

SECTION 08 11 13

HOLLOW METAL DOORS AND FRAMES

PART 1 - GENERAL

1.01 DESCRIPTION

- A. This SECTION describes the requirements for furnishing and installing:
 - 1. Hollow metal doors and frames.
 - 2. Hollow metal frames for wood doors.
 - 3. Hollow metal frames for cased openings.
 - 4. Hollow metal frames for interior fixed glazing (borrowed lites).
 - 5. Hollow metal frames for exterior fixed glazing.
 - 6. Associated materials.
- B. Lead-lined hollow metal doors and frames are specified in SECTION 13 49 00 "RADIATION PROTECTION".
- C. Associated wood doors are specified in applicable SECTIONS of DIVISION 08 - OPENINGS.

1.02 DEFINITIONS

- A. Interior of the Building: Refer to SECTION 01 81 13 "SUSTAINABLE DESIGN REQUIREMENTS".
- B. Steel Thickness: Thickness of base metal without coatings in accordance with ANSI/SDI A250.8.

1.03 QUALITY ASSURANCE

- A. Source Limitations: Obtain hollow metal doors and frames through one source from a single manufacturer.
- B. Reference Standards:
 - 1. Hollow metal doors and frames and associated materials shall be in compliance with ANSI/SDI A250.8 and as specified.
 - 2. Manufacturing tolerances shall be in compliance with SDI-117.
- C. Qualifications:
 - 1. Manufacturer: Manufacturer shall have been regularly engaged in manufacturing hollow metal doors and frames of the types required with a proven record of successful in-service performance for not less than ten (10) years prior to the date of this Project.

2. Installer: Installer shall be experienced in the installation of hollow metal doors and frames, capable of providing installations of specified quality, and acceptable to the manufacturer.

D. Regulatory Requirements:

1. General: Hollow metal doors and frames and their installation shall be in compliance with requirements of the applicable building code and other regulations. Refer to SECTION 01 41 00 "REGULATORY REQUIREMENTS" for further information.
2. Fire-Rated Doors and Frames:
 - a. Fire-rated doors and frames shall comply with NFPA 80 and shall be listed and labeled by UL, ITS-WH, or other qualified testing agency acceptable to the public authority having jurisdiction for fire ratings indicated, based on testing at positive pressure according to NFPA 252 or UL 10C.
 - b. Fire-rated doors at vertical exit enclosures, exit passageways, and other locations required by code to be temperature-rise-rated shall have a maximum temperature transmission rating of 450 degrees Fahrenheit above ambient measured on the non-fire side after 30 minutes of standard fire test exposure and shall be labeled accordingly.
 - c. Fire-rated fixed-glazing frames shall comply with NFPA 80 and shall be listed and labeled by UL, ITS-WH, or other qualified testing agency acceptable to the public authority having jurisdiction for fire ratings indicated, based on testing according to NFPA 257, UL 9, or ASTM E2010.
 - d. Labels shall comply with requirements of the building code and NFPA 80 and shall be permanently affixed to the hinge stile of the door and hinge jamb of the frame.
3. Smoke and Draft Control Assemblies:
 - a. Smoke and draft control doors and frames shall comply with UL 1784 and shall be labeled accordingly with an 'S' label by UL, ITS-WH, or other qualified testing agency acceptable to the public authority having jurisdiction.
 - b. Applied smoke seals to meet smoke and draft control are specified in SECTION 08 71 00 "DOOR HARDWARE".

E. LEED Requirements:

1. Recycled Materials and Products: To the greatest extent practicable, furnish materials and products containing recycled materials in compliance with requirements of the LEED Rating System to contribute to the achievement of MR Credit 4.
2. Regional Materials and Products: To the greatest extent practicable, furnish materials and products that are extracted, processed, and manufactured regionally in compliance with requirements of the LEED Rating System to contribute to the achievement of MR Credit 5.

3. Low-Emitting Materials – Adhesives and Sealants: Adhesives, sealants, and sealant primers for use on the Interior of the Building shall be in compliance with requirements of the LEED Rating System to contribute to the achievement of IEQ Credit 4.1.
4. Low-Emitting Materials - Paints and Coatings: Paints, coatings, and associated materials for use on the Interior of the Building shall be in compliance with requirements of the LEED Rating System to contribute to the achievement of IEQ Credit 4.2.
5. Refer to SECTION 01 81 13 "SUSTAINABLE DESIGN REQUIREMENTS" for further information.

