SECTION 08 11 13
HOLLOW METAL DOORS AND FRAMES

PART 1 - GENERAL

1.01 SUMMARY

A. Section Includes:

1. Standard hollow metal doors and frames.

1.02 SUBMITTALS

A. Product Data: For each type of product indicated.

B. Shop Drawings: Include elevations, door edge details, frame profiles, metal thicknesses, preparations for hardware, and other details.

C. Samples for Initial Selection: For units with factory-applied color finishes.

D. Samples for Verification: For each type of exposed finish required.

E. Schedule: Prepared by or under the supervision of supplier, using same reference numbers for details and openings as those on Drawings.

PART 2 - PRODUCTS

2.01 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. Amweld Building Products, LLC.
2. Ceco Door Products; an Assa Abloy Group company.
3. Curries Company; an Assa Abloy Group company.
4. Fleming Door Products Ltd.; an Assa Abloy Group company.
5. Security Metal Products Corp.

2.02 MATERIALS

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

B. Hot-Rolled Steel Sheet: ASTM A 1011/A 1011M, CS, Type B.

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. Mineral-Fiber Insulation: ASTM C 665, Type I.

G. Bituminous Coating: Cold-applied asphalt mastic, SSPC-Paint 12, compounded for 15-mil (0.4-mm) dry film thickness per coat.

2.03 STANDARD HOLLOW METAL DOORS

A. General: Comply with ANSI/SDI A250.8.

1. Design: Flush panel.
2. Core Construction: Manufacturer's standard kraft-paper honeycomb, polystyrene, polyurethane, polyisocyanurate, mineral-board, or vertical steel-stiffener core.
   a. Thermal-Rated (Insulated) Doors: R-value of not less than 6.0 deg F x h x sq. ft./Btu when tested according to ASTM C 1363.
3. Vertical Edges for Single-Acting Doors: Beveled edge, 1/8 inch in 2 inches.
4. Top and Bottom Edges: Closed with flush or inverted 0.042-inch- thick, end closures or channels of same material as face sheets.
5. Tolerances: SDI 117, "Manufacturing Tolerances for Standard Steel Doors and Frames."

B. Exterior Doors: Face sheets fabricated from metallic-coated steel sheet. Comply with ANSI/SDI A250.8 for level and model and ANSI/SDI A250.4 for physical performance level:

1. Level 3 and Physical Performance Level A (Extra Heavy Duty), Model 1 (Full Flush).

C. Interior Doors: Face sheets fabricated from cold-rolled steel sheet. 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. Level 3 and Physical Performance Level A (Extra Heavy Duty), Model 1 (Full Flush).

D. Hardware Reinforcement: ANSI/SDI A250.6.

2.04 STANDARD HOLLOW METAL FRAMES

A. General: Comply with ANSI/SDI A250.8.

B. Exterior Frames: Fabricated from metallic-coated steel sheet.

1. Fabricate frames with mitered or coped corners.
2. Fabricate frames as full profile welded unless otherwise indicated.
3. Frames for Level 3 Steel Doors: 0.053-inch- thick steel sheet.

C. Interior Frames: Fabricated from cold-rolled steel sheet.

1. Fabricate frames with mitered or coped corners.
2. Fabricate frames as full profile welded unless otherwise indicated.
3. Fabricate knocked-down, drywall slip-on frames for in-place gypsum board partitions.
4. Frames for Level 3 Steel Doors: 0.053-inch- thick steel sheet.
5. Frames for Wood Doors: 0.053-inch- thick steel sheet.

D. Hardware Reinforcement: ANSI/SDI A250.6.

2.05 FRAME ANCHORS

A. Jamb Anchors:

1. Stud-Wall Type: Designed to engage stud, welded to back of frames; not less than 0.042 inch thick.
2. Compression Type for Drywall Slip-on Frames: Adjustable compression anchors.

B. Floor Anchors: Formed from same material as frames, not less than 0.042 inch thick, and as follows:

1. Monolithic Concrete Slabs: Clip-type anchors, with two holes to receive fasteners.

2.06 ACCESSORIES

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

B. Ceiling Struts: Minimum 1/4-inch-thick by 1-inch- wide steel.

C. Grout Guards: Formed from same material as frames, not less than 0.016-inch thick.

2.07 FABRICATION

A. Tolerances: Fabricate hollow metal work to tolerances indicated in SDI 117.

B. Hollow Metal Doors:

1. Exterior Doors: Provide weep-hole openings in bottom of exterior doors. Seal joints in top edges of doors against water penetration.
2. Astragals: Provide overlapping astragal on one leaf of pairs of doors where required by NFPA 80 for fire-performance rating or where indicated.

C. Hollow Metal Frames: Where frames are fabricated in sections, 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. Provide countersunk, flat- or oval-head exposed screws and bolts for exposed fasteners unless otherwise indicated.
3. Floor Anchors: Weld anchors to bottom of jambs and mullions with at least four spot welds per anchor.
4. Jamb Anchors: Provide number and spacing of anchors as follows:
   a. 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:
      i. Three anchors per jamb up to 60 inches high.
      ii. Four anchors per jamb from 60 to 90 inches high.
      iii. Five anchors per jamb from 90 to 96 inches high.
      iv. Five anchors per jamb plus 1 additional anchor per jamb for each 24 inches or fraction thereof above 96 inches high.
      v. Two anchors per head for frames more than 42 inches wide and mounted in metal-stud partitions.
   b. Compression Type: Not less than two anchors in each jamb.
   c. Postinstalled Expansion Type: Locate anchors not more than 6 inches from top and bottom of frame. Space anchors not more than 26 inches o.c.
5. Door Silencers: Except on weather-stripped doors, drill stops to receive door silencers.
   a. Single-Door Frames: Three door silencers.
   b. Double-Door Frames: Two door silencers.

D. Hardware Preparation: Factory prepare hollow metal work to receive templated mortised hardware 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 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 electrical Sections.
5. Provide fixed frame moldings on outside of exterior and on secure side of interior doors and frames.

2.08 STEEL FINISHES

A. Prime Finish: Apply manufacturer's standard primer immediately after cleaning and pretreating.

1. Shop Primer: ANSI/SDI A250.10.

B. Factory-Applied Paint Finish: ANSI/SDI A250.3.

1. Color and Gloss: As selected by Architect from manufacturer's full range.

PART 3 - EXECUTION

3.01 INSTALLATION

A. Hollow Metal Frames: Comply with ANSI/SDI A250.11.

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. Ceiling Struts: Extend struts vertically from top of frame at each jamb to overhead structural supports or substrates above frame unless frame is anchored to masonry or to other structural support at each jamb. Bend top of struts to provide flush contact for securing to supporting construction. Provide adjustable wedged or bolted anchorage to frame jamb members.

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, measured at door rabbet on a line 90 degrees from jamb perpendicular to frame head.

b. Alignment: Plus or minus 1/16 inch, measured at jambs on a horizontal line parallel to plane of wall.

c. Twist: Plus or minus 1/16 inch, measured at opposite face corners of jambs on parallel lines, and perpendicular to plane of wall.

d. Plumbness: Plus or minus 1/16 inch, measured at jambs at floor.

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

1. Non-Fire-Rated Standard Steel Doors:

i. Jambs and Head: 1/8 inch plus or minus 1/16 inch.

ii. Between Edges of Pairs of Doors: 1/8 inch plus or minus 1/16 inch.

iii. Between Bottom of Door and Top of Threshold: Maximum 3/8 inch.

iv. Between Bottom of Door and Top of Finish Floor (No Threshold): Maximum 3/4 inch.

3.02 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. 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.

C. Metallic-Coated Surfaces: Clean abraded areas and repair with galvanizing repair paint according to manufacturer's written instructions.

END OF SECTION

SECTION 08 21 00
FLUSH WOOD DOORS

PART 1 - GENERAL

1.01 SUMMARY

A. Section Includes: Extent and location of each type of flush wood door as indicated on Drawings and on Schedules.

B. Types of doors required include the following:

1. Solid core flush wood doors with wood veneer faces.

C. Related Sections: Drawings and general provisions of Contract, including General and Supplementary Conditions and Division 1, apply to Work of this Section.

1.02 SUBMITTALS

A. Shop Drawings: Submit in accordance with Section 01 33 00, Shop Drawings covering the items included under this Section. Shop Drawing submittals shall include:

1. Shop Drawings indicating location and size of each door, elevation of each kind of door, details of construction, location, and extent of hardware blocking, fire ratings, requirements for factory finishing, and other pertinent data.
   i. For factory pre-machined doors, indicate dimensions and locations of cutouts for locksets and other cutouts adjacent to light and louver openings.
2. Product Data: Door manufacturer's technical data for each type of door, including details of core and edge construction, trim for openings and louvers, and factory finishing specifications.
3. Samples: Submit samples 1'-0" square or as indicated for the following:
   i. Doors for Transparent Finish: Door faces with solid wood edging representing typical range of color and grain for each species of veneer and solid lumber required.
   ii. Metal Louvers: Blade and frame in 6-inch lengths for each material and finish required.
   iii. Metal Frames for Light Openings: Metal light frames in 6-inch lengths for each material, type, and finish required.

1.03 QUALITY ASSURANCE

A. Manufacturer's Qualifications: Firms regularly engaged in the manufacture of equipment, of types and sizes required, and whose products have been in satisfactory use in similar service for not less than 5 years.

1. Obtain doors from a single manufacturer.

B. Codes and Standards: Comply with the following standards:

1. NWWDA Quality Standard: I.S.1, "Industry Standard for Wood Flush Doors," of National Wood Window and Door Association (NWWDA).
2. AWI Quality Standards: "Architectural Woodwork Quality Standards," including Section 01 33 00, "Architectural Flush Doors," of Architectural Woodwork Institute (AWI) for grade of door, core construction, finish, and other requirements exceeding those of NWWDS quality standard.

1.04 PRODUCT DELIVERY, STORAGE, AND HANDLING

A. Protect doors during transit, storage, and handling to prevent damage, soiling, and deterioration. Comply with requirements of referenced standards and recommendations of NWWDA pamphlet, "How to Store, Handle, Finish, Install, and Maintain Wood Doors," as well as manufacturer's instructions.

B. Identify each door with individual opening numbers which correlate with designation system used on Shop Drawings for door, frames, and hardware using temporary, removable, or concealed markings.

1.05 PROJECT CONDITIONS

A. Conditioning: Do not deliver or install doors until conditions for temperature and relative humidity have been stabilized and will be maintained in storage and installation areas during remainder of construction period to comply with the following requirements applicable to Project's geographical location:

1. Referenced AWI quality standard including Section 100-S-3, "Moisture Content."

1.06 WARRANTY

A. Warranties shall be in addition to, and not a limitation of, other rights OWNER may have under the Contract Documents.

B. Door Manufacturer's Warranty: Submit written agreement on door manufacturer's standard form signed by manufacturer, Installer, and CONTRACTOR agreeing to repair

or replace defective doors which have warped (bow, cup, or twist) or show telegraphing of core construction in face veneers, or do not conform to tolerance limitations of referenced quality standards.

1. Solid Core Interior Doors: Life of installation.

C. CONTRACTOR's Responsibilities: Replace or refinish doors where CONTRACTOR's work contributed to rejection or to voiding of manufacturer's warranty.

PART 2 - PRODUCTS

2.01 MANUFACTURERS

A. Subject to compliance with specified requirements, manufacturers offering products which may be incorporated in Work include:

1. Solid Core Doors with Wood Veneer Faces:
   a. Algoma Hardwoods, Inc.
   b. Buell Door Company.
   c. Cal-Wood Door Div., Timberland Industries, Inc.
   d. Chappell Door Company.
   e. Doors, Incorporated.
   f. Eggers Industries, Architectural Door Division.
   g. Gay Doors, Inc.
   h. Glen-Mar Door Mfg. Co.
   i. Graham Manufacturing Corp.
   j. Ipik Door Co., Inc.
   k. Mohawk Flush Doors, Inc.
   l. Weyerhauser Company.

2.02 INTERIOR FLUSH WOOD DOORS

A. Solid Core Doors for Transparent Finish: Comply with the following requirements:

1. Faces: Natural birch, plain sliced.
2. AWI Grade: Custom.
3. Construction: PC-5 or PC-7 (Particleboard core, 5- or 7-ply).

B. Solid Core Doors for Opaque Finish: Comply with the following requirements:

1. Faces: Medium density overlay over standard thickness hardwood face veneers.
2. Construction: PC-5 or PC-7 (Particleboard core, 5- or 7-ply).
3. Faces and AWI Grade: Provide faces and grade to match non-rated doors in same area of building, unless otherwise indicated.

4. Construction: Manufacturer's standard core construction as required to provide fire-resistance rating indicated.
5. Edge Construction: Provide manufacturer's standard laminated edge construction for improved screw-holding capability and split resistance as compared to edges composed of a single layer of treated lumber.

2.03 LOUVERS AND LIGHT FRAMES

A. Metal Louvers: Size, type, and profile shown and fabricated from the following:

1. Natural Aluminum: Extruded aluminum with natural anodized finish complying with AA-C22A31, Class II.

2.04 FABRICATION

A. Fabricate flush wood doors to produce doors complying with following requirements:

1. In sizes indicated for Site fitting.
   i. Comply with final hardware Schedules and doorframe Shop Drawings and with hardware templates.
   ii. Coordinate measurements of hardware mortises in metal frames to verify dimensions and alignment before proceeding with factory pre-machining.

B. Openings: Cut and trim openings through doors to comply with applicable requirements of referenced standards for kind(s) of doors required.

1. Light Openings: Trim openings with moldings of material and profile indicated.
2. Louvers: Factory install louvers in prepared openings.

2.05 SHOP PRIMING

A. Doors for Opaque Finish: Shop prime exposed portions of doors for paint finish with 1 coat of wood primer specified in Section 09 90 00.

PART 3 - EXECUTION

3.01 EXAMINATION

A. Examine installed door frames prior to hanging door:

1. Verify that frames comply with indicated requirements for type, size, location, and swing characteristics and have been installed with plumb jambs and level heads.
2. Reject doors with defects.

B. Do not proceed with installation until unsatisfactory conditions have been corrected.

3.02 INSTALLATION

A. Manufacturer's Instructions: Install wood doors to comply with manufacturer's instructions and referenced AWI standard and as indicated.

B. Job-Fit Doors: Align and fit doors in frames with uniform clearances and bevels as indicated below; do not trim stiles and rails in excess of limits set by manufacturer or permitted with fire-rated doors. Machine doors for hardware. Seal cut surfaces after fitting and machining.

1. Fitting Clearances for Non-Rated Doors: Provide 1/8 inch at jambs and heads; 1/16 inch per leaf at meeting stiles for pairs of doors; and 1/8 inch from bottom of door to top of decorative floor finish or covering. Where threshold is shown or scheduled, provide 1/4-inch clearance from bottom of door to top of threshold.

C. Pre-fit Doors: Fit to frames for uniform clearance at each edge.

D. Field Finished Doors: Refer to the following for finishing requirements:

1. Section 09 90 00.

3.03 ADJUSTING AND PROTECTION:

A. Operation: Rehang or replace doors which do not swing or operate freely.

B. Finished Doors: Refinish or replace doors damaged during installation.

C. Protect doors as recommended by door manufacturer to assure that wood doors will be without damage or deterioration at time of Substantial Completion.

