DIVISION 8 – DOORS AND WINDOWS

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

A. This Section includes the following:
1. Solid-core doors with wood-veneer faces.
2. Factory finishing flush wood doors.
3. Louvers for flush wood doors.

B. Related Sections include the following:
1. Division 8 Section "Steel Frames" for hollow metal frames.
2. Division 8 Section "Door Hardware."

1.3 SUBMITTALS

A. Product Data: For each type of door. Include details of core and edge construction, trim for openings, and louvers.
1. Include factory-finishing specifications.

B. Shop Drawings: Indicate location, size, and hand of each door; elevation of each kind of door; construction details not covered in Product Data; location and extent of hardware blocking; and other pertinent data.
1. Indicate dimensions and locations of mortises and holes for hardware.
2. Indicate dimensions and locations of cutouts.
3. Indicate requirements for veneer matching.
4. Indicate doors to be factory finished and finish requirements.
5. Indicate fire ratings for fire doors.

C. Samples for Verification: As follows:
1. Corner sections of doors approximately 8 by 10 inches (200 by 250 mm) with door faces and edgings representing the typical range of color and grain for each species of veneer and solid lumber required. Finish sample with same materials proposed for factory-finished doors.
2. Louver blade and frame sections, 6 inches (150 mm) long, for each material and finish specified.
3. Frames for light openings, 6 inches (150 mm) long, for each material, type, and finish required.

1.4 QUALITY ASSURANCE

A. Source Limitations: Obtain flush wood doors through one source from a single manufacturer.

B. Quality Standard: Comply with the following standard:
1. NWWDA Quality Standard: NWWDA I.S.1-A, "Architectural Wood Flush Doors."
2. AWI Quality Standard: AWI's "Architectural Woodwork Quality Standards" for grade of door, core, construction, finish, and other requirements.

C. Fire-Rated Wood Doors: Doors complying with NFPA 80 that are listed and labeled by a testing and inspecting agency acceptable to authorities having jurisdiction, for fire ratings indicated, based on testing according to NFPA 252.
1. Test Pressure: Test at atmospheric pressure.

1.5 DELIVERY, STORAGE, AND HANDLING

A. Protect doors during transit, storage, and handling to prevent damage, soiling, and deterioration. Comply with requirements of referenced standard and manufacturer's written instructions.
   1. Individually package doors in plastic bags or cardboard cartons.
   2. Individually package doors in cardboard cartons and wrap bundles of doors in plastic sheeting.

B. Mark each door with individual opening numbers used on Shop Drawings. Use removable tags or concealed markings.

1.6 PROJECT CONDITIONS

A. Environmental Limitations: 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 the remainder of the construction period to comply with requirements of the referenced quality standard for Project's geographical location.

1.7 WARRANTY

A. General Warranty: Door manufacturer's warranty specified in this Article shall not deprive the Owner of other rights the Owner may have under other provisions of the Contract Documents and shall be in addition to, and run concurrent with, other warranties made by the Contractor under requirements of 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 that have warped (bow, cup, or twist) more than 1/4 inch (6.35 mm) in a 42-by-84-inch (1067-by-2134-mm) section or that show telegraphing of core construction in face veneers exceeding 0.01 inch in a 3-inch (0.25 mm in a 75-mm) span, or do not comply with tolerances in referenced quality standard.
   1. Warranty shall also include installation and finishing that may be required due to repair or replacement of defective doors.
   2. Warranty shall be in effect during the following period of time after the date of Substantial Completion:
      a. Solid-Core Interior Doors: Life of installation.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

A. Available Manufacturers: Subject to compliance with requirements, manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:
   1. Flush Wood Doors:
      a. Algoma Hardwoods Inc.
      b. Eggers Industries; Architectural Door Division.
      c. Mohawk Flush Doors, Inc.
      d. Weyerhaeuser Co.

   2. Metal Louvers for Doors:
      a. Air Louvers, Inc.
      b. Anemostat Door Products.
      c. Construction Specialties, Inc.
      d. Leslie-Locke, Inc.

2.2 DOOR CONSTRUCTION, GENERAL

A. Doors for Transparent Finish: Comply with the following requirements:
   1. Grade: Premium, with Grade AA faces.
   2. Faces: Red Oak.
   3. Match between Veneer Leaves: Red Oak.
   4. Stiles: Same as species face.

2.3 SOLID-CORE DOORS

A. Particleboard Cores: Comply with the following requirements:
   1. Particleboard: ANSI A208.1, Grade LD-2.
   2. Blocking: Provide wood blocking at particleboard-core doors as follows:
      a. 5-inch (125-mm) top-rail blocking, at doors indicated to have closers.
      b. 5-inch (125-mm) bottom-rail blocking, at exterior doors and doors indicated to have kick, mop, or armor plates.
      c. 5-inch (125-mm) midrail blocking, at doors indicated to have exit devices.

B. Exterior Doors: Comply with the following requirements:
   1. Core: Glued-block core.
   2. Construction: Five or seven plies with stiles and rails bonded to core, then entire unit abrasive planed before veneering.

C. Interior Veneer-Faced Doors: Comply with the following requirements:
   1. Core: Particleboard core.
   2. Construction: Five or seven plies with stiles and rails bonded to core, then entire unit abrasive planed before veneering.

