TECHNICAL SPECIFICATIONS

BID # B-12-2022-23

EXTERIOR DOOR REPLACEMENT
AT
MORRILL MIDDLE SCHOOL

BERRYESSA UNION SCHOOL DISTRICT

Measure U Bond Program
Berryessa Union School District
1376 Piedmont Road
San Jose, CA 95132

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TECHNICAL SPECIFICATIONS

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SECTION 081113 - HOLLOW METAL DOORS AND FRAMES

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

A. Section Includes:

1. Standard and custom hollow metal doors and frames.
2. Steel sidelight, borrowed lite and transom frames.
3. Acoustical Rated Doors
4. Louvers installed in hollow metal doors.
5. Light frames and glazing installed in hollow metal doors.

B. Related Sections:

1. Division 08 Section "Glazing" for glass view panels in hollow metal doors.
2. Division 08 Section "Door Hardware".
3. Division 09 Sections "Painting" for field painting hollow metal doors and frames.

C. Codes and References: Comply with the version year adopted by the Authority Having Jurisdiction.

1. ANSI/SDI A250.8 - Specifications for Standard Steel Doors and Frames.
2. ANSI/SDI A250.4 - Test Procedure and Acceptance Criteria for Physical Endurance for Steel Doors, Frames, Frames Anchors and Hardware Reinforcing.
3. ANSI/SDI A250.6 - Recommended Practice for Hardware Reinforcing on Standard Steel Doors and Frames.
4. ANSI/SDI A250.10 - Test Procedure and Acceptance Criteria for Prime Painted Steel Surfaces for Steel Doors and Frames.
5. ANSI/SDI A250.11 - Recommended Erection Instructions for Steel Frames.
6. ASTM A1008 - Standard Specification for Steel Sheet, Cold-Rolled, Carbon, Structural, High-Strength Low-Alloy and High-Strength Low-Alloy with Improved Formability.
7. ASTM A653 - Standard Specification for Steel Sheet, Zinc-Coated (Galvanized) or Zinc-Iron Alloy-Coated (Galvannealed) by the Hot-Dip Process.
8. ASTM A924 - Standard Specification for General Requirements for Steel Sheet, Metallic-Coated by the Hot-Dip Process.
9. ASTM C 1363 - Standard Test Method for Thermal Performance of Building Assemblies by Means of a Hot Box Apparatus.
10. ASTM E283 - Standard Test Method for Determining Rate of Air Leakage Through Exterior Doors Under Specified Pressure Differences Across the Specimens.

11. ASTM E330 - Standard Test Method for Structural Performance of Exterior Windows, Curtain Walls, and Doors by Uniform Static Air Pressure Difference.
12. ASTM E 413 - Classification for Rating Sound Insulation.
13. ANSI/ASA S12.60 – Acoustical Performance Criteria, Design Requirements, and Guidelines for Schools
14. ASTM E1332 - Standard Classification for Determination of Outdoor-Indoor Transmission Class.
15. ANSI/BHMA A156.115 - Hardware Preparation in Steel Doors and Frames.
16. ANSI/SDI 122 - Installation and Troubleshooting Guide for Standard Steel Doors and Frames.
17. ANSI/NFPA 80 - Standard for Fire Doors and Fire Windows; National Fire Protection Association.
18. ANSI/NFPA 105: Standard for the Installation of Smoke Door Assemblies.
19. NFPA 252 - Standard Methods of Fire Tests of Door Assemblies; National Fire Protection Association.
20. NFRC 102 – Procedure for Measuring the Steady State Thermal Transmittance of Fenestration Systems.
21. NFRC 400 – Procedure for Determining Fenestration Product Air Leakage.
22. UL 10C - Positive Pressure Fire Tests of Door Assemblies.
23. UL 1784 - Standard for Air Leakage Tests of Door Assemblies.

1.3 SUBMITTALS

A. Product Data: For each type of product indicated. Include installation instructions, construction details, material descriptions, core descriptions, hardware reinforcements, profiles, anchors, fire-resistance rating, and finishes.

B. Door hardware supplier shall furnish templates, template reference number and/or physical hardware to the steel door and frame supplier in order to prepare the doors and frames to receive the finish hardware items.

C. Shop Drawings: Shall include the following:

1. Elevations of each door design.
2. Details of doors, including vertical and horizontal edge details and metal thicknesses.
3. Frame details for each frame type, including dimensioned profiles and metal thicknesses.
4. Locations of reinforcement and preparations for hardware.
5. Details of anchorages, joints, field splices, and connections.
6. Details of accessories.
7. Details of moldings, removable stops, and glazing.
8. Details of conduit and preparations for power, signal, and control systems.

D. Samples for Verification:

1. Samples are only required by request of the architect and for manufacturers that are not current members of the Steel Door Institute.

1.4 QUALITY ASSURANCE

A. Manufacturer Qualifications: Provide hollow metal doors and frames from an SDI Certified manufacturer.

B. Source Limitations: Obtain hollow metal doors and frames through one source from a single manufacturer wherever possible.

C. Quality Standard: In addition to requirements specified, furnish SDI-Certified manufacturer products that comply with ANSI/SDI A250.8, latest edition, "Recommended Specifications for Standard Steel Doors and Frames".

D. Fire-Rated Door Assemblies: Assemblies complying with NFPA 80 that are listed and labeled by a qualified testing agency, for fire-protection ratings indicated, based on testing according to UL10C or NFPA 252 at positive pressure (neutral pressure at 40” above sill).

1. Oversize Fire-Rated Door Assemblies Construction: For units exceeding sizes of tested assemblies, attach construction labels certifying doors are built to standard construction requirements for tested and labeled fire rated door assemblies except for size.
2. Temperature-Rise Limit: Where indicated, provide doors that have a maximum transmitted temperature end point of not more than 450 deg F (250 deg C) above ambient after 30 minutes of standard fire-test exposure.
3. Smoke Control Door Assemblies: Comply with UL 1784 and NFPA 105.

    a. Smoke "S" Label: Doors to bear “S” label and include smoke and draft control gasketing applied to frame and on meeting stiles of pair doors.

E. Fire-Rated, Borrowed-Light Frame Assemblies: Assemblies complying with NFPA 80 that are listed and labeled, by a testing and inspecting agency acceptable to authorities having jurisdiction, for fire-protection ratings indicated, based on testing according to NFPA 257. Provide labeled glazing material.

F. Energy Efficient Exterior Openings: Comply with minimum thermal ratings, based on ASTM C1363. Openings to be fabricated and tested as fully operable, thermal insulating door and frame assemblies.

1. Thermal Performance (Exterior Openings): Independent testing laboratory certification for exterior door assemblies being tested in accordance with ASTM C1363 and meet or exceed the following requirements:

    a. Door Assembly Operable U-Factor and R-Value Ratings: U-Factor 0.395, R-Value 2.53, including insulated door, thermal-break frame and threshold.

2. Air Infiltration (Exterior Openings): Independent testing laboratory certification for exterior door assemblies being tested in accordance with ASTM E283 to meet or exceed the following requirements:

a. Rate of leakage of the door assembly shall not exceed 0.25 cfm per square foot of static differential air pressure of 1.567 psf (equivalent to 25 mph wind velocity).

G. Pre-Submittal Conference: Conduct conference in compliance with requirements in Division 01 Section "Project Meetings" with attendance by representatives of Supplier, Installer, and Contractor to review proper methods and procedures for installing hollow metal doors and frames and to verify installation of electrical knockout boxes and conduit at frames with electrified or access control hardware.

1.5 DELIVERY, STORAGE, AND HANDLING

A. Deliver hollow metal work palletized, wrapped, or crated to provide protection during transit and Project site storage. Do not use non-vented plastic.

B. Deliver welded frames with two removable spreader bars across bottom of frames, tack welded to jambs and mullions.

C. Store hollow metal work under cover at Project site. Place in stacks of five units maximum in a vertical position with heads up, spaced by blocking, on minimum 4-inch high wood blocking. Do not store in a manner that traps excess humidity.

1. Provide minimum 1/4-inch space between each stacked door to permit air circulation. Door and frames to be stacked in a vertical upright position.

1.6 PROJECT CONDITIONS

A. Field Measurements: Verify actual dimensions of openings by field measurements before fabrication.

1.7 COORDINATION

A. Coordinate installation of anchorages for hollow metal frames. Furnish setting drawings, templates, and directions for installing anchorages, including sleeves, concrete inserts, anchor bolts, and items with integral anchors. Deliver such items to Project site in time for installation.

1.8 WARRANTY

A. [Manufacturer specific]

PART 2 - PRODUCTS

2.1 MANUFACTURERS

A. Acceptable Manufacturers: Products shall be manufactured by a member of the Steel Door Institute. Steel Door Institute Members are as follows:
1. Ceco Door.

2. Curries.
3. Deansteel Manufacturing Co.
4. DCI Hollow Metal.
5. Hollow Metal Xpress.
6. Mesker Door, Inc.
7. MPI.
8. Pioneer Industries, Inc.
9. Premier Steel Doors and Frames.
10. Republic Doors & Frames.
11. Security Metal Products Corp.
12. Steelcraft.

B. Substitutions: As approved by architect, construction manager, and school District.

2.2 MATERIALS

A. Cold-Rolled Steel Sheet: ASTM A 1008/A 1008M, Commercial Steel (CS), Type B; suitable for exposed applications.

B. Metallic-Coated Steel Sheet: ASTM A 653/A 653M, Commercial Steel (CS), Type B; with minimum G60 (Z180) or A60 (ZF180) metallic coating.

C. Frame Anchors: ASTM A 653/A 653M, Commercial Steel (CS), Commercial Steel (CS), Type B; with minimum G60 (Z180) or A60 (ZF180) metallic coating.

2.3 HOLLOW METAL DOORS

A. General: Provide 1-3/4 inch doors of design indicated, not less than thickness indicated; fabricated with smooth surfaces, without visible joints or seams on exposed faces unless otherwise indicated. Comply with ANSI/SDI A250.8.

B. Exterior Doors (Energy Efficient): Face sheets fabricated of commercial quality hot-dipped zinc coated steel that complies with ASTM A924 A60. Provide doors complying with requirements indicated below by referencing ANSI/SDI A250.8 for level and model, and ANSI/SDI A250.4 for physical performance level.

1. Design: Flush panel.
2. Core Construction: Foamed in place polyurethane and steel reinforced core with no stiffener face welds.

    a. Provide 18 gauge steel vertical reinforcements 6 inches apart and welded in place. Foamed in place polyurethane core is chemically bonded to all interior surfaces. No face welding is permitted.
    b. Thermal properties to rate at a fully operable minimum U-Factor 0.374 and R-Value 2.53, including insulated door, Mercury thermal-break frame and threshold.

3. Level/Model: Level 3 and Physical Performance Level A (Extra Heavy Duty), Minimum 16 gauge (0.053-inch - 1.3-mm) thick steel, Model 2.

4. Vertical Edges: Vertical edges to be mechanically interlocked with hairline seam. Beveled Lock Edge, 1/8 inch in 2 inches (3 mm in 50 mm).
5. Top and Bottom Edges: Reinforce tops and bottoms of doors with a continuous steel channel not less than 16 gauge, extending the full width of the door and welded to the face sheet. Doors with an inverted top channel to include a steel closure channel, screw attached, with the web of the channel flush with the face sheets of the door. Plastic or composite channel fillers are not acceptable.
6. Hinge Reinforcement: Minimum 7 gauge (3/16") plate 1-1/4" x 9".
7. Hardware Reinforcements: Fabricate according to ANSI/SDI A250.6 with reinforcing plates from same material as door face sheets.

C. Manufacturers Basis of Design:

D. Interior Doors: Face sheets fabricated of commercial quality cold rolled steel that complies with ASTM A 1008/A 1008M. Provide doors complying with requirements indicated below by referencing ANSI/SDI A250.8 for level and model and ANSI/SDI A250.4 for physical performance level:

1. Design: Flush panel.

    a. Fire Door Core: As required to provide fire-protection and temperature-rise ratings indicated.

2. Level/Model: Level 2 and Physical Performance Level B (Heavy Duty), Minimum 18 gauge (0.042-inch - 1.0-mm) thick steel, Model 2.
3. Top and Bottom Edges: Reinforce tops and bottoms of doors with a continuous steel channel not less than 16 gauge, extending the full width of the door and welded to the face sheet.
4. Hinge Reinforcement: Minimum 7 gauge (3/16") plate 1-1/4" x 9" or minimum 14 gauge continuous channel with pierced holes, drilled and tapped.
5. Hardware Reinforcements: Fabricate according to ANSI/SDI A250.6 with reinforcing plates from same material as door face sheets.