END OF SECTION

SECTION 08 22 00
FIBERGLASS REINFORCED PLASTIC (FRP) DOORS AND ALUMINUM FRAMES

PART 1 - GENERAL

1.01 DESCRIPTION

A. Scope of Work: Section includes fiberglass reinforced plastic (FRP) doors and frames.

1.02 REFERENCES

A. American Society for Testing and Materials (ASTM) Specifications

1.	A 123	Zinc Coatings
2.	C 591-01	Unfaced Preformed Rigid Cellular Polyisocyanurate.
3.	C 728-97	Insulation Board, Mineral Aggregate
4.	E 330-97	Structural Load Test
5.	E 1996	Wind Load Test
6.	E 1886	Impact Test Procedures (inclusive of Large Missile Impact)

B. Door and Frame Preparation for Hardware, American National Standard Institute Specifications (ANSI)

C. Recommended Locations for Builder's Hardware, Door and Hardware Institute (DHI)

D. Aluminum Association, Inc. (AA).

1.	AA5005-H14	Sheet Architectural.
2.	AA6061-T6	Heavy Duty Structures.
3.	AA6063-T5	Extrusions, Pipe, Architectural.
4.	AA DAF-45	Designation System for Aluminum Finishes.

E. American Architectural Manufacturers Association (AAMA)

1.	AAMA 2603-98	Pigmented Organic Coatings
2.	AAMA 609	Anodized Architectural Finishes Cleaning and Maintenance.
3.	AAMA 611-98	Anodized Architectural Standards.

1.03 PERFORMANCE REQUIREMENTS

A. Exterior FRP doors shall be designed to meet wind-loading requirements. Refer to Structural Drawings for wind and design pressures.

1.04 SUBMITTALS

A. Submit in accordance with Section 01 33 00. Include copies of manufacturer's specifications for fabrication and installation including certifications, data and test reports substantiating that products comply with requirements.

B. Submit shop drawings showing sizes and complete details of doors. Include details of core and edge construction, trim for openings and similar components. Include finishing specifications for doors to receive factory-applied shop finish.

C. Provide a schedule of doors and frames using same reference designations for details and openings as indicated on the Contract Drawings.

D. Furnish to the Owner six (6) copies of an Owners Operation and Maintenance Manual in accordance with Section 01 33 00. The manual shall consist of maintenance instructions for doors and frames; catalog pages for each product; name, address and phone number of the local representative of each manufacturer; and copy of the approved shop drawings.

1.05 PRODUCT HANDLING

A. Doors are to be stacked flat in a dry and protected area in original cartons prior to installation. Provide blocking or staging to protect door surfaces. Do not drag doors across one another. Lift doors and carry them into position. Identify each door with individual opening designations, as indicated on the approved shop drawings, using concealed markings.

1.06 WARRANTY

A. Submit written agreement in door manufacturer's standard form signed by manufacturer, Installer and Contractor, agreeing to repair or replace defective doors which have separated, delaminated from the core, expansion of the core, or otherwise failed due to defects in material and workmanship, improper installation or corrosion from a specified environment, for a period of not less than five (5) years.

PART 2 - PRODUCTS

2.01 ACCEPTABLE MANUFACTURERS

A. Special-Lite, Inc.

B. Marshall/Vega Corporation, Marshall, Arkansas.

C. Cline Aluminum Doors, Inc., Bradenton Florida.

D. Tiger Door, LLC

E. Substitutions: Manufacturers and model numbers listed are to establish a standard of quality. Similar items by other manufacturers that are equal in design, function and quality will be considered for prior approval provided required data and physical samples are submitted under provisions of Section 01 33 00.

2.02 FIBERGLASS REINFORCED PLASTIC (FRP) DOORS

A. Aluminum Members: Alloy and temper recommended by manufacturer for strength, corrosion resistance, and application of required finish.

B. FRP Door Composite Components: Minimum 3-ply composite laminated construction to include:

1. Facing: 0.120-inch (3.05 mm) composite FRP panel exterior grade, UV-protected fiber reinforced polyester panel on interior and exterior faces. Ultraviolet inhibitors shall be maximum amount formulated within the resin. Exterior and interior FRP panels shall be a Class C Flame Spread: Maximum of 75, and Smoke Developed Rating of 450 or less (ASTM E 84)
2. Surface texture will be pebble embossed with a non-directional pattern.
3. All mylar transporter fabrication film must be removed from FRP face sheets prior to door fabrication.
4. FRP face panels shall be USDA accepted with minimal porosity.
5. Face sheet shall be bonded to core and backup tube from edge to edge of door.
6. FRP face sheets shall be a Class C Flame Spread: Maximum of 75 and Smoke Developed rating of 450 or less (ASTM E 84), for both interior and exterior faces of interior and exterior doors.
7. Core: Organic materials shall be used to form a marine grade honeycomb core with high compression strength of 94.8 psi (ASTM C365), and internal aluminum hardware backup tube.
8. Hardware Backup: The hardware backup tube shall be a minimum 4.25-inches (107.95 mm) in width, 1.375-inches (34.93 mm) in depth with a wall thickness of 0.125-inches (3.18 mm). Contiguous for the full perimeter of the door to allow for all specified and non-specified hardware reinforcement.
9. Hardware Prep: Basic to include mortise lock edge prep or cylindrical lock prep; and pairs prepped for flush bolts, if required.
10. Bonding Agent: Environmentally friendly adhesive with strength buildup of 350 pounds per square inch (24.6 kg/cm^2).
11. Perimeter Door Trim: Wall thickness of 0.050-inch (1.25 mm) minimum in 6063-T5 extruded aluminum alloy with special beveled edge cap design and integral weather stripping on lock stile.

12. Replaceable Door Trim: Mechanically fastened to the hardware backup tube, allowing for replacement in the field, if damaged.
13. Trim Finish: To have minimum of a Class I anodized finish.
14. Weather stripping: Replaceable wool pile with nylon fabric, polypropylene backing meeting AAMA 701standards. Applied weather stripping not acceptable
15. Materials: Only nonferrous, non-rusting members shall be acceptable, including tie rods, screws and reinforcement plates.
16. Regulations: All components and agents to meet EPA standards.

C. Door Louvers:

1. Blades and Frames: 6063 –T5 extruded aluminum alloy, 0.062 inch minimum thickness. Louver blades shall be inverted "Y" type.
2. Insect Screens: 18-16 mesh, 0.111 inch diameter aluminum set in 6063 –T5 extruded aluminum alloy frame, 0.050 in minimum thickness.
3. Louver shall have minimum of 50% free air flow.

2.03 Aluminum Frames:

A. Frame Components: Extruded channel (tubular) 6063-T5 aluminum alloy, minimum wall thickness 0.125 inches; cut corners square and joinery shall be mechanical with no exposed fasteners

B. Profile: Open back with applied stop (OBS), 1.75 inches x 6".

C. Hinge and Strike Mounting Plates: Extruded aluminum alloy bar stock, 0.187r thick mounted in concealed integral channel with no exposed fasteners.

D. Door Stop: No screw on stops acceptable.

E. Frame Finish: Shall be Color anodic coating; AA-M12C22A31 Class II mechanical finish, non-specular, with chemical medium matte etch, minimum thickness 0.4 mil. Frame color shall match door color.

2.04 Accessories:

A. Fasteners: Aluminum, nonmagnetic stainless steel, or other material warranted by manufacturer as non-corrosive and compatible with aluminum components.

1. Do not use exposed fasteners.

B. Brackets and Reinforcements: Manufacturer's high strength aluminum units where feasible, otherwise nonferrous stainless steel.

C. Bituminous Coating: Cold applied asphaltic mastic, compounded for 30 mil thickness per coat.

2.05 OBSERVATION WINDOW FRP FRAME

A. Provide observation window FRP frames as shown on Drawings and Schedules. Frames shall be double rabbeted, 1/8-inch minimum thickness FRP, depth as shown or scheduled, with 2-inch jamb and sill widths. Head section shall be heights as shown or required. Frames shall be fabricated with mitered and bonded corners with concealed fasteners. Provide glass stops and appropriate anchors for securely holding frames in walls.

PART 3 - EXECUTION

3.01 EXAMINATION

A. Verify upon delivery that all doors and frames comply with the approved shop drawings and meet the indicated requirements for type, size, location and swing. Examine each opening for conditions that would prevent the proper application of doors, frames and related items. Do not proceed until defects are corrected.

3.02 INSTALLATION

A. Install doors and frames in accordance with manufacturer's instructions and approved shop drawings; set frames plumb, square, level, and aligned to receive doors.

B. Anchor frames to adjacent construction in strict accordance with recommendations and approved shop drawings and within tolerances specified in manufacturer's instructions.

1. Seal metal-to-metal joints between framing members using good quality elastomeric sealant.

C. Where aluminum surfaces contact with metals other than stainless steel, zinc or small areas of white bronze, protect from direct contact by one or more of the following methods.

1. Paint dissimilar metal with one coat of heavy-bodied bituminous paint.
2. Apply good quality elastomeric sealant between aluminum and dissimilar metal.
3. Paint dissimilar metal with one coat of primer and one coat of paint recommended for aluminum surface applications.
4. Use non-absorptive tape or gasket in permanently dry locations.

D. Hang doors with required clearances as follows:

1. Hinge and Lock Stiles: 0.125 inch (3.18 mm).
2. Between Meeting Stiles: 0.250 inch (6.35 m).
3. At Top Rails: 0.125 inch (3.18 mm).
4. Between Door Bottom and Threshold: 0.125 inch (3.18 mm).

E. Adjust doors and hardware to operate properly.

F. Install hardware for doors of this section.

G. Installation of door hardware is specified in Section 08 71 00.

3.03 CLEANING

A. Upon completion of installation thoroughly clean door and frame surface in accordance with AAMA 609.

B. Do not use abrasive, caustic or acid cleaning agents.

3.04 PROTECTION

A. Protect products of this section from damage caused by subsequent construction until substantial completion.

B. Repair damage or defect products to original specified condition in accordance with manufacturer's recommendations.

C. Replace damaged or defective products that cannot be repaired to the Architect's acceptance.

END OF SECTION

SECTION 08 31 13
ACCESS DOORS AND FRAMES

PART I - GENERAL

1.01 SUMMARY

A. Section Includes: Extent, location, and size of each type of access door required as indicated on Drawings.

B. Related Documents: Drawings and general provisions of Contract, including General and Supplementary Conditions and Division 1, apply to Work of this Section.

1.02 SUBMITTALS

A. Shop Drawings: Submit in accordance with Section 01 30 00, Submittals covering the items included under this Section. Shop Drawing submittals shall include:

1. Drawings for fabrication and installation of customized access doors and frames, including details of each frame type, elevations of door design types, anchorages, and accessory items.
2. Product Data: Submit manufacturer's technical data and installation instructions for each type of access door assembly, including setting drawings, templates, and instructions and directions for installation of anchorage devices.
    a. Include complete schedule, including types, general locations, sizes, wall and ceiling construction details, finishes, latching or locking provisions, and other data pertinent to installation.
3. Verification: Obtain specific locations and sizes for required access doors from trades requiring access to concealed equipment, and indicate on Submittal Schedule.
4. Special Size Access Doors: Use where required or requested; indicate on Schedule.
5. Samples: 3 inches by 5 inches minimum size, of each panel face material showing factory finished color and texture.

1.03 QUALITY ASSURANCE

A. Fire-Resistance Ratings: Wherever a fire-resistance classification is indicated, provide access door assembly with panel door, frame, hinge, and latch from manufacturers listed in Underwriters Laboratories, Inc., Building Materials Directory for rating shown.

1. Provide UL label on each fire-rated access door.

B. Size Variations: Obtain ENGINEER's acceptance of manufacturer's standard size units which may vary slightly from sizes indicated.

C. Coordination: Provide inserts and anchoring devices which must be built into other work for installation of access doors. Coordinate delivery with other Work to avoid delay.

PART 2 - PRODUCTS

2.02 MANUFACTURERS

A. Subject to compliance with specified requirements, manufacturers offering products which may be incorporated in Work include:

1. Access Doors:
   a. Bar-Co., Inc.
   b. J.L. Industries.
   c. Karp Associates, Inc.
   d. Milcor Division, Inryco, Inc.
   e. Nystrom, Inc.

2.03 MATERIALS AND FABRICATION

A. Provide each access door assembly manufactured as an integral unit, complete with all parts and ready for installation.

B. Steel Access Doors and Frames: Fabricate units of continuous welded steel construction, unless otherwise indicated. Grind welds smooth and flush with adjacent surfaces. Provide attachment devices and fasteners of type required to secure access panels to types of support shown.

C. Frames: Fabricate from l6-gauge steel.

D. Frames: Fabricate from 16-gauge, No. 4 satin finished stainless steel.

1. Fabricate frame with exposed flange nominal l-inch-wide around perimeter of frame for units installed in the following construction:
   a. Drywall finish.

E. For gypsum drywall or gypsum plaster, furnish perforated frames with drywall bead.

1. For installation in masonry construction, furnish frames with adjustable metal masonry anchors.
2. For full-bed plaster applications, furnish frames with galvanized expanded metal lath and exposed casing bead welded to perimeter of frame.

F. Flush Panel Doors:

1. Fabricate from not less than l4-gauge sheet steel, with concealed spring hinges or concealed continuous piano hinge set to open 175 degrees. Finish with manufacturer's factory-applied prime paint.
2. Fabricate from not less than 14-gauge stainless steel sheet, with concealed spring hinges or concealed piano hinge set to open 175 degrees. Buff exposed surfaces to No. 4 satin finish.
3. For fire-rated units, provide manufacturer's standard insulated flush panel/doors, with continuous piano hinge and self-closing mechanism.

G. Locking Devices: Provide flush, screwdriver-operated cam locks of number required to hold door in flush, smooth plane when closed.

1. Provide 1 cylinder lock per access door. Furnish 2 keys per lock. Key all locks alike, unless otherwise scheduled.
2. For recessed panel doors, provide access sleeves for each locking device. Furnish plastic grommets and install in holes cut through finish.

PART 3 - EXECUTION

3.01 INSTALLATION

A. Comply with manufacturer's instructions for installation of access doors.

B. Coordinate installation with work of other trades.

C. Set frames accurately in position and securely attach to supports with face panels plumb or level in relation to adjacent finish surfaces.

3.02 ADJUST AND CLEAN

A. Adjust hardware and panels after installation for proper operation.

B. Remove and replace panels or frames which are warped, bowed, or otherwise damaged.

END OF SECTION

SECTION 08 31 20
FLOOR DOORS

PART 1 - GENERAL

1.01 SUMMARY

A. Section Includes:

1. Extent, location, and size of each type of floor, pit, and sidewalk door required as indicated on Drawings.
2. Floor, pit, and sidewalk doors shall be of single- or double-cover construction of the size and as shown on Drawings.

B. Related Documents: Drawings and general provisions of Contract, including General and Supplementary Conditions and Division 1, apply to Work of this Section.

1.02 DESIGN REQUIREMENTS

A. Provide H-20 reinforcing for 300-pound wheel load where indicated.

B. Provide fall protection grating below floor doors.

1.03 SUBMITTALS

A. Shop Drawings: Submit in accordance with Section 01 33 00, "Submittal Procedures" covering the items included under this Section. Shop Drawing submittals shall include:

1. Drawings for fabrication and installation of all floor door sand frames, including details of each frame type, elevations of door design types, anchorage, and accessory items.
2. Product Data: Submit manufacturer's technical data and installation instructions for each type of floor door assembly, including setting drawings, templates, and instructions and directions for installation of anchorage devices.
    a. Include complete schedule including types, general locations, sizes, floor construction details, finishes, hardware information, latching or locking provisions, and other data pertinent to installation.
3. Verification: Obtain specific locations and sizes for required floor doors from trades and manufacturers requiring access to equipment, and indicate on Submittal Schedule.

