturer's standard written warranty agreeing to repair, restore or replace defects in elevator work materials and workmanship not due to ordinary wear and tear or improper use or care for 12 months from date of Substantial Completion. Under no circumstances shall the elevator warranty period commence prior to the governing authority issuing an operating permit for the elevator.

1.13 MAINTENANCE

- A. Furnish maintenance and call back service for a period of 12 months for each elevator from date of Notice of Completion during normal working hours, excluding callbacks. Service shall consist of the following activities and criteria:
 1. Prior to commencing the 12 month maintenance service period, execute a standard elevator maintenance service agreement with the San Mateo County Community College District, through the office of the Vice Chancellor of Facilities.
 2. Provide complete monthly maintenance on entire elevator system for a period of 12 months. This shall minimally include:
 - a. Examination: Include systematic examination with monthly adjustment and lubrication of elevator equipment. Whenever required provide replacement of defective parts with parts of same manufacturer as required for proper operation. Contractor is not responsible for repairs to car enclosures, door panels, frames, sills, or platform floor resulting from normal usage or misuse, accidents and negligence.
 - b. Testing: Include any testing required by Code authorities including monthly testing off Firefighters' Service.
 - c. Performance Standards: Maintain smooth starting, stopping, ride qualities and accurate leveling at all times.
 - d. Call-Backs: Provide 24 hour emergency call-back service at no additional cost to Owner. Emergency call-back includes trapped passengers and incidents where serious equipment or building damage may occur. Respond to trouble calls within one hour.
 - e. Telephone Monitoring: The automatic dialer shall be programmed to call the elevator contractor's telephone monitoring service. Coordinate through the District's Office of the Vice Chancellor of Facilities for the College's callback notification period.
 3. Final Service and Inspection: Two weeks before expiration of the year's maintenance, the equipment shall be lubricated, fully serviced, adjusted to the standard designated and emergency service operation devices shall be checked. A representative of the District will make a complete inspection.
 4. Elevator Shutdowns:
 - a. Should the elevator become inoperative, repair or replace minor components within 24 hours of notification of failure and return to service. Complete service and repairs of major components within 72 hours.
 - b. The District may order the work done by other contractors at the Contractor's expense for failure to comply with the requirements noted above.
 - c. Extend maintenance and responsibility for correct operation to devices repaired or replaced by others under these circumstances.
 5. Follow-Up Tests: Test all safety devices and emergency operations at 6 month intervals or sooner and submit written report on each test. Perform tests at times

- that do not interfere with College operations.
6. Maintenance Tool and Software Manuals: Provide maintenance tools, supporting software, instruction manuals and all documentation required for maintenance of the entire system including trouble shooting, diagnostics and adjusting. All diagnostic tools and equipment required for adjusting and troubleshooting shall be an integral "on-board" feature of the microprocessor controller, and shall not require recharging, reprogramming or be of the automatic destruct type.
 7. Maintenance Materials: The elevator service contractor shall provide a metal cabinet in the machine room containing a reasonable supply of expendable parts required for prompt replacement. Replenish parts used for routine maintenance to ensure an adequate supply is available. Cabinet (but not contents) shall become property of SMCCCD and shall not be removed upon expiration of maintenance period.
- B. Manufacturer shall have a service office and full time service personnel within a 50 mile radius of the project site.

PART 2 - PRODUCTS

2.1 HYDRAULIC PASSENGER ELEVATORS

- A. Manufacturers:
1. ThyssenKrupp Elevator; www.thyssenkruppelevator.com.
 2. Otis Elevator Co; www.otis.com.
 3. Schindler Elevator Corp.; www.us.schindler.com
 4. Substitutions: Section 01 60 00 – Product Requirements: Product Options and Substitutions.
- B. Product Description and Basis of Design: Model "Seville 30", by ThyssenKrup Elevator Corp.