1.04 SUBMITTALS

- A. Product Data: Submit manufacturer's descriptive and technical data clearly marked to show specific products, materials, metal finishes, and compliance with requirements.
 1. Include data for shop primer, showing compliance with specified requirements.
 2. Include manufacturer's printed installation instructions.
- B. Shop Drawings: Submit Shop Drawings for each type of hollow metal door and frame, frame condition, and adjoining construction. Include:
 1. Elevation of each door and frame design.
 2. Door details including vertical and horizontal edges, metal thicknesses, lite frames, louvers, and methods of assembling door sections.
 3. Frame details including dimensioned profiles; metal thicknesses; joints, field splices, and connections; removable and fixed stops; glazing; and anchorages at each different wall opening condition.
 4. Locations and thicknesses of reinforcement and preparations for door and other hardware.
 5. Details of conduit and preparations for power, signal, and control systems.
 6. Schedule of hollow metal doors and frames using the same reference numbers for openings as those indicated.
- D. Certificate of Compliance:
 1. Submit manufacturer's written certification that products meet or exceed specified requirements.
 2. Submit manufacturer's written certification that fire-rated doors and frames meet or exceed specified requirements and have been constructed to conform to design, materials, and construction equivalent to requirements for labeled assemblies and tested in accordance with UL10C.
 - a. Oversize Fire-Rated Assembly Certification: For assemblies exceeding sizes of tested assemblies, submit written certification by a qualified Testing Agency that the assembly complies with standard construction requirements for tested and labeled fire-rated assemblies except for size.

- E. Test Reports for Fire-Rated Doors and Frames: Submit test reports, based on evaluation of comprehensive tests performed by a qualified Testing Agency, for each type of fire-rated metal door and frame assembly.
- F. Maintenance Data: Furnish manufacturer's printed recommendations for the care and maintenance of hollow metal doors and frames to the Owner.

1.05 LEED SUBMITTALS

- A. General Requirements:
 - 1. Submittals to document compliance with specified LEED requirements are required in addition to other submittals specified in the Article titled "Submittals".
 - 2. Even if Product Data to demonstrate LEED compliance is identical to that submitted to document compliance with other requirements, submit additional copies as a separate submittal to document compliance with LEED requirements. Clearly identify this submittal as "LEED Submittal" on the transmittal and on the data.
 - 3. Submit LEED Submittals concurrent with the non-LEED submittals specified hereinbefore.
- B. LEED Certification Product Data: Submit LEED Certification Product Data specified in SECTION 01 81 13 "SUSTAINABLE DESIGN REQUIREMENTS".
- C. LEED Material Buyout Form: Complete and submit LEED Material Buyout Form, attached at the end of SECTION 01 81 13 "SUSTAINABLE DESIGN REQUIREMENTS", for the applicable LEED credit(s) specified hereinbefore.
- D. Prohibited Content Installer Certification: Following completion of installation, complete and submit the certification form specified in SECTION 01 33 29.07 "PROHIBITED CONTENT INSTALLER CERTIFICATION".

1.06 PRODUCT DELIVERY, STORAGE, AND HANDLING

- A. Deliver, store, and handle products to the Site in a manner to prevent damage and deterioration and in compliance with ANSI/SDI A250.8.
- B. Furnish doors and frames in packaging such as cardboard or other containers, separators, banding, spreader bars, and paper wrappings to protect products. Do not use unvented plastic or other coverings that could trap humidity.
- C. Upon delivery, thoroughly inspect doors and frames for damage. Promptly clean and touch-up scratches and disfigurements with specified field-applied primer. Minor damage may be repaired provided finish items are equal to new Work and acceptable to Architect; otherwise remove damaged products as directed and provide new acceptable products at no increase in Contract Sum or Contract Time.
- D. Store doors and frames at the Site under cover in a location where they will not be exposed to or come in contact with the elements. Place products on minimum 4-inch high wood blocking. Avoid use of non-vented plastic or canvas shelters which could create humidity chamber. If cardboard wrapper on door becomes wet, remove carton immediately. Provide 1/4-inch space between doors to permit air circulation.
- E. Store products in a vertical position in a manner to prevent their twisting, bending, and other damage

- F. Comply with additional requirements of the manufacturer.

1.07 COORDINATION

- A. Coordinate fabrication and installation of hollow metal doors and frames with the Work of other trades including, but not limited to preparation of openings to receive frames, doors, door hardware, glazing, and shop- and field-applied finishes, and grouting of frames, and power, signal, and control systems used with the doors and frames.
- B. Verify measurements and conditions in field for Work fabricated to fit job conditions and show measurements on the final Shop Drawings.