4. Special Size and Load Floor Doors: Use where required or requested as indicated on Drawing Schedule.
5. Samples: 3 inches by 5 inches minimum size, of each cover face material showing factory finished color, pattern, and texture.

B. Submittals Sequence: Submit Schedule, Product Data, and Shop Drawings at earliest possible date, particularly where acceptance must precede fabrication of other work (e.g., concrete work) which is critical in the Project Construction Schedule. Include the product data, samples, Shop Drawings of other work affected by floor doors, and other information essential to the coordinated review of same.

1.04 QUALITY ASSURANCE

A. Single Source Responsibility: Provide floor doors, frames, hardware, and related items produced by a single manufacturer capable of showing prior production of floor door assemblies similar to those required.

B. Size Variations: Obtain ENGINEER's acceptance of manufacturer's standard size units which may vary slightly from sizes indicated.

C. Coordination: Provide inserts and anchoring devices which must be built into other Work for installation of floor doors. Coordinate delivery with other Work to avoid delay.

1.05 PROJECT CONDITIONS

A. Field Measurement: Where possible, field measure openings before fabrication to ensure proper fit of work; show measurements on final Shop Drawings. Coordinate fabrication with construction progress to avoid delay. If necessary, proceed with fabrication without measurements, and coordinate tolerances to ensure proper fit.

1.06 WARRANTIES

A. Special Warranty: Submit a written warranty, executed by the manufacturer, agreeing to repair or replace components or entire units which fail in materials or workmanship within the specified warranty period. Failures include, but are not necessarily limited to, structural failure including excessive deflection, excessive water leakage, faulty operation of hardware, deterioration of metals, metal finishes and other materials beyond normal weathering.

1. Warranty period for floor door units shall be 5 years after the date of Substantial Completion.

PART 2 - PRODUCTS

2.01 MANUFACTURERS

A. Subject to compliance with specified requirements, manufacturers offering products which may be incorporated in Work include:

1. Floor Doors:
   a. Babcock-Davis Hatchways, Inc.
   b. The Bilco Company.
   c. Dur-Red Products.
   d. Fall Protection Grating:
      i. The Bilco Company
   e. Ladder Safety Posts:
      i. "Ladder Up," The Bilco Company.

2.02 MATERIALS AND FABRICATION

A. Provide each floor door assembly manufactured as an integral unit, complete with all parts and ready for installation.

B. Aluminum Floor Doors and Frames: Fabricate units of continuous welded aluminum construction unless otherwise indicated. Grind welds smooth and flush with adjacent surfaces. Furnish attachment devices and fasteners of type required to secure frames to types of floor or walkway shown on Drawings.

C. Covers: Covers shall be mill finish aluminum 1/4-inch diamond pattern, reinforced on the underside. Covers shall open to 90 degrees and lock automatically in that position.

D. Channel Frame: Channel frame shall be 1/4-inch extruded aluminum with bituminous coating applied to the exterior of the frame and with full anchor flange and welded anchors for concrete installation around the perimeter.

E. For watertightness, furnish frame with formed gutters a minimum of 3-inch wide by 3-inch deep, anchors, and a welded 1-1/2-inch drain coupling located on the right front corner of the channel frame or in another corner if shown on Drawings or specified otherwise. Fully weld gutter frame for absolute weathertightness.

F. Hinges, Pins, Bolts, and Nuts: Provide the covers with heavy 12 gauge, No. 316 stainless steel hinges and stainless steel pins. Hinges shall pivot so the cover does not protrude into channel frame. Hinges shall be through-bolted to the cover with stainless steel lock bolts and shall be through-bolted to the frame with stainless steel bolts and lock nuts.

G. Springs, Tubes, Shoes, Plates, Enclosures, and Operators: Provide the covers with manufacturer's standard springs, tubes and caps, tube or spring enclosures, operators, support plates, and shoes, which shall allow ease of operation through the entire 90-degree arc of opening, and act as a check in retarding downward motion when being closed. Tube and spring enclosures shall prevent accumulation of moisture, grit, and debris inside the tube and spring assembly.

H. Hold-Open Arms: Provide the covers with hold-open arms with guides which automatically lock the covers in the open position. Vinyl covered release handles shall be provided and conveniently located for closing.

I. Exterior Lift Handle: Provide the covers with a stainless steel lift handle designed to be flush with walking surface when not in use.

J. Exterior Locking and Latching Devices: Provide the covers with the following locking or latching device and related hinged lid, flush gasketed removable screw plug, or threaded cover plug as noted:

1. Recessed Hasp: Provide a recessed hinged hasp with staple to receive padlock and covered by a hinged flush lid.

K. Hardware Finish: Except where noted otherwise, all hardware shall be zinc plated and chromate sealed.

L. Cover and Frame Finish: Provide mill finish on covers and frame.

2.03 ACCESSORIES

A. Provide ladder safety posts at fixed ladders located below floor doors and roof hatches. Safety posts shall be designed with telescoping section that locks automatically when fully extended. Up and down movement shall be controlled by a stainless steel spring balancing mechanism. Unit shall be completely assembled with fasteners for securing to ladder rungs in accordance with manufacturer's instructions. Finish to match ladder served.

1. Safety post shall be Bilco Ladder Up, or approved equal.

B. Provide fall prevention device below floor doors. The fall prevention device shall be permanently installed fall-through prevention system that is easily retractable for full access and allows visibility for inspection. The product must be corrosion resistant and tested and certified to meet current OSHA Standard 1926.502 (c) (4) (i) drop test. All metallic components, hardware hooks, and anchors shall be fabricated from Type 316 stainless steel.

1. Fall prevention device shall be Hatch Safety Net as manufactured by U.S.F. Fabrication, Inc. or approved equal.

PART 3 - EXECUTION

3.01 INSTALLATION

A. Comply with manufacturer's instructions for installation of floor doors.

B. Preparatory Work: For normal flush installation, set frames accurately in position, recessed below the finished grade or floor level with cover face panels plumb or level in relationship to adjacent finish surfaces. If unit is watertight type, unit should be set with slight pitch in direction of drain coupling. All four corners of the frame shall be in the same plane; verify that leaves are seated properly on frame all around. Securely attach units to supports.

C. Method: For flush installation, pour concrete to top of frame; for wood, bolt through frame.

D. Coordinate installation with Work of other trades.

3.02 ADJUST AND CLEAN

A. Adjust hardware and covers after installation for proper operation.

B. Remove and replace covers or frames which are warped, bowed, or otherwise damaged.

END OF SECTION

SECTION 08 33 30
OVERHEAD COILING DOORS

PART 1 - GENERAL

1.01 SUMMARY

A. Section Includes: Overhead coiling doors as indicated on Drawings and Schedules. Types of overhead coiling doors include the following:

1. Insulated overhead doors.
2. Chain-operated doors.
3. Motorized-operated doors.

B. Provide complete operating door assemblies including door curtains, guides, counterbalance mechanism, hardware, operators, and installation accessories.

C. Related Documents: Drawings and general provisions of Contract, including General and Supplementary Conditions and Division 1 Specification Sections, apply to Work of this Section.

1.02 PERFORMANCE REQUIREMENTS

A. Wind Loading: Design and reinforce overhead coiling doors to withstand a 20 pounds per square foot (85 miles per hour) wind loading pressure unless otherwise indicated.

1.03 SUBMITTALS

A. Shop Drawings: Submit in accordance with Section 01 33 00, "Submittal Procedures" covering the items included under this Section. Shop Drawing submittals shall include:

1. Product Data: Submit manufacturer's product data, electric operator wiring diagram, roughing-in diagrams, and installation instructions for each type and size of overhead coiling door.
   a. Provide operating instructions and maintenance information, and complete information describing fire release system including electrical rough-in instructions.
2. Quality Assurance Submittals: Submit UL certification for over-size fire-rated doors and frames that each assembly has been constructed with materials and methods equivalent to requirements for labeled construction.

1.04 QUALITY ASSURANCE

A. Provide each overhead coiling door as a complete unit produced by one manufacturer, including hardware, accessories, mounting, and installation components.

B. Inserts and Anchorages: Provide inserts and anchoring devices which must be set in concrete or built into masonry for installation of units. Provide setting drawings, templates, instructions, and directions for installation of anchorage devices. Coordinate delivery with other work to avoid delay.

1.05 WARRANTY

A. Special Warranty: Submit a written warranty, executed by CONTRACTOR, Installer, and overhead door manufacturer, agreeing to repair or replace unit and components which fail in materials or workmanship within the specified warranty period. Failures include, but are not necessarily limited to, structural failures including excessive deflection, excessive leakage or air infiltration, faulty operation of hardware and operator system, and deterioration of metals, metal finishes, and other materials beyond normal weathering.

1. Submit written warranty in accordance with Section 01 74 00 "Warranties and Bonds".
2. Warranty period for aluminum windows is 3 years or 20,000 cycles after date of Substantial Completion.

PART 2 - PRODUCTS

2.01 MANUFACTURERS

A. Subject to compliance with specified requirements, manufacturers offering products which may be incorporated in Work include:

1. Atlas Door Corp.
2. The Cookson Co.
3. Cornell Iron Works, Inc.
4. Kinnear Division, Harsco Corp.
5. Mahon Rolling Door Division, RCM Corp.
6. North American Rolling Door, Inc.
7. Overhead Door Corp.
8. Raynor Manufacturing Co.
9. Windsor Door Division, The Ceco Corp.

2.02 DOOR CURTAIN MATERIALS AND CONSTRUCTION

A. Door Curtain: Fabricate overhead coiling door curtain of interlocking slats designed to withstand required wind loading, of continuous length for width of door without splices. Unless otherwise indicated, provide slats of material gauge recommended by door manufacturer for size and type of door required, and as follows:

1. Steel Door Curtain Slats: Structural quality, cold-rolled galvanized steel sheets complying with ASTM A 446, Grade A, with G90 zinc coating, complying with ASTM A 525, and phosphate treated before fabrication.
2. Insulation: Fill slat with manufacturer's standard rigid cellular polystyrene or polyurethane- foam type thermal insulation complying with maximum flame-spread and smoke-developed indexes of 75 and 450, respectfully, according to ASTM E 84. Enclose insulation completely metal slat faces.
3. Inside Curtain Face: To match material of outside metal curtain face.

B. Endlocks: Malleable iron castings galvanized after fabrication, secured to curtain slats with galvanized rivets. Provide locks on alternate curtain slats for curtain alignment and resistance against lateral movement.

C. Windlocks: Malleable iron castings secured to curtain slats with galvanized rivets. Unless otherwise recommended by door manufacturer, provide windlocks on doors exceeding 16 feet wide. Space windlocks approximately 24 inches o.c. on both edges of curtain.

D. Bottom Bar: Consisting of two angles, each not less than 1-inch by 1-inch by 1/8-inch-thick, galvanized or stainless steel or aluminum extrusions to suit type of curtain slats.

1. Provide a replaceable gasket of flexible vinyl or neoprene between angles as a weather seal and cushion bumper for manually operated doors unless shown as an overlapping joint.

E. Curtain Jamb Guides: Fabricate curtain jamb guides of steel angles, or channels and angles with sufficient depth and strength to retain curtain loading. Build-up units with minimum 3/16-inch-thick steel sections, galvanized after fabrication. Slot bolt holes for track adjustment.

F. Secure continuous wall angle to wall framing by 3/8-inch minimum bolts at not more than 30 inches o.c., unless closer spacing recommended by door manufacturer. Extend wall angles above door opening head to support coil brackets, unless otherwise indicated. Place anchor bolts on exterior wall guides so they are concealed when door is in closed position. Provide removable stops on guides to prevent over-travel of curtain and continuous bar for holding windlocks.

G. Weather Seals: Provide vinyl or neoprene weather stripping for exterior exposed doors, except where otherwise indicated. At door heads, use 1/8-inch thick continuous sheet secured to inside of curtain coil hood. At door jambs, use 1/8-inch thick continuous strip secured to exterior side of jamb guide.

2.03 COUNTERBALANCING MECHANISM

A. Counterbalance doors by means of adjustable steel helical torsion spring, mounted around a steel shaft and mounted in a spring barrel and connected to door curtain with required barrel rings. Use grease-sealed bearings or self-lubricating graphite bearings for rotating members.

B. Counterbalance Barrel: Fabricate spring barrel of hot-formed structural quality carbon steel, welded or seamless pipe, of sufficient diameter and wall thickness to support roll-up of curtain without distortion of slats and limit barrel deflection to not more than 0.03 inch per foot of span under full load.

1. Provide spring balance of one or more oil tempered, heat-treated steel helical torsion springs. Size springs to counterbalance weight of curtain, with uniform adjustment accessible from outside barrel. Provide cast steel barrel plugs to secure ends of springs to barrel and shaft.
2. Fabricate torsion rod for counterbalance shaft of case-hardened steel, of required size to hold fixed spring ends and carry torsional load.

C. Brackets: Provide mounting brackets of manufacturer's standard design, either cast iron or cold-rolled steel plate with bell mouth guide groove for curtain.

D. Hood: Form to entirely enclose coiled curtain and operating mechanism at opening head and act as weather seal. Contour to suit end brackets to which hood is attached. Roll and reinforce top and bottom edges for stiffness. Provide closed ends for surface-mounted hoods and any portion of between-jamb-mounting projecting beyond wall face. Provide intermediate support brackets as required to prevent sag.

1. Fabricate aluminum hoods for doors of Alloy 3003 aluminum sheet not less than 16 gauge (0.06-inch thick), mill finish.

2.04 PAINTING

A. Shop clean and prime ferrous metal and galvanized surfaces, exposed and unexposed, except faying and lubricated surfaces, with door manufacturer's standard rust-inhibitive primer. Finish coating of door shall be factory applied manufacturer's finish for caustic enviroments. Color as indicated on drawings, or,

if not otherwise indicated, as selected by OWNER from manufacturers' full range of standard colors.

B. Chain Hoist Operator: Provide manual chain hoist operator consisting of endless steel hand chain, chain pocket wheel and guard, and geared reduction unit with maximum 35 pounds pull for door operation. Design chain hoist with self-locking mechanism allowing curtain to be stopped at any point in its travel and to remain in position until movement is reactivated. Provide alloy steel hand chain with chain holder secured to operator guide.

2.05 ELECTRIC DOOR OPERATORS

A. Provide electric door operator assembly of size and capacity recommended, and provided by door manufacturer complete with electric motor and factory pre-wired motor controls, gear reduction unit, solenoid operated brake, remote control stations, control devices, conduit and wiring from controls to motor and central stations, and accessories required for proper operation.

B. Provide hand-operated disconnect or a mechanism for automatically engaging a sprocket and chain operator and releasing brake for emergency manual operation. Mount disconnect and operator so they are accessible from floor level. Include interlock device to automatically prevent motor from operating when emergency operator is engaged.

C. Design operator so that motor may be removed without disturbing limit switch adjustment and without affecting emergency auxiliary operator.