2.2 MATERIALS, GENERAL

- A. Colors, patterns, and finishes: As selected by the Architect from manufacturer's standard colors, patterns, and finish charts.
- B. Steel:
1. Shapes and bars: Carbon.
 2. Sheet: Cold-rolled steel sheet, commercial quality, Class 1, matte finish.
 3. Finish: Factory-applied baked enamel.
- C. ~~Plastic laminate: Decorative high pressure type, complying with NEMA LD3, Type GP-50 General Purpose Grade, nominal 0.050" thickness.~~ Stainless steel: No. 4 Satin Stainless Steel for interior and exterior doors and jambs. Interior wall finish: Rigidized Metals Corporation; Product: 5.WL® textured stainless steel panels, or approved equal.
- D. Resilient Flooring: Provided by Section 09 65 00.

2.3 HOISTWAY EQUIPMENT

- A. Platform: Fabricated frame of formed or structural steel shapes, gusseted and rigidly welded with a wood subfloor. Underside of the platform shall be fireproofed.
- B. Sling: Steel stiles affixed to a steel crosshead and bolstered with bracing members to remove strain from the car enclosure.
- C. Guide Rails: Steel, omega shaped, fastened to the building structure with steel brackets.

- D. Guide Shoes: Slide guides shall be mounted on top and bottom of the car.
- E. Buffers: Provide substantial buffers in the elevator pit. Mount buffers on a steel template that is fastened to the pit floor or continuous channels fastened to the elevator guide rail or securely anchored to the pit floor. Provide extensions if required by project conditions.
- F. Jack: Jack unit shall be of sufficient size to lift the gross load the height specified. Factory test jack to insure adequate strength and freedom from leakage. Brittle material, such as gray cast iron, is prohibited in the jack construction.
1. Provide the following jack type: Single post conventional (in ground). Single polished steel hydraulic plunger housed in a steel sealed casing with sufficient clearance space to allow for alignment during installation.
 2. Casing shall have a dished endcap and safety bulkhead as required by A17.1 code.
 3. Casing shall have a double-bottom cylinder (in order to control the descending speed of the car as the hydraulic oil passes through a relief orifice should be bottom plate fail.) Casing shall be a sealed PVC casing (to surround the entire cylinder and provide additional protection to the double-bottom cylinder investment and against environmental contamination.)
 3. Plunger shall have a high-pressure sealing system which will not allow for seal movement or displacement during the course of operation.
 4. Jack system will be supplied with schedule 40 PVC or an HDPE protection system complying with A17.1 code requirements to prevent in ground corrosion of the casing.
 5. Jack casing shall have a bleeder valve to discharge any air trapped in the jack.
- G. Automatic Self-Leveling: Provide each elevator car with a self-leveling feature to automatically bring the car to the landings and correct for overtravel or undertravel. Self-leveling shall, within its zone, be automatic and independent of the operating device. The car shall be maintained approximately level (within 3/8 inch) of the landing irrespective of its load.
- H. Wiring, Piping, and Oil: Provide all necessary hoistway wiring in accordance with the National Electrical Code. All necessary code compliant pipe and fittings shall be provided to connect the power unit to the jack unit. Provide proper grade oil as specified by the manufacturer of the power unit.

2.4 POWER UNIT

- A. Power Unit (Oil Pumping and Control Mechanism): A self-contained unit consisting of the following items:
1. Oil reservoir with tank cover.
 2. An oil hydraulic pump.
 3. An electric motor.
 4. Oil control valve with the following components built into single housing; high pressure relief valve, check valve, automatic unloading up start valve, lowering and leveling valve, and electro-magnetic controlling solenoids.
- B. Pump: Positive displacement type pump specifically manufactured for oil-hydraulic elevator service. Pump shall be designed for steady discharge with minimum pulsation to give smooth and quiet operation. Output of pump shall not vary more than 10 percent between no load and full load on the elevator car.
- C. Motor: Standard manufacture motor specifically designed for oil-hydraulic elevator service. Duty rating shall be selected for specified speed and load.
- D. Control System: Shall be microprocessor based and protected from environmental

extremes and excessive vibrations in a NEMA 1 enclosure.

