

SECTION 08111 – CUSTOM HOLLOW METAL 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. Custom hollow metal frames.

- B. Related Sections:

- 2. Division 08 Section "Door Hardware" for
- 3. Division 09 Sections "Exterior Painting" and "Interior Painting" for field painting hollow metal frames.
- 4. Division 16 Sections for electrical connections including conduit and wiring for door security and control systems.

1.3 DEFINITIONS

- A. Minimum Thickness: Minimum thickness of base metal without coatings.
- B. Custom Hollow Metal Work: Hollow metal work fabricated according to ANSI/NAAMM-HMMA 861.

1.4 SUBMITTALS

- A. Product Data: For each type of product indicated. Include construction details, material descriptions, core descriptions, fire-resistance rating, and finishes.
- B. Shop Drawings: Include the following:
  - 1. Frame details for each frame type, including dimensioned profiles and metal thicknesses.
  - 2. Locations of reinforcement and preparations for hardware.
  - 3. Details of each different wall opening condition.
  - 4. Details of anchorages, joints, field splices, and connections.
  - 5. Details of accessories.
  - 6. Details of conduit and preparations for power, signal, and control systems.

C. Samples for Verification:

1. For the frames, to demonstrate compliance with requirements for quality of materials and construction:
  - a. Frames: Show profile, corner joint, floor and wall anchors, and silencers. Include separate section showing fixed hollow metal panels and glazing if applicable.

D. Other Action Submittals:

1. Schedule: Provide a schedule of hollow metal work prepared by or under the supervision of supplier, using same reference numbers for details and openings as those on Drawings. Coordinate with door hardware schedule.

E. Oversize Construction Certification: For assemblies required to be fire rated and exceeding limitations of labeled assemblies.

F. Product Test Reports: Based on evaluation of comprehensive tests performed by a qualified testing agency, for each type of hollow metal door and frame assembly.

1.5 QUALITY ASSURANCE

A. Source Limitations: Obtain hollow metal work from single source from single manufacturer.

B. Smoke-Control Door Assemblies: Comply with NFPA 105 or UL 1784.

1.6 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 nonvented plastic.

1. Provide additional protection to prevent damage to finish of factory-finished units.

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- (102-mm-) high wood blocking. Do not store in a manner that traps excess humidity.
  - 1. Provide minimum 1/4-inch (6-mm) space between each stacked door to permit air circulation.

## 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.

## PART 2 - PRODUCTS

### 2.1 MANUFACTURERS

- A. Manufacturers: Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:
  - 1. Ceco Door Products; an Assa Abloy Group company.
  - 2. Curries Company; an Assa Abloy Group company.
  - 3. Kewanee Corporation (The).
  - 4. Pioneer Industries, Inc.
  - 5. Steelcraft; an Ingersoll-Rand company.
  - 6. Windsor Republic Doors.

### 2.2 MATERIALS

- A. Cold-Rolled Steel Sheet: ASTM A 1008/A 1008M, Commercial Steel (CS), Type B; suitable for exposed applications.
- B. Hot-Rolled Steel Sheet: ASTM A 1011/A 1011M, Commercial Steel (CS), Type B; free of scale, pitting, or surface defects; pickled and oiled.
- C. Metallic-Coated Steel Sheet: ASTM A 653/A 653M, Commercial Steel (CS), Type B; with minimum G60 (Z180) or A60 (ZF180) metallic coating.
- D. Frame Anchors: ASTM A 591/A 591M, Commercial Steel (CS), 40Z (12G) coating designation; mill phosphatized.
  - 1. For anchors built into exterior walls, steel sheet complying with ASTM A 1008/A 1008M or ASTM A 1011/A 1011M, hot-dip galvanized according to ASTM A 153/A 153M, Class B.
- E. Inserts, Bolts, and Fasteners: Hot-dip galvanized according to ASTM A 153/A 153M.

- F. Powder-Actuated Fasteners in Concrete: Fastener system of type suitable for application indicated, fabricated from corrosion-resistant materials, with clips or other accessory devices for attaching hollow metal frames of type indicated.
- G. Grout: ASTM C 476, except with a maximum slump of 4 inches (102 mm), as measured according to ASTM C 143/C 143M.
- H. Mineral-Fiber Insulation: ASTM C 665, Type I (blankets without membrane facing); consisting of fibers manufactured from slag or rock wool with 6- to 12-lb/cu. ft. (96- to 192-kg/cu. m) density; with maximum flame-spread and smoke-development indexes of 25 and 50, respectively; passing ASTM E 136 for combustion characteristics.
- I. Glazing: Comply with requirements in Division 08 Section "Glazing."
- J. Bituminous Coating: Cold-applied asphalt mastic, SSPC-Paint 12, compounded for 15-mil (0.4-mm) dry film thickness per coat. Provide inert-type noncorrosive compound free of asbestos fibers, sulfur components, and other deleterious impurities.

## 2.3 CUSTOM HOLLOW METAL FRAMES

- A. General: Fabricate frames of construction indicated. Close contact edges of corner joints tight with faces mitered and stops butted or mitered. Continuously weld faces and soffits and finish faces smooth. Comply with ANSI/NAAMM-HMMA 861.
  - 1. Door Frames for Openings 48 Inches (1219 mm) Wide or Less: Fabricated from 0.053-inch- (1.3-mm-) thick steel sheet.
  - 2. Door Frames for Openings More Than 48 Inches (1219 mm) Wide: Fabricated from 0.067- inch- (1.7-mm-) thick steel sheet.
  - 3. Sidelight and Transom Frames: Fabricated from same thickness material as adjacent door frame.
  - 4. Borrowed-Light Frames: Fabricated from 0.053-inch- (1.3-mm-) thick steel sheet.
- B. Exterior Frames: Formed from metallic-coated steel sheet.
- C. Interior Frames: Fabricated from cold-rolled steel sheet unless metallic-coated sheet is indicated.
- D. Hardware Reinforcement: Fabricate according to ANSI/NAAMM-HMMA 861 with reinforcing plates from same material as frame.
- E. Head Reinforcement: Provide minimum 0.093-inch- (2.3-mm-) thick, steel channel or angle stiffener for opening widths more than 48 inches (1219 mm).