D. Fire-Rated Doors: Comply with the following requirements:
   1. Construction: Construction and core specified above for type of face indicated or manufacturer's standard mineral-core construction as required to provide fire rating indicated.
   2. Blocking: For mineral-core doors, provide composite blocking with improved screw-holding capability approved for use in doors of fire ratings indicated and as follows:
      a. 5-inch (125-mm) top-rail blocking.
      b. 5-inch (125-mm) bottom-rail blocking, at doors indicated to have kick, mop, or armor plates.
      c. 4-1/2-by-10-inch (114-by-250-mm) lock blocks.
      d. 5-inch (125-mm) midrail blocking, at doors indicated to have exit devices.
      e. As necessary to eliminate need for through-bolting hardware.
   3. Edge Construction: At hinge stiles, provide manufacturer's standard laminated-edge construction with improved screw-holding capability and split resistance and with outer stile matching face veneer.

2.4 LOUVERS AND LIGHT FRAMES

A. Metal Louvers: As follows:
   1. Blade Type: Adjustable type with spring closer and 135 deg F (57 deg C) fusible link.
   2. Metal and Finish: Galvanized steel, 0.0396 inch (1.0 mm) thick, hot-dip zinc coated and factory primed for paint finish.

B. Metal Frames for Light Openings in Fire Doors: Manufacturer's standard frame formed of 0.0478-inch-(1.2-mm-) thick, cold-rolled steel sheet, factory primed and approved for use in doors of fire rating

indicated.

2.5 FABRICATION

A. Fabricate flush wood doors in sizes indicated for Project site fitting.

B. Fabricate and trim doors to size at factory to coordinate with frame shop drawings and floor finishes as indicated in the finish schedule.

C. Factory machine doors for hardware that is not surface applied. Locate hardware to comply with DHI-WDHS-3. Comply with final hardware schedules, door frame Shop Drawings, DHI A115-W series standards, and hardware templates.
   1. Coordinate measurements of hardware mortises in metal frames to verify dimensions and alignment before factory machining.

D. Openings: Cut and trim openings through doors to comply with applicable requirements of referenced standards for kind(s) of door(s) required.
   1. Light Openings: Trim openings with moldings of material and profile indicated.
   2. Louvers: Factory install louvers in prepared openings.

E. Exterior Doors: Factory treat exterior doors with water repellent after manufacturing has been completed.
   1. Flash top of out-swinging doors (with manufacturer's standard metal flashing).

2.6 SHOP PRIMING

A. Transparent Finish: Shop seal faces and edges of doors for transparent finish with stain (if required), other required pretreatments, and first coat of finish as specified in the following:
   1. Division 9 Section "Painting."
   2. Division 9 Section "Exterior Wood Stains."

2.7 FACTORY FINISHING

A. General: Comply with referenced quality standard's requirements for factory finishing.

B. Finish wood doors at factory.

C. Transparent Finish: Comply with requirements indicated for grade, finish system, staining effect, and sheen.
   1. Grade: Custom.
   2. Finish: AWI System TR-4 conversion varnish.
   3. Staining: Match building standard.
   4. Effect: Match building standard.
   5. Sheen: Match building standard.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Examine installed door frames before hanging doors.
   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. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 INSTALLATION

A. Hardware: For installation, see Division 8 Section "Door Hardware."

B. Manufacturer's Written Instructions: Install wood doors to comply with manufacturer's written instructions, referenced quality standard, and as indicated.
   1. Install fire-rated doors in corresponding fire-rated frames according to NFPA 80.

C. 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. Clearances: Provide 1/8 inch (3.2 mm) at heads, jambs, and between pairs of doors. Provide 1/8 inch (3.2 mm) from bottom of door to top of decorative floor finish or covering. Where threshold is shown or scheduled, provide 1/4 inch (6.4 mm) from bottom of door to top of threshold.
      a. Comply with NFPA 80 for fire-rated doors.
   2. Bevel non-fire-rated doors 1/8 inch in 2 inches (3-1/2 degrees) at lock and hinge edges.
   3. Bevel fire-rated doors 1/8 inch in 2 inches (3-1/2 degrees) on lock edge; trim stiles and rails only to extent permitted by labeling agency.

D. Factory-Finished Doors: Restore finish before installation, if fitting or machining is required at Project site.

3.3 ADJUSTING AND PROTECTING

A. Operation: Rehang or replace doors that 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 ensure that wood doors are without damage or deterioration at the time of Substantial Completion.

END OF SECTION

PART 1 – GENERAL

Furnish all necessary materials, labor, and equipment for the complete installation of the aluminum swing doors, door frames, hardware, and storefront framing system as shown on the drawings and specified herein.

1.01 SUMMARY

A. Section includes: Aluminum Swing Doors, including:
   1. YKK AP Model 35H Impact Resistant Heavy Duty Swing Doors.
   2. Glass: 9/16" Laminate of Saf-GlasTM by Security Impact Glass; Annealed, heat strengthened, or tempered as required. Makeup: ¼" hs gray/ .90 pvb / ¼" hs clear.
   3. Glazing: Dow Corning® 995 Structural Silicone Adhesive.