- E. Oil Control Unit: The following components shall be built into a single housing. Welded manifolds with separate valves to accomplish each function are not acceptable. Adjustments shall be accessible and be made without removing the assembly from the oil line.
1. Relief valve shall be externally adjustable and be capable of bypassing the total oil flow without increasing back pressure more than 10 percent above that required to barely open the valve.
 2. Up start and stop valve shall be adjustable and designed to bypass oil flow during start and stop of motor pump assembly. Valve shall close slowly, gradually diverting oil to or from the jack unit, ensuring smooth up starts and up stops.
 3. Check valve shall be designed to close quietly without permitting any perceptible reverse flow.
 4. Lowering valve and leveling valve shall be adjustable for down start speed, lowering speed, leveling speed and stopping speed to ensure smooth "down" starts and stops. The leveling valve shall be designed to level the car to the floor in the direction the car is traveling after slowdown is initiated.
- F. Solid State Starting: Provide an electronic starter featuring adjustable starting currents.

2.5 HOISTWAY ENTRANCES

- A. Doors and Frames: Provide complete hollow metal type hoistway entrances at each hoistway opening bolted\knock down construction.
1. Manufacturer's standard entrance design consisting of hangers, doors, hanger supports, hanger covers, fascia plates, sight guards, and necessary hardware.
 2. Main landing door and frame finish: Stainless steel panels, no. 4 brushed finish.
 3. Typical door and frame finish: Stainless steel panels, no. 4 brushed finish.
- B. Interlocks: Equip each hoistway entrance with an approved type interlock tested as required by code. Provide door restriction devices as required by code.
- C. Door Hanger and Tracks: Provide sheave type two point suspension hangers and tracks for each hoistway horizontal sliding door.
1. Sheaves: Polyurethane tires with ball bearings properly sealed to retain grease.
 2. Hangers: Provide an adjustable device beneath the track to limit the up-thrust of the doors during operation.
 3. Tracks: Drawn steel shapes, smooth surface and shaped to conform to the hanger sheaves.
- D. Hoistway Sills: Extruded metal, with groove(s) in top surface. Provide mill finish on aluminum.

2.6 CAR ENCLOSURE

- A. Car Enclosure:
1. Walls: Walls shall be constructed of stainless steel, no. 4 brushed finish. Cab type TKS, reinforced cold-rolled steel.
 2. Canopy: Cold-rolled steel with hinged exit.
 3. Ceiling: Suspended opaque acrylic ceiling grilles, acting as lighting diffusers to the fluorescent strip lights above that include electronic ballasts and four foot T8 lamps.
 4. Cab Fronts, Return, Transom, Soffit and Strike: Provide panels faced with brushed stainless steel.
 5. Doors: Horizontal sliding car doors reinforced with steel for panel rigidity. Hang doors on sheave type hangers with polyurethane tires that roll on a polished steel track and are guided at the bottom by non-metallic sliding guides.
 - a. Door Finish: Stainless steel panels: No. 4 brushed finish.

- b. Cab Sills: Extruded aluminum, mill finish, recessed to match floor finish.
 6. Handrail: Provide 1.5" diameter cylindrical metal on side and rear walls on front opening cars and side walls only on front and rear opening cars. Handrails shall have a stainless steel, no. 4 brushed finish.
 7. Ventilation: Manufacturer's standard exhaust fan, mounted on the car top.
 - B. Car Top Inspection: Provide a car top inspection station with an "Auto-Inspection" switch, an "emergency stop" switch, and constant pressure "up and down" direction and safety buttons to make the normal operating devices inoperative. The station will give the inspector complete control of the elevator. The car top inspection station shall be mounted in the door operator assembly.
 - C. Provide permit holder for display within the elevator cab.