## 2.4 FRAME ANCHORS

- A. Jamb Anchors:

1. Masonry Type: Adjustable strap-and-stirrup or T-shaped anchors to suit frame size, not less than 0.042 inch (1.0 mm) thick, with corrugated or perforated straps not less than 2 inches (50 mm) wide by 10 inches (250 mm) long; or wire anchors not less than 0.177 inch (4.5 mm) thick.
  2. Stud-Wall Type: Designed to engage stud, welded to back of frames; not less than 0.042 inch (1.0 mm) thick.
  3. Compression Type for Drywall Slip-on Frames: Adjustable compression anchors.
  4. Postinstalled Expansion Type for In-Place Concrete: Minimum 3/8-inch- (9.5-mm-) diameter bolts with expansion shields or inserts. Provide pipe spacer from frame to wall, with throat reinforcement plate, welded to frame at each anchor location.
- B. Floor Anchors: Formed from same material as frames, not less than 0.042 inch (1.0 mm) thick, and as follows:
1. Monolithic Concrete Slabs: Clip-type anchors, with two holes to receive fasteners.

## 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. To ensure proper assembly at Project site, clearly identify work that cannot be permanently factory assembled before shipment.
- B. Tolerances: Fabricate hollow metal work to tolerances indicated in ANSI/NAAMM- HMMA 861. Throat opening for hollow metal frames to be 1/4" greater than wall width for ease of installation.
- C. Hollow Metal Frames: 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.
1. Welded Frames: Weld flush face joints continuously; grind, fill, dress, and make smooth, flush, and invisible.

2. 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.
  3. Provide countersunk, flat- or oval-head exposed screws and bolts for exposed fasteners unless otherwise indicated.
  4. Grout Guards: Weld guards to frame at back of hardware mortises in frames to be grouted.
  5. Floor Anchors: Weld anchors to bottom of jambs and mullions with at least four spot welds per anchor.
  6. Jamb Anchors: Provide number and spacing of anchors as follows unless additional anchors are required by Fire-Rating:
    - a. Masonry Type: Locate anchors not more than 18 inches (457 mm) from top and bottom of frame. Space anchors not more than 32 inches (813 mm) o.c. and as follows:
      - 1) Two anchors per jamb up to 60 inches (1524 mm) high.
      - 2) Three anchors per jamb from 60 to 90 inches (1524 to 2286 mm) high.
      - 3) Four anchors per jamb from 90 to 120 inches (2286 to 3048 mm) high.
      - 4) Four anchors per jamb plus 1 additional anchor per jamb for each 24 inches (610 mm) or fraction thereof above 120 inches (3048 mm) high.
    - b. Stud-Wall Type: Locate anchors not more than 18 inches (457 mm) from top and bottom of frame. Space anchors not more than 32 inches (813 mm) o.c. and as follows:
      - 1) Three anchors per jamb up to 60 inches (1524 mm) high.
      - 2) Four anchors per jamb from 60 to 90 inches (1524 to 2286 mm) high.
      - 3) Five anchors per jamb from 90 to 96 inches (2286 to 2438 mm) high.
      - 4) Five anchors per jamb plus 1 additional anchor per jamb for each 24 inches (610 mm) or fraction thereof above 96 inches (2438 mm) high.
      - 5) Two anchors per head for frames above 42 inches (1066 mm) wide and mounted in metal-stud partitions.
    - c. Compression Type: Not less than two anchors in each jamb.
    - d. Postinstalled Expansion Type: Locate anchors not more than 6 inches (152 mm) from top and bottom of frame. Space anchors not more than 26 inches (660 mm) o.c.
  7. Door Silencers: Except on weather-stripped doors, drill stops to receive door silencers as follows. Keep holes clear during construction.
    - a. Single-Door Frames: Drill stop in strike jamb to receive three door silencers.
    - b. Double-Door Frames: Drill stop in head jamb to receive two door silencers.
- E. Fabricate concealed stiffeners, edge channels, and hardware reinforcement from either cold- or hot-rolled steel sheet.
- F. Hardware Preparation: Factory prepare hollow metal work to receive templated 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/NAAMM-HMMA 861.
  2. Reinforce doors and frames to receive nontemplated, mortised and surface-mounted door hardware.
  3. Comply with applicable requirements in ANSI/SDI A250.6 and ANSI/DHI A115 Series specifications for preparation of hollow metal work for hardware.
  4. Coordinate locations of conduit and wiring boxes for electrical connections with Division 26 Sections.
- G. Stops and Moldings: Provide stops and moldings around glazed lites where indicated. Form corners of stops and moldings with butted or mitered hairline joints.
1. Single Glazed Lites: Provide fixed stops and moldings welded on secure side of hollow metal work.
  2. Multiple Glazed Lites: Provide fixed and removable stops and moldings so that each glazed lite is capable of being removed independently.
  3. Provide fixed frame moldings on outside of exterior and on secure side of interior doors and frames.
  4. Provide loose stops and moldings on inside of hollow metal work.
  5. Coordinate rabbet width between fixed and removable stops with type of glazing and type of installation indicated.

## 2.10 STEEL FINISHES

- A. Prime Finish: Apply manufacturer's standard primer immediately after cleaning and pretreating.
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; compatible with substrate and field-applied coatings despite prolonged exposure.