1.1 ACOUSTICAL DOORS:

A. Acoustical Doors shall conform to the American National Standard Acoustical Performance Criteria, Design Requirements and Guidelines for Schools, ANSI/ASA, S12.60.
    1. These spaces include, but are not limited to, classrooms, instructional pods or activity areas, group instruction rooms, conference rooms, libraries, offices, speech clinics, offices used for educational purposes and music rooms for instruction, practice and performance.

B. The STC rating for hollow metal interior entry doors into multi-purpose, dining, gym, classrooms and other core learning spaces shall conform to the requirements of ANSI/ASA S12.60, with a minimum STC 30 operable rating. Doors to music rooms and doors between two classrooms shall be a minimum STC 40 operable rating. Comply with additional requirements as noted on the door schedule drawings.

C. Provide vision lite system consisting of acoustic glass, lite kit and glazing tape of the proper size and thickness to meet or exceed the STC acoustical rating of the door and frame assembly.

D. Provide gasketing and door bottoms as specified under Section 087100.

E. Gasketing and door seals are not to be painted.

F. Door manufacturer shall provide a Letter of Certification from an independent testing laboratory accredited as an acoustical laboratory, verifying that conformance to the STC acoustical performance has been met with the specified gasketing, under Section 087100. Testing shall be performed at laboratories that are fully accredited.

G. Doors shall have a 3/8” undercut.

H. Coordinate adjustable mortise door bottom as specified in Section 087100 with bottom door channel and undercuts.

2.4 HOLLOW METAL FRAMES

A. General: Comply with ANSI/SDI A250.8 and with details indicated for type and profile.

B. Thermal Break Frames: Subject to the same compliance standards and requirements as standard hollow metal frames. Tested for thermal performance in accordance with NFRC 102, and resistance to air infiltration in accordance with NFRC 400. Where indicated provide thermally broken frame profiles available for use in both masonry and drywall construction. Fabricate with 1/16” positive thermal break and integral weatherstripping.

C. Exterior Frames: Fabricated of hot-dipped zinc coated steel that complies with ASTM A 653/A 653M, Coating Designation A60.

1. Fabricate frames with mitered or coped corners. Profile as indicated on drawings.
2. Frames: Minimum 14 gauge (0.067-inch -1.7-mm) thick steel sheet.
3. Manufacturers Basis of Design:

D. Interior Frames: Fabricated from cold-rolled steel sheet that complies with ASTM A 1008/A 1008M.

1. Fabricate frames with mitered or coped corners. Profile as indicated on drawings.
2. Frames: Minimum 16 gauge (0.053-inch -1.3-mm) thick steel sheet.
3. Manufacturers Basis of Design:

E. Fire rated frames: Fabricate frames in accordance with NFPA 80, listed and labeled by a qualified testing agency, for fire-protection ratings indicated.

F. Hardware Reinforcement: Fabricate according to ANSI/SDI A250.6 Table 4 with reinforcement plates from same material as frames.

2.5 FRAME ANCHORS

A. Jamb Anchors:

1. New Masonry Type: Adjustable strap-and-stirrup or T-shaped anchors to suit frame size, formed from A60 metallic coated material, not less than 0.042 inch

thick, with corrugated or perforated straps not less than 2 inches wide by 10 inches long; or wire anchors not less than 0.177 inch thick.

2. Stud Wall Type: Designed to engage stud and not less than 0.042 inch thick.

B. Floor Anchors: Floor anchors to be provided at each jamb, formed from A60 metallic coated material, not less than 0.042 inches thick.

C. Mortar Guards: Formed from same material as frames, not less than 0.016 inches thick.

2.6 LOUVERS

A. Metal Louvers: Door manufacturer's standard metal louvers unless otherwise indicated.

1. Blade Type: Vision proof inverted V or inverted Y.
2. Metal and Finish: Galvanized steel, 0.040 inch thick, factory primed for paint finish with baked enamel or powder coated finish. Match pre-finished door paint color where applicable.

B. Louvers for Fire Rated Doors: Metal louvers with fusible link and closing device, listed and labeled for use in doors with fire protection rating of 1-1/2 hours and less.

1. Manufacturers: Subject to compliance with requirements, provide door manufacturers standard louver to meet rating indicated.
2. Metal and Finish: Galvanized steel, 0.040 inch thick, factory primed for paint finish with baked enamel or powder coated finish. Match pre-finished door paint color where applicable.

2.7 LIGHT OPENINGS AND GLAZING

A. Stops and Moldings: Provide stops and moldings around glazed lights where indicated. Form corners of stops and moldings with butted or mitered hairline joints at fabricator’s shop. Fixed and removable stops to allow multiple glazed lights each to be removed independently. Coordinate frame rabbet widths between fixed and removable stops with the type of glazing and installation indicated.

B. Moldings for Glazed Lights in Doors and Loose Stops for Glazed Lights in Frames: Minimum 20 gauge thick, fabricated from same material as door face sheet in which they are installed.

C. Fixed Frame Moldings: Formed integral with hollow metal frames, a minimum of 5/8 inch (16 mm) high unless otherwise indicated. Provide fixed frame moldings and stops on outside of exterior and on secure side of interior doors and frames.

D. Preformed Metal Frames for Light Openings: Manufacturer's standard frame formed of 0.048-inch-thick, cold rolled steel sheet; with baked enamel or powder coated finish; and approved for use in doors of fire protection rating indicated. Match pre-finished door paint color where applicable.

E. Glazing: Comply with requirements in Division 08 Section "Glazing" and with the hollow metal door manufacturer's written instructions.

1. Factory Glazing: Factory install glazing in doors as indicated. Doors with factory installed glass to include all of the required glazing material.

2.8 ACCESSORIES

A. Mullions and Transom Bars: Join to adjacent members by welding or rigid mechanical anchors.

B. Grout Guards: Formed from same material as frames, not less than 0.016 inches thick.

2.9 FABRICATION

A. Fabricate hollow metal work to be rigid and free of defects, warp, or buckle. Accurately form metal to required sizes and profiles, with minimum radius for thickness of metal. Where practical, fit and assemble units in manufacturer's plant. When shipping limitations so dictate, frames for large openings are to be fabricated in sections for splicing or splining in the field by others.

B. Tolerances: Fabricate hollow metal work to tolerances indicated in ANSI/SDI A250.8.

C. Hollow Metal Doors:

1. Exterior Doors: Provide optional weep-hole openings in bottom of exterior doors to permit moisture to escape where specified.
2. Glazed Lights: Factory cut openings in doors with applied trim or kits to fit. Factory install glazing where indicated.
3. Louvers: Factory cut openings in door and install louvers into prepared openings where indicated.
4. Astragals: Provide overlapping astragals as noted in door hardware sets in Division 08 Section "Door Hardware" on one leaf of pairs of doors where required by NFPA 80 for fire-performance rating or where indicated. Extend minimum 3/4 inch beyond edge of door on which astragal is mounted.
5. Continuous Hinge Reinforcement: Provide welded continuous 12 gauge strap for continuous hinges specified in hardware sets in Division 08 Section "Door Hardware".

D. Hollow Metal Frames:

1. Shipping Limitations: Where frames are fabricated in sections due to shipping or handling limitations, provide alignment plates or angles at each joint, fabricated of same thickness metal as frames.
2. Welded Frames: Weld flush face joints continuously; grind, fill, dress, and make smooth, flush, and invisible.

    a. Welded frames are to be provided with two steel spreaders temporarily attached to the bottom of both jambs to serve as a brace during shipping and handling. Spreader bars are for bracing only and are not to be used to size the frame opening.

3. Sidelight and Transom Bar Frames: Provide closed tubular members with no visible face seams or joints, fabricated from same material as door frame. Fasten members at crossings and to jambs by butt welding.
4. High Frequency Hinge Reinforcement: Provide high frequency hinge reinforcements at door openings 48-inches and wider with mortise butt type hinges at top hinge locations.
5. Continuous Hinge Reinforcement: Provide welded continuous 12 gauge straps for continuous hinges specified in hardware sets in Division 08 Section "Door Hardware".
6. Provide countersunk, flat- or oval-head exposed screws and bolts for exposed fasteners unless otherwise indicated for removable stops, provide security screws at exterior locations.
7. Hospital (Terminated) Stops: Where indicated on the drawings, provide frame stops that terminate six inches above the bottom of each jamb. Close the bottom of the stop at a 45 degree angle.
8. Mortar Guards: Provide guard boxes at back of hardware mortises in frames at all hinges and strike preps regardless of grouting requirements.
9. Floor Anchors: Weld anchors to bottom of jambs and mullions with at least four spot welds per anchor.
10. Jamb Anchors: Provide number and spacing of anchors as follows:

    a. New Masonry Type: Locate anchors not more than 18 inches from top and bottom of frame. Space anchors not more than 32 inches o.c. and as follows:

        1) Two anchors per jamb up to 60 inches high.
        2) Three anchors per jamb from 60 to 90 inches high.
        3) Four anchors per jamb from 90 to 120 inches high.
        4) Four anchors per jamb plus 1 additional anchor per jamb for each 24 inches or fraction thereof above 120 inches high.

    b. Stud Wall Type: Locate anchors not more than 18 inches from top and bottom of frame. Space anchors not more than 32 inches o.c. and as follows:

        1) Three anchors per jamb up to 60 inches high.
        2) Four anchors per jamb from 60 to 90 inches high.
        3) Five anchors per jamb from 90 to 96 inches high.
        4) Five anchors per jamb plus 1 additional anchor per jamb for each 24 inches or fraction thereof above 96 inches high.
        5) Two anchors per head for frames above 42 inches wide and mounted in metal stud partitions.
11. Door Silencers: Except on weatherstripped or gasketed doors, drill stops to receive door silencers. Silencers to be supplied by frame manufacturer regardless if specified in Division 08 Section "Door Hardware".
12. Frame Undercoating: Where frames are fully grouted with an approved Portland Cement based grout or mortar, coat inside of frame throat with a water-based frame undercoating or asphaltic emulsion coating to a minimum thickness of 3 mils DFT, tested in accordance with UL 10C and applied to the frame under a 3rd party independent follow-up service procedure.

E. Hardware Preparation: Factory prepare hollow metal work to receive template mortised hardware; include cutouts, reinforcement, mortising, drilling, and tapping according to

the Door Hardware Schedule and templates furnished as specified in Division 08 Section "Door Hardware."

1. Locate hardware as indicated, or if not indicated, according to ANSI/SDI A250.8.
2. Reinforce doors and frames to receive non-template, mortised and surface mounted door hardware.
3. Comply with applicable requirements in ANSI/SDI A250 specifications for preparation of hollow metal work for hardware.
4. Coordinate locations of conduit and wiring boxes for electrical connections with Division 26 Sections.

2.10 STEEL FINISHES

A. Prime Finishes: Doors and frames to be cleaned, and chemically treated to insure maximum finish paint adhesion. Surfaces of the door and frame exposed to view to receive a factory applied coat of rust inhibiting shop primer.

1. Shop Primer: Manufacturer's standard, fast-curing, lead and chromate free primer complying with ANSI/SDI A250.10 acceptance criteria; recommended by primer manufacturer for substrate; and compatible with substrate and field-applied coatings.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Examine substrates, areas, and conditions, with Installer present, for compliance with requirements for installation tolerances and other conditions affecting performance of the Work.

B. General Contractor to verify the accuracy of dimensions given to the steel door and frame manufacturer for existing openings or existing frames (strike height, hinge spacing, hinge back set, etc.).

C. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 PREPARATION

A. Remove welded in shipping spreaders installed at factory. Restore exposed finish by grinding, filling, and dressing, as required to make repaired area smooth, flush, and invisible on exposed faces.

B. Prior to installation, adjust and securely brace welded hollow metal frames for square, level, twist, and plumb condition.

C. Tolerances shall comply with SDI-117 "Manufacturing Tolerances Standard Steel Doors and Frames."

D. Drill and tap doors and frames to receive non-template, mortised, and surface-mounted door hardware.

3.3 INSTALLATION

A. General: Install hollow metal work plumb, rigid, properly aligned, and securely fastened in place; comply with Drawings and manufacturer's written instructions.

B. Hollow Metal Frames: Install hollow metal frames of size and profile indicated. Comply with ANSI/SDI A250.11 and NFPA 80 at fire rated openings.