2.7 DOOR OPERATION

- A. Door Operation: Provide a direct current motor driven heavy duty operator designed to operate the car and hoistway doors simultaneously. Door movements shall be electrically cushioned at both limits of travel and the door operating mechanism shall be arranged for manual operation in event of power failure. Doors shall automatically open when the car arrives at the landing and automatically close after an adjustable time interval or when the car is dispatched to another landing. Closed-loop, microprocessor controlled motor-driven linear door operator, with adjustable torque limits, also acceptable. AC controlled units with oil checks or other deviations are not acceptable.
 1. Door nudging operation to occur if doors are prevented from closing for an adjustable period of time.
- B. Door Protection Devices: Provide a door protection system using microprocessor controlled infra-red light beams. The beams shall project across the car opening detecting the presence of a passenger or object. If door movement is obstructed, the doors shall immediately reopen.

2.8 CAR OPERATING STATION

- A. Car Operating Station, General: The main car control in each car shall contain the devices required for specific operation mounted in an integral swing return panel requiring no applied faceplate. Swing return shall have a brushed stainless steel finish. The main car operating panel shall be mounted in the return and comply with handicap requirements. Pushbuttons that illuminate using long lasting LED's shall be included for each floor served, and emergency buttons and switches shall be provided per code. Switches for car light and accessories shall be provided.
- B. Emergency Communications System: Provide phone box with telephone and automatic dialer.
 1. Push-button activated system.
 2. The telephone shall be on a POTS line (not on the District's VOIP internal communications system).
 3. Mount behind a pattern of holes as an integral part of car operating panel.
 4. The automatic dialer shall be programmed to call the elevator contractor's telephone monitoring service (see Article 1.13 – Maintenance).
- C. Auxiliary Operating Panel: Not Required.
- D. Column Mounted Car Riding Lantern: A car riding lantern shall be installed in the elevator cab and located in the entrance. The lantern, when illuminated, will indicate the intended direction of travel. The lantern will illuminate and a signal will sound when the car arrives at a floor where it will stop. The lantern shall remain illuminated until the door(s) begin to close.

2.9 CONTROL SYSTEMS

- A. Elevators shall use standard, non-proprietary controllers. Acceptable controllers include:
 - 1. Thyssen-Krup TAC22.
 - 2. MotionControl Engineering.
 - 3. Equivalent non-proprietary controller that can be easily and economically serviced by an elevator service company other than the installing company.
 - 4. Substitutions: Section 01 60 00 – Product Requirements: Product Options and Substitutions.
- B. Controller: The elevator control system shall be microprocessor based and software oriented. Control of the elevator shall be automatic in operation by means of push buttons in the car numbered to correspond to floors served, for registering car stops, and by "up-down" push buttons at each intermediate landing and "call" push buttons at terminal landings.
- C. All diagnostic tools and equipment required for adjusting and troubleshooting shall be an integral/ "on-board" feature of the microprocessor controller, and shall not require recharging, reprogramming or be of the automatic destruct type.

2.10 HALL STATIONS

- A. Hall Stations, General: Provide one pushbutton riser with faceplates having a brushed stainless steel finish.
 - 1. Phase 1 firefighter's service key switch, with instructions, shall be incorporated into the hall station at the designated level.
 - 2. Key switches shall be keyed to the College's master key system. This requirement ensures that operating personnel do not have to carry or duplicate additional keys, and emergency response personnel (particularly fire responders) have the appropriate keys. Each function and/or lock shall be keyed alike.
 - 3. Coordinate the design of the elevator controls key switches with the work of the security system design and the hardware specifications. Provide appropriately pinned cylinders to the elevator contractor for installation.
- B. Floor Identification Pads: Provide door jamb pads at each floor. Jamb pads shall comply with Americans with Disabilities Act (ADA) requirements.
- C. Hall Position Indicator: An electronic dot matrix position indicator shall be provided and mounted for optimum viewing. As the car travels, its position in the hoistway shall be indicated by the illumination of the alphanumeric character corresponding to the landing which the elevator is stopped or passing. When hall lanterns are provided, the position indicator shall be combined with the hall lanterns in the same faceplate. Faceplates shall match hall stations. Provide at all landings.
- D. Hall lanterns: Not required for this application.