PART 2 - PRODUCTS

2.01 MATERIALS

- A. Steel Sheet:

- 1. Hollow Metal Doors: Cold-rolled in compliance with ASTM A1008 Commercial Steel (CS) Type B except steel sheet for exposed surfaces of exterior doors and doors in toilet, bath, janitor, and other wet and damp areas shall be hot-dip zinc-iron alloy-coated (galvannealed) sheet in compliance with ASTM A653 Commercial Steel (CS), Type B, with A60 galvannealed coating. Steel for door faces shall be stretcher leveled.
 - a. Internal Stiffening: Manufacturer's standard in compliance ANSI/SDI A250.8 and as follows:
 - 1) Interior Non-Fire-Rated Doors: Honeycomb core.
 - 2) Interior Fire-Rated Doors: In compliance with regulatory requirements and listing requirements of the labeling authority.
 - 3) Exterior Non-Fire-Rated Doors: Vertical steel stiffeners with thermal insulation with U-value determined in accordance with ASTM E1423 and in compliance with regulatory requirements.
 - 4) Exterior Fire-Rated Doors: Thermal insulation U-value determined in accordance with ASTM E1423 and in compliance with regulatory requirements and listing requirements of the labeling authority.
- 2. Hollow Metal Frames: Cold-rolled in compliance with ASTM 1008 Commercial Steel (CS) Type B or hot-rolled, pickled, and oiled in compliance with ASTM A1011 Commercial Steel (CS) Type B, except steel sheet for exterior frames and frames in toilet, bath, janitor, and other wet or damp areas shall be hot-dip iron alloy-coated (galvannealed) sheet in compliance with ASTM A653 Commercial Steel (CS), Type B, with A60 metallic coating.

- B. Grout:

- 1. Frames for Interior Metal-Framed Openings: Gypsum plaster in compliance with ASTM C28 with average dry compressive strength of not less than 700 psi per ASTM C472; U.S. Gypsum "Structo-Lite Basecoat", or accepted equal.

2. Frames for Exterior Metal-Framed Openings: Pre-blended product containing a balanced mixture of portland cement, sand, hydrated lime, poly-fiber and conforming to the proportion specifications of ASTM C926; Basalite Concrete Products, LLC "Basalite Stucco Premix", or accepted equal.
 3. Frames for Concrete and Masonry Openings: Cementitious grout in compliance with ASTM C476 with a compressive strength of not less than 2000 psi and a slump of not more than 4-inches per ASTM C143.
- C. Expansion Bolts (for use in concrete and grouted masonry): Drilled-in, wedge type, torque-controlled anchor with impact section designed to prevent thread damage and complete with required nuts and washers; fabricated of carbon steel with zinc-electroplated finish in compliance with ASTM B633 Type III, Fe/Zn 5 (SC1) for interior use and AISI Type 304 stainless steel for exterior use; in compliance with ICC-ES AC193 acceptance criteria; Hilti, Inc. "Kwik Bolt TZ" in compliance with ICC-ES ESR-1917), or accepted equal.
1. Furnish bolt sizes and lengths suitable for specific Work required and to meet design criteria, but not less than those indicated.
 2. Expansion bolts shall have a capability to sustain, without failure, a load equal to 6 times the load imposed when installed in unit masonry assemblies and equal to 4 times the load imposed when installed in concrete, as determined by testing per ASTM E488 conducted by a qualified independent testing agency.
- D. Primers:
1. Shop Primer: Rust-inhibiting, low VOC, modified alkyd resin primer formulated for direct to metal (DTM) application to steel and meeting or exceeding ANSI/SDI A250.10 acceptance criteria for prime painted steel surfaces (salt spray testing, condensation resistance, impact testing, and film adhesion); Sherwin Williams "Kem Kromik Universal Metal Primer B50AV1001 Light Gray" (VOC less than 420 g/L), or accepted equal.
 2. Field Touch-Up Primer: Air-drying type recommended in writing by the manufacturer, in compliance with regulatory and LEED requirements, and compatible with shop-applied primer and with field-applied paint specified in SECTION 09 91 00 "PAINTING".
- E. Door Hardware: Specified in SECTION 08 71 00 "DOOR HARDWARE".
- F. Glazing: As specified in SECTION 08 80 00 "GLAZING".

2.02 FABRICATION

- A. General Requirements:
1. Fabricate hollow metal doors and frames of required types, styles, and sizes in accordance with applicable portions of ANSI/SDI A250.8, accepted Shop Drawings, as indicated, and as specified.
 2. Mark, label, or otherwise identify doors and frames as complying with ANSI/SDI A250.8.
- B. Doors:
1. Types:

- a. Exterior Doors: ANSI/SDI A250.8 Level 3 - Model 2 (seamless) and Physical Performance Level A (Extra Heavy Duty) with steel thickness of door faces not less than 0.053-inch (nominal 16-gauge).
 - b. Interior Doors: ANSI/SDI A250.8 Level 2 - Model 2 (seamless) and Physical Performance Level B (Heavy Duty) with steel thickness of door faces not less than 0.042-inch (nominal 18-gauge).
2. Thickness: 1-3/4 inches.
3. Sizes and Configurations: As indicated.
4. Faces: Smooth and with no seams visible (seamless).
5. Top and Bottom Edges: Close top and bottom edges with steel closures, steel thickness not less than 0.053-inch (nominal 16-gauge); top surface flush for interior doors; top and bottom surfaces flush and watertight for exterior doors.
6. Vertical Edges: No seams visible. Bevel vertical edges of doors 1/8-inch per 2-inches, unless otherwise indicated.
7. Hardware Reinforcement: Fabricate reinforcement in compliance with ANSI/SDI A250.6 with reinforcing plates from same material as door face sheets.
8. Louvers: Comply with SDI-111C as follows.
 - a. Non-Fire-Rated Doors: Inserted, vision proof type, stationary, with inverted "V" or "Y" blades; locations and sizes as indicated.
 - b. Fire-Rated Doors: Fire-rated louvers complying with requirements of the labeling authority.
9. Glazed Openings:
 - a. Configurations, Sizes, and Locations: As indicated.
 - b. Fixed Glazing Stops: Provide on the exterior side of exterior doors and the corridor- or non-secured-side of interior doors.
 - c. Removable Glazing Stops: Either the snap-in type or the type secured with countersunk screws.
 - d. Glazing Stops for Fire-Rated Doors: Comply with requirements of the labeling authority.
10. Clearances: Fabricate doors to provide installation clearances specified in Part 3 of this SECTION.
11. Astragals: Provide 1-1/2 inch wide overlapping flat surface steel astragal on one leaf of pairs of doors where required by NFPA 80 or listing agency for fire-performance rating, and where indicated. Extend astragal not less than 3/4-inch beyond edge of door on which astragal is mounted. Steel shall be not less than 0.067-inch thick (nominal 14-gauge). Secure to doors with spot welds at maximum 4-inch centers and 1-inch from ends; no cutouts permitted in astragals.

- a. Locations for Exterior Pairs of Doors: Provide astragal on exterior side of active leaf for out-swinging doors and on exterior side of inactive leaf for in-swinging doors.
- b. Locations for Interior Pairs of Doors: Provide astragal on least conspicuous side of opening, unless otherwise indicated or directed.

C. Frames:

1. General Requirements:

- a. Provide one-piece, full-profile welded frames with corners and connections mitered and welded and exposed welds ground flush and smooth with adjacent surfaces. All fastenings shall be concealed, unless otherwise indicated.
- b. Fabricate frames with profiles and shapes free of warp, buckles, fractures, and other defects.
- c. After fabrication, apply mineral filler to eliminate weld scars and other blemishes. Level and grind smooth and flush with adjacent surfaces.

2. Sizes and Configurations: As indicated.

3. Steel Thickness: Not less than 0.053-inch (nominal 16-gauge).

4. Glazing Stops:

- a. Fixed Glazing Stops: Provide on the exterior side of exterior glazed openings and on the non-secured-side of interior glazed openings. Refer uncertainties to the Architect.
- b. Removable Glazing Stops: Either the snap-in type or the type secured with countersunk screws.

5. Plaster, Grout, and Mortar Guards: Steel, not less than 0.0179-inch thick (nominal 26-gauge), welded to frame at back of door hardware cutouts where plaster, grout, mortar, or other materials could obstruct hardware operation.

6. Frame Anchors:

- a. Provide anchors at each jamb as follows:

DOOR OR WINDOW HEIGHT	STUD WALLS AND PARTITIONS	UNIT MASONRY AND CONCRETE WALLS AND PARTITIONS
Up to 7'-6"	4	3
7'-6" to 8'-0"	5	4
Over 8'-0"	5 plus 1 additional for each 2'-0" or fraction thereof over 8'-0"	1 for each 2'-0" or fraction thereof

- b. Fabricate anchors from steel sheet not less than 0.053-inch thick (nominal 16-gauge). Anchors to be built into exterior walls shall be hot-dip galvanized after fabrication in compliance with ASTM A153, Class B, C, or D, as applicable.
 - c. Vary anchor types to provide positive fastening to adjacent construction.
 - d. Secure a metal clip angle at bottom of each jamb member for anchoring to floor, with not less than two fasteners.
- 7. Inserts, Bolts, and Fasteners:
 - a. Provide manufacturer's standard types.
 - b. Items to be built into exterior walls shall be hot-dip galvanized in compliance with ASTM A153, Class B, C, or D as applicable.
- 8. Frames to be Grouted: Fabricate frames to be grouted with grout holes at top of each jamb. Provide additional grout holes as required to fill internal obstructions. Tape plugs to frames. Install grout protection guards at lock preparations, junction boxes, and tapped mounting holes.