B. Contractor can submit substitutions, subject to the requirements stated in the specifications.

C. Related Sections:
   1. Section 08910, Aluminum Curtain Wall Systems.

1.02 SYSTEM PERFORMANCE DESCRIPTION

A. Performance Requirements: Provide aluminum single acting swing doors that comply with performance requirements indicated, as demonstrated by testing manufacturer's assemblies in accordance with South Florida Building Code Protocol PA 201-94 for Large Missile Impact and Test Protocol PA 203-94 for Cycle Loads.
   1. Air Infiltration: Air infiltration shall be tested in accordance with ASTM E 283 at static pressure of 6.24 psf (299 Pa). Infiltration shall not exceed the following:
      a. Single Doors: 0.07 cfm/linear feet of crack based on a door size of 3´6" x 8´.

   2. Water Infiltration: No uncontrolled water other than condensation on indoor face of any component when tested in accordance with ASTM E 331at a test pressure differential of 10.0 psf (479 Pa). Water test to be performed immediately after design pressure test.

   3. Structural: Door corner structural strength test using a dual moment loading criteria as follows:
      a. A representative corner section consisting of a 12 inch top rail and a 24 inch long stile.
      b. Top rail of each section is anchored to a fixed surface at 3 inches from corner joint; a load arm was subsequently mounted at 19 inches from inside edge of top rail on suspended side rail.
      c. A load was applied to the load arm at 19 inches from inside edge of side rail and amount of rotation of load arm was observed. Process was repeated at increasing loads until point of failure defined as greater than 45 degrees rotation of load arm occurred.
      d. Test results shall be supported by an independent laboratory report as follows: 290 lbs.

   4. Structural Uniform Load Test:
      a. Single Doors:
         1) Positive Pressure: 69 psf
         2) Negative Pressure: 90 psf

   5. Forced Entry Resistance: Tests performed simultaneously with 300 lb. forces applied to the active door panel within 3" of the locks in the direction that would tend to open the

door while 150 lb. forces were applied in both perpendicular directions to the 300 lb. force simultaneously.

1.03 SUBMITTALS

A. General: Prepare, review, approve, and submit specified submittals in accordance with "Conditions of the Contract" and Division 1 Submittals Section. Product data, shop drawings, samples, and similar submittals are defined in "Conditions of the Contract".

B. Product Data: Product Data: Submit product data for each type storefront series specified.

C. Shop Drawings: Shop Drawings: Submit shop drawings showing layout, profiles, and product components, including anchorage, accessories, finish colors, and textures.

D. Samples: Submit verification samples for colors on actual aluminum substrates indicating full color range expected in installed system.

E. Quality Assurance/Control Submittals:
1. Test Reports: Submit certified test reports showing compliance with specified performance characteristics and physical properties.
2. Installer Qualification Data: Submit installer qualification data.

F. Close-out Submittals:
1. Warranty: Submit warranty documents specified herein.
2. Project Record Documents: Submit project record documents for installed materials in accordance with Division 1 Project Close-out (Project Record Documents) Section.

1.04 QUALITY ASSURANCE

A. Qualifications:
1. Installer Qualifications: Installer experienced (as determined by contractor) to perform work of this section who has specialized in the installation of work similar to that required for this project. If requested by Owner, submit reference list of completed projects.
2. Manufacturer Qualifications: Manufacturer capable of providing field service representation during construction, approving acceptable installer and approving application method.

1.05 PRODUCT CONDITIONS / SITE CONDITIONS

A. Field Measurements: Verify actual measurements/openings by field measurements before fabrication; show recorded measurements on shop drawings. Coordinate field measurements, fabrication schedule with construction progress to avoid construction delays.

1.06 WARRANTY

A. Project Warranty: Refer to "Conditions of the Contract" for project warranty provisions.

B. Manufacturer's Warranty: Submit, for Owner's acceptance, manufacturer's standard warranty document executed by authorized company official. Manufacturer's warranty is in addition to, and not a limitation of, other rights Owner may have under the Contract Documents.
1. Beneficiary: Issue warranty in the legal name of the project Owner.
2. Warranty Period: 10 years commencing on Date of Substantial Completion.

3. Warranty Acceptance: Owner is sole authority who will determine acceptability of manufacturer's warranty documents.

PART 2 - PRODUCTS

It is the intent of this specification to have a single source responsibility for the supply of the aluminum doors and framing systems on this project. Any deviation from the acceptable manufacturers listed below must be approved in writing by the architect at least ten (10) days prior to bid date.

2.01 MANUFACTURERS (Acceptable Manufacturers/Products)

The design is based upon the following manufacturer. Substitute manufacturers will be accepted subject to fulfilling the requirements outlined herein.

A. Acceptable Manufacturers: YKK AP America Inc.
5630 Gwaltney Drive
Atlanta, GA 30336
Telephone: (404) 629-3800; Fax: (404) 629-3838

1. Heavy Duty Swing Doors **(08410.A)**: YKK AP Model 35H Impact Resistant Heavy Duty Swing Doors.
   a. Description: 4-11/16" (119.1 mm) Door Stile.