1. Set frames accurately in position, plumbed, leveled, aligned, and braced securely until permanent anchors are set. After wall construction is complete and frames properly set and secured, remove temporary braces, leaving surfaces smooth and undamaged. Shim as necessary to comply with installation tolerances.
2. Floor Anchors: Provide floor anchors for each jamb and mullion that extends to floor, and secure with post-installed expansion anchors.
3. Masonry Walls: Coordinate installation of frames to allow for solidly filling space between frames and masonry with mortar.
4. Grout Requirements: Grout shall be mixed to provide a 4 inch (102 mm) maximum slump consistency, hand troweled into place. Grout mixed to a thin "pumpable" consistency shall not be used.

C. Hollow Metal Doors: Fit hollow metal doors accurately in frames, within clearances specified below. Shim as necessary.

1. Non-Fire-Rated Standard Steel Doors:

    a. Jambs and Head: 1/8 inch plus or minus 1/16 inch.
    b. Between Edges of Pairs of Doors: 1/8 inch plus or minus 1/16 inch.
    c. Between Bottom of Door and Top of Threshold: Maximum 3/8 inch.
    d. Between Bottom of Door and Top of Finish Floor (No Threshold): Maximum 3/4 inch.

2. Fire-Rated Doors: Install doors in accordance with NFPA 80.

D. Field Glazing: Comply with installation requirements in Division 08 Section "Glazing" and with hollow metal manufacturer's written instructions.

3.4 ADJUSTING AND CLEANING

A. Final Adjustments: Check and readjust operating hardware items immediately before final inspection. Leave work in complete and proper operating condition. Remove and replace defective work, including hollow metal work that is warped, bowed, or otherwise unacceptable.

B. Remove grout and other bonding material from hollow metal work immediately after installation.

C. Prime-Coat and Painted Finish Touchup: Immediately after erection, sand smooth rusted or damaged areas of prime coat, or painted finishes, and apply touchup of compatible air drying, rust-inhibitive primer, zinc rich primer (exterior and galvanized openings) or finish paint.

END OF SECTION 081113

SECTION 081416 - FLUSH WOOD DOORS

PART 1 - GENERAL

1.1 SUMMARY

A. Related Documents:
1. Drawings and general provisions of the Subcontract apply to this Section.
2. Review these documents for coordination with additional requirements and information that apply to work under this Section.

B. Section Includes:
1. Flush solid core wood doors.

C. Related Sections:
1. Division 08 Section "Hollow Metal Doors and Frames"
2. Division 08 Section "Hardware".
3. Division 08 Section "Glazing".

1.2 REFERENCES

A. General:
1. The following documents form part of the Specifications to the extent stated. Where differences exist between codes and standards, the one affording the greatest protection shall apply.
2. Unless otherwise noted, the referenced standard edition is the current one at the time of commencement of the Work.
3. Refer to Division 01 Section "General Requirements" for the list of applicable regulatory requirements.

B. ASTM E90 Standard Test Method for Laboratory Measurement of Airborne Sound Transmission Loss of Building Partitions and Elements

C. California Building Code (CBC) Standard 7-2: Fire Tests of Door Assemblies

D. National Fire Protection Association (NFPA) 80: Fire Doors and Windows.

E. NFPA Standard 252: Fire Tests for Door Assemblies.

F. Underwriters Laboratories (UL) Standard 10B: Fire Tests of Door Assemblies.

G. UL Standard 10C: Positive Pressure Fire Tests of Door Assemblies.

H. Window and Door Manufacturers' Association (WDMA) Industry Standard I.S.1 Series - Industry Standard for Wood Flush Doors.

I. Woodwork Institute (WI): Manual of Millwork Standards , Section 12.

1.3 SUBMITTALS

A. Submit under provisions of Division 01 Section "General Requirements."

B. Product Data: Manufacturer's product literature, specifications and installation instructions.

C. Shop Drawings: Door elevations, type, fire rating, WIC grade, dimensions, swing, core type, blocking for hardware, veneer, finish, cutout locations and details.

D. Samples: 12 by 12 inches (300 by 300 mm) for approval of transparent wood finish.

E. Certifications: Certification of compliance with applicable requirements of WDMA I.S.1 and WIC.

F. Closeout Submittals: Warranty.

1.4 QUALITY ASSURANCE

A. Comply with requirements of WDMA I.S.1 and WIC. Where conflicts occur, the more stringent shall apply.

B. Regulatory Requirements:
1. California Building Code (CBC) Chapters 7 and 10.
2. Fire and Smoke-and-Draft Assembly Labeled Doors:
a. NFPA 252, CBC Standard 7-2.
b. UL 10B and 10C.
3. Installed Door and Frame Assemblies: NFPA 80.

C. Manufacturer Qualifications: A qualified manufacturer that is certified for chain of custody by an FSC-accredited certification body.

1.5 DELIVERY, STORAGE AND HANDLING

A. Deliver, store and handle wood doors in accordance with requirements of WIC and manufacturer's recommendations.

B. Do not deliver or install doors until conditions for temperature and relative humidity have been stabilized in accordance with WIC requirements.

1.6 WARRANTY

A. Provide for replacing, rehanging and refinishing wood doors exhibiting manufacturing or material defects.

B. Warranty Period:
1. Interior Doors: Life of the original installation.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

A. Algoma Hardwoods, Inc.;

B. Eggers Industries;

C. Marshfield DoorSystems, Inc.

D. Or Equal.

2.2 MATERIALS

A. Solid Core Flush Wood Doors:
1. WIC [Custom] [Premium] grade, 1 ¾ inches (45 mm) thick, staved lumber or particleboard core, 5-ply construction.
2. Select among the following par.2:
3. Face Veneer: Medium density overlay (MDO) for painted finish.

4. Face Veneer: [White maple] [White birch] for transparent finish, [cut], [matched].
5. Adhesive: Exterior Doors - Type I; interior Doors - Type II.

6. Blocking for Hardware: Provide blocking such that no throughbolting is required for hardware installation. Provide blocking for closers on all doors whether or not closers are scheduled.

<Include Par. 3, 4 and/or 5 if required:>

B. Smoke-and-Draft and Fire Rated Doors: 1 ¾ inches (45 mm) thick, match non-rated door appearance.
1. Core: Staved lumber or particleboard core construction for 20 minute rated doors, mineral core required for longer ratings.

C. Accessories:
1. Glazing: Comply with Division 08 Section "Glazing".
2. Glazing Stops: Algoma, flush wood or wood veneered bead, labeled type required for fire rating, match door veneer.
3. Door Louvers:
a. Non-Rated Doors: Algoma, wood louver recessed bead WL-4-RE, species to match door veneer.
b. Fusible Link Louvers: Note: Not permitted on fire rated doors where smoke-draft assemblies are required. Anemostat "FLDL-UL", or equal, UL labeled for use in fire rated doors, factory primed.

2.3 FABRICATION

A. Fabricate doors in accordance with requirements of specified standards.
1. Factory prefit wood doors.
2. Shop prepare doors to receive hardware; refer to Division 08 Section "Door Hardware"- for hardware requirements, templates, and locations.
a. Factory machine doors for mortise hardware.
b. Consult with Glenn Skipper, ext. 6125, and Pat DuPont, ext. 7668, on the following paragraph. Omit par. if not applicable.
c. Electrical Hardware and Devices: Prepare doors and frames to receive electrical hardware specified in Division 08 Section "Door Hardware", [and security/card access and fire alarm devices].
3. Bevel strike edge of single-acting doors 1/8 inch in 2 inches (3 mm in 50 mm).
4. Make cutouts for glass [and louvers].

B. Fire and Smoke-and-Draft Rated Doors:
1. Labels: UL or ITS/Warnock-Hersey.
a. Items provided with labels other than the fire resistive rating shown on the Door Schedule are not permitted and will be rejected.
b. Install labels where visible when doors are installed, in open position.

2. Provide maximum allowable edge strips of wood species to match face veneers.

3. [Provide astragals and metal edge trim for meeting edges of double doors [, veneer wrapped in same species as door face.]

4. [Metal meeting edges for double doors are not acceptable.]

C. Finish: Factory finish in accordance with WI System 5, transparent, clear, satin sheen.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Examine frames and conditions under which doors are to be installed. Proceed with the work only when frames and conditions are satisfactory.

3.2 INSTALLATION

A. Install doors in accordance with reference standards and with manufacturer's recommendations and instructions.
   1. Install fire rated doors in accordance with NFPA 80 and the manufacturer's fire test report installation data.
      a. Field cutting of fire rated doors is not permitted.
   2. Coordinate installation of doors with frames specified in 08 Section "Hollow Metal Doors and Frames", and hardware specified Division 08 Section "Door Hardware" [including electrified hardware] [and] glazing specified in 08 Section "Glazing"] [and] [security/card access] [and] [fire alarm] items in Division 16.].

B. Rehang or replace doors which do not operate or swing freely.

C. Protection: Protect wood surfaces after installation. At Substantial Completion, doors shall be without indication of use, deterioration, or damage.

END OF SECTION 081416

SECTION 08 71 00

DOOR HARDWARE

PART 1 - GENERAL

1.01 RELATED DOCUMENTS

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

1.02 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. Thresholds, gasketing and weather-stripping.
10. 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. Division 8: Section - Steel Doors and Frames.
2. Division 8: Section - Wood Doors.
3. Division 8: Section - Aluminum Storefront
4. Division 28: Section - Fire/Life-Safety Systems & Security Access Systems.

1.03 REFERENCES (USE DATE OF STANDARD IN EFFECT AS OF BID DATE.)

A. 2019 California Building Code, CCR, Title 24.

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 Other Opening Protectives
2. NFPA 105 - Smoke and Draft Control Door Assemblies

F. UL - Underwriters Laboratories.

1. UL 10C - Fire Tests of Door Assemblies
2. UL 305 - Panic Hardware

G. WHI - Warnock Hersey Incorporated

H. SDI - Steel Door Institute

1.04 SUBMITTALS & 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. Include a Cover Sheet with;
   a. Job Name, location, telephone number.
   b. Architects name, location and telephone number.
   c. Contractors name, location, telephone number and job number.
   d. Suppliers name, location, telephone number and job number.
   e. Hardware consultant's name, location and telephone number.

2. Job Index information included;
   a. Numerical door number index including; door number, hardware heading number and page number.
   b. Complete keying information (referred to DHI hand-book "Keying Systems and Nomenclature"). Provision should be made in the schedule to provide keying information when available; if it is not available at the time the preliminary schedule is submitted.
   c. Manufacturers' names and abbreviations for all materials.
   d. Explanation of abbreviations, symbols, and codes used in the schedule.
   e. Mounting locations for hardware.
   f. Clarification statements or questions.
   g. Catalog cuts and manufacturer’s technical data and instructions.

3. Vertical schedule format sample:

Heading Number 1 (Hardware group or set number – HW -1)						
			(a) 1 Single Door #1 - Exterior from Corridor 101		(b) 90°	(c) RH
			(d) 3' 0"x7' 0" x 1-3/4" x (e) 20 Minute (f) WD x HM			
(g) 1	(h)	(i) ea	(j) Hinges - (k) 5BB1HW 4.5 x 4.5 NRP (l) ½ TMS		(m) 626	(n) IVE
2	6AA	1 ea	Lockset - ND50PD x RHO x RH x 10-025 x JTMS		626	SCH

(a) - Single or pair with opening number and location. (b) - Degree of opening (c) - Hand of door(s) (d) - Door and frame dimensions and door thickness. (e) - Label requirements if any. (f) - Door by frame material. (g) - (Optional) Hardware item line #. (h) - Keyset Symbol. (i) - Quantity. (j) - Product description. (k) - Product Number. (l) - Fastenings and other pertinent information. (m) - Hardware finish codes per ANSI A156.18. (n) - Manufacture abbreviation.

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. Wiring Diagrams: Provide product data and wiring and riser diagrams for all electrical products listed in the Hardware Schedule portion of this section.

F. Keying Schedule: Submit separate detailed schedule indicating clearly how the Owner's final instructions on keying of locks has been fulfilled.

G. 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.

H. Furnish as-built/as-installed schedule with close-out documents, including keying schedule and transcript, wiring/riser diagrams, manufacturers' installation and adjustment and maintenance information.

I. Fire Door Assembly Testing: Submit a written record of each fire door assembly to the Owner to be made available to the Authority Having Jurisdiction (AHJ) for future building inspections.

J. LEED Certification Points: Submit information and certifications necessary to achieve maximum points for LEED certification; coordinate and cooperate with Owner and Architect in providing information necessary for required LEED rating.