## 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. Examine roughing-in for embedded and built-in anchors to verify actual locations before frame installation.
- 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 squareness, alignment, twist, and plumbness to the following tolerances:
  - 1. Squareness: Plus or minus 1/16 inch (1.6 mm), measured at door rabbet on a line 90 degrees from jamb perpendicular to frame head.
  - 2. Alignment: Plus or minus 1/16 inch (1.6 mm), measured at jambs on a horizontal line parallel to plane of wall.
  - 3. Twist: Plus or minus 1/16 inch (1.6 mm), measured at opposite face corners of jambs on parallel lines, and perpendicular to plane of wall.
  - 4. Plumbness: Plus or minus 1/16 inch (1.6 mm), measured at jambs on a perpendicular line from head to floor.
- C. Drill and tap doors and frames to receive nontemplated, 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 HMMA 840.
  - 1. Set frames accurately in position, plumbed, aligned, and braced securely until permanent anchors are set. After wall construction is complete, remove temporary braces, leaving surfaces smooth and undamaged.
    - a. At fire-protection-rated openings, install frames according to NFPA 80.
    - b. Where frames are fabricated in sections because of shipping or handling limitations, field splice at approved locations by welding face joint continuously; grind, fill, dress, and make splice smooth, flush, and invisible on exposed faces.
    - c. Install frames with removable glazing stops located on secure side of opening.
    - d. Install door silencers in frames before grouting.
    - e. Remove temporary braces necessary for installation only after frames have been properly set and secured.
    - f. Check plumbness, squareness, and twist of frames as walls are constructed. Shim as necessary to comply with installation tolerances.
    - g. Field apply bituminous coating to backs of frames that are filled with grout containing antifreezing agents.
  - 2. Floor Anchors: Provide floor anchors for each jamb and mullion that extends to floor, and secure with postinstalled expansion anchors.

- a. Floor anchors may be set with powder-actuated fasteners instead of postinstalled expansion anchors if so indicated and approved on Shop Drawings.
3. Metal-Stud Partitions: Solidly pack mineral-fiber insulation behind frames.
4. Masonry Walls: Coordinate installation of frames to allow for solidly filling space between frames and masonry with grout.
5. Concrete Walls: Solidly fill space between frames and concrete with grout. Take precautions, including bracing frames, to ensure that frames are not deformed or damaged by grout forces.
6. In-Place Concrete: Secure frames in place with postinstalled expansion anchors. Countersink anchors, and fill and make smooth, flush, and invisible on exposed faces.
7. Installation Tolerances: Adjust hollow metal door frames for squareness, alignment, twist, and plumb to the following tolerances:
  - a. Squareness: Plus or minus 1/16 inch (1.6 mm), measured at door rabbet on a line 90 degrees from jamb perpendicular to frame head.
  - b. Alignment: Plus or minus 1/16 inch (1.6 mm), measured at jambs on a horizontal line parallel to plane of wall.
  - c. Twist: Plus or minus 1/16 inch (1.6 mm), measured at opposite face corners of jambs on parallel lines, and perpendicular to plane of wall.
  - d. Plumbness: Plus or minus 1/16 inch (1.6 mm), measured at jambs at floor.

#### 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 Touchup: Immediately after erection, sand smooth rusted or damaged areas of prime coat and apply touchup of compatible air-drying, rust-inhibitive primer.
- D. Metallic-Coated Surfaces: Clean abraded areas and repair with galvanizing repair paint according to manufacturer's written instructions.

END OF SECTION 08111

08211 WOOD DOORS

PART 1 GENERAL

1.1 SECTION INCLUDES

- A. Pre-hung Shaker-style interior wood panel doors: non-rated, typical for interior doors except at stairwell and elevator equipment room.
- B. Interior wood solid core doors, rated, at interior stairwell and elevator equipment room
- C. Glass Transoms

1.2 RELATED SECTIONS

- A. Section 08710 - Door Hardware.
- B. Section 08111- Hollow Metal Frames
- C. Drawings and general provisions of the Contract, including Agreement and Division 1 Specification Sections, apply to this Section.

1.3 DEFINITIONS

- A. “Certified Well-Managed” Forests: For the purposes of this section, “certified well-managed” shall be determined by the standards endorsed by the Forest Stewardship Council (FSC).
- B. FSC-Certified: Wood products coming from a “certified well-managed” forest.

1.4 REFERENCES

- A. ANSI A135.4 - Basic Hardboard.
- B. ASTM E152 - Methods of Fire Tests of Door Assemblies.
- C. AWI - Quality Standards of the Architectural Woodwork Institute, including Section 1300, “Architectural Flush Doors”.
- D. HPMA HP - Hardwood and Decorative Plywood.
- E. NFPA 80 - Fire Doors and Windows.
- F. NFPA 252 - Standard Method of Fire Tests for Door Assemblies.

G. Warnock Hersey - Certification Listings for Fire Doors.

H. NWWDA Quality Standard: "Industry Standard for Wood Flush Doors".

#### 1.5 SUBMITTALS FOR REVIEW

A. See the General Conditions for submittal requirements.

B. Product Data: Indicate door core materials and construction; veneer species, type and characteristics.

1. Manufacturing Location: Cut sheets or letter from manufacturer(s) stating the location of material(s) manufacturer, and/or the location of the mining or harvest of raw material(s) furnished under this section.
2. Indoor Air Quality: Cut sheets or letter from manufacturer stating that no urea-formaldehyde was used in the fabrication of this product.
3. Material Safety Data Sheets (MSDS) or cut sheets for adhesives, sealants, and sealant primers, with complete Volatile Organic Compound (VOC) information.
4. FSC Certification: Provide evidence of compliance with standards endorsed by the Forest Stewardship Council (FSC) and as follows:
  - a. Indicate certified status of forest of origin,
  - b. Indicate chain of custody from forest of origin through manufacturing and fabrication

C. Shop Drawings: Illustrate door opening criteria, elevations, sizes, types, swings, special blocking for hardware, factory machining criteria and factory finishing criteria.