2. Corner Construction: Fabricate door corners joined by concealed reinforcement secured with screws, and sigma deep penetration welding.
3. Glazing Stops: Manufacturer's standard glazing stops with EPDM glazing gaskets to prevent water infiltration at the exterior and Dow Corning® 995 Structural Silicone Adhesive with fixed stops at the interior.
4. Weather-stripping: Manufacturer's standard elastomer type in replaceable rabbets for stiles and rails.
5. Hardware:
   (2) pairs mortise butt hinges per leaf. Ball bearing. 4 ½ " X 4" Brass US26D finish.
   (1) Adams Rite MS1850 three point hookbolt lock on active leaf or single door.
   (1) Adams Rite two point lock on inactive leaf.
   (2) H-4202 Keyed cylinders (H-4204 thumbturn on inside optional).
   Type "A" standard YKK AP push/pull (Type "C" 1" diameter tubular push/pull is optional).
   LCN 4040 surface mounted closer (hold open optional).
   (1) E9-0502 mill finish aluminum threshold with E9-0503 adapter and E2-0051 elastomer weather-strip, counterflashed using E9-0611 extruded aluminum flashing. Threshold and flashing are weeped to the exterior.

2.02 MATERIALS

A. Extrusions: ASTM B 221 (ASTM B 221M), 6063-T5 Aluminum Alloy.

B. Aluminum Sheet:
1. Anodized Finish: ASTM B 209 (ASTM B 209M), 5005-H14 Aluminum Alloy, 0.050 inch (1.27 mm) minimum thickness.

2.03 ACCESSORIES

A. Manufacturer's Standard Accessories:
1. Fasteners: Zinc plated steel concealed fasteners; Hardened aluminum alloys or AISI 300 series stainless steel exposed fasteners, countersunk, finish to match aluminum color.

2. Sealant: Non-skinning type, AAMA 803.3.
3. Glazing: Setting blocks, edge blocks, and spacers in accordance with ASTM C 864, shore durometer hardness as recommended by manufacturer. Glazing gaskets in accordance with ASTM C 864.

2.04 FABRICATION

A. Shop Assembly: Fabricate and assemble units with joints only at intersection of aluminum members with uniform hairline joints; rigidly secure, and sealed in accordance with manufacturer's recommendations.
   1. Hardware: Drill and cut to template for hardware. Reinforce frames and door stiles to receive hardware in accordance with manufacturer's recommendations.
   2. Welding: Conceal welds on aluminum members in accordance with AWS recommendations or methods recommended by manufacturer. Members showing welding bloom or discoloration on finish or material distortion will be rejected.

B. Fabrication Tolerances:
   1. Material Cuts: Square to 1/32 inch (0.8 mm) off square, maximum, over largest dimension; proportionate amount of 1/32 inch (0.8 mm) on other two dimensions.
   2. Maximum Offset: 1/64 inch (0.4 mm) in alignment between two consecutive member in line, end to end.
   3. Maximum Offset: 1/64 inch (0.4 mm) between framing members at glazing pocket corners.
   4. Joints (Between adjacent members in same assembly): Hairline and square to adjacent member.
   5. Variation (In squaring diagonals for doors and fabricated assemblies): 1/16 inch (1.6 mm).
   6. Flatness (For doors and fabricated assemblies): +/- 1/16 inch (1.6 mm) off neutral plane.

2.05 FINISHES AND COLORS

A. Anodized Finish: YKK AP America Anodized Finish:
   1. Clear: YKK AP YS1N with clear protective composite coating.

B. Finishing: Prepare aluminum surfaces for specified finish; apply finish in accordance with the following:
   1. Anodized Coating: Electrolytic color coating followed by an organic top coating applied to aluminum extrusions produced from quality controlled billets meeting AA-6063-T5.
      a. Exposed surfaces shall be free of scratches and other serious blemishes.
      b. Extrusion shall be given a caustic etch followed by an anodic oxide treatment and sealed with an organic electrodeposition applied protective top coating.
      c. Overall coating thickness for finishes shall be a minimum of 0.7 mils.
      d. Coating shall conform to Aluminum Association Standard AAM12C22A4X. A4X designation shall signify an anodic coating of 0.4 mils minimum followed by an organic top coating of a minimum 0.3 mils.
      e. In addition to the Aluminum Association Standard above, finish shall conform to the following:
         1) AAMA 605.2 Mortar Resistance Test Specification; Test Method per ASTM C207, 24 Hour Pat Test.
         2) CASS Corrosion Resistance Test. CASS 240/ASTM B368 Test Method.
         3) Other AAMA 605.2 Performance Tests specified in these specifications,

such as: 7.3 Dry Film Hardness; 7.8.2 Salt Spray Resistance; 7.9.1.2 Color Retention, South Florida; 7.9.1.4 Gloss Retention, South Florida.

C. Finishes Testing:
1. Apply 0.5% solution NaOh, sodium hydroxide, to small area of finished sample area; leave in place for sixty minutes; lightly wipe off NaOh. Do not clean area further.
2. Submit samples with test area noted on each sample.

PART 3 – EXECUTION

3.01 MANUFACTURER'S INSTRUCTIONS/RECOMMENDATIONS

A. Compliance: Comply with manufacturer's product data, including product technical bulletins, product catalog, installation instructions, and product carton instructions.

3.02 EXAMINATION

A. Site Verification of Conditions: Verify conditions (which have been previously installed under other sections) are acceptable for product installation in accordance with manufacturer's instructions.
1. Verify location of preset anchors, perimeter fasteners, and block-outs are in accordance with shop drawings.

3.03 PREPARATION

A. Adjacent Surfaces Protection: Protect adjacent work areas and finish surfaces from dama during product installation.
1. Aluminum Surface Protection: Protect aluminum surfaces from contact with lime, mortar, cement, acids, and other harmful contaminants.