2.03 PREPARATION FOR DOOR HARDWARE

- A. Factory-prepare hollow metal doors and frames to receive hardware in accordance with the final hardware schedule and templates furnished by hardware suppliers.
 - 1. Preparation includes sinkages and cutouts for mortised and concealed hardware.
 - 2. Weld plaster, grout, and mortar guards behind cutouts in frames.
 - 3. Hardware preparation for labeled openings shall conform to the requirements of the labeling authority.
- B. Provide reinforcements for both concealed and surface-applied hardware in accordance with ANSI/SDI A250.8.
 - 1. Drill and tap mortised reinforcements at factory, using templates.
 - 2. Install reinforcements with concealed connections designed to develop full strength of reinforcements.

2.04 SHOP FINISHING

- A. General Requirements:
 - 1. After fabrication, thoroughly clean and otherwise prepare steel for maximum paint adhesion in compliance with the primer manufacturer's printed instructions and ANSI/SDI A250.10.
 - 2. Apply primer in compliance with the manufacturer's printed instructions and ANSI/SDI A250.10. Primed surfaces shall be smooth and free from pinholes, irregularities, rough spots, missed areas, foreign embedded material, and other defects and ready to receive field-applied finishes.
- B. Doors and Frames: Apply one coat of shop primer.

1. Interior Doors and Frames: Field finishing is specified in SECTION 09 91 00 "PAINTING".
2. Exterior Doors and Frames: Field finishing is specified in SECTION 09 91 00 "PAINTING".

PART 3 - EXECUTION

3.01 INSPECTION

- A. Verify that conditions are satisfactory for the installation of hollow metal doors and frames.
- B. Do not begin installation until unsatisfactory conditions have been corrected.

3.02 PREPARATION

- A. Protection:
 1. Protect adjacent surfaces and finishes from damage during installation of doors and frames.
 2. Protect doors and frames from damage during field handling and installation.
- B. Grouting:
 1. Frames for Installation in Metal-Framed Partitions: Prior to installation, mix and apply grout in compliance with the manufacturer's printed instructions. Solidly fill frames with grout and allow to dry. Promptly remove grout from exposed surfaces.
 2. Frames for Installation in Masonry Walls: Specified hereinafter.
 3. Frames for Installation in Concrete Walls: Specified hereinafter.

3.03 INSTALLATION

- A. General Requirements:
 1. Install hollow metal doors and frames in compliance with the manufacturer's printed instructions and requirements of ANSI/SDI A250.11, both as applicable to Project conditions, accepted Shop Drawings, as indicated, and as specified.
 2. 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.
 3. Install frames with removable glazing stops located on secure side of opening. Secure frames to adjacent supporting Work so frames will retain their position and stability. Check plumbness, squareness, and twist of frames as walls are constructed. Shim as necessary to comply with installation tolerances.
 4. Secure frames to adjacent supporting Work to retain their position and stability.
 5. Secure frame anchors to concrete floor construction with expansion anchors.

6. Install doors to maintain accurate alignment with frames. Adjust doors to maintain specified perimeter clearances; provide shims as required.
 7. Remove temporary braces necessary for installation only after frames have been properly set and secured.
- B. Fire-Rated Doors and Frames: In addition to general requirements, install fire-rated doors and frames in compliance with NFPA 80 and requirements of the labeling authority.
- C. Smoke Control Assemblies: In addition to general requirements, install smoke control doors and frames in compliance with NFPA 105 and requirements of the labeling authority.
- D. Frames at In-Place Concrete or Masonry Construction: Secure frames in place with post-installed, flat-head expansion anchors. Countersink anchors, and fill in mineral filler, and make smooth, flush, and invisible on exposed faces.
- E. Grouting of Frames in Concrete and Masonry Walls:
1. Masonry Walls: Specified in applicable SECTIONS of DIVISION 04 - MASONRY. Coordinate installation of frames to allow for solidly filling space between frames and masonry with grout.
 2. 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. Promptly remove grout from exposed surfaces.
- F. Door Hardware:
1. Install hardware in compliance with the manufacturer's printed instructions applicable to Project conditions, taking care not to damage hardware, doors, frames, and their finishes.
 2. Install door silencers in frames before grouting.
 3. Adjust and lubricate hardware as required for smooth, quiet, and proper operation.
 4. Check and readjust hardware immediately before inspections for Substantial Completion and final acceptance of the Work.
 5. Comply with additional requirements specified in SECTION 08 71 00 "DOOR HARDWARE".
- G. Frame Installation Tolerances: Adjust frames for squareness, alignment, twist, and plumb to the following tolerances:
1. Squareness: Plus or minus 1/16-inch, measured at door rabbet on a line 90 degrees from jamb perpendicular to frame head.
 2. Alignment: Plus or minus 1/16-inch, measured at jambs on a horizontal line parallel to plane of wall.
 3. Twist: Plus or minus 1/16-inch, measured at opposite face corners of jambs on parallel lines, and perpendicular to plane of wall.
 4. Plumbness: Plus or minus 1/16-inch, measured at jambs at floor.