D. Door Operator Type: Provide wall- or bracket-mounted door operator units consisting of electric motor, worm gear drive from motor to reduction gear box, chain or worm gear drive from reduction box to gear wheel mounted on counterbalance shaft, and a disconnect-release for emergency manual operation. Provide motor and drive assembly of horsepower and design as determined by door manufacturer for size of door required.

E. Electric Motors: Provide high-starting torque, reversible constant duty, Class A insulated electric motors with overload protection, sized to move door in either direction from any position at not less than 2/3 foot or more than 1 foot per second.

1. Coordinate voltage, wiring requirements, and current characteristics of motors with building electrical system. (See electrical Drawings for NEMA type area classifications.)
2. Provide open drip-proof type motor and controller with NEMA Type 12 enclosure.
3. Provide motor and controller with explosion-proof NEMA 7 enclosure.

F. Automatic Closing: Provide automatic closing device and governor, operating when activated by temperature rise and melting of 160 degrees F (71 degrees C) fusible link. Construct governor unit to be inoperative during normal door operations. Design release mechanism for easy resetting.

1. Provide manufacturer's standard UL labeled smoke detectors and electromechanical door holder release devices where indicated.
   a. Fabricate unit to permit manual lifting of curtain for emergency exit after automatic closing with curtain returning to closed position when released.

G. Remote Control Station: Provide momentary contact, 3-button control station with push-button controls labeled "Open," "Close," and "Stop."

1. Provide interior units, full-guarded, surface-mounted heavy-duty explosion-proof NEMA Type 7 enclosure.

H. Automatic Reversing Control: Provide each motorized door with automatic safety sensor extending full width of door opening. Activation with sensor will immediately stop downward travel and reverse direction to fully opened position.

1. Pressure Sensor Edge: Provide each motorized door with an automatic safety sensor edge located within astragal or weather stripping mounted to bottom door rail. Contact with switch will immediately reverse downward door travel. Furnish manufacturer's standard take-up reel or self-coiling cable.
   a. Provide electrically actuated automatic bottom bar.
2. Photoelectric Sensor: Manufacturer's standard system designed to detect an obstruction in door opening without contact between door and obstruction.

I. Limit Switches: Provide adjustable switches, interlocked with motor controls and set to automatically stop door at fully opened and fully closed positions.

PART 3 - EXECUTION

3.01 INSTALLATION

A. Install door and operating equipment complete with necessary hardware, jamb and head mold strips, anchors, inserts, hangers, and equipment supports in accordance with final Shop Drawings, manufacturer's instructions, and as specified in this Section.

B. Upon completion of installation, including Work by other trades, lubricate, test, and adjust doors to operate easily, free from warp, twist, or distortion and fitting weathertight for entire perimeter.

END OF SECTION

SECTION 08 41 13
ALUMINUM ENTRANCES AND STOREFRONTS

PART 1 - GENERAL

1.01 SUMMARY

A. Section Includes: Aluminum entrances and storefronts as indicated on Drawings and Drawing Schedules. Aluminum entrances and storefront types required for the Project include:

1. Exterior entrance doors.
2. Vestibule doors matching entrance doors.
3. Frames for exterior entrances.
4. Storefront type framing system.

B. Related Documents: Drawings and general provisions of Contract, including General and Supplementary Conditions and Division 1, apply to Work of this Section.

1.02 SYSTEM DESCRIPTION

A. Performance Requirements: Provide aluminum entrance and storefront assemblies that comply with specified performance characteristics. Each system shall be tested by a recognized testing laboratory or agency in accordance with specified test methods. Provide certified test results.

B. Thermal Movement: Provide systems capable of withstanding thermal movements resulting from an ambient temperature range of 120 degrees F (67 degrees C) that could cause a metal surface temperature range of 180 degrees F (100 degrees C) within the framing system.

C. Wind Loading: Provide assemblies capable of withstanding a uniform test pressure of 20 pounds per square foot inward and 20 pounds per square foot outward when tested in accordance with ASTM E 330.

D. Fixed Framing Transmission Characteristics: Provide aluminum entrance and storefront framing system that complies with requirements indicated for transmission characteristics.

1. Air Infiltration: Provide framing system with an air infiltration rate of not more than 0.06 cubic feet per minute per square foot of fixed area (excluding operable door edges) when tested in accordance with ASTM E 283 at an inward test pressure differential of 6.24 pounds per square foot.

2. Water Penetration: Provide framing system with no water penetration (excluding operable door edges) as defined in the test method when tested in accordance with ASTM E 331 at an inward test pressure differential of 6.24 pounds-force per square foot.
3. Condensation Resistance: Where framing systems are thermal-break construction, provide units tested for thermal performance in accordance with AAMA 1502 showing condensation resistance factor (CRF) of not less than 45.
4. Air Infiltration: Provide doors with an air infiltration rate of not more than 0.50 cubic feet per minute for single doors, and 1.0 for pairs of doors when tested in accordance with ASTM E 283 at an inward test pressure differential of 1.567 pounds per square foot.

1.03 SUBMITTALS

A. Shop Drawings: Submit in accordance with Section 01 33 00 "Submittal Procedures" covering the items included under this Section. Shop Drawing submittals shall include:

1. Drawings for fabrication and installation of entrances and storefronts.
2. Elevations.
3. Detail sections of typical composite members.
4. Hardware, mounting heights.
5. Anchorages and reinforcements.
6. Expansion provisions.
7. Glazing details.
8. Product Data: Manufacturer's product specifications, technical product data, standard details, and installation recommendations for each type of entrance and storefront product required. Include the following information:
   a. Fabrication methods.
   b. Finishing.
   c. Hardware.
   d. Accessories.

B. Test and Inspection Report: Certified test results showing that entrance and storefront systems have been tested by a recognized testing laboratory or agency and comply with specified performance characteristics.

1.04 QUALITY ASSURANCE

A. Manufacturer's Qualifications: Firms regularly engaged in manufacture of equipment, of types and sizes required, and whose products have been in satisfactory use in similar service for not less than 5 years.

B. Single Source Responsibility: Provide entrance and storefront produced by a single manufacturer capable of showing prior production of units similar to those required for this Project.

C. Design Criteria: Drawings indicating sizes, spacing of members, profiles, and dimensional requirements of entrance and storefront work. Minor deviations will be accepted in order to utilize manufacturer's standard products when, in ENGINEER's sole judgment, such deviations do not materially detract from the design concept or intended performances.

1.05 PROJECT CONDITIONS

A. Field Measurements: Check openings by field measurement before fabrication to ensure proper fitting of work; show measurements on final Shop Drawings. Coordinate fabrication schedule with construction progress to avoid delay in Work. Where necessary, proceed with fabrication without field measurement, and coordinate fabrication tolerances to ensure proper fit.

PART 2 - PRODUCTS

2.01 MANUFACTURERS

A. Subject to compliance with specified requirements, manufacturers offering products which may be incorporated in Work include:

1. Aluminum Entrances and Storefronts:
   a. Amarlite/Arco Metals Co.
   b. Cronstroms Manufacturing, Inc.
   c. Guaranteed Products.
   d. Harcar Aluminum Products Co.
   e. Kawneer Company, Inc.
   f. PPG Industries, Inc.
   g. Rebco, Inc.
   h. Tajima, Inc.
   i. Tubelite Division, Indal, Inc.
   j. United States Aluminum Corp., International Alum. Corp.
   k. United States Metals and Manufacturing Corp.
   l. Vistawall Architectural Products.
   m. YKK Architectural Products.

2.02 MATERIALS

A. Aluminum Members: Provide alloy and temper recommended by the manufacturer for strength, corrosion resistance, and application of required finish; comply with ASTM B 221 for extrusions and ASTM B 209 for sheet or plate.

B. Fasteners: Provide fasteners of aluminum, nonmagnetic stainless steel, or other materials warranted by the manufacturer to be noncorrosive and compatible with aluminum components, hardware, anchors, and other components.

1. Reinforcement: Where fasteners screw-anchor into aluminum less than 0.125-inch thick, reinforce the interior with aluminum or nonmagnetic stainless steel to receive screw threads, or provide standard noncorrosive pressed-in splined grommet nuts.
2. Exposed Fasteners: Except where unavoidable for application for hardware, do not use exposed fasteners. For the application of hardware, use fasteners that match the finish of member or hardware being fastened.
   a. Provide Phillips flat-head machine screws for exposed fasteners.

C. Concealed Flashing: Provide 26-gauge minimum dead-soft stainless steel, or 0.026-inch minimum extruded aluminum of alloy and type selected by manufacturer for compatibility with other components.

D. Brackets and Reinforcements: Where feasible, provide high-strength aluminum brackets and reinforcements; otherwise provide nonmagnetic stainless steel or hot-dip galvanized steel complying with ASTM A 386.

E. Concrete/Masonry Inserts: Provide concrete and masonry inserts fabricated from cast iron, malleable iron, or hot-dip galvanized steel complying with ASTM A 386.

F. Compression Weather Stripping: Provide the manufacturer's standard replaceable compressible weather-stripping gaskets of molded neoprene complying with ASTM D 2000 or molded PVC complying with ASTM D 2287.

G. Sliding Weather Stripping: Provide the manufacturer's standard replaceable weather stripping of wool, polypropylene, or nylon woven pile, with nylon fabric or aluminum strip backing, complying with AAMA 701.2.

H. Glass and Glazing Materials: Glass and glazing materials shall comply with requirements of Section 08 80 00 “Glass & Glazing.

2.03 COMPONENTS

A. Storefront Framing System: Provide inside-outside matched, resilient flush-glazed storefront framing system with provisions for glass replacement. Shop-fabricate and pre-assemble frame components where possible.

1. Thermal Break Construction: Fabricate storefront framing system with integrally concealed, low conductance thermal barrier located between exterior materials and exposed interior members to eliminate direct metal-to-metal contact. Use manufacturer's standard construction that has been in use for similar projects for period of not less than 3 years.

B. Stile-and-Rail Type Aluminum Doors:

1. Frame: Provide tubular frame members, fabricated with mechanical joints using heavy inserted reinforcing plates and concealed tie-rods or j-bolts.
2. Design: Provide 1-3/4-inch thick doors of design indicated. Bottom rail shall be 10 inches high.
3. Medium stile (3-1/2-inch nominal width).
4. Glazing: Fabricate doors to facilitate replacement of glass or panels, without disassembly of stiles and rails. Provide snap-on extruded aluminum glazing stops with exterior stops anchored for nonremoval.

2.04 HARDWARE

A. Refer to hardware in Section 08 71 00 "Door Hardware" for requirements for hardware items other than those indicated to be provided by the aluminum entrance manufacturer.

B. Provide manufacturer's heavy-duty hardware units as indicated, scheduled, or required for operation of each door, including the following items of sizes, number, and type recommended by manufacturer for service required; finish to match door.

2.05 OVERHEAD CONCEALED CLOSERS

A. Provide independently hung, single-acting overhead concealed closers with concealed arm and track, complying with ANSI A156.4, Grade 2. Comply with manufacturer's recommendations for size of closer depending on door size, exposure to weather, and anticipated frequency of use. Include the following:

1. Non-hold-open.

B. Keyed Cylinders: Provide mortise type, 5-pin tumbler, inside cylinder units with cast aluminum face; comply with ANSI A156.5, Grade 1.

1. See Section 08 71 00 "Door Hardware" for keying requirements.

C. Deadlocks: Provide mortised, maximum security type deadlocks, with minimum 1-inch-long pivoted bolt and stainless steel strike box; comply with ANSI A156.5, Grade 1. Match profile of aluminum door stile edge. Provide single cylinder for key lock.

D. Flush Bolts: Provide standard edge mortised lever extension type flush bolts complying with ANSI A156.16, for inactive leaves of pairs of doors. Provide flush bolts at both the top and bottom of doors.

E. Push/Pulls: Provide door manufacturer's heavy-duty 1 inch diameter satin stainless steel push bar and pull handle set of style indicated.

1. Pull Handles: Provide stainless steel pull handle approximately 8 inches center-to-center, straight, with 2-1/2 inch projection.
2. Push Bars: Provide the manufacturer's standard full door width single bar push bar.

F. Thresholds: Provide extruded aluminum threshold of for exterior entry doors in mill finish, complete with anchors and clips, coordinated with pivots and floor-concealed closers.

2.06 FABRICATION

A. Sizes of door and frame units and profile requirements are indicated on Drawings. Variable dimensions are indicated, with maximum and minimum dimensions required to achieve design requirements and coordination with other work.

B. Pre-fabrication: Before shipment to Site, complete fabrication, assembly, finishing, hardware application, and other work to the greatest extent possible. Disassemble components only as necessary for shipment and installation.

C. Welding: Comply with AWS recommendations; grind exposed welds smooth and restore mechanical finish.

D. Reinforcing: Install reinforcing as required for hardware and necessary for performance requirements, sag resistance, and rigidity.

E. Dissimilar Metals: Separate dissimilar metals with zinc chromate primer, bituminous paint, or other separator that will prevent corrosion.

F. Continuity: Maintain accurate relation of planes and angles with hairline fit of contacting members.

1. Uniformity of Finish: Abutting extruded aluminum members shall not have an integral color or texture variation greater than half the range indicated in the sample pair submittal.

G. Fasteners: Conceal fasteners wherever possible.

H. Weather Stripping: For exterior doors, provide compression weather stripping against fixed stops; at other edges, provide sliding weather stripping retained in adjustable strip mortised into door edge.
1. Provide EPDM or vinyl blade gasket weather stripping in bottom door rail, adjustable for contact with threshold.
2. At interior doors and other locations without weather stripping, provide neoprene silencers on stops to prevent metal-to-metal contact.
3. Provide finger guards of collapsible neoprene or PVC gasketing securely anchored into frame at hinge jamb of center-pivoted doors.

2.07 FINISHES

A. High-Performance Organic Coating: Provide NAAMM AA-C12C42R1x coating (cleaned with inhibited chemicals, conversion coated with acid-chromate-fluoride-phosphate treatment, and painted with organic coating specified below). Prepare, pre-treat, and apply coating to exposed metal surfaces to comply with coating and resin manufacturers' instructions using a licensed applicator.

1. Kynar 500 or Hylar 5000 Polyvinylidene Fluoride (PVDF) Fluorocarbon Multicoat System: Provide resin-based coating per manufacturer's standard multicoat thermo-cured system, composed of specially formulated primer (minimum of 0.2 mil dry film thickness) and fluorocarbon color topcoats containing full-strength 70 percent “Kynar 500” or “Hylar 5000:” resin, minimum 1.0 mil dry film thickness, complying with AAMA 2605.
2. Color: Provide color as selected by ENGINEER from standard choices available from the coating manufacturer.

PART 3 - EXECUTION

3.01 ACCEPTABLE INSTALLERS

A. Installer's Qualifications: Entrances and storefront shall be installed by a firm that has not less than 5 years successful experience in the installation of systems similar to those required for this Project.

3.02 INSTALLATION

A. Comply with manufacturer's instructions and recommendations for installation.

B. Set units plumb, level, and true to line, without warp or rack of framing members, doors, or panels. Provide proper support and anchor securely in place.

1. Separate aluminum and other corrodible metal surfaces from sources of corrosion of electrolytic action at points of contact with other materials. Comply with requirements specified under paragraph "Dissimilar Materials" in the Appendix to AAMA 101-85.

C. Set sill members and other members in bed of sealant as indicated, or with joint fillers or gaskets as indicated to provide weathertight construction. Comply with requirements of Division 7 for sealant, fillers, and gaskets.