D. Samples: Submit two samples of door construction, 12 x 12 inch in size cut from top corner of door.

E. Samples: Submit four samples of door veneer, 16 x 16 inch in size, 1/2 inch thick, illustrating wood grain and finish.

#### 1.6 SUBMITTALS FOR INFORMATION

A. Manufacturer's Installation Instructions: Indicate special installation instructions.

#### 1.6 QUALITY ASSURANCE

A. Perform work in accordance with AWI Quality Standard Section 1300, Custom Grade.

B. Finish doors in accordance with AWI Quality Standard Section 1500.

C. Manufacturer: Company specializing in manufacturing the Products specified in this section.

D. All solid core wood doors shall be obtained from a single Manufacturer.

E. The following programs are accredited by the Forest Stewardship Council:

1. Green Cross Certification Program; administered by Scientific Certification Systems (SCS)
2. SmartWood Certification Program; administered by the Rainforest Alliance.
3. Silva Forest Foundation; administered by Silva Forest Foundation

#### 1.8 REGULATORY REQUIREMENTS

- A. Installed Fire Rated Door Assembly: Conform to NFPA 80; Refer to Door Schedule for Fire-rated doors.

#### 1.9 DELIVERY, STORAGE, AND PROTECTION

- A. Material and Equipment: Transport, handle, store, and protect products.
- B. Package, deliver and store doors in accordance with AWI Section 1300.

#### 1.10 PROJECT CONDITIONS

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

#### 1.11 WARRANTY

- A. See the General Conditions for additional requirements.
- B. Provide warranty to the following term:
  1. Interior Doors: Life of the Original Installation.
- C. Include coverage for delamination of veneer, warping beyond specified installation tolerances, defective materials and telegraphing core construction.
- D. Replace doors where Contractor's work contributed to rejection or to voiding of Manufacturer's warranty.

### PART 2 PRODUCTS

#### 2.1 MANUFACTURERS

- A. Marshfield Door Systems -Signature Series Stile and Rail Doors
- B. Algoma Hardwoods, Inc.- Stile and Rail Doors

#### 2.2 DOOR TYPES

- A. Shaker-style Interior Doors: 1-3/4 inches thick; solid core construction, fire rated as scheduled. Finish: Maple

Stops will be accepted. Set finishing nails, fill, sand and finish smooth and flush with top of stop. Glass: 1/4" clear; tempered where required by code.

- B. Flush Interior Doors: 1-3/4 inches thick; solid core construction, fire rated as scheduled. Finish: Maple. Core (Solid, Fire Rated): AWI Section 1300, Type FD 1-3/4 inch. All Interior doors to be of 5-ply construction. Veneer Facing (Flush Interior Doors): AWI Custom quality species wood, Maple, quarter sliced, with book matched grain, for clear, transparent finish. Submit Manufacturer's full range of stain finishes for Architect's selection.

### 2.3 DOOR CONSTRUCTION

- A. Core (Solid, Non-Rated): AWI Section 1300, Type PC - Particleboard.
- B. Core (Solid, Fire Rated): AWI Section 1300, Type FD 1-3/4 inch.
- C. All Interior doors to be of 5-ply construction.

### 2.4 FLUSH DOOR FACING

- A. Veneer Facing (Flush Interior Doors): AWI Custom quality species wood, Maple, quarter sliced, with book matched grain, for clear, transparent finish. Submit Manufacturer's full range of stain finishes for Architect's selection. Add 1/2" round raised profile to align with recessed panel in non-rated Shaker style doors.

### 2.5 LIGHT FRAMES

- A. Provide wood glass stops, with finish surfaces flush with face veneers. Same species as veneer.

### 2.6 ADHESIVE

- A. Facing Adhesive: Type I - waterproof.

### 2.7 FABRICATION

- A. Fabricate non-rated doors in accordance with AWI Quality Standards requirements.
- B. Fabricate fire rated door in accordance with AWI Quality Standards and to UL requirements. Attach fire rating label to door.
- C. Provide lock blocks at lock edge, and top of pair of doors for closers, for hardware reinforcement.
- D. Vertical Exposed Edge of Stiles: Same species as veneer facing.
- E. Fit door edge trim to edge of stiles after applying veneer facing. Use full length of adhesive and finish nails, counter sink, fill and sand smooth prior to finish application (to prevent warp and separation).

- F. Bond edge banding to cores.
- G. Factory machine doors for finish hardware in accordance with hardware requirements and dimensions. Do not machine for surface hardware. Provide solid blocking for through bolted hardware.
- H. Factory fit doors for frame opening dimensions identified on shop drawings.
- I. Provide edge clearances in accordance with AWI 1600.
- J. Factory machine all glass openings. No site cutting will be permitted. Cut and trim openings through doors complying with applicable requirements of referenced standards. Trim openings with square edge cherry stops, sized to finish flush with door face on both sides.
- K. Factory size all doors scheduled to be “undercut” prior to face veneer application and finishing. No on-site undercutting will be permitted.
- L. Adhesives: All adhesives must comply with the Volatile Organic Compound (VOC) limits of Rule #1168, South Coast Air Quality Management District.
- M. Sealants and Sealant Primers: All sealants and sealant primers must comply with the Volatile Organic Compound (VOC) limits of Regulation 8, Rule 51 of the Bay Area Quality Management District.