2.11 MISCELLANEOUS ELEVATOR COMPONENTS

- A. Oil Hydraulic Silencer: Install an oil hydraulic silencer (muffler device) at the power unit location. The silencer shall contain pulsation absorbing material inserted in a blowout proof housing arranged for inspecting interior parts without removing unit from oil line.

2.12 BATTERY EMERGENCY OPERATION

- A. Battery backup is required to prevent entrapment during power outages. In the event of a power outage, the battery power lowers the elevator to the main exit floor and the door open to allow anyone who would otherwise be entrapped to exit safely.
- B. Battery backup should operate as follows:
 - 1. Provide a battery driven unit that will initiate operation of the protective circuits in case of power failure.
 - 2. Arrange circuitry so that, if the mainline switch is open when the power transfer takes place, the elevator will not respond to the operation of the protective circuit.
 - 3. In case of normal power failure, arrange the elevator system to lower from a battery emergency supply. The emergency power supply shall consist of battery and battery chargers.
 - 4. Upon the failure of normal power, lower the elevator to the main exit floor. Upon arrival at the main exit landing, the elevator doors shall open automatically and remain open until regular door time has expired. The elevator shall then become inactivated.
 - 5. Automatically resume normal operation on restoration of normal power supply to the building.

2.13 EMERGENCY LIGHTING

- A. Provide elevator car with a battery driven and self-recharging emergency car lighting unit, mounted on top of car, with sufficient capacity to operate emergency lights in continuous operation for four hours and the alarm bell for one hour.
 - 1. Within 5 seconds of loss of normal power activate two lamps as part of normal cab lighting.
 - 2. Surface mounted lights are not acceptable.
 - 3. Provide a test button in service cabinet.

2.14 CARD READERS

- A. Elevators with exterior access shall be tied to the College's access control and alarm monitoring system (ACAMS), for after-hours access. The ACAMS shall also be used if floors or areas of the building are to be isolated from each other during or after hours.
- B. Elevator contractor shall provide required wiring from the cab and elevator lobbies to the machine room.
- C. Final connections of the card readers shall be made by the security system integrator.

2.15 PROTECTIVE PADS

- A. Provide each cab with its own set of pads provided in a heavy duty duffel bag with handles.
- B. Pads shall cover all walls with cutout sections for car operating panels. Equip cab interior walls with heavy duty stainless steel buttons attached to cab panels for hanging of protective pads.

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Before starting elevator installation, inspect hoistway, hoistway openings, pits and machine rooms/control space, as constructed and verify all critical dimensions, and examine supporting structures and all other conditions under which elevator work is to be installed. Do not proceed with elevator installation until unsatisfactory conditions have been corrected in a manner acceptable to the installer.

- B. Installation constitutes acceptance of existing conditions and responsibility for satisfactory performance.

3.2 PREPARATION

- A. Arrange for temporary electrical power for installation work and testing of elevator components.
- B. Jack unit excavation: Drill or otherwise excavate below elevator pit construction as required to install the jack unit.
 - 1. Install casing for jack unit.
 - 2. Provide HDPE jack protection system for all in ground jacks.
 - 3. Set casing for jack unit assembly plumb, and partially fill with water-settled sand, eliminating voids. Back fill depth shall be sufficient to hold the bottom of the jack in place over time.

3.3 INSTALLATION

- A. Install elevator systems components and coordinate installation of hoistway wall construction.
 - 1. Work shall be performed by competent elevator installation personnel in accordance with ASME A17.1, manufacturer's installation instructions and approved shop drawings.
 - 2. Comply with the National Electrical Code for electrical work required during installation.
- B. Coordination: Coordinate elevator work with the work of other trades, for proper time and sequence to avoid construction delays. Use benchmarks, lines, and levels designated by the Contractor, to ensure dimensional coordination of the work.
- C. Alignment: Coordinate installation of hoistway entrances with installation of elevator guide rails for accurate alignment of entrances with cars. Where possible, delay final adjustment of sills and doors until car is operable in shaft. Reduce clearances to minimum safe, workable dimensions at each landing.
- D. Lubricate operating parts of system where recommended by manufacturer.