3.04 INSTALLATION

A. General: Install manufacturer's system in accordance with shop drawings, and within specified tolerances.

3.05 ADJUSTING AND CLEANING

A. Adjusting: Adjust swing doors for operation in accordance with manufacturer's recommendations.

B. Cleaning: The General Contractor shall clean installed products in accordance with manufacturer's instructions prior to Owner's acceptance, and remove construction debris from project site. Legally dispose of debris.

C. Protection: The General Contractor shall protect the installed product's finish surfaces from damage during construction.

END OF SECTION

SECTION 08520 – ALUMINUM WINDOWS

GOVERNMENT OF THE U. S. VIRGIN ISLANDS: OFFICE OF THE GOVERNOR
PHASE II RENOVATION AT 19A – 20 KONGENS GADE
ST. THOMAS, U. S. VIRGIN ISLANDS

PART 1 - GENERAL

1.01 SUMMARY

A. Provide aluminum windows:

1. Individual units set in wall construction.

1.02 SUBMITTALS

A. Submit for approval samples, shop drawings, product data, mock-ups, warranty, test reports, maintenance data.

1.03 QUALITY ASSURANCE

A. Comply with governing codes and regulations. Provide products of acceptable manufacturers which have been in satisfactory use in similar service for three years. Use experienced installers. Deliver, handle, and store materials in accordance with manufacturer's instructions.

B. Testing: Window performance.

C. Performance: Comply with AAMA 101 for grade of window required.

1. Residential: AAMA Grade and Performance Class R15.
2. Commercial: AAMA Grade and Performance Class C20.
3. Heavy-Duty Commercial: AAMA Grade and Performance Class HC40.

PART 2 - PRODUCTS

2.01 MATERIALS

A. Manufacturers: EFCO Corp., Graham Architectural Products, Pioneer, Peerless Products, Wausau Metals Corp. or approved equal.

B. Aluminum Windows:
1. Window Operation: [Double-hung] windows.
2. Window Grade: [Architectural] grade, AAMA 101.
3. Glazing: [Insulating] glass.
4. Glazing Color: [Tinted] glass.
5. Construction: Thermal-break type.
6. Aluminum Window Members: Aluminum extrusions.
7. Anchors, Clips, and Window Accessories: Aluminum, nonmagnetic stainless steel, or galvanized steel.
8. Aluminum Finish: Fluoropolymer, Kynar 500, 3-coat.

C. Auxiliary Materials:
1. Window cleaner's bolts.
2. Operating hardware.
3. Insect screening.

PART 3 - EXECUTION

3.01 INSTALLATION

A. Fabricate windows to conform to AAMA standards and accept glass specified.

B. Install materials and systems in accordance with manufacturer's instructions and approved submittals. Install materials and systems in proper relation with adjacent construction and with uniform appearance. Coordinate with work of other sections.

C. Operation: Provide locking units with manual operation; provide pole for out of reach hardware.

D. Restore damaged finishes and test for proper operation. Clean and protect work from damage.

END OF SECTION

PART 1 – GENERAL

1.01 RELATED DOCUMENTS

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

1.02 SUMMARY

A. This Section includes items known commercially as finish or door hardware that are required for swing, sliding, and folding doors, except special types of unique hardware specified in the same sections as the doors and door frames on which they are installed.

B. This Section includes the following:
1. Hinges
2. Continuous hinges
3. Pivots
4. Spring hinges
5. Key control system
6. Lock cylinders and keys
7. Lock and latch sets
8. Bolts
9. Exit devices
10. Push/Pull units
11. Closers
12. Overhead holders
13. Miscellaneous door control devices
14. Door trim units
15. Protection plates
16. Weatherstripping for exterior doors
17. Sound stripping for interior doors
18. Automatic drop seals (door bottoms)
19. Astragals or meeting seals on pairs of doors
20. Thresholds

C. Related Sections: The following Sections contain requirements that relate to this Section:
1. Section 08110: Steel Doors and Frames
2. Section 08111: Standard Steel Doors
3. Division 26: Electrical

D. Products furnished but not installed under this Section to include:
1. Cylinders for locks on bi-parting aluminum doors.
2. Cylinders for locks on frameless glass doors.
3. Final replacement cores and keys to be installed as directed by Owner.

1.03 REFERENCES

A. Standards of the following as referenced:
1. American National Standards Institute (ANSI)
2. Door and Hardware Institute (DHI)
3. Factory Mutual (FM)
4. National Fire Protection Association (NFPA)
5. Underwriters' Laboratories, Inc. (UL)
   a. UL 10C - Fire Tests Door Assemblies

6. Warnock Hersey

B. Regulatory standards of the following as referenced:
   1. Department of Justice, Office of the Attorney General, *Americans with Disabilities Act*, Public Law 101-336 (ADA).
   2. CABO/ANSI A117.1: *Providing Accessibility and Usability for Physically Handicap People*, 1992 edition.

1.04 SUBMITTALS

A. General: Submit the following in accordance with Conditions of Contract and Division 1 Specification sections.

B. Product data including manufacturers' technical product data for each item of door hardware, installation instructions, maintenance of operating parts and finishes, and other information necessary to show compliance with requirements. For items other than those scheduled in the "Headings" of Section 3, provide catalog information for the specified items and for those submitted.