## 2.8 FINISH

- A. Factory finish doors in accordance with AWI Quality Standard Section 1500 to the following finish designations:
  - 1. Finish TR-2 , Transparent. Satin; Custom Quality.
- B. Seal door top edge with sealer to match door facing.
- C. See 2.2.C for custom mahogany entry doors.

## PART 3 EXECUTION

### 3.1 EXAMINATION

- A. Verify of existing conditions before starting work.
- B. Verify that opening sizes and tolerances are acceptable.
- C. Do not install doors in frame openings that are not plumb or are out-of-tolerance for size or alignment.

### 3.2 INSTALLATION

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

B. Install relocated doors in accordance with AWI reference standards.

3.3 INSTALLATION TOLERANCES

A. Conform to AWI requirements for fit and clearance tolerances.

B. Conform to AWI Section 1300 requirements for maximum tolerances.

3.4 ADJUSTING

A. Contract Closeout: Adjust installed work. Adjust door for smooth and balanced door movement. Adjust closer for full closure.

3.5 SCHEDULE

A. Refer to Door Schedule on the Drawings.

END OF SECTION

SECTION 08710-DOOR HARDWARE

PART 1 GENERAL

1.1 SECTION INCLUDES

- A. Hardware for wood and hollow metal doors.
- B. Thresholds.
- C. Weatherstripping, seals, door gaskets and sweeps.

1.2 RELATED SECTIONS

- A. Section 08111 - Standard Steel Doors.
- B. Section 08112 - Standard Steel Frames.
- C. Section 08410 – Aluminum Entrances
- D. Section 08780 – Access Control System
- E. Section (16) - Electrical

1.3 REFERENCES

- A. NFPA 80 - Fire Doors and Windows.
- B. AWI - Architectural Woodwork Institute - Quality Standards.
- C. NFPA 101 - Code for Safety to Life from Fire in Buildings and Structures.
- D. NFPA 252 - Fire Tests of Door Assemblies.
- E. UL 10C - Fire Tests of Door Assemblies.
- F. UL 294 – Access Control Equipment
- G. UL 305 - Panic Hardware.
- H. ANSI A117.1 - Specifications for Making Buildings and Facilities Accessible to and Usable by Physically Handicapped People.

1.4 SUBMITTALS

- A.** See the General Conditions for submittal requirements.
- B.** Shop Drawings: Submit complete Hardware Schedule in a vertical form, organized into "hardware sets" indicating complete designations of every item required for each door or opening. Include the following information:
  - 1. Type, style, function, size and finish of each hardware item.

2. Name and manufacturer of each item.
  3. Fastenings and other pertinent information.
  4. Location of hardware set cross-referenced to indications on drawings both on floor plans and in door and frame schedule.
  5. Explanation of all abbreviations, symbols, codes, etc., contained in schedules.
  6. Mounting locations for hardware.
  7. Door and frame sizes and materials.
  8. Electrical Characteristics.
  9. Keying schedule.
- C. Templates: Templates of finish hardware items to be supplied are to be furnished to each fabricator of doors, frames and other work to be factory-prepared for the installation of hardware.
- D. Keying Schedule: A keying schedule shall be submitted using keyset symbols referenced in DHI manual "Keying Systems And Nomenclature". The keying schedule shall be indexed by door number, keyset, hardware heading number, cross keying instructions and special key stamping instructions.
- E. Wiring Diagrams: Coordinate installation of the electronic hardware with the project electrical engineer and provide installation and technical data, including wiring diagrams, to the project electrical engineer and electrical sub-contractor. Upon completion of the electrical hardware installation, verify that all components are working properly and state in the required guarantee that this inspection has been performed.
- 1.5 QUALITY ASSURANCE:
- A. Substitutions: Manufacturers and model numbers listed are to establish a standard of quality and design.
- B. Supplier Qualifications: Suppliers shall be recognized architectural finish hardware suppliers, with warehousing facilities.
- C. Fire-rated openings: Fire-rated openings shall be provided with fire-rated hardware in compliance with NFPA Standard No. 80 requirements. Provide only hardware that has been tested and listed by U/L for types and sizes of doors required and complies with requirements of door and door frame labels.
- D. Components used in conjunction with Access System as required, shall be UL294 certified to the necessary conformance of UL.
- E. Perform work in accordance with the following requirements:
1. ANSI A117.1 - Specifications for Making Buildings and Facilities Accessible to and Usable by Physically Handicapped People.
  2. NFPA 101.
  3. NFPA 80.
  4. NFPA 252.
  5. UL 294

1.6 OPERATION AND MAINTENANCE DATA

- A. See the General Conditions for submittal requirements.
- B. Operations and maintenance data: At the completion of the job, furnish to the owner, two copies of an owners operation and maintenance manual. The manual shall consist of a labeled hardcover three ring binder with the following technical information:

1. Maintenance instructions for each item of hardware.
2. Catalog pages for each product.
3. Parts list for each product.
4. Copy of final hardware schedule.
5. Copy of final keying schedule.

#### 1.7 DELIVERY, STORAGE, AND HANDLING

- A. Deliver, store, protect and handle products to site per the General Conditions.
- B. Package hardware items individually; label and identify each package with door opening code to match hardware schedule.
- C. Deliver keys to the Owner.

#### 1.8 COORDINATION

- A. Coordinate the work with doors, frames, and related work to insure proper size, thickness, hand, function and finish of hardware.
- B. Coordinate all electrical requirement and pre-prep of doors, frames and related equipment furnish by this and related sections.

#### 1.9 WARRANTY

- A. Provide five-year warranty for all components.
- B. Warranty: Include coverage for door closers.

#### 1.10 MAINTENANCE MATERIALS

- A. Provide maintenance materials under provisions of the General Conditions.
- B. Provide special wrenches and tools applicable to each different or special hardware component.