1.05 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. To maintain the integrity of patented key systems provide a letter of authorization from the specified manufacturer indicating that supplier has authorization to purchase the key system directly from the manufacturer.
3. Stock parts for products supplied and are 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.

1.06 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. Contractor to inventory door hardware jointly with representatives of hardware supplier and hardware installer until each all are satisfied that count is correct.

E. Exit Doors: Operable from inside with single motion without the use of a key or special knowledge or effort.

F. Product packaging to be labelled in compliance with CA Prop 65, Safe Drinking Water and Toxic Enforcement Act of 1986.

1.07 WARRANTY

A. Provide warranties of respective manufacturers' regular terms of sale from day of final acceptance as follows:

1. Locksets: "ND" Ten (10) years.
2. Electronic: One (1) year.
3. Closers: Thirty (30) years.
4. Exit devices: Three (3) years.
5. All other hardware: Two (2) years.

1.08 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.

1.09 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, Security 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.

PART 2 - PRODUCTS

2.01 MANUFACTURERS

Item	Manufacturer	Acceptable Substitutes
Hinges	Ives	Hager, Stanley, McKinney
Locks, Latches & Cylinders	Schlage	Or Approved Equal
Exit Devices	Von Duprin	Or Approved Equal
Closers	LCN	Or Approved Equal
Push, Pulls & Protection Plates	Ives	Trimco, BBW, DCI
Flush Bolts	Ives	Trimco, BBW, DCI
Dust Proof Strikes	Ives	Trimco, BBW, DCI
Coordinators	Ives	Trimco, BBW, DCI
Stops	Ives	Trimco, BBW, DCI
Overhead Stops	Glynn-Johnson	Or Approved Equal
Thresholds	Zero	Pemko, National Guard
Seals & Bottoms	Zero	Pemko, National Guard

2.02 MATERIALS

A. Hinges: Exterior out-swinging door butts shall be non-ferrous material and shall have stainless steel hinge pins. All doors to have non-rising pins.

1. Hinges shall be sized in accordance with the following:
   a. Height:
      1) Doors up to 42" wide: 4-1/2" inches.
      2) Doors 43" to 48" wide: 5 inches.
   b. Width: Sufficient to clear frame and trim when door swings 180 degrees.
   c. Number of Hinges: Furnish 3 hinges per leaf to 7'-5" in height. Add one for each additional 2 feet in height.

2. Furnish non-removable pins (NRP) at all exterior out-swing doors and interior key lock doors with reverse bevels.

B. Floor Closers: Shall be equipped with compression springs, cam and roller operating mechanism and a one piece spindle-cam for maximum operating performance and longevity.

C. Pivots: High strength forgings and castings with precision bearings for smooth operation. Positive locking vertical adjustment mechanism to allow installer to precisely position the door and balance the load.

D. Continuous Hinges: As manufactured by Ives, an Allegion Company. UL rated as required. (No continuous hinges per District)

E. Heavy Duty Cylindrical Locks and Latches: Schlage "ND" Series as scheduled with "Rhodes" design, fastened with through-bolts and threaded chassis hubs.

1. Provide cylindrical locksets exceeding the ANSI/BHMA A156.2 Grade 1 performance standards for strength, security, and durability in the categories below:
   a. Abusive Locked Lever Torque Test – minimum 3,100 inch-pounds without gaining access
   b. Offset lever pull – minimum 1,600 foot pounds without gaining access
   c. Vertical lever impact – minimum 100 impacts without gaining access

2. Cycle life - tested to minimum 16 million cycles per ANSI/BHMA A156.2 Cycle Test with no visible lever sag or use of performance aids such as set screws or spacers
3. UL 10C for 4'-0" x 10'-0" 3-hour fire door.
4. Cylinders: Refer to "KEYING" article, herein.
5. Provide solid steel anti-rotation through bolts and posts to control excessive rotation of lever.
6. Provide lockset that allows lock function to be changed to over twenty other common functions by swapping easily accessible parts.
7. Provide locks with standard 2-3/4 inches (70 mm) backset, unless noted otherwise, with 1/2 inch latch throw capable of UL listing of 3 hours on a 4' x 10' opening. Provide proper latch throw for UL listing at pairs.
8. Provide locksets with separate anti-rotation thru-bolts, and no exposed screws.
9. Provide independently operating levers with two external return spring cassettes mounted under roses to prevent lever sag.
10. Provide standard ASA strikes unless extended lip strikes are necessary to protect trim.
11. Provide wired electrified options as scheduled in the hardware sets.
    a. 12 through 24 volt DC operating capability, auto-detecting
    b. Selectable EL (fail safe)/EU (fail secure) operating mode via switch on chassis
    c. 0.230A (230mA) maximum current draw
    d. 0.010A (10mA) holding current
    e. Modular / "plug in" request to exit switch

12. Lever Trim: Solid cast levers without plastic inserts, and wrought roses on both sides.

F. Deadlocks: Rotating cylinder trim rings of attack-resistant design. Mounting plates and actuator shields of plated cold-rolled steel. Mounting screws of ¼" diameter steel and protected by drill-resistant ball bearings. Steel alloy deadbolt with hardened steel roller. Strike alloy deadbolt with reinforcer and two 3" long screws. ANSI A156.5, 2001 Grade 1 certified.

G. Exit devices: Von Duprin as scheduled.

1. Provide certificate by independent testing laboratory that device has completed over 1,000,000 cycles and can still meet ANSI/BHMA A156.3 - 2001 standards.
2. All internal parts shall be of cold-rolled steel with zinc dichromate coating.
3. Mechanism case shall have an average thickness of .140".
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 ¾" 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 .130" 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 CBC Section 11B.404.2.7 and shall be mounted between 34" and 44" above the finished floor surface.
    a. Provide exit devices UL certified to meet maximum 5 pound requirements according to the California Building Code section 11B-309.4, and UL listed for Panic Exterior Fire Exit Hardware maximum opening force of 15 pounds according to the California Building Code section 11B-404.2.9.

15. Hardware (including panic hardware) shall not be provided with "Night Latch" (NL) function for any accessible doors or gates unless the following conditions are met per DSA Interpretation 10-08 DSA/AC (External). Revised 4/28/09). Such conditions must be clearly demonstrated and indicated in the specification.
    a. Such hardware has a 'dogging' feature.
    b. It is dogged during the time the facility is open.
    c. Such 'dogging' operation is performed only by employees as their job function (non-public use).

H. 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. Provide the manufactures drop plates, brackets and spacers as required at narrow head rails and special frame conditions. NO wood plates or spacers will be allowed.
8. Maximum effort to operate closers shall not exceed 5 lbs., 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 closer may be increased but shall not exceed 15 lbs. when specifically approved by fire marshal. All closers shall be adjusted to operate with the minimum amount of opening force and still close and latch the door. These forces do not apply to the force required to retract latch bolts or disengage other devices that hold the door in a closed position. Per 11B-404.2.8.1, door shall take at least 5 seconds to move from an open position of 90 degrees to a position of 12 degrees from the latch jamb.

I. Flush Bolts & Dust Proof Strikes: 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.

1. Manual flush bolts only permitted on storage or mechanical openings as scheduled.
2. Provide dust proof strikes at openings using bottom bolts.

J. Door Stops:

1. Unless otherwise noted in Hardware Sets, provide floor 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 (CBC Section 11B-307).
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.

K. 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.

L. 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 Division 7 “Thermal and Moisture Protection”.
3. Use ¼” fasteners, red-head flat-head sleeve anchors (SS/FHSL).
4. Thresholds shall comply with CBC Section 11B-404.2.5.

M. Seals: Provide silicone gasket at all rated and exterior doors.

1. Fire-rated Doors, Resilient Seals: UL10C Classified complies with NFPA 80 & NFPA 252. Coordinate with selected door manufacturers' and selected frame manufacturers' requirements.
2. Fire-rated Doors, Intumescent Seals: Furnished by selected door manufacturer. Furnish fire-labeled opening assembly complete and in full compliance with UL10C Classified complies with NFPA 80 & NFPA 252. Where required, intumescent seals vary in requirement by door type and door manufacture -- careful coordination required.

3. Smoke & Draft Control Doors, Provide UL10C Classified complies with NFPA 80 & NFPA 252 for use on “S” labeled Positive Pressure door assemblies.

N. Door Shoes & Door Top Caps: Provide door shoes at all exterior wood doors and top caps at all exterior out-swing doors.

O. 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.

2.03 KEYING

A. Furnish PrimusXP “Classic” keyway Patent Protected Schlage cylinders where noted. Furnish all other cylinders in matching conventional “Classic” keyway. Furnish Patent Protected Schlage keys for all cylinders. (e.g. Primus XP Classic Keyway for patent protected / Maximum control) (with mix of conventional “Classic” keyway)

B. Furnish construction keying for doors requiring locking during construction.

1. For FSIC systems provide 23-030-ICX Full Size Construction Cores
2. For FSIC systems provide ten 48-101-ICX Construction Keys
3. For FSIC systems provide two 48-056-ICX Control Keys (const.)
4. For FSIC systems provide two control keys for installing the permanent cores (49-056 for “Classic” keyways, 48-052-XP for “Classic Primus”) (49-003 for “Everest Conventional”, 48-005–XP for “Everest Primus”)

C. Furnish all keys with visual key control.

1. Stamp key “Do Not Duplicate”.
2. Stamp (BHMA) key symbol on key.
3. Delete key section identifier from the key bow.

D. Furnish all cylinders with visual key control.

1. Stamp unique owner supplied code on cylinder side. (CKC) (6 character maximum).

E. Furnish mechanical keys as follows:

1. Furnish 2 cut change keys for each different change key code.
2. Furnish 1 uncut key blank for each change key code.
3. Furnish 6 cut masterkeys for each different masterkey set.
4. Furnish 3 uncut key blanks for each masterkey set.
5. Furnish 2 cut control keys cut to the top masterkey for permanent I/C cylinders.
6. Furnish 1 cut control key cut to each SKD combination.

F. Furnish Schlage Padlocks and the cylinders to tie them into the masterkey system for gates, storage boxes, utility valve security, roof hatches and roll-up doors keyed as directed in the keying schedule.

1. Furnish KS43D2200 padlock for use with non-I/C Schlage cylinders. Furnish 47-413 (conventional) or 47-743-XP (PrimusXP) with above.
2. Furnish KS43G3200 padlock for use with FSIC Schlage cylinders. Furnish 23-030 (Classic / Everest) or 20-740 (PrimusXP) with above.
3. Furnish KS41D1200 padlock for use with SFIC Schlage cylinders. Furnish 80-037 (Everest-B) with above.

G. Furnish one Schlage cabinet lock for each cabinet door or drawer so designated on the drawings or keying schedule to match the masterkey system.

1. Furnish CL100PB for use with non-I/C Schlage cylinders.
2. Furnish CL77R for use with FSIC Schlage cylinders.
3. Furnish CL721G for use with SFIC Schlage cylinders.

2.04 FINISHES

A. Generally to be satin chrome US26D (626 on bronze and 652 on steel) unless otherwise noted.

B. Furnish push plates, pull plates and kick or armor plates in satin stainless steel US32D (630) unless otherwise noted.

C. Door closers shall be powder-coated to match other hardware, unless otherwise noted.

D. Aluminum items to be finished anodized aluminum except thresholds which can be furnished as standard mill finish.

2.05 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

3.01 INSPECTION

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.

3.02 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 34" and 44" AFF.

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.

H. Hardware Installer shall coordinate with security contractor to route cable to connect electrified locks, panic hardware and fire exit hardware to power transfers or electric hinges at the time these items are installed so as to avoid disassembly and reinstallation of hardware.

I. Hardware Installer shall also be present with the security contractor when the power is turned on for the testing of the electronic hardware applications. Installer shall make adjustments to solenoids, latches, vertical rods and closers to insure proper and secure operation.

J. All wiring for electro-mechanical hardware mounted on the door shall be connected through the power transfer and terminated in the interface junction box specified for in the Electrical Section.

K. Conductors shall be minimum 18 gage stranded, multicolored. A minimum 12 in. loop of conductors shall be coiled in the interface junction box. Each conductor shall be permanently marked with its function.

L. If a power supply is specified in the hardware sets, all conductors shall be terminated in the power supply. Make all connections required for proper operation between the power supply and the electro-mechanical hardware. Provide the proper size conductors as specified in the manufacturer’s technical documentation.

3.03 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, return to that work area 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.