D. Refer to Section 08 80 00 “Glass & Glazing” for installation of glass and other panels indicated to be glazed into doors and framing, and not pre-glazed by manufacturer.

3.03 ADJUSTING

A. Adjust operating hardware to function properly, for smooth operation without binding, and for weathertight closure.

3.04 CLEANING

A. Clean the completed system, inside and out, promptly after installation, exercising care to avoid damage to coatings.

B. Clean glass surfaces after installation complying with requirements contained in Section 08 80 00 “Glass & Glazing” for cleaning and maintenance. Remove excess glazing and sealant compounds, dirt and other substances from aluminum surfaces.

3.05 PROTECTION

A. Institute protective measures required throughout the remainder of the construction period to ensure that aluminum entrances and storefronts will be without damage or deterioration, other than normal weathering, at time of acceptance.

END OF SECTION

SECTION 08 51 13
ALUMINUM WINDOWS

PART 1 - GENERAL

1.01 SUMMARY

A. Section Includes: Aluminum window units, including each type, grade, and performance class required, as indicated on Drawings and Schedules.

B. Types of aluminum window units required include:

1. Fixed windows.

C. Applications of aluminum windows on Project include:

1. Individual units set in conventional wall construction.

D. Related Documents: Drawings and general provisions of Contract, including General and Supplementary Conditions and Division 1, apply to Work of this Section.

1.02 DEFINITIONS

A. Performance class number included as a part of the window designation system is the actual design pressure in pounds per square feet used to determine the structural test pressure and water test pressure.

B. Structural test pressure, windload test, is equivalent to 150 percent of the design pressure.

C. Water leakage resistance test pressure is equivalent to 15 percent of the design pressure with 2.86 pounds per square foot as a minimum.

1.03 SYSTEM DESCRIPTION

A. Aluminum window units required include:

1. Heavy commercial grade of the performance class indicated.

B. Design Requirements: Comply with air infiltration, water penetration, and structural performance requirements indicated in AAMA 101 for the type, grade, and performance class of window units required.

1. Heights of window units above grade at the window centerline are indicated or can be determined from Drawings. Consult with ENGINEER for clarification needed to confirm required loading and test pressures.
2. Design wind velocity at the Site is 140 miles per hour.

C. Testing: Test each type and size of required window unit through a recognized testing laboratory or agency, in accordance with ASTM E 330 for structural performance, with ASTM E 283 for air infiltration, and with both ASTM E 331 and ASTM E 547 for water penetration. Provide certified test results.

D. Structural Performance: Provide units with no failure or permanent deflection for a positive (inward) and negative (outward) test pressure of 75 pounds-force per square foot.

E. Air Infiltration: Provide units with an air infiltration rate of not more than 0.37 cfm per foot of operable sash joint for an inward test pressure of 6.24 pounds-force per square foot.

F. Water Penetration: Provide units with no water penetration as defined in the test method at an inward test pressure of 3.00 pounds-force per square foot.

G. Condensation Resistance: Where window units are indicated to be of thermal-break construction, provide units which have been tested for thermal performance in accordance with AAMA 1502 showing at condensation resistance factor (CRF) of 45.

H. Sound Insulation Construction: Fabricate aluminum window units that have been certified to provide a sound transmission class (STC) rating of at least 40 when tested in accordance with ASTM E 90 and classified according to ASTM E 413.

1.04 SUBMITTALS

A. Shop Drawings: Submit in accordance with Section 01 33 00, Submittal Procedures covering the items included under this Section. Shop Drawing submittals shall include:

1. Drawings for each type of window, including information not fully detailed in the manufacturer's standard product data and the following:
   a. Typical unit elevations at 3/4-inch scale.
   b. Anchors.
   c. Hardware.
   d. Accessories.
   e. Glazing details.

2. Product Data: Submit manufacturer's product specifications, technical product data, recommendations and standard details for each type of aluminum window unit required. Include the following information:
   a. Fabrication methods.
   b. Finishing.
   c. Hardware.
   d. Accessories.

B. Test Report: Provide certification by the manufacturer showing that each type, grade, and size of window unit complies with requirements where the manufacturer's standard window units have been tested in accordance with specified tests and meet performance requirements specified. Where such testing has not been accomplished, perform required tests through a recognized testing laboratory or agency and provide certified test results.

C. Warranty: Submit in accordance with requirements of Division 1, General Requirements, warranties covering the items included under this Section.

1.05 QUALITY ASSURANCE

A. Standards: Requirements for aluminum windows, terminology and standards of performance, and fabrication workmanship are those specified and recommended in AAMA 101 and applicable general recommendation published by AAMA and AA.

B. Single Source Responsibility: Provide aluminum windows produced by a single manufacturer capable of showing prior production of units similar to those required for the Project.

C. Design Criteria:

1. Drawings are based on a specific type and model of aluminum window by a single manufacturer. An equivalent type of window by another listed manufacturer may be accepted provided that deviations in dimensions and profiles are minor and do not materially detract from the design concept or intended performances as judged solely by ENGINEER.

1.06 PROJECT CONDITIONS

A. Field Measurements: Where possible, check actual window openings in construction work by accurate field measurement before fabrication; show recorded measurements on final Shop Drawings. Coordinate Fabrication Schedule with construction progress as directed by CONTRACTOR to avoid delay of Work. Where necessary, proceed with fabrication without field measurements, and coordinate fabrication tolerances to ensure proper fit of window units.

PART 2 - PRODUCTS

2.01 MANUFACTURERS

A. Subject to compliance with specified requirements, manufacturers offering products which may be incorporated in Work include:

1. Fixed Windows:
   a. Custom Window Company.
   b. Desco Windows.
   c. Graham Architectural Products Corporation.
   d. Kawneer Company, Inc.
   e. Modu-Line Windows, Inc.
   f. Peerless Products, Inc.
   g. TRACO.
   h. Wausau Window and Wall Systems.

2.02 MATERIALS

A. Aluminum Extrusions: Provide alloy and temper recommended by the window manufacturer for the strength, corrosion resistance, and application of required finish, but not less than 22,000 psi ultimate tensile strength, and not less than 0.062-inch thickness at any location for main frame and sash members.

B. Fasteners: Provide aluminum, nonmagnetic stainless steel, epoxy adhesive, or other materials warranted by the manufacturer to be noncorrosive and compatible with aluminum window members, trim, hardware, anchors, and other components of window units.

2. Reinforcement: Where fasteners screw-anchor into aluminum less than 0.125-inch thick, reinforce interior with aluminum or nonmagnetic stainless steel to receive screw threads, or provide standard noncorrosive pressed-in splined grommet nuts.

1. Exposed Fasteners: Except where unavoidable for application of hardware, do not use exposed fasteners. For application of hardware, use fasteners that match the finish of the member or hardware being fastened, as appropriate.

C. Anchors, Clips, and Window Accessories: Fabricate anchors, clips, and window accessories of aluminum, nonmagnetic stainless steel, or hot-dip zinc-coated steel or iron complying with the requirements of ASTM A 386. Provide sufficient strength to withstand design pressure indicated.

D. Compression Type Glazing Strips and Weather Stripping: Unless otherwise indicated, and at manufacturer's option, provide compressible stripping for glazing

and weather stripping such as molded EPDM or neoprene gaskets complying with AAMA SG-1 or with ASTM D 2000, Designation 2BC415 to 3BC620, or molded PVC gaskets complying with ASTM D 2287, or molded expanded EPDM or neoprene gaskets complying with ASTM C 509, Grade 4.

E. Sealant: For sealants required within fabricated window units, provide type recommended by manufacturer for joint size and movement. Sealant shall remain permanently elastic, nonshrinking, and nonmigrating. Comply with Section 07 92 00 for selection and installation of sealants.

1.02 WINDOW GRADES AND PERFORMANCE CLASSIFICATION

A. Heavy Commercial Windows: Provide window units complying with requirements of AAMA Grade and Performance Class HC40.

1.03 WINDOW TYPES

A. The following paragraphs define the operating arrangement for the types of sash required in window units and specify minimum provisions for each type. Drawings indicate which panels of each window unit are operable sash and which are fixed.

B. Fixed windows are window units consisting of a glazed frame installed into one opening and are not operable.

1.04 HARDWARE

A. Except to the extent that more specific or stringent requirements are indicated, provide the manufacturer's standard hardware fabricated from aluminum, stainless steel, or other corrosion-resistant material compatible with aluminum and of sufficient strength to perform the function for which it is intended.

1. Four-bar friction hinges for casement windows shall comply with the requirements of AAMA 904.1.
2. Friction Shoes: Provide friction shoes of nylon or other non-abrasive, non-staining, non-corrosive, durable material.
3. Counterbalancing mechanism for single-, double-, or triple-hung windows shall comply with the requirements of AAMA 902.2.
4. Gear-type rotary operators for awning, casement, and jalousie windows shall comply with the requirements of ASTM E 405, Method A, when subjected to the operating moments and closing torques indicated in AAMA 101.

B. Window Types:

1. Fixed windows are inoperable units. Except for special provisions as indicated for maintenance, cleaning and removal, no operating hardware or equipment is required.

1.05 ACCESSORIES

A. Except to the extent that more specific or stringent requirements are indicated, provide manufacturer's standard accessories that comply with indicated standards.

1.06 FABRICATION

A. Except to the extent that more specific or stringent requirements are indicated, provide manufacturer's standard fabrication that complies with indicated standards and that produces units that are reglazable without dismantling sash framing. Include a complete system for assembly of components and anchorage of window units, and prepare sash for glazing except where pre-glazing at the factory is indicated.

B. Sizes and Profiles: Required sizes for window units and profile requirements are indicated on Drawings. Variable dimensions are indicated along with maximum and minimum dimensions as required to achieve design requirements and coordination with other Work.

1. Details shown are based upon standard details by one or more manufacturers. Similar details by other manufacturers will be acceptable, provided they comply with size requirements, minimum/maximum profile requirements, and performance standards as indicated or specified.

C. Thermal Break Connection: Fabricate aluminum window units with an integrally concealed low conductance thermal barrier, located between exterior materials and window members exposed on the interior, in a manner that eliminates direct metal-to-metal contact. Provide thermal break construction which has been in use for not less than 3 years, has been tested to demonstrate resistance to thermal conductance and condensation, and has been tested to show adequate strength and security of glass retention.

1. Pre-glazing Fabrication: Pre-glaze window units at the factory where possible and practical for applications indicated. Comply with glass and glazing requirements of Section 08 80 00 “Glass & Glazing” and AAMA 101.

1.07 FINISHES

A. High-Performance Organic Coating: Provide NAAMM AA-C12C42R1x coating (cleaned with inhibited chemicals, conversion coated with acid-chromate-fluoride-phosphate treatment, and painted with organic coating specified below). Prepare, pre-treat, and apply coating to exposed metal surfaces to comply with coating and resin manufacturers' instructions using a licensed applicator.

1. Kynar 500 or Hylar 5000 Polyvinylidene Fluoride (PVDF) Fluorocarbon Coating: Provide resin-based coating per manufacturer's standard multicoat thermo-cured system, composed of specially formulated primer (minimum of 0.2 mil dry film thickness) and fluorocarbon topcoats containing full-strength 70 percent "Kynar 500" or "Hylar 5000" resin, minimum 1.0 mil dry film thickness complying with AAMA 2605.
2. Color: Provide color as selected by OWNER from standard choices available from the coating manufacturer.

PART 3 - EXECUTION

3.01 INSPECTION

A. Inspect openings before beginning installation. Verify that rough or masonry opening is correct and the sill plate is level.

1. Masonry surfaces shall be visibly dry and free of excess mortar, sand, and other construction debris.
2. Metal surfaces shall be dry, clean, free of grease, oil, dirt, rust and corrosion, and welding slag, without sharp edges or offsets at joints.

3.02 INSTALLATION

A. Comply with manufacturer's specifications and recommendations for installation of window units, hardware, operators, and other components of the Work.

B. Set units plumb, level and true to line, without warp or rack of frames or sash. Provide proper support and anchor securely in place.

1. Separate aluminum and other corrodible surfaces from sources of corrosion or electrolytic action at points of contact with other materials by complying with the requirements specified under paragraph "Dissimilar Materials" in the Appendix to AAMA 101.

C. Set sill members and other members in a bed of compound or with joint fillers or gaskets, as shown, to provide weathertight construction. Refer to Section 079200 for compounds, fillers, and gaskets to be installed concurrently with window units. Coordinate installation with wall flashings and other components of the Work.

3.03 ADJUSTING

A. Adjust operating sash and hardware to provide a tight fit at contact points and at weather stripping for smooth operation and a weathertight closure.

3.04 CLEANING

B. Clean aluminum surfaces promptly after installation of windows. Exercise care to avoid damage to protective coatings and finishes. Remove excess glazing and sealant compounds, dirt, and other substances. Lubricate hardware and other moving parts.

END OF SECTION

SECTION 08 71 00
DOOR HARDWARE

PART 1 - GENERAL

1.01 SUMMARY

A. Section Includes: Finish or door hardware required for swing, sliding, and folding doors, except special types of unique hardware specified in the same Section as the door and door frames on which they are installed. Finish and door hardware includes:

1. Hinges.
2. Pivots.
3. Spring hinges.
4. Key control system.
5. Lock cylinders and keys.
6. Lock and latch sets.
7. Bolts.
8. Exit devices.
9. Closers.
10. Overhead holders.
11. Miscellaneous door control devices.
12. Door trim units.
13. Protection plates.
14. Weather stripping for exterior doors.
15. Astragals or meeting seals on pairs of doors.
16. Thresholds.
17. Security products.

B. Related Documents: Drawings and general provisions of Contract, including General and Supplementary Conditions and Division 1 Specification Sections, apply to Work of this Section.

1.02 SUBMITTALS

A. Shop Drawings: Submit in accordance with Section 01 33 00, Submittal Procedures covering the items included under this Section. Shop Drawing submittals shall include:

1. Product data, including manufacturers' technical product data for each item of door hardware, installation instructions, maintenance of operating parts and finish, and other information necessary to show compliance with requirements.

2. Final Door Hardware Schedule coordinated with doors, frames, and related work to ensure proper size, thickness, hand, function, and finish of door hardware.
3. Final Door Hardware Schedule Content: Based on door hardware indicated, organize schedule into hardware sets, indicating complete designations of every item required for each door or opening. Include the following information:
    a. Type, style, function, size, and finish of each hardware item.
    b. Name and manufacturer of each item.
    c. Fastenings and other pertinent information.
    d. Location of each hardware set cross-referenced to indications on Drawings, both on floor plans and on Door and Frame Schedule.
    e. Explanation of all abbreviations, symbols, and codes contained on Schedule.
    f. Mounting locations for hardware.
    g. Door and frame sizes and materials.
    h. Keying information.

B. Submittal Sequence: Submit initial draft of final Schedule along with essential product data to facilitate the fabrication of other work that is critical in the Project Construction Schedule. Submit final Schedule after samples, product data, coordination with Shop Drawings of other work, delivery schedules, and similar information has been completed and accepted.

C. Keying Schedule: Submit separate detailed Schedule indicating clearly how OWNER's final instructions on keying of locks have been fulfilled.

D. Samples of each type of exposed hardware unit in finish indicated and tagged with full description for coordination with Schedule. Submit samples prior to submission of final hardware schedule.

E. 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.

1.03 QUALITY ASSURANCE

A. Single Source Responsibility: Obtain each type of door hardware (latch and lock sets, hinges, closers, etc.) from a single manufacturer, although several may be indicated as offering products complying with requirements.