H. Door Installation Tolerances:

1. Non-Rated Doors:
 - a. Jamb 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: Not more than 1/4-inch.
 - d. Between Bottom of Door and Top of Finish Floor (no threshold): Not more than 1/2-inch.
2. Fire-Rated Doors: In compliance with NFPA 80 and limitations of the labeling authority.
3. Smoke-Control Doors: In compliance with NFPA 105 and limitations of the labeling authority.

3.04 FINISH TOUCH-UP

- A. Immediately after installation, prepare and touch-up areas where shop primer has been damaged with specified field touch-up primer. Feather preparation and touch-up Work into undamaged areas so that upon completion of repairs, neither damage nor repair Work will be evident after finish paint or coating is applied.
- B. Thoroughly remove rust, clean and prepare surfaces, and apply primer in compliance with the manufacturer's printed instructions. When complete touch-up Work shall not be obvious and shall comply with requirements for shop-applied finish.

3.05 REPAIRS

- A. Repair minor damage to doors and frames in compliance with the manufacturer's printed recommendations to the satisfaction of the Architect.
- B. Remove doors and frames that cannot be satisfactorily repaired; remove hardware, glazing, and door accessories; and provide new acceptable Work and reinstall hardware, glazing, and door accessories at no increase in Contract Sum or Contract Time.
- C. When complete, repairs and replacement Work shall match original undamaged Work in all aspects.

3.05 CLEANING

- A. Remove foreign materials from exposed surfaces of hollow metal Work immediately after installation.

3.06. COMPLETION

- A. When complete, frames shall be set square, plumb and level, accurately aligned with adjacent Work; securely anchored to supporting Work to prevent movement, and in compliance with specified tolerances.
- B. Doors shall fit frames to specified tolerances; be plumb in all positions of swing; operate smoothly and quietly without binding, and close positively without undue pressure.

- C. Exposed surfaces shall be clean and free from dents, scratches, tool marks, stains, discoloration, and other defects and damage, and ready to receive field-applied finishes.

3.07 PROTECTION

- A. Protect hollow metal doors and frames from damage and deterioration until time of completion and acceptance by the Owner.
- B. Maintain ambient temperature and relative humidity conditions in accordance with the manufacturer's printed recommendations to protect the Work.
- C. Do not allow doors and frames to be exposed to construction activity or traffic without adequate protection.

END OF SECTION

SECTION 08 12 16.10

STANDARD ALUMINUM FRAMES

PART 1 - GENERAL

1.01 DESCRIPTION

- A. This SECTION describes the requirements for furnishing and installing standard aluminum frames for interior wood doors, cased openings, and interior windows (borrow lights).
- B. Aluminum frames are indicated on the Drawings.

1.02 DEFINITIONS

- A. Interior of the Building: Refer to SECTION 01 81 13 "SUSTAINABLE DESIGN REQUIREMENTS".

1.03 QUALITY ASSURANCE

- A. Source Limitations: Obtain standard aluminum frames through one source from a single manufacturer.
- B. Qualifications:
 - 1. Manufacturer: Manufacturer shall have been regularly producing standard aluminum frames of the type required with a proven record of successful in-service performance for not less than 5 years prior to the date of this Project.
 - 2. Installer: Installer shall be trained, experienced, and skilled in the installation of standard aluminum frames of the types specified and capable of providing installations of specified quality.
- C. Regulatory Requirements:
 - 1. General: Aluminum frames and their installation shall be in compliance with requirements of the applicable building code and other regulations. Refer to SECTION 01 41 00 "REGULATORY REQUIREMENTS" for further information.
 - 2. 20-Minute Fire-Rated Frames in Corridor and Smoke Barrier Walls:
 - a. Frames required to have a fire protection rating of 20-minutes in corridor and smoke barrier walls shall testing in accordance with NFPA 252 or UL 10C without the hose stream test and shall comply with requirements for a smoke- and draft-control door assembly as tested in accordance with UL 1784.
 - b. Frames shall be permanently identified with the letter "S" on the label. Label shall comply with the governing code and shall be permanently affixed to the hinge jamb.
- D. LEED Requirements:

1. Recycled Materials and Products: To the greatest extent practicable, furnish materials and products containing recycled materials in compliance with requirements of the LEED Rating System to contribute to the achievement of MR Credit 4.
2. Regional Materials and Products: To the greatest extent practicable, furnish materials and products that are extracted, harvested or recovered, as well as manufactured regionally in compliance with requirements of the LEED Rating System to contribute to the achievement of MR Credit 5.
3. Refer to SECTION 01 81 13 "SUSTAINABLE DESIGN REQUIREMENTS" for further information.