3.4 FIELD QUALITY CONTROL

- A. Acceptance testing: Upon completion of the elevator installation and before permitting use of elevator, perform acceptance tests as required by A17.1 Code and local authorities having jurisdiction. Perform other tests, if any, as required by governing regulations or agencies.
- B. Advise Owner, Contractor, Architect, and governing authorities in advance of dates and times tests are to be performed on the elevator.

3.5 ADJUSTING

- A. Make necessary adjustments of operating devices and equipment to ensure elevator operates smoothly and accurately.

3.6 CLEANING

- A. Section 01 74 00 – Cleaning: Final cleaning.
- B. Before final acceptance, remove protection from finished surfaces and clean and polish surfaces in accordance with manufacturer's recommendations for type of material and finish provided. Stainless stall shall be cleaned with soap and water and dried with a non-abrasive surface; shall not be cleaned with bleached-based cleansers.
- C. At completion of elevator work, remove tools, equipment, and surplus materials from site. Clean equipment rooms and hoistway. Remove trash and debris.

3.7 PROTECTION

- A. At time of Substantial Completion of elevator work, or portion thereof, provide suitable protective coverings, barriers, devices, signs, or other such methods or procedures to protect elevator work from damage or deterioration. Maintain protective measures throughout remainder of construction period.

3.8 DEMONSTRATION

- A. Instruct Owner's personnel in proper use, operations, and daily maintenance of elevators. Review emergency provisions, including emergency access and procedures to be followed at time of failure in operation and other building emergencies. Train Owner's personnel in normal procedures to be followed in checking for sources of operational failures or malfunctions.
- B. Make a final check of each elevator operation, with Owner's personnel present, immediately before date of substantial completion. Determine that control systems and operating devices are functioning properly.

3.9 ELEVATOR SCHEDULE

- A. Exterior Quad Elevator (Elevator 5-EL-W):
 - 1. Elevator Model: Seville 30.
 - 2. Rated Capacity: 3000 lbs.
 - 3. Rated Speed: 125 ft./min.
 - 4. Operation System: TAC22.
 - 5. Travel: 12'-0"
 - 6. Landings: 2 total.
 - 7. Openings:
 - a. Front: 1.
 - b. Rear: 1.
 - 8. Clear Car Inside: 6' - 8" wide x 4' - 9" deep.
 - 9. Cab Height: 7'-4".
 - 10. Hoistway Entrance Size: 3' - 6" wide x 7'-0 high.
 - 11. Door Type: Single Speed.
 - 12. Power Characteristics: ~~460 volts, 3 Phase, 60 Hz.~~ 480 volts, 3 Phase, 60 Hz.
 - 13. Seismic Requirements: Zone 3+
 - 14. Fixture and Button Style: Signa4.
- B. Elevator #2 (Elevator 5-EL-N):
 - 1. Elevator Model: Seville 30.
 - 2. Rated Capacity: 3000 lbs.
 - 3. Rated Speed: 125 ft./min.
 - 4. Operation System: TAC22.
 - 5. Travel: 28'-0"
 - 6. Landings: 3 total.

7. Openings:
 - a. Front: 3.
 - b. Rear: 0.
8. Clear Car Inside: 6' - 8" wide x 4' - 9" deep.
9. Cab Height: 7'-4".
10. Hoistway Entrance Size: 3' - 6" wide x 7'-0 high.
11. Door Type: Center, Single Speed.
12. Power Characteristics: ~~460 volts, 3 Phase, 60 Hz.~~ 480 volts, 3 Phase, 60 Hz.
13. Seismic Requirements: Zone 3+.
14. Fixture and Button Style: Signa4.

END OF SECTION