### PART 2 PRODUCTS

#### 2.1 ACCEPTABLE MANUFACTURERS

- A. List of manufacturers represented in this section: See schedule section 3.5 of this specification.

#### 2.2.1 KEYING

- A. Supplier will coordinate meeting with the Owner and cylinder manufacturer to finalize keying requirements and supply Best Premium Level key system for project.
- B. Keys: Provide nickel silver keys only. Furnish 4 change keys for each lock: Provide the following:
  - 1 Great Grand Master
  - 4 Grand Master
  - 4 Sub Master per floor
  - 2 Cylinder Tools # ED211

Deliver all keys to the Owner's representative.

- C. Construction Keying: All cylinders shall furnish with temporary construction cores. Furnish "BRASS" keyed construction cores at all exterior doors, electrical rooms, mechanical and 25% of the balance of interior openings with locks. The construction keyed cores by the supplier and the contractor shall remove this system in the presence of the Owner. Furnish 5 construction master keys and 3 removal keys and deliver to the Contractor.
- D. Key Management: Supplying a complete key storage and management system shall provide Key control. Key cabinet provided shall be equal to Lund 1205 Series with Best prep and Cylinder 1ESPL-7 A02531-626, wall mounted type with capacity of keyed locks plus 50% and provide storage for extra set of interchangeable cores for exterior doors.

## 2.3 FINISHES

- A. Finishes: Identified in schedule at end of section. In general, all door hardware in general shall be 630 brushed stainless finish.

## PART 3 EXECUTION

### 3.1 EXAMINATION

- A. Verify that doors and frames are ready to receive work and dimensions are as indicated on shop drawings.
- B. Verify that electric power is available to power operated devices and of the correct characteristics.

### 3.2 INSTALLATION

- A. Install hardware in accordance with manufacturer's instructions. Closures shall be thru-bolted.
- B. Use templates provided by hardware item manufacturer.
- C. Mounting heights for hardware from finished floor to center line of hardware item (verify with architect):
  1. Levers: 36-40"
  2. Exit Devices: 38-40-5/16"

### 3.3 ADJUSTING

- A. Adjust work under when complete.
- B. Adjust hardware for smooth operation. Closures shall be inspected for proper adjustments and closing speed.
- C. Contractor shall re-adjust all closures 6 months after substantial completion.

### 3.4 PROTECTION OF FINISHED WORK

- A. Protect finished Work when complete.
- B. Do not permit adjacent work to damage hardware or finish.

3.5 SCHEDULE

LIST OF MANUFACTURERS

HINGES

McKinney-	TA2714	T4A3786	T4A3386	MCK-25HD
*Stanley-	FBB179	FBB168	FBB199	662HD
Hager-	BB1279	BB1168	BB1199	780-224 HD

LOCKS

\*Best 45H Series (No Substitution)

Electronic Locks

Best 45HM Series PROX READER UNITS (No Substitution)

CYLINDER & CORES

Best 1E Series (No Substitution)

CLOSERS

\*Yale 4400  
LCN- 4041  
Stanley- D4550/1

AUTO CLOSERS

\*Besam Swingmaster 900 (No Substitution)

EXIT DEVICES

Sargent- 85-88 13 ETW 8700 ETW  
Von-Duprin- 35-98L-02 9827L-02  
\*Precision 2100-2400 Series 2200 V4900B Trim

MISCELLANEOUS

\*Trimco- 1270WV 1229A KM050 1001-3  
Rockwood- 401 608 KP-18 70 SERIES  
Hager- 232 307D 190S 30S

MISCELLANEOUS

\*Trimco- 1014-3B 3913  
Rockwood- 110x70C 555  
Hager 46N 282D

OVERHEAD DOOR CONTROLS

Rixson 9 & 10 SERIES  
SARGENT 590 & 1540 SERIES  
\*ABH 4420 & 9020 SERIES

ELECTRIC HOLD OPEN DEVICES

Rixson 998  
LCN 7800  
\*ABH 2100

Thresholds and Weather Seals

Zero  
\*National Guard  
Pemko

\*Note: The above items designated with an asterisk are used in the hardware schedule.

#### GENERAL SCHEDULE NOTES

1. All cylinders to be interchangeable core, with temporary cores furnished for construction use. Permanent cores are to be furnished only to Owner's representative. Coordinate with cylinder manufacturer for delivery 10 working days prior to building turn-over.
2. All hinges to be 4-1/2 x 4-1/2 inch unless otherwise noted.
3. Manufacturers listed with the \* are used in the following hardware sets. For equal manufacturers, see schedule in section 3.5 of this specification.
4. All hardware to be "brushed stainless" or "brushed chrome" finish as scheduled, except closers to be sprayed to match.
5. All electronic locksets, electrical and data wiring and equipment associated with remotely monitored locks to be as specified. See the door schedule for specific locations.
6. All offices shall have locksets, typical.

## SECTION 08814 - MIRRORED GLASS

### PART 1 - GENERAL

#### 1.1 RELATED DOCUMENTS

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

#### 1.2 SUMMARY

- A. This Section includes the following:
  - 1. Silvered mirrored glass.

#### 1.3 DEFINITIONS

- A. Deterioration of Silvered Mirrored Glass: Defects developed from normal use that are attributable to the manufacturing process and not to causes other than glass breakage and practices for maintaining and cleaning silvered mirrored glass contrary to mirrored glass manufacturer's written instructions. Defects include discoloration, black spots, and clouding of the silver film.

#### 1.4 PERFORMANCE REQUIREMENTS

- A. Provide mirrored glass that will not fail under normal usage. Failure includes glass breakage and deterioration attributable to defective manufacture, fabrication, and installation.