B. Supplier Qualifications: A recognized architectural door hardware supplier with warehousing facilities in 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 employs an experienced architectural hardware consultant (AHC) who is available to OWNER, ENGINEER, and CONTRACTOR, at reasonable times during the course of the Work, for consultation.

1. Require supplier to meet with OWNER to finalize keying requirements and to obtain final instructions in writing.

C. Codes and Standards, Fire-Rated Openings:

1. Provide door hardware for fire-rated openings that complies with NFPA Standard No. 80 and requirements of authorities having jurisdiction.
2. Provide only items of door hardware that are listed and are identical to products tested by UL, Warnock Hersey, FM, or other testing and inspecting organization, acceptable to authorities having jurisdiction for use on types and sizes of doors indicated in compliance with requirements of fire-rated door and doorframe labels.
   a. Where emergency exit devices are required on fire-rated doors (with supplementary marking on door, UL or FM labels indicating "Fire Door to be Equipped with Fire Exit Hardware"), provide UL or FM label on exist devices indicating "Fire Exit Hardware."

1.04 PRODUCT HANDLING

A. Tag each item or package separately with identification related to final Door Hardware Schedule, and include basic installation instructions with each item or package.

B. Packaging of door hardware is responsibility of supplier. As material is received by door hardware supplier from various manufacturers, sort and repackage in containers clearly marked with appropriate door hardware set number to match set numbers of approved Door Hardware Schedule. Two or more identical sets may be packed in same container.

C. Inventory door hardware jointly with representatives of the door hardware supplier and the door hardware installer until each is satisfied that the count is correct.

D. Deliver individually packaged door hardware items at the proper times to the proper locations (shop or Site) for installation.

E. Provide secure lock-up for door hardware delivered to Site but not yet installed. Control handling and installation of door hardware items which are not immediately replaceable so completion of Work will not be delayed by door hardware losses, both before and after installation.

1.05 MAINTENANCE

A. Maintenance Tools and Instructions: Provide a complete set of specialized tools and maintenance instructions as needed for OWNER's continued adjustment, maintenance, and removal and replacement of door hardware.

PART 2 - PRODUCTS

2.01 MANUFACTURERS

1. Subject to compliance with specified requirements, manufacturers offering products which may be incorporated in Work include:Butts and Hinges:
   a. Bommer Industries, Inc.
   b. Hager Hinge Co.
   c. McKinney Products Co.
   d. PBB, Inc.
   e. Stanley Hardware, Division Stanley Works.
   f. Ives
   g. Rutherford Controls (a DORMA Group Company)
2. Cylinders and Locks:
   a. Corbin and Russwin Architectural Hardware, Division Black and Decker Corp.
   b. Kawneer (for aluminum entry).
   c. Sargent Manufacturing Company.
   d. Yale.
   e. Best
   f. Falcon
3. Bolts:
   a. Corbin/Russwin.
   b. Glynn-Johnson Corp.
   c. Rockwood.
   d. Sargent.
   e. Stanley Hardware Division, Stanley Works.
   f. Trimco.
4. Exit/Panic Devices:
   a. Corbin and Russwin Architectural Hardware.
   b. Sargent Manufacturing Company.
   c. Von Durpin, Division Ingersoll-Rand door Hardware Group.
   d. Yale.
   e. Precision Hardware Inc.
   f. Falcon
5. Overhead Closers:
   a. Corbin and Russwin Architectural Hardware.

b. Kawneer (for aluminum entry).
c. LCN, Division Ingersoll-Rand Door Hardware Group.
d. Sargent Manufacturing Company.
e. Rixson.

6. Door Control Devices:
   a. Corbin and Russwin Architectural Hardware.
   b. Glynn-Johnson Corp.
   c. Hager Hinge Co.
   d. Stanley Hardware Division, Stanley Works.
   e. Rutherford Controls (a DORMA Group Company)
7. Door Trim Units:
   a. Hager Hinge Co.
8. Kick, Mop, and Armor Plates:
   a. Brookline Industries, Division Yale Security, Inc.
   b. Rockwood.
   c. Trimco.
   d. Ives
9. Door Stripping and Seals:
   a. National Guard Products, Inc.
   b. Reese Enterprises, Inc.
   c. Zero International, Inc.
   d. Pemko
10. Thresholds:
   a. Kawneer (for aluminum entry).
   b. National Guard Products, Inc.
   c. Reese Enterprises, Inc.
   d. Zero International, Inc.
   e. Pemko
11. Sound Stripping:
   a. National Guard Products, Inc.
   b. Reese Enterprises, Inc.
   c. Zero International, Inc.
   d. Pemko.

2.02 SCHEDULED HARDWARE

A. Requirements for design, grade, function, finish, size, and other distinctive qualities of each type of door hardware are indicated on Legend of Hardware Types and Schedule of Door Hardware Sets at the end of this Section. Products are identified by using hardware designation numbers of the following.

   1. Manufacturer's Product Designations: One or more manufacturers are listed for each hardware type required in the Legend of Hardware Types for purposes of establishing minimum requirements. Provide either the product designated or, where more than one manufacturer is listed, the

comparable product of one of the other manufacturers which complies with requirements, including those specified elsewhere in this Section and supply comparative and cross-referenced product data.

2.03 MATERIALS AND FABRICATION

A. Hand of Door: Drawings show direction of slide, swing, or hand of each door leaf. Provide each item of hardware for proper installation and operation of door movement as shown.

B. Manufacturer's Name Plate: Do not use manufacturer's products which have manufacturer's name or trade name displayed in a visible location (omit removable nameplates), except in conjunction with required UL labels and as otherwise acceptable to ENGINEER.

1. Manufacturer's identification will be permitted on rim of lock cylinders only.

C. Base Metals: Produce hardware units of basic metal and forming method indicated, using manufacturer's standard metal alloy, composition, temper and hardness, but in no case of lesser (commercially recognized) quality than specified for the applicable hardware units by applicable ANSI A156 series standard for each type hardware item and with ANSI A156.18 for finish designations indicated. Do not furnish optional materials or forming methods for those indicated, except as otherwise specified.

D. Fasteners: Provide hardware manufactured to conform to published templates, generally prepared for machine screw installation. Do not provide hardware which has been prepared for self-tapping sheet metal screws except as specifically indicated.

1. Provide screws for installation with each hardware item. Provide Phillips flat-head screws, except as otherwise indicated. Finish exposed (exposed under any condition) screws to match hardware finish or, if exposed in surfaces of other Work, to match finish of such other Work as closely as possible, including prepared-for-paint surfaces to receive painted finish.
2. Provide concealed fasteners for hardware units which are exposed when door is closed, except to extent no standard units of the type specified are available with concealed fasteners. Do not use through-bolts for installation where bolt head or nut on the opposite face is exposed in other Work, except where it is not feasible to adequately reinforce the Work. In such cases, provide sleeves for each through-bolt or use sex screw fasteners.

E. Tools and Maintenance Instructions for Maintenance: Furnish a complete set of specialized tools and maintenance instructions as needed for OWNER's continued adjustment, maintenance, and removal and replacement of finish hardware.

2.04 HINGES, BUTTS, AND PIVOTS

A. Templates: Except for hinges and pivots to be installed entirely (both leaves) into wood doors and frames, provide only template-produced units.

1. Screws: Provide Phillips flat-head or machine screws complying with the following requirements:For metal doors and frames, install machine screws into drilled and tapped holes.
2. For wood doors and frames, install wood screws.
3. For fire-rated wood doors, install No. 12 by 1-1/4-inch, threaded-to-the-head steel wood screws.
4. Finish screw heads to match surface of hinges or pivots.

B. Hinge Pins: Except as otherwise indicated, provide hinge pins as follows:

1. Steel Hinges: Steel pins.
2. Nonferrous Hinges: Stainless steel pins.
3. Exterior Doors: Nonremovable pins.

C. Power Transfer Hinge: Provide power transfer hinges (Basis of Design: Rutherford Controls power transfer electrified hinge device) for alumumin frames where indicated on electrical drawings to receive card key control device. Coordinate model with requirements of Owner-furnished card key control and door frame. Coordinate voltage power module above ceiling with owner's security vendor prior to installation.

2.05 LOCK CYLINDERS, AND KEYING

A. Supplier shall meet with OWNER to finalize keying requirements and obtain final instructions in writing.

B. Review the keying system with OWNER, and provide the type required (master, grandmaster or great-grandmaster), either new or integrated with OWNER's existing system.

C. Equip Locks with:

1. Manufacturer's standard 6-pin tumbler cylinders.
2. Manufacturer's special 6-pin tumbler cylinder, with construction master key feature, which permits voiding of construction keys without cylinder removal.

D. Metals: Construct lock cylinder parts from brass/bronze, stainless steel, or nickel silver.

E. Comply with OWNER's instructions for masterkeying and, except as otherwise indicated, provide individual change key for each lock which is not designated to be keyed alike with a group of related locks.
   1. Permanently inscribe each key with number or lock that identifies cylinder manufacturer key symbol, and notation: "DO NOT DUPLICATE."

F. Key Material: Provide keys of nickel silver only.

G. Key Quantity: Furnish 3 change keys for each lock; 5 master keys for each master system; and 5 grandmaster keys for each grandmaster system.

   1. Deliver keys to key control system manufacturer.
   2. Deliver keys to OWNER's Representative.

2.06 LOCKS, LATCHES, AND BOLTS

A. Strikes: Provide manufacturer's standard wrought box strike for each latch or lock bolt\ with curved lip extended to protect frame, finished to match hardware set.

   1. Provide dust-proof strikes for foot bolts, except where special threshold construction provides nonrecessed strike for bolt.
   2. Provide roller type strikes where recommended by manufacturer of the latch and lock units.
   3. Provide flat lip strikes for locks with 3-piece, antifriction latch bolts as recommended by manufacturer.
   4. Provide extra-long strike lips for locks used on frames with applied wood casing trim.
   5. Provide recess type top strikes for bolts locking into head frames unless otherwise indicated.

B. Electric Strikes: Provide Rutherford Controls Series 0 electric strike for Rim Exit Devices where indicated on electrical / security drawings to receive a card key control device. Coordinate model with requirements of Owner-furnished card key control and door frame. Coordinate voltage power module above ceiling with owner's security vendor prior to installation.

C. Lock Throw: Provide 5/8-inch minimum throw of latch and deadbeat used on pairs of doors. Comply with UL requirements for throw of bolts and latch bolts on rated fire openings.

1. Provide 1/2-inch minimum throw of latch for other bored and pre-assembled types of locks and 3/4-inch minimum throw of latch for mortise locks. Provide 1-inch minimum throw for all dead bolts.

D. Flush Bolt Heads: Minimum of 1/2-inch-diameter rods of brass, bronze, or stainless steel with minimum 12-inch long rod for doors up to 7'-0" in height. Provide longer rods as necessary for doors exceeding 7'-0" in height.

E. Exit Device Dogging: Except on fire-rated doors, wherever closers are provided on doors equipped with exit devices, equip the units with keyed dogging device to hold the push bar down and the latch bolt in the open position.

2.07 CLOSERS AND DOOR CONTROL DEVICES

A. Size of Units: Except as otherwise specifically indicated, comply with manufacturer's recommendations for size of door control unit, depending upon size of door, exposure to weather, and anticipated frequency of use.

1. Where parallel arms are indicated for closers, provide closer unit one size larger than recommended for use with standard arms.
2. Provide parallel arms for all overhead closers except as otherwise indicated.

B. Access-Free Manual Closers: Where manual closers are indicated for doors required to be accessible to the physically handicapped, provide adjustable units complying with ANSI A117.1 provisions for door opening force and delayed action closing.

C. Combination Door Closers and Holders: Provide units designed to hold door in open position under normal usage and to release and automatically close door under fire conditions. Incorporate an integral electromagnetic holder mechanism designed for use with UL listed fire detectors, provided with normally closed switching contacts.

1. Provide integral smoke detector device in combination door closers and holders complying with UL 228.

D. Provide black resilient parts for exposed bumpers. Color selection by Owner.

2.08 DOOR TRIM UNITS

A. Fasteners: Provide manufacturer's standard exposed fasteners for door trim units (kick plates, edge trim, viewers, knockers, mail drops, and similar units); either machine screws of self-tapping screw.

B. Fabricate edge trim of stainless steel not more than 1/2 inch or less than 1/16 inch smaller in length than door dimension.

C. Fabricate protection plates (armor, kick, or mop) not more than 1-1/2-inch less than door width.

1. Metal Plates: Stainless steel, 0.050 inch (U.S. 18 gauge).

2.09 WEATHER STRIPPING AND SEALS

A. Except as otherwise indicated, provide continuous weather stripping at each edge of every exterior door leaf. Provide type, sizes, and profiles shown on Drawings or Schedules. Provide noncorrosive fasteners as recommended by manufacturer for application indicated. Provide smoke, light, or sound seals on interior doors where indicated or scheduled.

B. Replaceable Seal Strips: Provide only those units where resilient or flexible seal strip is easily replaceable and readily available from stocks maintained by manufacturer.

C. Weather Stripping at Jambs and Heads:

1. Provide bumper-type resilient insert and metal retainer strips, surface applied unless shown as mortised or semi-mortised, of following metal, finish, and resilient bumper material:
2. Extruded aluminum with color anodized finish as selected by ENGINEER from manufacturer's standard color range, 0.062-inch minimum thickness of main walls and flanges.

D. Weather Stripping at Door Bottoms:

1. Provide threshold consisting of contact type resilient insert and metal housing of design and size shown on Drawings or Schedules, of following metal, finish, and resilient seal strip:
2. Extruded aluminum with color anodized finish as selected by ENGINEER from manufacturer's standard color range, 0.062-inch minimum thickness of main walls and flanges.
3. Solid neoprene wiper or sweep seal complying with MIL R 6055, Class II, Grade 40.

2.10 THRESHOLDS

A. Except as otherwise indicated, provide standard metal threshold unit of type, size, and profile as shown on Drawings or Schedules.

2.11 HARDWARE FINISHES

A. Provide matching finishes for hardware units at each door or opening to the greatest extent possible and except as otherwise indicated. Reduce differences in color and textures as much as commercially possible where the base metal or metal forming process is different for individual units of hardware exposed at the same door or opening. In general, match items to the manufacturer's standard finish for the latch and lock set (or push-pull units if no latch or lock sets) for color and texture.

B. Provide finishes which match those established by BHMA, or if none established, match ENGINEER's sample.

C. Provide quality of finish, including thickness of plating or coating (if any), composition, hardness, and other qualities complying with manufacturer's standards, but in no case less than specified by referenced standards for the applicable units of hardware.

D. Provide protective lacquer coating on all exposed hardware finishes of brass, bronze, and aluminum except as otherwise indicated. The suffix "-NL" is used with standard finish designations to indicate no lacquer.

E. The designations used on Schedules and elsewhere to indicate hardware finishes are those listed in ANSI A156.18, Materials and Finishes Standard, by BHMA, including coordination with the traditional U.S. finishes shown by certain manufacturers for their products.

F. Rust-Resistant Finish: For iron and steel base metal required for exterior work and in areas shown as high-humidity areas (and also when designed with the suffix -RR), provide 0.2 mil thick copper coating on base metal before applying brass, bronze, nickel, or chromium-plated finishes.