3.04 HARDWARE LOCATIONS

A. Conform to CCR, Title 24, Part 2; and ADAAG; and the drawings for access-compliant positioning requirements for the disabled.

3.05 FIELD QUALITY CONTROL

A. Contractor is responsible for providing the services of an Architectural Hardware Consultant (AHC) or a proprietary product technician to inspect installation and certify that hardware and its installation have been furnished and installed in accordance with manufacturers' instructions and as specified herein.

3.06 SCHEDULE

A. The items listed in the following schedule shall conform to the requirements of the foregoing specifications.

B. While the hardware schedule is intended to cover all doors, and other movable parts of the building, and establish type and standard of quality, the contractor is responsible for examining the Plans and Specifications and furnishing proper hardware for all openings whether listed or not. If there are any omissions in hardware groups in regard to regular doors they shall be called to the attention of the Architect prior to bid opening for instruction; otherwise, list will be considered Complete. No extras will be allowed for omissions.

C. The Door Schedule on the Drawings indicates which hardware set is used with each door.

Manufacturers Abbreviations (Mfr.)

ADA	=	Adams Rite Mfg.	Aluminum Door Hardware
GLY	=	Glynn-Johnson Corporation	Overhead Door Stops
IVE	=	Ives	Hinges, Pivots, Bolts, Coordinators, Dust Proof Strikes, Push Pull & Kick Plates, Door Stops & Silencers
JOH	=	L.E. Johnson	Sliding Door Hardware
LCN	=	LCN	Door Closers
SCE	=	Schlage Electronics	Electronic Door Components
SCH	=	Schlage Lock Company	Locks, Latches & Cylinders
TRI	=	Trimco	Signs
VON	=	Von Duprin	Exit Devices
ZER	=	Zero International	Thresholds, Gasketing & Weather-stripping

HARDWARE GROUP NO. 01

QTY		DESCRIPTION	CATALOG NUMBER	FINISH	MFR
3	EA	HINGE	5BB1 4.5 X 4.5 NRP	630	IVE
1	EA	VANDL STOREROOM LOCK	ND96JD RHO (Reuse (E)	626	SCH
1	EA	PRIMUS CORE	20-740 (Reuse (E)	626	SCH
1	EA	SURFACE CLOSER	4040XP EDA	689	LCN
1	EA	FLOOR STOP	FS18S (Use round wall stop if possible)	BLK	IVE
1	EA	JAMB SEAL	328AA-S	AA	ZER
1	EA	HEAD SEAL	429AA-S	AA	ZER
1	EA	DOOR SWEEP	39A (Brush type per District)	A	ZER
1	EA	THRESHOLD	PER DETAIL	AL	ZER

HARDWARE GROUP NO. 02

QTY		DESCRIPTION	CATALOG NUMBER	FINISH	MFR
3	EA	HINGE	5BB1HW 5 X 4.5 NRP	630	IVE
1	EA	VANDL STOREROOM LOCK	ND96JD RHO (Reuse (E)	626	SCH
1	EA	PRIMUS CORE	20-740 (Reuse (E)	626	SCH
1	EA	SURFACE CLOSER	4040XP EDA	689	LCN
1	EA	FLOOR STOP	FS18S (Use round wall stop if possible)	BLK	IVE
1	EA	JAMB SEAL	328AA-S	AA	ZER
1	EA	HEAD SEAL	429AA-S	AA	ZER
1	EA	DOOR SWEEP	39A (Brush type per District)	A	ZER
1	EA	THRESHOLD	PER DETAIL	AL	ZER

HARDWARE GROUP NO. 03

QTY		DESCRIPTION	CATALOG NUMBER	FINISH	MFR
3	EA	HINGE	5BB1 4.5 X 4.5	630	IVE
1	EA	VANDL STOREROOM LOCK	ND96JD RHO (Reuse (E)	626	SCH
1	EA	PRIMUS CORE	20-740 (Reuse (E)	626	SCH
1	EA	SURFACE CLOSER	4040XP	689	LCN
1	EA	WALL STOP	WS406/407CCV	630	IVE
1	EA	GASKETING	328AA-S	AA	ZER
1	EA	DOOR SWEEP	253A (Brush type per District)	A	ZER
1	EA	THRESHOLD	PER DETAIL	AL	ZER

HARDWARE GROUP NO. 04

QTY		DESCRIPTION	CATALOG NUMBER	FINISH	MFR
3	EA	HINGE	5BB1 4.5 X 4.5 NRP	630	IVE
1	EA	PANIC HARDWARE	CD-PA-AX-99-NL	626	VON
1	EA	RIM CYLINDER	20-057 ICX	626	SCH
1	EA	MORTISE CYLINDER	26-091 ICX XQ11-948	626	SCH
1	EA	PRIMUS CORE	20-740 (Reuse (E)	626	SCH
1	EA	SURFACE CLOSER	4040XP EDA	689	LCN
1	EA	FLOOR STOP	FS18S (Use round wall stop if possible)	BLK	IVE
1	EA	JAMB SEAL	328AA-S	AA	ZER
1	EA	HEAD SEAL	429AA-S	AA	ZER
1	EA	DOOR SWEEP	39A (Brush type per District)	A	ZER
1	EA	THRESHOLD	PER DETAIL	AL	ZER

HARDWARE GROUP NO. 05

QTY		DESCRIPTION	CATALOG NUMBER	FINISH	MFR
3	EA	HINGE	5BB1 4.5 X 4.5 NRP	630	IVE
1	EA	PANIC HARDWARE	CD-PA-AX-99-NL	626	VON
1	EA	RIM CYLINDER	20-057 ICX	626	SCH
1	EA	MORTISE CYLINDER	26-091 ICX XQ11-948	626	SCH
1	EA	PRIMUS CORE	20-740 (Reuse (E)	626	SCH
1	EA	OH STOP	100S (Use round wall stop if possible)	630	GLY
1	EA	SURFACE CLOSER	4040XP EDA	689	LCN
1	EA	JAMB SEAL	328AA-S	AA	ZER
1	EA	HEAD SEAL	429AA-S	AA	ZER
1	EA	DOOR SWEEP	39A (Brush type per District)	A	ZER
1	EA	THRESHOLD	PER DETAIL	AL	ZER

HARDWARE GROUP NO. 06

QTY		DESCRIPTION	CATALOG NUMBER	FINISH	MFR
3	EA	HINGE	5BB1 4.5 X 4.5 NRP	630	IVE
1	EA	VANDL VESTIBULE LOCK	ND93JD RHO XN12-035 (Reuse (E)	626	SCH
2	EA	PRIMUS CORE	20-740 (Reuse (E)	626	SCH
1	EA	SURFACE CLOSER	4040XP EDA	689	LCN
1	EA	FLOOR STOP	FS18S (Use round wall stop if possible)	BLK	IVE
1	EA	JAMB SEAL	328AA-S	AA	ZER
1	EA	HEAD SEAL	429AA-S	AA	ZER
1	EA	DOOR SWEEP	39A (Brush type per District)	A	ZER
1	EA	THRESHOLD	PER DETAIL	AL	ZER

HARDWARE GROUP NO. 07

QTY		DESCRIPTION	CATALOG NUMBER	FINISH	MFR
3	EA	HINGE	5BB1 4.5 X 4.5 NRP	630	IVE
1	EA	VANDL VESTIBULE LOCK	ND93JD RHO XN12-035 (Reuse (E)	626	SCH
2	EA	PRIMUS CORE	20-740 (Reuse (E)	626	SCH
1	EA	OH STOP	90S (Use round wall stop if possible)	630	GLY
1	EA	SURFACE CLOSER	4040XP	689	LCN
1	EA	GASKETING	328AA-S	AA	ZER
1	EA	DOOR SWEEP	253A (Brush type per District)	A	ZER
1	EA	THRESHOLD	PER DETAIL	AL	ZER

HARDWARE GROUP NO. 08

QTY		DESCRIPTION	CATALOG NUMBER	FINISH	MFR
3	EA	HINGE	5BB1 4.5 X 4.5 NRP	630	IVE
1	EA	VANDL VESTIBULE LOCK	ND93JD RHO XN12-035 (Reuse (E)	626	SCH
2	EA	PRIMUS CORE	20-740 (Reuse (E)	626	SCH
1	EA	OH STOP	100S (Use wall stop if possible)	630	GLY
1	EA	SURFACE CLOSER	4040XP EDA	689	LCN
1	EA	JAMB SEAL	328AA-S	AA	ZER
1	EA	HEAD SEAL	429AA-S	AA	ZER
1	EA	DOOR SWEEP	39A (Brush type per District)	A	ZER
1	EA	THRESHOLD	PER DETAIL	AL	ZER

HARDWARE GROUP NO. 09

QTY		DESCRIPTION	CATALOG NUMBER	FINISH	MFR
3	EA	HINGE	5BB1 4.5 X 4.5 NRP	630	IVE
1	EA	VANDL OFFICE LOCK	ND91JD RHO (Reuse (E)	626	SCH
1	EA	PRIMUS CORE	20-740 (Reuse (E)	626	SCH
1	EA	SURFACE CLOSER	4040XP EDA	689	LCN
1	EA	FLOOR STOP	FS18S (Use round wall stop if possible)	BLK	IVE
1	EA	JAMB SEAL	328AA-S	AA	ZER
1	EA	HEAD SEAL	429AA-S	AA	ZER
1	EA	DOOR SWEEP	39A (Brush type per District)	A	ZER
1	EA	THRESHOLD	PER DETAIL	AL	ZER

HARDWARE GROUP NO. 10

QTY		DESCRIPTION	CATALOG NUMBER	FINISH	MFR
3	EA	HINGE	5BB1 4.5 X 4.5 NRP	630	IVE
1	EA	CLASSROOM DEADBOLT	B663J	626	SCH
1	EA	PRIMUS CORE	20-740 (Reuse (E)	626	SCH
1	EA	PUSH PLATE	8200 4" X 16"	630	IVE
1	EA	PULL PLATE	8302 8" 6" X 16"	630	IVE
1	EA	SURFACE CLOSER	4040XP EDA	689	LCN
1	EA	FLOOR STOP	FS18S (Use round wall stop if possible)	BLK	IVE
1	EA	JAMB SEAL	328AA-S	AA	ZER
1	EA	HEAD SEAL	429AA-S	AA	ZER
1	EA	DOOR SWEEP	39A (Brush type per District)	A	ZER
1	EA	THRESHOLD	PER DETAIL	AL	ZER

HARDWARE GROUP NO. 11

QTY		DESCRIPTION	CATALOG NUMBER	FINISH	MFR
6	EA	HINGE	5BB1 4.5 X 4.5 NRP	630	IVE
1	EA	REMOVABLE MULLION	KR4954 STAB	689	VON
1	EA	PANIC HARDWARE	CD-PA-AX-99-NL	626	VON
1	EA	PANIC HARDWARE	PA-AX-99-EO	626	VON
1	EA	RIM CYLINDER	20-057 ICX	626	SCH
1	EA	MORTISE CYLINDER	26-091 ICX	626	SCH
1	EA	MORTISE CYLINDER	26-091 ICX XQ11-948	626	SCH
3	EA	PRIMUS CORE	20-740	626	SCH
2	EA	SURFACE CLOSER	4040XP EDA	689	LCN
2	EA	FLOOR STOP	FS18S (Use round wall stop if possible)	BLK	IVE
1	EA	JAMB SEAL	328AA-S	AA	ZER
1	EA	HEAD SEAL	429AA-S	AA	ZER
1	EA	THRESHOLD	PER DETAIL	AL	ZER

HARDWARE GROUP NO. 12

QTY	DESCRIPTION	CATALOG NUMBER	FINISH	MFR
OPENING OMITTED FROM PLANS				

END OF SECTION

SECTION 088000 - GLAZING

PART 1 - GENERAL

1.1 SUMMARY

A. Related Documents:
1. Drawings and general provisions of the Subcontract apply to this Section.
2. Review these documents for coordination with additional requirements and information that apply to work under this Section.

B. Section Includes:
1. Glass and glazing required throughout Project and not specified as a part of other Sections.

C. Related Sections:
1. Division 08 Section "Hollow Metal Doors and Frames."
2. Division 08 Section "Flush Wood Doors."

1.2 REFERENCES

A. General:
1. The following documents form part of the Specifications to the extent stated. Where differences exist between codes and standards, the one affording the greatest protection shall apply.
2. Unless otherwise noted, the referenced standard edition is the current one at the time of commencement of the Work.
3. Refer to Division 01 Section "General Requirements" for the list of applicable regulatory requirements.