#### 1.5 SUBMITTALS

- A. Product Data: For the following:
  - 1. Silvered mirrored glass. Include description of materials and process used to produce mirrored glass that indicates source of glass, glass coating components, edge sealer, and quality-control provisions.
  - 2. Mirror mastic.
  - 3. Mirror hardware.
- B. Shop Drawings: Include elevations, sections, details, and attachments to other Work.
- C. Samples for Verification: For the following products, in sizes indicated below:

1. Mirrored glass, 12 inches (300 mm) square, including edge treatment on 2 adjoining edges.
  2. Mirror clips.
- D. Product Certificates: Signed by manufacturers of mirrored glass and mirror mastic certifying that products furnished comply with requirements.
- E. Mirror Mastic Glass Coating Compatibility Test Reports: From an organic protective coating manufacturer indicating that mirror mastic has been tested for compatibility and adhesion with organic protective coating applied to silvered mirrored glass. Include organic coating manufacturers' interpretation of test results relative to performance and recommendations for use of mastics with organic protective coating.
- F. Warranties: Special warranties specified in this Section.

#### 1.6 QUALITY ASSURANCE

- A. Installer Qualifications: An experienced installer who has completed mirrored glass installations similar in material, design, and extent to that indicated for Project and whose work has resulted in construction with a record of successful in-service performance.
- B. Source Limitations for Mirrored Glass: Obtain mirrored glass from one source for each type of mirrored glass indicated.
- C. Source Limitations for Glazing Accessories: Obtain glazing accessories from one source for each type of accessory indicated.
- D. Glazing Publications: Comply with published recommendations in GANA's "Glazing Manual," unless more stringent requirements are indicated. Refer to this publication for definitions of glass and glazing terms not otherwise defined in this Section or in referenced standards.
- E. NAAMM's Publication: For silvered mirrored glass, comply with recommendations in NAAMM's "Mirrors, Handle with Extreme Care, Tips for the Professional on the Care and Handling of Mirrors."
- F. Preconstruction Mirror Mastic Glass Coating Compatibility Test: Submit mirror mastic products to organic protective coating manufacturer for testing to determine compatibility of adhesive with mirrored glass coating.

#### 1.7 DELIVERY, STORAGE, AND HANDLING

- A. Protect glazing materials according to mirrored glass manufacturer's written instructions and as needed to prevent damage to glass and glazing materials from condensation, temperature changes, direct exposure to sun, or other causes.
- B. For silvered mirrored glass, comply with mirrored glass manufacturer's written instructions for shipping, storing, and handling mirrored glass as needed to prevent deterioration of silvering,

damage to edges, and abrasion of glass surfaces and applied coatings. Store indoors, protected from moisture including condensation.

#### 1.8 PROJECT CONDITIONS

- A. Environmental Limitations: Do not install mirrored glass until ambient temperature and humidity conditions are maintained at levels indicated for final occupancy.

#### 1.9 WARRANTY

- A. General Warranty: Special warranty specified in this Article shall not deprive Owner of other rights Owner may have under other provisions of the Contract Documents and shall be in addition to, and run concurrent with, other warranties made by Contractor under requirements of the Contract Documents.
- B. Manufacturer's Special Warranty for Silvered Mirrored Glass: Written warranty, made out to Owner and signed by mirrored glass manufacturer agreeing to replace silvered mirrored glass units that deteriorate as defined in "Definitions" Article, f.o.b. the nearest shipping point to Project site, within specified warranty period indicated below:
  - 1. Warranty Period: Five years from date of Substantial Completion.

### PART 2 - PRODUCTS

#### 2.1 MANUFACTURERS

- A. Available Manufacturers: Subject to compliance with requirements, manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:
  - 1. American Mirror Company, Inc.
  - 2. Carolina Mirror Company.
  - 3. Donisi Mirror Company.
  - 4. Gardner Glass Products.
  - 5. Gilded Mirrors, Inc.
  - 6. Lenoir Mirror Company.
  - 7. Stroupe Mirror Co., Inc.
  - 8. Sunshine Mirror.
  - 9. Virginia Mirror Co., Inc.
  - 10. VVP America, Inc.; Binswanger Mirror Products.
  - 11. Walker Glass Co., Ltd.

#### 2.2 FLOAT GLASS

- A. Tempered Float Glass: ASTM C 1048, Type I (transparent glass, flat), Condition A (uncoated), Kind FT (fully tempered), Quality q3 (glazing select) float glass, complying with the following requirements:
  - 1. Fabrication Process: By horizontal (roller-hearth) process with roll-wave distortion parallel to bottom edge of mirror as installed, unless otherwise indicated.
  - 2. Clear Tempered Float Glass: Class 1 (clear).
    - a. Thickness: 1/4-inch; 6.0 mm.

## 2.3 MIRRORED GLASS

- A. Silvered Mirrored Glass: Tempered, clear float glass with successive layers of chemically deposited silver, electrically or chemically deposited copper, and manufacturer's standard organic protective coating applied to second glass surface to produce a coating system complying with FS DD-M-411.

## 2.4 FABRICATION

- A. Mirrored Glass Sizes: Cut mirrored glass to final sizes and shapes to suit Project conditions.
- B. Mirrored Glass Edge Treatment: Treat edges as indicated below.
  - 1. Rounded polished edge.
  - 2. Seal edges of silvered mirrored glass after edge treatment to prevent chemical or atmospheric penetration of glass coating.
  - 3. Require mirrored glass manufacturer to perform edge treatment and sealing in factory immediately after cutting to final sizes.