PART 3 - EXECUTION

3.01 INSTALLATION

A. Mount hardware units at heights indicated in "Recommended Locations for Builders Hardware for Standard Steel Doors and Frames" by the Door and Hardware Institute, except as specifically indicated or required to comply with governing regulations, and except as may be otherwise directed by ENGINEER.

B. Install each hardware item in compliance with manufacturer's instructions and recommendations. Wherever cutting and fitting is required to install hardware onto or into surfaces which are later to be painted or finished in another way,

coordinate removal, storage, and re-installation or application of surface protections with finishing work specified in Division 9. Do not install surface-mounted items until finishes have been completed on the substrates involved.

C. Set units level, plumb, and true to line and location. Adjust and reinforce the attachment substrate as necessary for proper installation and operation.

D. Drill and countersink units which are not factory prepared for anchorage fasteners. Space fasteners and anchors in accordance with industry standards.

E. Set thresholds for exterior doors in full bed of butyl rubber or polyisobutylene mastic sealant.

3.02 ADJUSTING, CLEANING, AND DEMONSTRATING

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 surfaces soiled by hardware installation.

C. Final Adjustment: Wherever hardware installation is made more than 1 month prior to acceptance or occupancy of a space or area, return to Work during the week prior to acceptance or occupancy and make final check and adjustment of all hardware items in such space or area. Clean operating items as necessary to restore proper function and finish of hardware and doors. Adjust door control devices to compensate for final operation of heating and ventilating equipment.

D. Instruct OWNER's personnel in proper adjustment and maintenance of hardware and hardware finishes during the final adjustment of hardware.

E. Continued Maintenance Service: Approximately 6 months after the acceptance of hardware in each area, the Installer, accompanied by the representative of the latch and lock manufacturer, shall return to the Project and re-adjust every item of hardware to restore proper function 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.

3.03 DOOR HARDWARE SCHEDULE

A. The hardware sets represent the design intent and direction of the owner and architect. They are a guideline only and should not be considered a detailed hardware schedule. Discrepancies, conflicting hardware and missing items should

be brought to the attention of the architect with corrections made prior to the bidding process. Omitted items not included in a hardware set should be scheduled with the appropriate additional hardware required for proper application and functionality.

B. Provide electric strike and hinges (Basis of Design: Rutherford Controls Strike Series 0 for Rim Exit Device and power transfer hinge device) for aluminum frames where indicated on electrical / security drawings at doors to receive a card key control device. Coordinate model with requirements of Owner-furnished card key control and door frame. Coordinate voltage power module above ceiling with owner's security vendor prior to installation.

C. Manufacturer's Abbreviations:

1. MK - McKinney
2. RF - Rixson
3. RO - Rockwood
4. RC – Rutherford Controls
5. SA - Sargent
6. YA - Yale
7. PE - Pemko
8. SU - Securitron

Hardware Schedule

Set: 1 Doors: M100 Description: Aluminum entrance doors					
2	Pivot Set	195	626	RF	087100
2	Pivot - intermediate	M19	626	RF	087100
1	Exit Device conc. vert. rod (exit only)	AD8410	US32D	SA	087100
1	Exit Device conc. vert. rod (nightlatch less pull)	DG163 AD8410 106	US32D	SA	087100
2	Offset Pull 1-1/4" diameter 11" tall	RM3240-11 Mtg-Type 12HD	US32	RO	087100
2	Concealed Overhead Stop	6 series stop	630	RF	087100
2	Door Closer (top jamb mount)	351 O 351A	EN	SA	087100
1	Threshold	2005AT ES14L		PE	087100
1	Rain Guard	346C		PE	087100
1	Weather strip	By aluminum door supplier			084100
2	Door Sweep	345ANB		PE	087100
1	Astragals	By aluminum door supplier			084100
2	Magnetic Door Lock	8371 – surface / low profile	US32D	RC	087100

Set: 2
Doors: M100A
Description: Aluminum vestibule doors

2	Pivot Set	195	626	RF	087100
2	Pivot - intermediate	M19	626	RF	087100
2	Dummy Bar	720	630	YA	087100
2	Offset Pull 1-1/4" diameter 11" tall	RM3240-11 Mtg-Type 12HD	US32	RO	087100
2	Concealed Overhead Stop	6 series stop	630	RF	087100
2	Door Closer (top jamb mount)	351 O 351A	EN	SA	087100
2	Silencers	By aluminum door supplier			084100

Set: 3
Doors: C105
Description: Exterior from stair, no outside trim

3	Hinge (hvy wt)	T4A3386 NRP	US32D	MK	087100
1	Exit Device rim (exit only)	8810	US32D	SA	087100
1	Door Closer (parallel with stop arm)	351 PS	EN	SA	087100
1	Threshold	2005AT ES14L		PE	087100
1	Rain Guard	346C		PE	087100
1	Head weather strip	2891APK		PE	087100
2	Jamb weather strip	45041CNB TEK		PE	087100
1	Door Sweep	345ANB		PE	087100
1	Electric Strike	Series 0, 0161-05 12VAC/DC	US32D	RC	087100

Set: 3A
Doors: M106A
Description: Exterior from stair, FRP door, alumium frame, no outside trim

3	Hinge (hvy wt)	T4A3386 NRP	US32D	MK	087100
1	Exit Device rim (exit only)	8810	US32D	SA	087100
1	Door Closer (parallel with stop arm)	351 PS	EN	SA	087100
1	Threshold	2005AT ES14L		PE	087100
1	Rain Guard	346C		PE	087100
1	Weather strip	45041CNB		PE	087100
1	Door Sweep	345ANB		PE	087100

Set: 4
Doors: C105B
Description: Stair entry from upper floor

3	Hinge (hvy wt)	T4A3386	US32D	MK	087100
1	Exit Device rim (passage lever trim)	8815 ETL	US32D-CPC	SA	087100
1	Door Closer (regular arm mount)	351 O	EN	SA	087100
1	Threshold	171AK FHSL14		PE	087100
1	Weather strip	45041CNB		PE	087100
1	Door Sweep	345ANB		PE	087100

Set: 5
Doors: 17
Description: Exterior door, nightlatch outside trim, hollow metal door/frame

3	Hinge (hvy wt)	T4A3386 NRP	US32D	MK	087100
1	Exit Device rim (nightlatch trim)	DG163 8804 PSB	US32D	SA	087100
1	Door Closer (parallel with stop arm)	351 PS	EN	SA	087100
1	Threshold	2005AT ES14L		PE	087100
1	Rain Guard	346C		PE	087100
1	Head weather strip	2891APK		PE	087100
2	Jamb weather strip	45041CNB TEK		PE	087100
1	Door Sweep	345ANB		PE	087100

Set: 5A
Doors: M108A
Description: Exterior door, FRP door with aluminum frame, nightlatch outside trim

3	Hinge (hvy wt)	T4A3386 NRP	US32D	MK	087100
1	Exit Device rim (nightlatch trim)	DG163 8804 PSB	US32D	SA	087100
1	Door Closer (parallel with stop arm)	351 PS	EN	SA	087100
1	Threshold	2005AT ES14L		PE	087100
1	Rain Guard	346C		PE	087100
1	Weather strip	45041CNB		PE	087100
1	Door Sweep	345ANB		PE	087100
1	Electric Strike	S6514	US32D	RC	087100

Set: 6
Doors: FW102, FW102C, FW102E, G101A, G101F, G201A, G201F, GB101, GB102A, GB102B, GB103E, GB103F, SP101, SP101A
Description: Exterior door with F20 function, FRP door with aluminum frame

3	Hinge (hvy wt)	T4A3386 NRP	US32D	MK	087100
1	Apartment Lock	DG163 8243 LNL	US32D	SA	087100
1	Door Closer (parallel with stop arm)	351 PS	EN	SA	087100
1	Threshold	2005AT ES14L		PE	087100
1	Rain Guard	346C		PE	087100
1	Weather strip	45041CNB		PE	087100
1	Door Sweep	345ANB		PE	087100
1	Electric Strike	S6514	US32D	RC	087100

Set: 7
Doors: C104
Description: Exterior door with F20 function, hollow metal door/frame

3	Hinge (hvy wt)	T4A3386 NRP	US32D	MK	087100
1	Apartment Lock	DG163 8243 LNL	US32D	SA	087100
1	Door Closer (parallel with stop arm and hold open)	351 PSH	EN	SA	087100
1	Threshold	2005AT ES14L		PE	087100
1	Rain Guard	346C		PE	087100
1	Head weather strip	2891APK		PE	087100
2	Jamb weather strip	45041CNB TEK		PE	087100
1	Door Sweep	345ANB		PE	087100
1	Electric Strike	S6514	US32D	RC	087100

Notes: P100 does not get electric strike.

Set: 7A
Doors: C100, C101, M109A, M111A, P100, P101, P101F
Description: Exterior door with F20 function, FRP door with aluminum frame

3	Hinge (hvy wt)	T4A3386 NRP	US32D	MK	087100
1	Apartment Lock	DG163 8243 LNL	US32D	SA	087100
1	Door Closer (parallel with stop arm and hold open)	351 PSH	EN	SA	087100
1	Threshold	2005AT ES14L		PE	087100
1	Rain Guard	346C		PE	087100
1	Weather strip	45041CNB		PE	087100
1	Door Sweep	345ANB		PE	087100

Set: 8
Doors: M106
Description: Fire rated, Stair from corridor

3	Hinge (std wt)	TA2314	US32D	MK	087100
1	Fire Exit Device rim (passage lever trim)	12 8815 ETL	US32D	SA	087100
1	Door Closer (parallel arm)	1431 P9	EN	SA	087100
1	Gasketing	S88D		PE	087100

Set: 9
Doors: A113A
Description: Fire rated, Stair from open office

3	Hinge (std wt)	TA2314	US32D	MK	087100
1	Fire Exit Device rim (lever trim)	12 8813 ETL	US32D	SA	087100
1	Door Closer (parallel arm)	1431 P9	EN	SA	087100
1	Wall stop	401	US26D	RO	087100
1	Gasketing	S88D		PE	087100

Set: 10					
Doors: M101					
Description: Fire rated, Lobby from corridor					
3	Hinge (std wt)	TA2314	US32D	MK	087100
1	Passage Set	8215 LNL	US32D	SA	087100
1	Door Closer (parallel with stop arm)	1431 PS	EN	SA	087100
1	Gasketing	S88D		PE	087100
1	Electric Strike	Series 0, 0161-05 12VAC/DC	US32D	RC	087100

Set: 11					
Doors: C105A					
Description: Fire rated, Corridor from stair					
3	Hinge (std wt)	TA2314	US32D	MK	087100
1	Classroom Lock	DG163 8237 LNL	US32D	SA	087100
1	Door Closer (parallel with stop arm)	1431 PS	EN	SA	087100
1	Gasketing	S88D		PE	087100
Notes: Door C105A - RH door, locking lever on stair side.					

Set: 12					
Doors: A113B					
Description: Fire rated, Stairs to corridor					
3	Hinge (std wt)	TA2314	US32D	MK	087100
1	Office Lock	DG163 8205 LNL	US32D	SA	087100
1	Door Closer (parallel arm)	1431 P9	EN	SA	087100
1	Wall stop	401	US26D	RO	087100
1	Gasketing	S88D		PE	087100
Notes: Door A113B - LH door, locking lever on stair side.					
1	Electric Strike	S6514	US32D	RC	087100

Set: 13					
Doors: A115					
Description: Fire rated, Electrical					
3	Hinge (std wt)	TA2314	US32D	MK	087100
1	Storeroom Lock	DG163 8204 LNL	US32D	SA	087100
1	Door Closer (parallel arm)	1431 P9	EN	SA	087100
1	Wall stop	401	US26D	RO	087100
1	Gasketing	S88D		PE	087100
1	Electric Strike	S6514	US32D	RC	087100

Set: 14
Doors: A109A
Description: Aluminum single door between labs

1	Pivot Set	195	626	RF	087100
1	Pivot - intermediate	M19	626	RF	087100
2	Mortise Deadlock	MS1850S	628	AD	087100
1	Mortise Cylinder	DG1-63-42	US26D	SA	087100
1	Push Bar 1" diameter	RM3202 Mtg-Type 12HD	US32	RO	087100
1	Offset Pull 1" diameter	RM3230-10 Mtg-Type 12HD	US32	RO	087100
1	Concealed Overhead Stop	2 series stop	652	RF	087100
1	Door Closer (top jamb mount)	351 O 351A	EN	SA	087100
3	Silencer	By aluminum frame supplier			084100

Notes: Mount deadlock cylinders at 48 inches above the floor. Mount horizontal push bar at 42" above the floor. Mount top of the pull through bolt to horizontal push bar (common end connection).

Set: 15
Doors: FW101, FW102B
Description: Electrical room

3	Hinge (std wt)	TA2314	US32D	MK	087100
1	Exit Device rim (lever trim)	8813 ETL	US32D	SA	087100
1	Door Closer (parallel arm)	1431 P9	EN	SA	087100
1	Wall stop	401	US26D	RO	087100
3	Silencers	By aluminum door supplier		00	

Set: 16
Doors: A100
Description: Office entry

3	Hinge (std wt)	TA2314	US32D	MK	087100
1	Exit Device rim (lever trim)	8813 ETL	US32D	SA	087100
1	Door Closer (parallel arm)	1431 P9	EN	SA	087100
1	Kick Plate	K1050 10" high BE CSK	US32D	RO	087100
1	Wall stop	401	US26D	RO	087100
3	Silencer	608		RO	087100

Set: 17
Doors: A103
Description: Restroom

3	Hinge (std wt)	TA2314	US32D	MK	087100
1	Pull Plate	126x70C	US32D	RO	087100
1	Push Plate	70E	US32D	RO	087100
1	Door Closer (regular arm)	1431 O	EN	SA	087100
1	Mop Plate	K1050 4" high BE CSK	US32D	RO	087100
1	Kick Plate	K1050 10" high BE CSK	US32D	RO	087100
1	Wall stop	401	US26D	RO	087100
3	Silencer	608		RO	087100

Set: 18					
Doors: A102, GB102C					
Description: Break room, Generator Bay					
3	Hinge (std wt)	TA2314	US32D	MK	087100
1	Passage Set	8215 LNL	US32D	SA	087100
1	Door Closer (regular arm)	1431 O	EN	SA	087100
1	Kick Plate	K1050 10" high BE CSK	US32D	RO	087100
1	Wall stop	401	US26D	RO	087100
3	Silencer	608		RO	087100

Set: 19					
Doors: A105					
Description: Shower					
3	Hinge (std wt)	TA2314	US32D	MK	087100
1	Privacy Set	49 8266 LNL	US32D	SA	087100
1	Wall stop	401	US26D	RO	087100
3	Silencer	608		RO	087100

Set: 19A					
Doors: M104					
Description: Restroom					
3	Hinge (std wt)	TA2314	US32D	MK	087100
1	Privacy Set	49 8266 LNL	US26D	SA	087100
1	Door Closer (parallel arm)	1431 P9	EN	SA	087100
1	Wall stop	401	US26D	RO	087100
3	Silencer	608		RO	087100

Set: 20					
Doors: A101, A104, A107, A112, A114					
Description: Office, training and supply closets					
3	Hinge (std wt)	TA2314	US32D	MK	087100
1	Office Lock	DG163 8205 LNL	US32D	SA	087100
1	Wall stop	401	US26D	RO	087100
3	Silencer	608		RO	087100

Set: 20A					
Doors: A108A, A109B					
Description: Lab A and Lab B					
3	Hinge (std wt)	TA2314	US32D	MK	087100
1	Office Lock	DG163 8205 LNL	US32D	SA	087100
1	Door Closer (regular arm)	1431 O	EN	SA	087100
1	Kick Plate	K1050 10" high BE CSK	US32D	RO	087100
1	Wall stop	401	US26D	RO	087100
3	Silencer	608		RO	087100

Set: 20B
Doors: M110A
Description: Parts

3	Hinge (std wt)	TA2314	US32D	MK	087100
1	Office Lock	DG163 8205 LNL	US32D	SA	087100
1	Door Closer (regular arm with hold open)	1431 H	EN	SA	087100
1	Wall stop	401	US26D	RO	087100
3	Silencer	608		RO	087100

Set: 20C
Doors: A108B, A109C, C100A, C101A, C102, M103, M108, M109, M109D, P100B

3	Hinge (std wt)	TA2314	US32D	MK	087100
1	Office Lock	DG163 8205 LNL	US32D	SA	087100
1	Door Closer (parallel arm)	1431 P9	EN	SA	087100
1	Wall stop	401	US26D	RO	087100
3	Silencer	608		RO	087100
1	Electric Strike	S6514	US32D	RC	087100

Notes: Door M108 (LHR door - locking lever on corridor M-108 side). Door P100B (LHR door). Electric strike on A108B and A109C only.