B. "Glazing Manual" published by Flat Glass Marketing Assn.

C. "Safety Standard for Architectural Glazing Materials (16 CFR 1201) CI and CII issued by the Consumer Product Safety Commission.

D. California Building Code, Chapter 16 as modified by Division 01 Section "Lateral Force Procedures", and Chapter 24.

E. ANSI Z 97.1, "Safety Glass Test Requirements".

F. ASTM International.

1.	ASTM C864	Standard Specification for Dense Elastomeric Compression Seal Gaskets, Setting Blocks, and Spacers
2.	ASTM C1036	Standard Specification for Flat Glass
3.	ASTM C1048	Standard Specification for Heat-Treated Flat Glass—Kind HS, Kind FT Coated and Uncoated Glass
4.	ASTM E774	Standard Specification for the Classification of the Durability of Sealed Insulating Glass Units. (This standard is withdrawn and no replacement has been issued).

G. DD-G-1403.

H. Sealed Insulating Glass Manufacturers Association (SIGMA) Recommendations.

I. BAAQMD Regulation 8-51 - Adhesive and Sealant Products.

1.3 SYSTEM DESCRIPTION

A. Install each piece of glass watertight and airtight. Each installation shall withstand local, normal temperature changes, wind loading, impact loading (for operating sash and doors) without failure of any kind, including loss or breakage of glass, failure of sealants or gaskets to remain watertight, deterioration of glazing materials, and other defects of work.

B. Where no thickness of glass is given in the glass schedule, it shall be determined by glass manufacturer for the wind loads specified in the California Building Code Chapter 16 as modified by Division 01 Section "Lateral Force Procedures".

1.4 SUBMITTALS

A. Product Data: Manufacturer's product data, material safety data sheets, and specifications for installations indicated, listing specific materials proposed. Indicate completely, recommendations for use of primers, joint preparation and sealant dimensions, and shall state shelf life (from date of shipment by manufacturer to expiration date for use on a project) for the material. Provide necessary information required to translate batch number code into date of manufacture and to thereby determine the latest date of usage from manufacturer's shelf life requirements.

B. Samples:
1. Each glass type required, minimum size 12 by 12 inches (300 by 300 mm).
2. Each type of glazing material and available colors, and accessories.

C. Certifications:
1. Certification that all insulating units furnished comply with Class CBA of ASTM E774 and the performance specified.
2. Certification that all sealants are fully compatible with the surfaces and finishes with which they are in contact.

D. Closeout Submittals: Material Safety Data: Sealant and adhesive quantity use for in accordance with requirements of BAAQMD Regulation 8-51.

E. LEED Submittals:

1.5 QUALITY ASSURANCE

A. Regulatory Requirements: Glazing materials and installation shall comply with the requirements of Bay Area Air Quality Management District Regulation 8-51.

1.6 DELIVERY, STORAGE AND HANDLING

A. Package and deliver glass in manufacturer's sealed unopened containers, fully identified, and each pane clearly labeled with manufacturer's name and product designation.

B. Protect glass from damage and store in accordance with manufacturer's recommendations. Keep handling to a minimum. Protect edges of laminated and insulated glass from damage.

C. Glazing Sealants:
1. Deliver sealants and related accessories to the job site in factory sealed, unopened containers bearing manufacturer's name, product designation and batch number.
2. Store in unopened containers. Follow manufacturer's recommendations for storage temperatures and shelf life (see "Submittals" above).
3. Follow manufacturer's recommendations for handling products containing toxic materials. Keep flammable material away from heat, sparks and open flame. Use recommended solvents and cleaning agents for cleaning tools, equipment and skin.

1.7 ENVIRONMENTAL CONDITIONS

A. Perform no glazing operations when ambient temperature is at or below 40 deg F (4.4 deg C).

1.8 WARRANTIES

A. Insulating Glass Units: Warrant for 10 years from date of acceptance of Project to be free from delamination and failure of seals and not to develop material obstruction of vision as a result of dust, moisture or film formation on internal glass surfaces.

B. Low-E Glass: Warrant for 10 years from date of acceptance of Project to be free of peeling or other deterioration of the Low-E coating.

C. Laminated Glass: Warrant for 10 years from date of acceptance of Project to be free from delamination and discoloration.

D. Glazing Sealants: Warranty for 10 years per sealant manufacturer's standard warranty of merchantable quality. Warranty shall certify that cured sealants:
1. Will perform as a watertight weatherseal.
2. Will not become brittle or crack due to weathering or normal expansion and contraction of adjacent surfaces.
3. Will not harden beyond a Shore A durometer of 50, nor soften below a durometer of 10.
4. Will not change color when used with compatible back-up materials.
5. Will not bleed.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

A. Glass Manufacturers: PPG, LOF, Guardian Industries, Ford Glass, Hordis Brothers Inc., or equal. Provide all tinted and Low-E glass from the same manufacturer for the entire project.

2.2 MATERIALS

A. Glass types, thicknesses and fabricated assemblies are scheduled in the Glass Schedule included in PART 3. EXECUTION of this Section. Where no thickness is given, it shall be determined by glass manufacturer as specified in Article 1.04 System Description of this Section. Adjacent tinted and Low-E glass shall have the same light transmittance.
1. Clear Annealed Float Glass: Clear float glass conforming to ASTM C 1036, Type I, Class 1, quality q3.
2. Heat Strengthened Clear Float Glass: As specified for clear annealed float glass except heat strengthened to conform to ASTM C 1048, Kind HS.
3. Tempered Clear Float Glass: As specified for clear annealed float glass except fully tempered to conform to ASTM C 1048, Kind FT.
4. Annealed Tinted Float Glass: Glare reducing float glass conforming to ASTM C 1036, Type I, Class 2, quality q3, 1/4 inch (6 mm) thick.
   a. PPG "Solex", green color, or equal.
   b. LOF "Blue-Green ", blue-green color, or equal.
   c. PPG "Azurelite", blue color, no substitutions.
   d. PPG "Solargray", gray color, or equal.
   e. PPG "Solarbronze", bronze color, or equal.
5. Heat Strengthened Tinted Float Glass: As specified for annealed tinted float glass except heat strengthened to conform to ASTM C 1048, Kind HS.
6. Tempered Tinted Float Glass: As specified for annealed tinted float glass except fully tempered to conform to ASTM C 1048, Kind FT.
7. Clear Wire Glass: 1/4 inch (6 mm) thick, clear rolled glass conforming to ASTM C-1036, Type II (flat), Class I, Form 1 (wired and polished both faces), wired with welded polished wires, 1/2 inch (13 mm) x 1/2 inch (13 mm) square pattern, smooth wires vertical, manufactured by Hordis Bros., Sierracin/Transtech, or equal.
8. Annealed Obscure Glass: Conforming to ASTM C 1036, Type II, Class I, Form 3, Finish 1, pattern p3 "hammered" texture glass.
9. Tempered Obscure Glass: As specified for annealed obscure glass except conforming to ASTM C 1048, kind FT.
10. Obscure Wire Glass: As specified for Clear Wire Glass, except Form 3, Finish 1, pattern p3 "hammered" texture glass.

11. Clear Fire Rated Tempered Safety Glass, 20 Minute Rated: "Pyroswiss", no known equal, with UL or Warnock-Hersey label, manufactured by Nippon Electric Glass Co., Ltd., and distributed by Technical Glass Products, 2425 Carillon Point, Kirkland, WA 98003, Tel. 1-800-426-0279.
12. Clear Fire Rated Safety Glass Ceramic, 20 - 90 Minute Rated: "Firelite Plus", no known equal, with UL or Warnock-Hersey label, manufactured by Nippon Electric Glass Co., Ltd., and distributed by Technical Glass Products, 2425 Carillon Point, Kirkland, WA 98003, Tel. 1-800-426-0279.
13. nnealed Low-E Clear Float Glass: PPG "Sungate 500(2)", or equal, clear float glass with transparent reflective coating on inboard (No. 2) surface, conforming to ASTM C 1036, Type I, Class 2, quality q3.
14. Tempered Low-E Clear Float Glass: PPG "Sungate 500(2) ", or equal, [clear][tinted] float glass with transparent reflective coating on inboard (No. 2) surface, tempered to conform to ASTM C 1048, Kind FT.
15. Annealed Low-E Tinted Float Glass: PPG "Sungate 500(2)", or equal, clear float glass with transparent reflective coating on inboard (No. 2) surface, conforming to ASTM C 1036, Type I, Class 2, quality q3.
16. Heat Strengthened Low-E Tinted Float Glass: PPG "Sungate 500(2)", or equal, tinted float glass with transparent reflective coating on inboard (No. 2) surface, heat strengthened to conform to ASTM C 1048, Kind HS.
17. Tempered Low-E Tinted Float Glass: PPG "Sungate 500(2) ", or equal, [clear][tinted] float glass with transparent reflective coating on inboard (No. 2) surface, tempered to conform to ASTM C 1048, Kind FT.
18. Heat Strengthened Low-E Tinted Float Glass: PPG "Sungate 1000(2)", or equal, tinted float glass with transparent reflective coating on inboard (No. 2) surface, heat strengthened to conform to ASTM C 1048, Kind HS.
19. Tempered Low-E Tinted Float Glass: PPG "Sungate 1000(2)", or equal, tinted float glass with transparent reflective coating on inboard (No. 2) surface, tempered to conform to ASTM C 1048, Kind FT.
20. Spandrel Glass: Tempered spandrel glass conforming with DD-G-1403, Grade B, Style II, color as shown or selected by University.
21. Insulating Glass:
    a. Manufacturer And Unit Fabrication: By a member of the Sealed Insulating Glass Manufacturers Assn. (SIGMA) and fabricated in accordance with SIGMA recommendations, except where more stringent requirements are indicated.
    b. Class: "CBA" and certified as such by the Insulating Glass Certification Council (IGCC).
    c. Construction: ASTM E 774 organic elastomeric sealed edge (no metal edges permitted) consisting of a polyisobutylene primary seal and a silicone secondary seal, with the interior air space hermetically sealed and provided with a concealed desiccant agent. Secondary seals other than silicone shall not be used.
    d. Where visible through the glass, the exposed surface of the metal spacer tube shall be painted with thermosetting, siliconized acrylic paint, or equal, color to match the color of aluminum frame at the interior of the building.
    e. Configuration: As per Glass Schedule.
22. Laminated Glass: Fabricated using heat and pressure with Monsanto, or approved equal, clear polyvinyl butyral sheet interlayer, configuration of assembly as per Glass Schedule. Laminated glass shall conform to requirements of Reference Standard 1.2.B.
23. Glazing Materials and Accessories: Glazing materials and accessories shall be fully compatible with the materials and finishes with which they are in contact. Neoprene and EPDM materials shall not come in contact with silicone sealant materials. Silicone rubber spacers, setting and edge blocks and gaskets shall be either Type I (designed to prevent adhesion) or Type II (designed for adhesion) as per glazing system manufacturer's recommendations for each condition of use.
    a. Glazing Tapes: Preformed, preshimmed polyisobutylene-butyl tape, 1/2 inch (13 mm) wide x thickness to suit proper face clearance of glass, black color; "Pecora BB-50 Extru-Seal", PTI "606", Tremco Preshimmed #440, or "Polyshim" ("Polyshim" only where glass lites exceed 150 united inches), or equal.
    b. Glazing Sealants: One component, silicone based sealant, black color; Dow-Corning "795" or General Electric "Silpruf 2000", or equal. Sealants shall be recommended by the manufacturer for the particular condition of use.
    c. Glazing Sealants (Butt Glazing And Steel Windows): One component, silicone based sealant, black color except clear color at butt glazing; Dow-Corning "795" or "999-A", or General Electric "Gesil N 2600", "SCS 100" or "SCS 1200", or equal, as per manufacturer's recommendations for the particular condition of use.
    d. Primers (If Required For Sealants): Non-staining and non-etching type as recommended by sealant manufacturer.
    e. Setting Blocks: Neoprene, EPDM or silicone rubber conforming to ASTM C 864, 80-90 Shore A durometer hardness, and which will permit permanent mounting. Blocks shall be 0.1 inch (2.5 mm) long for each square foot of glass area (but no less than 4 inches (100 mm)) x 1/16 inches (1.6 mm) less than full channel width and of thickness to provide proper bite and minimum edge

clearance for glass. Where length of block may become excessive, lead blocks having a length of 0.05" for each square foot of glass (4 inches (100 mm) minimum) may be used. Do not use lead blocks for insulating, laminated or wire glass.

f. Edge Blocks: Neoprene, EPDM or silicone rubber conforming to ASTM C 864, 60-70 Shore A durometer hardness, and which will permit permanent mounting. Blocks shall be 3 inches (75 mm) minimum length x full channel width and of thickness or configuration to provide 1/8 inch (3 m) (nom.) clearance between block and glass edge.

g. Glazing Spacers: Neoprene, EPDM or silicone rubber conforming to ASTM C 864, 60-70 Shore A durometer hardness, size as required by glazing conditions, continuous (do not use intermittent spacers).

h. Insulation (Glass Spandrels): Owens-Corning Fiberglas "CW 225-FSK", or approved equal, fiberglass, semi-rigid, friction fit board with integral aluminum foil vapor barrier, "R" value as indicated on Drawings. Include galvanized steel mounting channels as required by job conditions.