C. Final hardware schedule coordinated with doors, frames, and related work to ensure proper size, thickness, hand, function, and finish of door hardware.
   1. Final Hardware Schedule Content: Based on hardware indicated, organize schedule into vertical format "hardware sets" indicating complete designations of every item required for each door or opening. Use specification Heading numbers with any variations suffixed a, b, etc. 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 in door and frame schedule.
      e. Explanation of all abbreviations, symbols, and codes contained in schedule.
      f. Mounting locations for hardware.
      g. Door and frame sizes and materials.
      h. Keying information.
      i. Wiring diagrams, riser diagrams and system descriptions fully detailing the function(s) of each electrically controlled opening.
      j. Cross-reference numbers used within schedule deviating from those specified.
         1) Column 1: State specified item and manufacturer.
         2) Column 2: State prior approved substituted item and its manufacturer.

   2. Submittal Sequence: Submit final schedule at earliest possible date, particularly where acceptance of hardware schedule must precede fabrication of other work that is critical in the Project construction schedule. Include with schedule the product data, samples, shop drawings of other work affected by door hardware, and other information essential to the coordinated review of schedule.
   3. Keying Schedule: Submit separate detailed schedule indicating clearly how the Owner's final instructions on lock functions and keying of locks has 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.
   1. Samples will be returned to the supplier. Units that are acceptable and remain undamaged through submittal, review, and field comparison process may, after final check of operation, be incorporated into the Work, within limitations of function and keying coordination requirements.

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.

F. Contract closeout submittals:
1. Operation and maintenance data: Complete information for installed door hardware.
2. Warranty: Completed and executed warranty forms.

1.05 QUALITY ASSURANCE

A. Single Source Responsibility: Obtain each type of hardware (latch and locksets, hinges, closers, etc.) from a single manufacturer.

B. Supplier Qualifications: A recognized architectural door hardware supplier, with warehousing facilities in the Project's vicinity, that has a record of successful in-service performance for supplying door hardware similar in quantity, type, and quality to that indicated for this Project and that employs an experienced Architectural Hardware Consultant (AHC) who is available to the Owner, Architect and Contractor, at reasonable times during the course of the Work, for consultation.

C. Coordination Meetings: Supplier shall set up and attend the following:
1. Supplier to meet with the Owner to finalize lock functions and keying requirements and to obtain final instructions in writing.
2. Supplier to meet with the installer prior to beginning of installation of door hardware.
3. Supplier to meet with the Owner, General Contractor, electrical and security contractors to coordinate all electrical hardware items. Supplier to provide riser diagrams and wiring diagrams as required by the General and sub-contractors.

D. Fire-Rated Openings: Provide door hardware for fire-rated openings that complies with NFPA Standard No. 80 requirements of authorities having jurisdiction. Provide only items of door hardware that are listed and tested by UL or Warnock Hersey for given type/size opening and degree of label. Provide proper latching hardware, door closers, approved-bearing hinges and seals whether listed in the Hardware Schedule or not. All hardware shall comply with standards UBC 702 (1997) and UL 10C.
1. Where emergency exit devices are required on fire-rated doors, (with supplementary marking on doors' UL labels indicating "Fire Door to be equipped with Fire Exit Hardware"), provide UL label on exit devices indicating "Fire Exit Hardware".

1.06 PRODUCT HANDLING

A. Tag each item or package separately with identification related to final 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 hardware supplier from various manufacturers, sort and repackage in containers clearly marked with appropriate hardware set number to match set numbers of approved hardware schedule. Two or more identical sets may be packed in same container.

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

D. Deliver individually packaged door hardware items promptly to place of installation (shop or Project site).

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

1.07 WARRANTY

A. Special warranties:
   1. Door Closers: Ten year period
   2. Exit Devices: Three year period
   3. Automatic Door Operators: Two year period
   4. Locks and Cylinders: Three year period

1.08 MAINTENANCE

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

B. Parts kits: Furnish manufacturers' standard parts kits for locksets, exit devices, and door closers.

PART 2 – PRODUCTS

2.01 MANUFACTURED UNITS
(*Denotes manufacturer referenced in the Hardware Headings)

A. Hinges:
   1. Acceptable manufacturers:
      a. Ives*
      b. Hager Companies
      c. Bommer

   2. Characteristics:
      a. Templates: Provide only template-produced units.
      b. Screws: Provide Phillips flat-head screws complying with the following requirements:
         1) For metal doors and frames, install machine screws into drilled and tapped holes.
         2) For wood doors and frames, install threaded-to-the-head wood screws.
         3) For fire-rated wood doors, install #12 x 1- 1/4 inch, threaded-to-the-head steel wood screws.
         4) Finish screw heads to match surface of hinges or pivots.

      c. Hinge pins: Except as otherwise indicated, provide hinge pins as follows:
         1) Out-Swing Exterior Doors: Non-removable pins.
         2) Out-Swing Corridor Doors with Locks: Non-removable pins.
         3) Interior Doors: Non-rising pins.
         4) Tips: Flat button and matching plug. Finished to match leafs.

      d. Size: Except as otherwise indicated, size hinges as follows:
         1) Exterior Doors:
            a) Heavy weight, ball bearing, nonferrous, 5 x 4-1/2
            b) Interior Doors:
               Doors up to 3'-0" in width: Standard weight, ball bearing, 4-1/2 x 4-1/2
               Doors over 3'-1" in width and labeled doors over 8'-0" in height: Heavy weight, ball bearing, 5 x 4-1/2.

      e. Quantity: Furnish one pair of hinges for all doors up to 5'-0" high. Furnish one hinge for each additional 2-1/2 feet or fraction thereof.