Set: 20D
Doors: M109C

3	Hinge (std wt)	TA2314	US32D	MK	087100
1	Office Lock	DG163 8205 LNL	US32D	SA	087100
1	Door Closer (parallel arm with hold open)	1431 PH9	EN	SA	087100
1	Wall stop	401	US26D	RO	087100
3	Silencer	608		RO	087100

Set: 20E
Doors: M110
Description: Parts

3	Hinge (std wt)	TA2314	US32D	MK	087100
1	Office Lock	DG163 8205 LNL	US32D	SA	087100
1	Door Closer (parallel with stop arm and hold open)	1431 PSH	EN	SA	087100
3	Silencer	608		RO	087100

Set: 21
Doors: M102, M105
Description: Mechanical/Electrical

3	Hinge (std wt)	TA2314	US32D	MK	087100
1	Storeroom Lock	DG163 8204 LNL	US32D	SA	087100
1	Door Closer (regular arm)	1431 O	EN	SA	087100
1	Wall stop	401	US26D	RO	087100
3	Silencer	608		RO	087100

Set: 21A Doors: 109C Description: Maintenance Storage					
3	Hinge (std wt)	TA2314	US32D	MK	087100
1	Storeroom Lock	DG163 8204 LNL	US32D	SA	087100
1	Door Closer (parallel arm)	1431 P9	EN	SA	087100
1	Wall stop	401	US26D	RO	087100
3	Silencer	608		RO	087100

END OF SECTION

SECTION 08 80 00
GLASS AND GLAZING

PART 1 - GENERAL

1.01 SUMMARY

A. Section Includes: Glass and glazing work as indicated on Drawings and Schedules. Types of Work in this Section include glass and glazing for:

1. Window units not indicated as pre-glazed.
2. Storefront construction.

1.02 SYSTEM DESCRIPTION

A. Provide glass and glazing that has been produced, fabricated, and installed to withstand normal thermal movement, wind loading, and impact loading (where applicable) without failure. Includes loss or breakage of glass, failure of sealants or gaskets to remain watertight and airtight, deterioration of glass and glazing materials, and other defects in Work.

1. Deterioration of insulating glass is defined as failure of hermetic seal due to causes other than breakage which results in intrusion of dirt or moisture, internal condensation or fogging, deterioration of protected internal glass coating, if any, resulting from seal failure, and any other visual evidence of seal failure or performance.

1.03 SUBMITTALS

A. Shop Drawings: Submit in accordance with Section 01 33 00 "Submittal Procedures" covering the items included under this Section. Shop Drawing submittals shall include:

1. Product Data: Manufacturer's technical data for each glazing material and fabrication glass product required, including installation and maintenance instructions.
2. Samples: For verification purposes, 12-inch square samples of each type of glass indicated, and 12-inch-long samples of each color required for each type of sealant or gasket exposed to view. Install sealant or gasket sample between two strips of material representative of adjoining framing system in color.

B. Quality Assurance Submittals: Submit certificates from respective manufacturers attesting that glass and glazing materials provided for Project comply with requirements.

1. Separate certification will not be required for glazing materials bearing manufacturer's permanent labels designating type and thickness of glass, provided labels represent a quality control program involving a recognized certification agency or independent testing laboratory acceptable to authorities having jurisdiction.

C. Compatibility and Adhesion Test Report: Submit statement from sealant manufacturer indicating that glass and glazing materials have been tested for compatibility and adhesion with glazing sealants and interpreting test results relative to material performance, including recommendations for primers and substrate preparation needed to obtain adhesion.

1.04 QUALITY ASSURANCE

A. Glazing Standards: Comply with recommendations of Flat Glass Marketing Association (FMGA), Glazing Manual and Sealant Manual, except where more stringent requirements are indicated. Refer to those publications for definitions of glass and glazing terms not otherwise defined in this Section or other referenced standards.

B. Safety Glazing Standard: Where safety glass is indicated or required by authorities having jurisdiction, provide type of products indicated which comply with ANSI Z97.1 and testing requirements of 16 CFR Part 1201 for Category II materials.

C. Insulating Glass Certification Program: Provide insulating glass units permanently marked either on spacers or at least one component pane of units with appropriate certification label of inspecting and testing organization indicated below:

1. Insulating Glass Certification Council (IGCC).

D. Single Source Responsibility: To ensure consistent quality of appearance and performance, provide materials produced by a single manufacturer or fabricator for each kind and condition of glass indicated and composed of primary glass obtained from a single source for each type and class required.

1.05 DELIVERY, STORAGE, AND HANDLING

A. Protect glass and glazing materials during delivery, storage, and handling to comply with manufacturer's directions and as required to prevent edge damage to glass, and damage to glass and glazing materials from effects of moisture

including condensation, of temperature changes, of direct exposure to sun, and from other causes.

1.06 PROJECT CONDITIONS

A. Environmental Conditions: Do not proceed with glazing when ambient and substrate temperature conditions are outside the limits permitted by glazing material manufacturer or when joint substrates are wet due to rain, frost, condensation or other causes.

PART 2 - PRODUCTS

2.01 MANUFACTURERS

A. Subject to compliance with specified requirements, manufacturers offering products which may be incorporated in Work include:

1. Manufacturers of Insulating Glass:
   a. AFG Industries, Inc.
   b. Cardinal IG.
   c. Guardian Industries Corp.
   d. PPG Industries, Inc.
   e. Viracon, Inc.
   f. Visteon.

2.02 GLASS PRODUCTS, GENERAL

A. Primary Glass Standard: Provide primary glass which complies with ASTM C 1036 requirements, including those indicated by reference to type, class, quality and, if applicable, form, finish, mesh, and pattern.

B. Heat-Treated Glass Standard: Provide heat-treated glass which complies with ASTM C 1048 requirements including those indicated by reference to kind, condition, type, quality, class, and, if applicable, form, finish, and pattern.

2.03 PRIMARY GLASS PRODUCTS

A. Clear Float Glass: Type I, (transparent glass, flat), Class 1, Quality q3 (glazing select).

2.04 LAMINATED GLASS PRODUCTS

A. Refer to primary and heat-treated glass requirements relating to properties of uncoated glasses making up laminated glass products.

B. Plastic Interlayer: Provide glass fabricator's standard polyvinyl butyral interlayer for laminating panes of glass with a proved record of showing no tendency to bubble, discolor or lose physical or mechanical properties after laminating and installation, in clear or colors and of thickness indicated.

C. Laminating Process: Fabricate laminated glass using laminator's standard heat-plus-pressure process to produce glass free from foreign substances and air/glass pockets.

D. Laminated Safety Glass: Two panes of glass of equal thickness, laminated together with not less than 0.030-inch-thick plastic interlayer and complying with requirements indicated below:

1. Glass Characteristics: Float glass, complying with requirements for class, tint, kind, and thickness of each pane (ply) indicated below:
   a. Class 1 - clear for both panes.
2. Kind:
   a. FT (fully-tempered).
3. Thickness:
   a. 1/4-inch.
4. Color of Plastic Interlayer: Clear.

2.05 SEALED INSULATING GLASS UNITS

A. Provide pre-assembled units consisting of organically sealed panes of glass enclosing a hermetically sealed dehydrated air space and complying with ASTM E 774 for performance classification indicated, as well as with other requirements specified for glass characteristics, air space, sealing system, sealant, spacer material, corner design, and desiccant.

1. For properties of individual glass panes making up units, refer to product requirements specified elsewhere in this Section applicable to types, classes, kinds, and conditions of glass products indicated.
2. Performance Classification per ASTM E 774, Class A.
3. Thickness of each Pane:
   a. 1/4 inch.
4. Air Space Thickness:
   a. 1/2-inch.
5. Sealing System:
   a. Manufacturer's standard.
6. Spacer Material:
   a. Manufacturer's standard metal.
7. Corner Construction: Manufacturer's standard corner construction.

B. Low Emissivity-Coated Insulating Glass Units: Manufacturer's standard units with one pane of glass coated with a durable, neutral-colored, low-emissivity metallic coating, of type and on surface indicated, and complying with the following requirements:

1. Exterior Pane:
   a. Clear float glass, coated on second surface.

C. Insulating Spandrel Glass: Manufacturer's standard units with kind HS (heat-strengthened) exterior pane and location of reflective coating matching that of coated insulating glass units for type, class and coating characteristics, and with interior pane complying with the following additional requirements:

1. Ceramic-Coated Heat-Treated Spandrel Glass: Condition B (spandrel glass, one surface ceramic coated), Kind HS (heat-strengthened), Type I (transparent glass, flat), Class 1 (clear), Quality q3 (glazing select), and complying with the following requirements:
   a. Color: As indicated or, if not otherwise indicated, as selected by ENGINEER from manufacturer's standard color.
   b. Location of Ceramic Coating: Third surface of insulating spandrel unit.

2.10 GLAZING GASKETS

A. Lock-Strip Gaskets: Neoprene extrusions of size and shape indicated, fabricated into frames with molded corner units and zipper lock strips, complying with ASTM C 542; black.

1. Neoprene, ASTM 864.

2.11 MISCELLANEOUS GLAZING MATERIALS

A. Compatibility: Provide products of material, size, and shape with referenced glazing standard, requirements of manufacturers of glass, and other glazing materials for application indicated, and with a proven record of compatibility with surfaces contacted in installation.

B. Cleaners, Primers, and Sealers: Type recommended by sealant or gasket manufacturer.

C. Setting Blocks: Elastomeric material with a Shore Type A durometer hardness of 85, plus or minus 5.

D. Spacers: Elastomeric material with a Shore Type A durometer hardness recommended by glass manufacturer to maintain glass lites in place for application indicated.

E. Edge Blocks: Elastomeric material of hardness required to limit lateral movement (side-walking).

PART 3 - EXECUTION

3.01 EXAMINATION

A. Require Glazier to inspect Work of glass framing erector for compliance with manufacturing and installation tolerances, including those for size, squareness, offsets at corners; for presence and functioning of weep system; for existence of minimum required face or edge clearances; and for effective sealing of joinery. Obtain Glazier's written report listing conditions detrimental to performance of glazing work. Do not allow glazing work to proceed until unsatisfactory conditions have been corrected.

3.02 PREPARATION

A. Clean glazing channels and other framing members to receive glass immediately before glazing. Remove coatings which are not firmly bonded to substrates. Remove lacquer from metal surfaces where elastomeric sealants are indicated for use.

3.03 GLAZING

A. Comply with combined printed recommendations of glass manufacturers, of manufacturers of sealants, gaskets and other glazing materials, except where more stringent requirements are indicated, including those of referenced glazing standards.

B. Glazing channel dimensions as indicated in details are intended to provide for necessary bite on glass, minimum edge and face clearances, and adequate sealant thicknesses, with reasonable tolerances. Adjust as required by job conditions at time of installation.

C. Protect glass from edge damage during handling and installation; use a rolling block in rotating glass units to prevent damage to glass corners. Do not impact glass with metal framing. Use suction cups to shift glass units within openings; do not raise or drift glass with a pry bar. Rotate glass with flares or bevels along one horizontal edge which would occur in vicinity of setting blocks so that these are located at top of opening. Remove from Site and dispose of glass units with edge

damage or other imperfections of kind that, when installed, weakens glass and impairs performance and appearance.

D. Apply primers to joint surfaces where required for adhesion of sealants, as determined by pre-construction sealant-substrate testing.

E. Install setting blocks of proper size in sill rabbet, located one-quarter of glass width from each corner, but with edge nearest corner not closer than 6 inches from corner unless otherwise required. Set blocks in thin course of sealant which is acceptable for heel bead use.

F. Provide spacers inside and out of correct size and spacing to preserve required face clearances, for glass sizes larger than 50 united inches (length plus height), except where gaskets or glazing tapes with continuous spacer rods are used for glazing. Provide 1/8-inch minimum bite of spacers on glass and use thickness equal to sealant width, except with sealant tape use thickness slightly less than final compressed thickness of tape.

G. Provide edge blocking to comply with requirements of referenced glazing standard, except where otherwise required by glass unit manufacturer.

H. Set units of glass in each series with uniformity of pattern, draw, bow, and similar characteristics.

I. Provide compressible filler rods or equivalent back-up material, as recommended by sealant and glass manufacturers, to prevent sealant from extruding into glass channel weep systems and from adhering to joints back surface as well as to control depth of sealant for optimum performance, unless otherwise indicated.

J. Force sealants into glazing channels to eliminate voids and to ensure complete wetting or bond of sealant to glass and channel surfaces.

K. Tool exposed surfaces of sealants to provide a substantial wash away from glass. Install pressurized tapes and gaskets to protrude slightly out of channel, so as to eliminate dirt and moisture pockets.

L. Where wedge-shaped gaskets are driven into one side of channel to pressurize sealant or gasket on opposite side, provide adequate anchorage to ensure that gasket will not walk out when installation is subjected to movement.

M. Miter-cut wedge-shaped gaskets at corners and install gaskets in manner recommended by gasket manufacturer to prevent pull away at corners; seal corner joints and butt joints with sealant recommended by gasket manufacturer.

3.04 PROTECTION AND CLEANING

A. Protect exterior glass from breakage immediately upon installation by use of crossed streamers attached to framing and held away from glass. Do not apply markers to surfaces of glass. Remove nonpermanent labels and clean surfaces.

B. Protect glass from contact with contaminating substances resulting from construction operations. If, despite such protection, contaminating substances do come into contact with glass, remove immediately by method recommended by glass manufacturer.

C. Examine glass surfaces adjacent to or below exterior concrete and other masonry surfaces at frequent intervals during construction, but not less often than once a month, for build-up of dirt, scum, alkali deposits, or staining. When examination reveals presence of these forms of residue, remove by method recommended by glass manufacturer.

D. Remove and replace glass which is broken, chipped, cracked, abraded, or damaged in other ways during construction period, including natural causes, accidents and vandalism.

E. Wash glass on both faces not more than four days prior to date scheduled for inspections intended to establish date of Substantial Completion in each area of Work. Wash glass by method recommended by glass manufacturer.

3.05 GLASS SCHEDULE

A. Refer to drawings for size and location.

END OF SECTION