## 2.5 MISCELLANEOUS MATERIALS

- A. Setting Blocks: Neoprene, 70 to 90 Shore A hardness.
- B. Edge Sealer: Coating compatible with glass coating and approved by mirrored glass manufacturer for use in protecting against silver deterioration at mirrored glass edges.
- C. Mirror Mastic: An adhesive setting compound, produced specifically for setting mirrored glass by spot application, certified by both mirrored glass manufacturer and mastic manufacturer as compatible with glass coating and substrates on which mirrored glass will be installed.
  - 1. Available Manufacturers: Subject to compliance with requirements, manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:
    - a. Gunther Mirror Mastics.
    - b. Palmer Products Corporation.

- D. Extruded-Aluminum Top and Bottom Trim: J-channels formed with a return deep enough to produce a glazing channel to accommodate mirrored glass units of thickness indicated and in lengths required to cover bottom edge of each mirrored glass unit in a single piece.
1. Bottom Trim: J-channels formed with front leg and back leg not less than 3/8 and 7/8 inch (9.5 and 22 mm) in height, respectively, and a thickness of not less than 0.05 inch (1.3 mm).
  2. Top Trim: J-channels formed with front leg and back leg not less than 5/8 and 1 inch (16 and 25 mm) in height, respectively, and a thickness of not less than 0.062 inch (1.57 mm) .
  3. Available Products: Subject to compliance with requirements, products that may be incorporated into the Work include, but are not limited to, the following:
    - a. Bottom Trim:
      - 1) CRL Standard "J" Channel; C. R. Laurence Co., Inc.
      - 2) Medium Gauge Aluminum Shallow Nose "J" Moulding Lower Bar; Sommer & Maca Industries, Inc.
      - 3) Heavy Gauge Aluminum Shallow Nose "J" Moulding Lower Bar; Sommer & Maca Industries, Inc.
    - b. Top Trim:
      - 1) CRL Deep "J" Channel; C. R. Laurence Co., Inc.
      - 2) Heavy Gauge Aluminum Deep Nose "J" Moulding Lower Bar; Sommer & Maca Industries, Inc.
- E. Fasteners: Fabricated of same basic metal and alloy as fastened metal and matching it in finished color and texture where fasteners are exposed.
- F. Anchors and Inserts: Provide devices as required for mirror hardware installation. Provide toothed or lead-shield expansion-bolt devices for drilled-in-place anchors. Provide galvanized anchors and inserts for applications on inside face of exterior walls and where indicated.

## PART 3 - EXECUTION

### 3.1 EXAMINATION

- A. Examine substrates, over which mirrored glass units are to be mounted, with Installer present, for compliance with installation tolerances, substrate preparation, and other conditions affecting performance.
1. Verify compatibility with and suitability of substrates, including compatibility of mirror mastic with existing finishes or primers.
  2. Proceed with mirrored glass installation only after unsatisfactory conditions have been corrected and surfaces are dry.

### 3.2 PREPARATION

- A. Comply with mastic manufacturer's written installation instructions for preparation of substrates, including coating surfaces with mastic manufacturer's special bond coating where applicable.

### 3.3 GLAZING

- A. General: Install mirrored glass units to comply with written instructions of mirrored glass manufacturer and with referenced GANA and NAAMM publications. Mount mirrored glass accurately in place in a manner that avoids distorting reflected images.
- B. Provide space for air circulation between back of mirrored glass units and face of mounting surface.
- C. Mastic Spot Installation System: Install mirrored glass units with mastic as follows:
  - 1. Apply barrier coat to mirrored glass backing where approved in writing by manufacturers of mirrored glass and backing material.
  - 2. Apply mastic in spots to comply with mastic manufacturer's written instructions for coverage and to allow air circulation between back of mirrored glass units and face of mounting surface.
  - 3. After mastic is applied, align mirrored glass units and press into place while maintaining a minimum air space of 1/8 inch (3 mm) between back of mirrored glass and mounting surface.
- D. For wall-mounted mirrored glass units, install permanent means of support at bottom and top edges with bottom support designed to withstand mirrored glass weight and top support designed to prevent mirrored glass from coming away from wall along top edges.
  - 1. Attach mirror hardware securely to mounting surfaces with mechanical fasteners installed with anchors or inserts as applicable. Install fasteners so heads do not impose point loads on backs of mirrored glass units.
  - 2. For continuous bottom supports, provide setting blocks 1/8 inch (2 mm) thick by 4 inches (100 mm) long at quarter points. For channels or other continuous supports in which water could be trapped, provide, between setting blocks, two slotted weeps not less than 1/4 inch (3 mm) wide by 3/8 inch (4.5 mm) long.
  - 3. For metal or plastic clips, place a felt or plastic pad between mirrored glass and each clip to prevent spalling of mirrored glass edges.
  - 4. Where indicated, install bottom and top trim. Fabricate trim in single lengths to fit and cover top and bottom edges of mirrored glass units.
  - 5. Where indicated, install bottom trim and top clips. Fabricate bottom trim in single lengths to fit and cover bottom edge of mirrored glass units. Locate top clips so they are symmetrically placed and evenly spaced.
  - 6. Where indicated, install bottom and top clips symmetrically placed and evenly spaced.

### 3.4 PROTECTION AND CLEANING

- A. Protect mirrored glass from breakage and contaminating substances resulting from construction operations.
  - 1. Do not permit edges of silvered mirrored glass to be exposed to standing water.
  - 2. Maintain environmental conditions that will prevent silvered mirrored glass from being exposed to moisture from condensation or other sources for continuous periods of time.
  
- B. Wash mirrored glass not more than four days before date scheduled for inspections intended to establish date for Substantial Completion. Wash mirrored glass by methods recommended in NAAMM publication and in writing by mirrored glass manufacturer. Use water and glass cleaners free from substances capable of damaging mirrored glass edges or coatings.

END OF SECTION 08814