B. Continuous Hinges:
   1. Acceptable manufacturers:

a. Select Products Ltd.*
b. Hager Companies
c. Markar Products

2. Characteristics:
   a. Continuous geared hinges to be manufactured of extruded 6063 T6 aluminum alloy with anodized finish and concealed, self-lubricating thrust bearings.
   b. Continuous barrel-type hinges to be manufactured of stainless steel with knuckles formed around a pin extending the entire length of the hinge.
   c. Uncut hinges shall be non-handed, manufactured to template.
   d. Hinges to be assembled in matching pairs. Fasteners supplied shall be 410 stainless steel, plated and hardened.
   e. Provide UL listed continuous hinges at fire doors. Continuous hinges at fire doors shall meet the required ratings without the use of auxiliary fused pins or studs.

C. Cylinders:
1. Acceptable manufacturers:
   a. Schlage* Everest-D/Primus
   b. Medeco
   c. Sargent ASSA V-10

2. Characteristics:
   a. Standard System: Except as otherwise indicated, provide new great grandmaster key system for Project. Allow for expansion to accommodate future rekeying of existing facilities and for future new construction.
   b. At perimeter openings and elsewhere as shown, equip locksets with high-security, interchangeable core controlled access cylinders that comply with the performance requirements of ANSI A156.5, 1992, Grade 1 Operational.
   c. Unless otherwise indicated, equip interior locksets with interchangeable core cylinders featuring patented, restricted keys and auxiliary locking pin. Patented key and cylinder design shall be valid until 2014.
   d. Furnish temporary construction cores for all perimeter openings, electrical and mechanical room doors, and elsewhere as shown. Furnish final cores and keys for installation as directed by Owner.
   e. Comply with Owner's instructions for great grandmaster keying and, except as otherwise indicated, provide individual change key for each lock that is not designated to be keyed alike with a group of related locks.
      1) Permanently inscribe each key with manufacturer's key symbol, and notation, "DO NOT DUPLICATE."
      2) Permanently inscribe each cylinder, in a concealed location, with manufacturer's key symbol.

   f. Key Material: Provide keys of nickel silver only.
   g. Key and Core Quantity:
      1) Furnish 3 change keys for each lock, not to exceed 10 change keys for ech keyed alike group.
      2) Furnish 4 control keys.
      3) Furnish 5 master keys for each master system.
      4) Furnish 5 grandmaster keys for each grandmaster system.
      5) Furnish 5 great-grandmaster keys for each great grandmaster system.
      6) Furnish 10 construction master keys.

7) Furnish 2 construction control keys
8) Furnish 200 extra blanks for each keyway
9) Furnish 10 extra uncombinated cores for each keyway

h. Furnish 1 Framon KX-1 Code Machine with space cams, depth cams, vices and cutters as required to accommodate key system
i. Key Control software: Schlage Sitemaster 200 for Windows or equivalent, preloaded with factory bitting, door numbers and keysets per instructions.
j. Deliver keys, extra cores, key control software and code machine to Owner.

D. Locksets, Latchsets, Deadbolts:
1. Acceptable manufacturers:
a. Schlage* L9000 Series, 07A Lever Design

2. Mortise Locksets and Latchsets: as scheduled.
a. Chassis: cold-rolled steel, handing field-changeable without disassembly.
b. Latchbolts: 3/4-inch throw stainless steel anti-friction type.
c. Lever Trim: through-bolted, accessible design and independent break-away spindles.
d. Thumbturns: accessible design not requiring pinching or twisting motions to operate.
e. Deadbolts: stainless steel 1-inch throw.
f. Electric operation: Manufacturer-installed continuous duty solenoid.
g. Strikes: 16 gage curved stainless steel with 1" deep box construction, lips of sufficient length to clear trim and protect clothing.
h. Certifications:
1) ANSI A156.13, 1994, Grade 1 Operational, Grade 2 Security.
i. Attic Stock: Furnish 2 passage lock bodies, 2 privacy lock bodies, 5 office/classroom lock bodies, 2 storeroom lock bodies, 5 complete sets trim and 10 cylinder housings. Deliver attic stock to owner.