1.03 SUBMITTALS

- A. Product Data: Submit manufacturer's printed descriptive information, technical data, and specifications for frames clearly marked to show specific products, materials, fabrication, and shop painting. Include manufacturer's printed installation instructions.
- B. Shop Drawings: Submit Shop Drawings covering each type of frame, frame condition, and complete anchorage details. Include elevations and details showing frame types and profiles.
- C. Frame Schedule: Submit schedule of standard aluminum frames using the same reference numbers for details and openings as those indicated.
- D. Certificate of Compliance: Submit manufacturer's written certification that 20-minute rated fire-rated frames meet or exceed specified requirements and have been constructed to conform to design, materials, and construction equivalent to requirements for labeled assemblies and tested in accordance with ANSI/UL10C.
- E. Samples:
 1. Fabrication Sample: For each vertical-to-horizontal intersection, submit sample made from 12-inch lengths of full-size components and showing details of assembly.
 2. Finish Samples: Submit 12-inch long sections of specified frame material showing full extent of variations color and texture in finish to be furnished.
- F. Warranty: Submit review copy of proposed warranty.
- G. Maintenance Data: Furnish manufacturer's printed recommendations for the care of aluminum frames to the Owner.

1.04 LEED SUBMITTALS

- A. General Requirements:
 1. Submittals to document compliance with specified LEED requirements are required in addition to other submittals specified in the Article titled "Submittals".
 2. Even if Product Data to demonstrate LEED compliance is identical to that submitted to document compliance with other requirements, submit additional copies as a

separate submittal to document compliance with LEED requirements. Clearly identify this submittal as "LEED Submittal" on the transmittal and on the data.

3. Submit LEED Submittals concurrent with the non-LEED submittals specified hereinbefore.
- B. LEED Certification Product Data: Submit LEED Certification Product Data specified in SECTION 01 81 13 "SUSTAINABLE DESIGN REQUIREMENTS".
- C. LEED Material Buyout Form: Complete and submit LEED Material Buyout Form, attached at the end of SECTION 01 81 13 "SUSTAINABLE DESIGN REQUIREMENTS", for the applicable LEED credit(s) specified hereinbefore.
- D. Prohibited Content Installer Certification: Following completion of installation, complete and submit the certification form specified in SECTION 01 33 29.07 "PROHIBITED CONTENT INSTALLER CERTIFICATION".

1.04 PRODUCT DELIVERY, STORAGE, AND HANDLING

- A. Deliver and store products in the manufacturer's original protective packaging and other means necessary to prevent damage and deterioration during shipment, handling, and storage. Packaging shall be properly labeled for identification and installation purposes.
- B. Do not deliver products to the jobsite until wet construction materials such as concrete, gypsum board finish, and finish paint are dry and temperature and humidity are controlled and normal.
- C. Maintain protective coverings in place and in good repair until removal is necessary. Packaging shall be properly labeled for identification and installation purposes.
- D. Store products inside enclosed storage facilities or enclosed building, elevated above concrete slabs in a clean, dry, secure location, protected from construction activities, until ready for use in the Work. Do not cover with tarp or create a moisture chamber over stored products.
- E. Comply with additional requirements of the manufacturer and AAMA "Care and Handling of Architectural Aluminum from Shop to Site".

1.05 COORDINATION

- A. Coordinate with other applicable trades to ensure that walls are finished before frames are attached, and that fasteners are concealed.

1.06 WARRANTY

- A. Furnish to the Owner a written warranty, executed by an authorized representative of the manufacturer, stating that aluminum frames will be free from defects in factory materials and workmanship for entire warranty period.
- B. During warranty period repair or replace frame components found to be defective at no cost to the Owner.
- C. Warranty period shall be for two (2) years from the date of Substantial Completion.

- D. Manufacturer's warranty shall be in addition to, and not a limitation of, other rights Owner may have under the Contract Documents.

PART 2 - PRODUCTS

2.01 ACCEPTABLE MANUFACTURERS

- A. Furnish standard aluminum frames manufactured by Raco Interior Products, Inc. of Houston, TX, or subject to compliance with requirements an accepted equal by one of the following:
1. Advanced Architectural Frames of Garden Grove, CA.
 2. Versatrac division of American Door Products Inc. of Houston, TX.
 3. Western Integrated Materials of Long Beach, CA.

2.02 STANDARD ALUMINUM FRAMES

- A. Basis-of-Design Product: Raco Interior Products, Inc. "Solutions II OfficeFronts".
- B. Sizes and Configurations: As indicated on the Drawings.
- C. Materials and Components:
1. Frames, Trim, and Stops: Extruded aluminum in compliance with ASTM B221, 6063-T5 alloy-temper and as required to ensure compliance with dimensional tolerances and maintain finish color uniformity. Billets shall be composed of at least 33 percent recycled aluminum.
 - a. Throats: Fixed type, suitable to partitions indicated.
 - b. Trim Width: As indicated on the Drawings.
 2. Gaskets:
 - a. Glazing: Manufacturer's standard rubber extrusions, continuous, suitable to glazing thickness and type, replaceable, black color.
 - b. Doors: Manufacturer's standard rubber extrusions in compliance with listing requirements, continuous, replaceable, black color.
 3. Anchorage Devices, and Clips: Manufacturer's standard types suitable to opening sizes and construction, of materials and finishes compatible with the materials being secured.
 4. Fasteners: Aluminum, stainless steel, or zinc-plated steel in compliance with ASTM A164.
 5. Accessories: Manufacturer's standard, as recommended by the manufacturer for complete and proper installation.
 6. Door Hardware: Specified in SECTION 08 71 00 "DOOR HARDWARE".