2.3 FABRICATION

A. Cut glass to full fit and play, consistent with glass and glazing material manufacturers' recommendations and the requirements of the Drawings and References, Codes and Standards Article.

B. Follow code requirements and glass manufacturer's recommendations for minimum bite and edge and face clearances.

C. Cut lights to smooth straight edges, clean, free of nicks and flares; nipping not permitted. Follow glass manufacturer's directions exactly for tinted and Low-E glass.

D. Where glass edges (including cut openings) are required to be exposed, grind smooth and polish.

E. Tempered and heat strengthened glass shall be horizontally treated only. Fabrication and treatment shall, where at all possible, be such that roller distortion lines (where they may occur) will run horizontally (parallel to sill and head) after installation.

F. Glass Identification:
1. Tempered and heat strengthened glass shall bear the manufacturer's identification as to type and thickness.
2. Glazing in fire rated doors and fire rated windows shall bear UL classification marking in accordance with UL 9.
3. Manufacturer's and UL identifications for glazing shall be permanently etched so as to be visible after glass has been set in place and glazed.
4. Glass other than tempered, heat strengthened and UL-marked glass shall not have labels.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Inspect surfaces to receive glazing materials and report defects which might adversely affect the glazing work. Commencing work implies acceptance of surfaces as satisfactory.

B. Weep systems shall be open.

C. Surfaces shall be free of condensation and moisture.

D. Steel surfaces shall be primed and dry.

3.2 PREPARATION

A. Clean rebates and glazing reveals free of foreign matter, special coatings, dust, grease, projections and irregularities prior to setting glass. Solvents used for cleaning shall not etch or damage glass or metal surfaces.

B. Wipe glass free of dust and oil.

3.3 INSTALLATION

A. Conform to recommendations of glass manufacturer where such covers points not shown on Drawings or specified herein.

B. Remove "loose" stops furnished with the units and reinstall as a part of the glazing operation.

C. Handle lites so as to prevent nicks and flares on glass edges.

D. Install glass exceeding 1/8" thickness on identical setting blocks permanently mounted and centered at 1/4 points. If necessary to reduce deflection of horizontal supporting member, blocks may be placed at 1/8 points or with the nearest end 6" (whichever is greater) from edge of glass unit. Ensure that blocks are equidistant from centerline of glass. Do not obstruct weep holes.

E. Provide permanently mounted edge blocks at head and jambs of dry-glazed lights to prevent damage to glass edges during installation and lateral shifting of glass due to thermal and seismic loads and vibrations. Follow recommendations of Flat Glass Marketing Assn. Glazing Manual.

F. Set glass to maintain bite, edge and face clearance stipulated by code and the glass manufacturer.

G. Take special precautions to protect laminated glass edges from deterioration of vinyl interlayer by moisture.

H. Glaze dry-glazed aluminum doors and frames as per manufacturer's directions using glazing gaskets and seals furnished with the units.

I. Miter gaskets at corners, and install so as to prevent pulling away at corners. Gaskets with gaps or other visible irregularities on door and window units shall be corrected by manufacturer or fabricator at no additional cost to University.

J. Set interior non-wired glass in fixed stops with glazing tape one face.

K. Wire glass installed in metal frames and stops shall be embedded in metal sash putty, and all exposed joints between the metal and the glass struck and pointed.

<Delete the following paragraph as appropriate.>

L. Steel Windows:
1. Clean surfaces to receive glazing materials.
2. Apply glazing tape against fixed stops with corners butted tightly (do not overlap). Install head and sill tape first and extend full width of opening. Tape shall be straight without dips and so placed that it will finish flush with top of stop after glass is installed.
3. Set glass on glazing blocks at 1/4 points (if required by size) and properly position glass in opening. Remove paper backing from tape and press glass against tape to ensure full contact.
4. Snap stops in place making sure that exterior glazing sealant reveal is maintained all around.
5. Apply glazing sealant in exterior reveal all four sides. Tool to uniform, smooth bead with 1/16" watershed surface.

<Delete the following 3 paragraphs if appropriate.>

M. Where butted glass without mullions is required, seal with silicone sealant in strict accord with sealant and glass manufacturer's directions. Set glass so that joint is plumb and glass edges are aligned to provide for a uniform joint width of 3/8" (max.). Mask edges of glass to confine sealant to joints and to avoid contact with either face. Use primers where so required. Neatly tool joints to slightly concave surface using recommended tooling agent. Remove masking from glass and clean glass surfaces completely free of sealant material.

N. Set pattern glass with smooth side to exterior, and to room side of corridors.

O. Insulation (Spandrel Glass): Attach mounting channels for insulation to aluminum framing members in accord with glass manufacturer's recommendations and so as to maintain a minimum distance of l" between glass

surface and insulation face. Cut insulation to fit tightly. Orient foil vapor barrier to the interior. Seal edges, joints, penetrations, tears and holes with compatible adhesive foil tape.

P. Close and tightly seal all partly used sealant containers, and store protected in well-ventilated area at temperature recommended by sealant manufacturer.

3.4 FIELD QUALITY CONTROL

A. Conduct field check (test) of glazing in exterior for water leakage in accordance with AAMA 501.2.

B. After substantial cure of exterior glazing sealants which are exposed to the weather, test for water leaks. Flood the joint exposure with water directed from a 3/4 inch (38 mm) garden hose held perpendicular to the wall face, 24 inches (600 mm) from the joint, connected to a water system with 43 psf minimum static water pressure. Move stream of water along joint at an approximate rate of 20 feet (6 m) per minute.

C. Test approximately 5 percent of total glazing system in locations which are typical of every joint condition and which can be inspected easily for leakage on opposite face. Conduct tests in presence of the Project Manager, who will determine actual percentage of joints to be tested and the actual period of exposure to water from hose, based upon extent of observed leakage or lack thereof.

D. Repair glazing installation at leaks or, where leakage is excessive, replace glazing sealants.

E. Where nature of observed leakage indicates possibility of inadequate glazing joint bond strength, the Project Manager may direct that additional testing be performed at a time when joints have been fully cured, followed by natural exposure through both extreme temperatures, and returned to range of temperature in which it is feasible to conduct testing. Repair or replace work as required for permanent elimination of leakage.

<Include the following Article as appropriate.>

3.5 WASTE MANAGEMENT

A. Separate float glass and place in designated containers for recycling.

B. Separate tempered glass and place in designated containers for recycling.

C. Separate corrugated cardboard in accordance with the approved Waste Management Plan in Division 01 Section "Construction Waste Management", and place in designated containers for recycling.

D. Place used sealant containers in designated containers for legal disposal.

3.6 CLEANING

A. Initial cleaning of glass surfaces is a part of this Section. Follow glass manufacturer's directions exactly for cleaning tinted and Low-E glass. Do not use abrasive cleaners or sharp instruments. Final cleaning and periodic cleaning of glass for protection from etching due to alkaline runoff from cementitious surfaces or due to construction soil is a part of the General Subcontract and is specified as a part of Division 01.

3.7 PROTECTION

A. Protect installed glass from damage due to subsequent construction operations.

B. Identification or caution markers shall not be applied to glass surfaces nor shall they be applied to metal surfaces in any way which would damage or stain the metal.

C. Replace glass broken or damaged prior to acceptance of Project. Costs occasioned by replacement shall be borne by those causing the damage.

3.8 GLASS SCHEDULE

A. Glass types are indicated on Drawings.

Glass Type	Material or Assembly
lA	~~Annealed clear float glass, 1/4 inch (6 mm) thick.~~
~~2A~~	~~Heat strengthened clear float glass, 1/4 inch (6 mm) thick.~~
3A	Tempered clear float glass, 1/4 inch (6 mm) thick.
3B	~~Tempered clear float glass, 3/8 inch (thick.~~
~~3C~~	~~Tempered clear float glass, 1/2 inch (13 mm) thick.~~
~~3D~~	~~Tempered clear float glass, 3/4 inch (19 mm) thick.~~
~~4A~~	~~Annealed tinted float glass, 1/4 inch (6 mm) thick.~~
~~4B~~	~~Heat strengthened tinted float glass, 1/4 inch (6 mm) thick.~~
~~4C~~	~~Tempered tinted float glass, 1/4 inch (6 mm) thick.~~
~~5A~~	~~Annealed Low-E clear float glass, 1/4 inch (6 mm) thick.~~
~~5B~~	~~Tempered Low-E clear float glass, 1/4 inch (6 mm) thick.~~
~~6A~~	~~Heat strengthened Low-E tinted float glass, 1/4 inch (6 mm) thick.~~
~~6B~~	~~Tempered Low-E tinted float glass, 1/4 inch (6 mm) thick.~~
~~7A~~	~~Spandrel glass, 1/4 inch (6 mm) thick.~~
~~7B~~	~~Spandrel glass, 1/4 inch (6 mm) thick, with insulation.~~
~~8A~~	~~Annealed obscure glass, 1/4 inch (6 mm) thick.~~
~~8B~~	~~Tempered obscure glass, 1/4 inch (6 mm) thick.~~
~~9A~~	~~Clear wire glass, 1/4 inch (6 mm) thick.~~
~~9B~~	~~Obscure wire glass, 1/4 inch (6 mm) thick.~~
10A	~~Insulating glass fabricated with 1/4 inch (6 mm) thick clear annealed float glass outboard light, 1/2 inch (13 mm) air space and 1/4 inch (6 mm) thick clear annealed float glass inboard light.~~
10B	Insulating glass fabricated with 1/4 inch (6 mm) thick tempered clear float glass outboard light, 1/2 inch (13 mm) air space and 1/4 inch (6 mm) thick clear tempered float glass inboard light.
11A	~~Insulating glass fabricated with 1/4 inch (6 mm) thick tinted annealed float glass outboard light, 1/2 inch (13 mm) air space and 1/4 inch (6 mm) thick clear annealed float glass inboard light.~~
~~11B~~	~~Insulating glass fabricated with 1/4 inch (6 mm) thick tinted heat strengthened float glass outboard light, 1/2 inch (13 mm) air space and 1/4 inch (6 mm) thick clear annealed float glass inboard light.~~
~~11C~~	~~Insulating glass fabricated with 1/4 inch (6 mm) thick tempered tinted float glass outboard light, 1/2 inch (13 mm) air space and 1/4 inch (6 mm) thick clear tempered float glass inboard light.~~
~~12A~~	~~Insulating glass fabricated with 1/4 inch (6 mm) thick tinted Low-E annealed float glass outboard light, 1/2 inch (13 mm) air space and 1/4 inch (6 mm) thick clear annealed float glass inboard light.~~
~~12B~~	~~Insulating glass fabricated with 1/4 inch (6 mm) thick tinted Low-E heat strengthened float glass outboard light, 1/2 inch (13 mm) air space and 1/4 inch (6 mm) thick clear annealed float glass inboard light.~~
~~12C~~	~~Insulating glass fabricated with 1/4 inch (6 mm) thick tempered tinted Low-E float glass outboard light, 1/2 inch (13 mm) air space and 1/4 inch (6 mm) thick clear tempered float glass inboard light.~~
l3A	Laminated glass fabricated with one layer [inner][outer] of 1/4 inch (6 mm) thick heat strengthened clear float glass and one layer [inner][outer] of 1/4 inch (6 mm) thick, tempered clear float glass with 0.060" interlayer.

END OF SECTION 088000

SECTION 099100 - PAINTING

PART 1 - GENERAL

1.1 SUMMARY

A. Related Documents:
1. Drawings and general provisions of the Subcontract apply to this Section.
2. Review these documents for coordination with additional requirements and information that apply to work under this Section.
3. Refer to other Sections for references to painting work included under this Section.