7. Glazing: Specified in SECTION 08 80 00 "GLAZING".
- C. Fabrication: Fabricate standard aluminum frames in accordance with the final accepted Shop Drawings and as follows:
1. Fastenings: Fabricate frames with concealed fastenings.
 2. Stops: Manufacturer's standard, fabricated of extruded aluminum, continuous, snap-in type. Locate removable stops on secured side.
 3. Door Hardware Preparation: Factory prepare frames to template for hardware specified in SECTION 08 71 00 "DOOR HARDWARE".
 - a. Provide sinkages and cutouts for mortised and concealed hardware.
 - b. Provide plaster guards or mortar boxes behind cutouts in frames.
 - c. Provide reinforcements for both concealed and surface-applied hardware:
 - 1) Drill and tap mortised reinforcements.
 - 2) Install reinforcements with concealed connections designed to develop full strength of reinforcements.
 4. Aluminum Finishes:
 - a. Exposed: After fabrication, provide clear anodized finish as specified in SECTION 05 05 13 "SHOP-APPLIED COATINGS FOR METAL". Protect finish with a strippable film or covering.
 - b. Concealed Surfaces: Mill finish.

PART 3 - EXECUTION

3.01 INSPECTION

- A. Verify that conditions are satisfactory for the installation of aluminum frames.
- B. Do not begin installation until unsatisfactory conditions have been corrected.

3.02 PREPARATION

- A. Surface Preparation: At cementitious surfaces, protect aluminum surfaces that will be in contact with concrete from corrosion with an application of protective coating recommended in writing by the manufacturer. At dissimilar metals, comply with AAMA 101, Appendix Dissimilar Materials by separating aluminum materials and other corrodible surfaces from sources of corrosion or electrolytic action contact points.
- B. Protection:
 1. Protect adjacent surfaces and finishes from damage during installation of aluminum frames.

2. Protect frames and other materials from damage during field handing and installation.

3.03 INSTALLATION

A. General Requirements:

1. Install aluminum frames plumb and level in compliance with the manufacturer's printed instructions, final accepted Shop Drawings, and as specified.
2. Assemble door frames, sidelights, and window units with screws utilizing internal screw spline system, insert into the rough opening, and attach perimeter flanges.
3. Assemble sidelights and windows without the use of clips.
4. Secure frames to adjacent supporting construction to retain their position and stability.

B. Smoke Control Frames: In addition to general requirements, install smoke control frames in compliance with NFPA 105.

C. Door Hardware:

1. Install door hardware in compliance with the manufacturer's printed instructions and specified in SECTION 08 71 00 "DOOR HARDWARE".
2. Do not damage hardware, doors, frames, or their finishes.
3. Adjust and lubricate hardware for proper operation.

D. Glazing: Install glazing in compliance with the manufacturer's printed instructions and as specified in SECTION 08 80 00 "GLAZING".

3.04 CLEANING

- #### A.
- After installation, clean aluminum frames in compliance with the manufacturer's printed instructions and AAMA 609 & 610 "Cleaning and Maintenance Guide for Architecturally Finished Aluminum" without damaging finish.

3.05 REPAIRS

- #### A.
- Repair damaged components to the satisfaction of the Architect.
- #### B.
- Remove frame components that are damaged beyond successful repair and provide new replacement components at no additional cost to the Owner. Replacement components shall match adjacent original undamaged Work.

3.06 COMPLETION

- #### A.
- When complete, frames shall be set true-to-line and position, plumb, level, rigid, in true alignment with adjacent Work, securely fastened in place, and free of warp and twist and other defects and damage.

- B. Joints shall be hairline tight and surfaces shall be flush with adjacent components.
- C. Exposed surfaces shall be clean and free of dents, nicks, scratches, tool marks, and other damage and defects.
- D. Door hardware shall meet requirements specified in SECTION 08 71 00 "DOOR HARDWARE".
- E. Glazing shall meet requirements specified in SECTION 08 80 00 "GLAZING".
- F. Finishes shall match accepted samples.

3.07 PROTECTION

- A. Protect aluminum frames from damage and deterioration until time of completion and acceptance by the Owner.
- B. Do not allow frames to be exposed to construction traffic or activity without adequate protection.

END OF SECTION