B. Section Includes:
1. Field application of paints and coatings.
2. Unless otherwise specified or shown, paint all surfaces and items which are exposed to view, including those out of doors or on roofs.
3. Surface preparation.

C. Related Sections:
1. Division 08 Section "Hollow Metal Doors and Frames" for shop primed items.
2. Division 08 Section "Flush Wood Doors" for shop primed items.

D. Surfaces Not To Be Painted:
1. Prefinished items, except prefinished items specified to be field painted in Article [3.03] [and] [3.09].
2. Walls or ceilings of concealed or inaccessible areas.
3. Fire or smoke rating labels on doors or frames.
4. Equipment name plates.
5. Fire sprinkler heads.
6. Heat detectors.
7. Smoke detectors.
8. Piping identification labels.
9. Moving parts of mechanical or electrical equipment.
10. Galvanized chain link fences and gates.
11. Galvanized traffic bumper rails.

1.2 REFERENCES

A. General:
1. The following documents form part of the Specifications to the extent stated. Where differences exist between codes and standards, the one affording the greatest protection shall apply.
2. Unless otherwise noted, the referenced standard edition is the current one at the time of commencement of the Work.
3. Refer to Division 01 Section "General Requirements" for the list of applicable regulatory requirements.[1]

1.3 SUBMITTALS

A. Submit under provisions of Division 01 Section "General Requirements."

B. Product Data:
1. Materials List: Complete list of proposed manufacturers and products.
2. Manufacturer's Specifications: Manufacturer’s technical information for each product, including paint analysis and application instructions.
3. Material safety data sheets for each product.

C. Samples:

1. Preliminary Samples: 8-1/2" x 11" samples of each color, texture and sheen on glossy card stock.
2. Field Samples: After preliminary samples have been approved, apply field samples at locations designated by Project Manager for final approval.
   a. Do not prepare interior field samples until permanent lighting is in place and operating.

D. Closeout Submittals:
1. Two copies of manufacturer's color and sheen formula, and 4" x 6" color chips, for each final color used in the Project.
2. Product Usage Records: Three copies of product usage records for each paint, coating and solvent product used in the project. Include product name, amount used, description of use and use location, and period of time over which the product was used.

1.4 QUALITY ASSURANCE

A. Applicator Qualifications: Company specializing in performing the work of this section with minimum [3] [5] years [documented] successful experience in work of similar scope.

B. Regulatory Requirements:
1. Bay Area Air Quality Management District (BAAQMD) Regulation 8-3 - Architectural Coatings.
2. Products containing chromates, cadmium, lead, or mercury or are not permitted.

C. Manufacturer's Instructions: Perform painting work in accordance with manufacturer's written instructions and recommendations.

D. Pre-Installation Meeting: Before painting begins, meet with Project Manager, Architect and Subcontractor to discuss painting work, color schedule, product compliance, and hazardous material remediation.

1.5 DELIVERY, STORAGE AND HANDLING

A. Deliver materials to the Project in original, new, unbroken packages and containers bearing manufacturer's name and label, with:
1. Name of material, color and sheen.
2. Manufacturer’s name, product number and date of manufacture.
3. Contents by volume of major pigments, vehicle constituents and volatile organic compound (VOC) content.
4. Thinning and application instructions.

1.6 PROJECT CONDITIONS

A. Comply with paint manufacturer's instructions on temperature and humidity conditions under which materials can be applied.

1.7 MAINTENANCE STOCK

A. Provide [1] full gallon/s of each type and color of finish coats used on the Project. Label with paint manufacturer, paint type, product number, color, sheen and its representative use on the Project.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

A. Acceptable Manufacturers: Kelly Moore or equal.

2.2 MATERIALS

A. Material Quality:
1. Provide premium quality materials. Materials not bearing manufacturer's identification as a premium-grade product are not acceptable.
2. Should manufacturer's specifications or product numbers change, provide its current equal or better product.
3. Primer and undercoats are to be of same manufacturer as final coat.
4. Materials left from previous jobs are not acceptable.
5. Use only thinners approved by paint manufacturer, and use only within recommended limits.
6. Etching Solutions: As recommended by paint manufacturer for the use intended.
7. Solvents: Non-petroleum based, as recommended by paint manufacturer for the use intended.
8. Crack Filler: Elastomeric, approved by paint manufacturer for the particular use intended.

B. Finish Coat Coordination: Provide finish coats which are compatible with prime paints used.
1. Review other Sections in which prime paints are provided. Ensure compatibility of total coating systems.
2. Upon request from other trades, furnish information on characteristics of finish materials proposed for use.
3. Provide barrier coats over incompatible primers, or remove and reprime.
4. Notify LBNL in writing of any problems anticipated in use of specified coating systems with substrates primed by others.

2.3 COLORS

A. General:
1. Color to be selectedby owner.
2. Use of proprietary names in color selections does not imply exclusion of equivalent products of other manufacturers.

B. Finish coat colors shall be factory mixed.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Examine areas and conditions under which painting work is to be applied.

B. Do not paint over dirt, rust, scale, grease, oil, dust, moisture, scuffed or damaged surfaces, or conditions detrimental to a durable paint life.

C. Starting work indicates acceptance of conditions of surfaces and within any particular area.

3.2 PREPARATION

A. Perform preparation and cleaning procedures in accordance with paint manufacturer's instructions and as specified for substrate condition.

B. Remove hardware, accessories, and items in place and not to be painted, or provide protection prior to surface preparation and painting. Reinstall removed items after painting.

C. Clean surfaces before applying paint. Remove oil and grease prior to mechanical cleaning. Schedule cleaning so contaminants from cleaning process do not fall onto wet, newly painted surfaces.

D. Moisture Content: Do not paint over surfaces where moisture content exceeds manufacturer's instructions.

E. Ferrous Metals:

1. Bare Surfaces: Clean of oil, dirt, loose mill scale, and other foreign substances [with solvent or by mechanical cleaning] [by commercial blast Sspc-Sp6].
2. Shop Applied Primer: Touch up where damaged or bare using same type of primer as adjacent surfaces.
3. Galvanized Surfaces: Clean free of oil and surface contaminants using etching solution, and rinse with water to neutralize

F. Non-Ferrous Metals: Remove contaminants with water, detergent or solvents. Allow metal to dry, then abrade to remove surface oxides.

G. Gypsum Board: Remove dust, and repair surface imperfections. Spot-prime defects after repair.

H. Wood: Clean wood surfaces of dirt, oil or other foreign substances. Sand smooth surfaces exposed to view, and remove dust.
1. Scrape and clean seasoned knots, apply thin coat of recommended knot sealer before applying prime coat.
2. After primer coat is dry, fill holes and surface defects with putty or plastic wood filler, sand smooth when dry.
3. Prime, stain or seal wood immediately upon delivery to job. Prime all faces, sides, ends, undersides, backsides, cutouts and edges.
4. Wood Doors: Seal bottom and top edges, and all cutouts, with 2 coats of paint, varnish or sealer.

I. Mix painting materials in accordance with manufacturer’s instructions.

J. Store materials in tightly covered containers. Maintain containers used in storage, mixing and application of paint in a clean condition, free of foreign materials and residue.
1. Cover containers of coatings or solvents when not in use.

K. Stir materials before application to produce mixture of uniform density, and stir as required during application. Do not stir surface film into material, strain material before using if necessary.

L. Manufacturer's Inspection of Surfaces: Prior to painting, paint manufacturer shall inspect surfaces in order to verify proper surface preparation and primer.

3.3 APPLICATION

A. Apply paint in accordance with manufacturer’s instructions. Use applicators and techniques best suited for substrate and type of material being applied.
1. Apply additional coats when stains or blemishes show through final coat, until paint is a uniform finish, color and appearance.
2. Ensure dry film thickness at corners and crevices is equivalent to that of flat surfaces.
3. Sand lightly between each succeeding enamel or varnish coat.
4. Paint surfaces behind movable equipment and furniture same as similar exposed surfaces. Paint surfaces behind permanently fixed equipment and furniture with prime coat only.
5. Paint interior surfaces of ducts, where visible through registers or grilles, with black, non-specular flat paint.
6. Paint backs and sides of access panels and removable or hinged covers to match exposed surfaces.
7. Finish exterior doors on tops, bottoms and side edges same as exterior faces.
8. Paint door louvers, glass stops [and astragals] to match color of door faces.
9. Paint prime coated access panels, grilles, louvers, etc., same color as adjacent surfaces, or, if adjacent surface does not require painting, use color as directed.
10. Prefinished Items To Be Field Painted: Prepare and paint the following prefinished items which are exposed to view in finished spaces, or are out of doors including on roofs. Paint to match adjacent surfaces, unless specified otherwise in Color Schedule Articles [3.07] or [3.08].
    a. Prefinished Mechanical and Electrical Equipment.
    b. Prefinished Electrical or FMCS Panels.
    c. Unistrut Components.
11. Paint ducts and piping which are exposed in finished areas, or are out-of-doors including roofs, to match wall or ceiling color, except as specified otherwise in Color Schedule Articles [ ] [ ] [ ].

B. Scheduling Painting: Apply first coat to surfaces that have been cleaned, pretreated or otherwise prepared for paint as soon as practicable after preparation.
   1. Do not apply materials in areas where dust is being generated, or will be generated, before coatings are thoroughly dry.
   2. Do not commence painting work in an area or space until all firestopping work in that area or space has been completed and inspected.
   3. Allow time between successive coats to permit proper drying.
   4. Do not recoat until paint feels firm and does not deform or feel sticky under moderate thumb pressure.

C. Minimum Coating Thickness: Apply materials at not less than manufacturer's recommended spreading rate, to achieve a total dry film thickness (DFT) as recommended by coating manufacturer.
   1. Dry film thicknesses specified in Articles [3.07] [or] [3.08] are those recommended by ICI for their particular products. Where products of other manufacturers are approved, apply materials at the spreading rate recommended by those manufacturers to achieve their recommended DFT.

D. Prime Coats: Apply to items not previously primed. Recoat primed and sealed surfaces where there is evidence of suction spots or unsealed areas in first coat.

E. Finish Coats: Provide even texture. Leave no laps, irregularity in texture, skid marks, or other surface imperfections.
   1. Opaque Finishes: Provide opaque, uniform finish, color and coverage. Cloudiness, spotting, holidays, brush marks, runs, sags, ropiness or other surface imperfections are not acceptable.
      a. Concrete Floors: Evenly apply abrasive material recommended by paint manufacturer at density in approved sample.
   2. Transparent Finishes: Provide glass smooth surface film of even luster. Cloudiness, color irregularity, runs, brush marks, orange peel, nail holes, or other surface imperfections are not acceptable.

F. Completed Work: Match approved samples for color, texture and coverage. Remove, refinish or repaint work not accepted.

3.4 FIELD QUALITY CONTROL

A. If test results show material being used does not comply with requirements, contractor may be directed to remove non-complying work, pay for testing, and repaint surfaces at no additional cost to the owner.

3.5 CLEANING

A. Remove discarded paint materials, rubbish, cans and rags from site at end of each workday.
   1. Keep flammable materials in approved labeled containers in a well-ventilated area.
   2. Cover containers of coatings or solvent products when not in use.

B. Protection: Protect work of other trades, whether to be painted or not. Correct damage by cleaning, repairing, replacing, or repainting, as acceptable to Project Manager.
   1. Clean glass and paint-spattered surfaces immediately by proper methods of washing and scraping. Do not damage or scratch finished surfaces.
   2. Do not paint fire sprinkler heads, heat detectors, or smoke detectors. If painted by Subcontractor, remove and replace with new items at no additional cost LBNL.
   3. Provide "Wet Paint" signs to protect new painted finishes.
   4. Remove temporary protective wrappings, provided by others for protection of their work, after completion of painting operations.
   5. Do not cover operating mechanical or electrical equipment.

C. Repair: At completion of work by other trades, touch up and restore damaged surfaces or defaced painted surfaces.

3.6 WASTE MANAGEMENT

A. Deliver unused paint in original containers to recycler in accordance with requirements of state and local regulations.

3.7 PAINT SCHEDULE - EXTERIOR COATINGS

1. Metals - Shop Primed Touch Up:
   a. Primer: _____
   b. _____
   c. _____
2. Metals - Galvanized:
   a. Primer: _____
   b. _____
   c. _____
3. Wood (Except Where Stained Finish Is Required):
   a. Primer: _____
   b. _____
   c. _____

3.8 COLOR SCHEDULE

A. Exterior Colors:
   1. C1 Color to be selected by owner.
      Sheen: Semigloss

END OF SECTION 099100