E. Manually Programmable Access Control Locks
1. Acceptable manufacturers:
a. Schlage* PRO5500 Series, 17 Lever design

2. Characteristics:
a. Access control locks shall be battery-powered, stand alone, keypad programmable with cylinder override.
b. Allow for a minimum of 120 three to eight digit user codes.
c. Certifications:
1) ANSI/BHMA Grade 1

F. Exit Devices:
1. Acceptable manufacturers:
a. Von Duprin* 35A/98 Series

2. Characteristics:
a. Exit devices shall be "UL" listed for life safety. All exit devices for fire rated openings shall have "UL" labels for "Fire Exit Hardware."
b. Exit devices mounted on labeled wood doors shall be mounted on the door per the door manufacturer's requirements.
c. Trim shall be thru-bolted to the lock stile case. Lever design to match locksets.
d. Exit devices shall be equipped with cylinder dogging feature in lieu of hex dogging.

e. Exit devices shall be made of brass, bronze, stainless steel, or aluminum material, powder coated, anodized, or plated to the standard architectural finishes to match the balance of the door hardware.
f. Provide glass bead conversion kits to shim exit devices on doors with raised glass heads.
g. All series of exit devices shall incorporate a fluid damper, which decelerates the touchpad on its return stroke and eliminates noise associated with exit device operation. All exit devices shall be non-handed. Touchpad shall extend a minimum of 1/2 of the door width and shall extend to the height of the cross rail housing for a "no pinch" operation. Plastic touchpads are not acceptable. All latchbolts to be the deadlocking type. Latchbolts shall have a self-lubricating coating to reduce wear. Plated or plastic coated latchbolts are not acceptable. Plastic linkage and "dogging" components are not acceptable.
h. Lever trim shall be solid case material with a break-away feature to limit damage to the unit from vandalism.
i. Surface vertical rod devices shall be UL labeled for fire door applications without the use of bottom rod assemblies (LBR). Where bottom rods are required for security applications, the devices shall be UL labeled for fire doors applications with rod and latch guards by the device manufacturer.
j. Exit devices to include impact resistant, flush mounted end cap design to avoid damage due to carts and other heavy objects passing through an opening. End cap shall be of heavy-duty metal alloy construction and provide horizontal adjustment to provide alignment with device cover plate. When exit device end cap is installed, no raised edges will protrude.

G. Closers and Door Control Devices:
1. Acceptable manufacturers:
a. LCN Closers*

2. Characteristics:
a. Door closers shall have fully hydraulic, full rack and pinion action with a high strength cast iron cylinder.
b. All closers shall utilize a stable fluid withstanding temperature range of 120°F to -30°F without seasonal adjustment of closer speed to properly close the door. Closers for fire-rated doors shall be provided with temperature stabilizing fluid that complies with standards UBC 7-2 (1997) and UL 10C.
c. Spring power shall be continuously adjustable over the full range of closer sizes, and allow for reduced opening force for the physically handicapped. Spring power adjustment (LCN Fast ™ Power Adjust) allows for quick and accurate power adjustment and visually shows closer power size settings by way of dial adjustment gauge located on closer spring tube. Hydraulic regulation shall be by tamper-proof, non-critical valves. Closers shall have separate adjustment for latch speed, general speed and back check.
d. All closers shall have solid forged steel main arms (and forearms for parallel arm closers) and where specified shall have a cast-in solid stop on the closer shoe ("CUSH"). Where closer is mounted on the push side, use "EDA" type closers and where door travel must be limited, use "CUSH" or "SCUSH" type closers. Auxiliary stops are not required when cush type closers are used.
e. Furnish all closers with full metal covers (MC).
f. Access- Free Manual Closers: Where manual closers are indicated for doors required to be accessible to the physically handicapped provide adjustable units comply with ADA and AnSI A-117.1 provisions for door opening force.
g. Closers to be installed to allow door swing as shown on plans. Doors swinging into exit corridors shall provide for corridor clear width as required by code. Where possible, mount closers inside rooms.

h. Powder coating finish to be certified to exceed 100 hours salt spray testing by ETL, an independent testing laboratory used by BHMA for ANSI certification.
i. Magnetic Door Holders to be heavy duty wall mounted with metal housing and complete mounting hardware. Provide 24V holding coils unless otherwise scheduled.
j. Attic Stock: Furnish 8 extra closer bodies as scheduled. Deliver attic stock to Owner.

H. Overhead Door Holders:
1. Acceptable manufacturers:
a. Glynn Johnson*
b. Rixson Firemark

2. Characteristics:
a. Provide heavy duty and medium duty, concealed door holders of stainless steel where scheduled.
b. Concealed holders to be installed with the jamb bracket mortised flush with the bottom of the jamb. The arm and channel to be mortised into the door.

I. Floor Stops and Wall Bumpers:
1. Acceptable manufacturers:
a. Ives*
b. Rockwood Manufacturing
c. Hager Companies

2. Characteristics: Refer to Hardware Headings.

J. Door Bolts/Coordinators:
1. Acceptable manufacturers:
a. Ives*
b. Rockwood Manufacturing
c. Hager Companies

2. Characteristics:
a. Flush bolts to be forged brass 6-3/4" x 1", with 1/2" diameter bolts. Plunger to be supplied with milled surface one side that fits into a matching guide.
b. Provide dustproof type bottom strikes.

K. Push Plates:
1. Acceptable manufacturers:
a. Ives*
b. Rockwood Manufacturing
c. Hager Companies

2. Characteristics:
a. Exposed Fasteners: Provide manufacturers standard exposed fasteners.
b. Provide plates sized as shown in Hardware Headings.

L. Door Pulls & Pull Plates:
1. Acceptable manufacturers:
a. Ives*
b. Rockwood Manufacturing
c. Hager Companies

2. Characteristics:
   a. Provide concealed thru-bolted trim on back to back mounted pulls, but not for single units.
   b. Provide unit type and size as shown in Hardware Headings.

M. Push Pull Sets:
1. Acceptable manufacturers:
   a. Ives*
   b. Rockwood Manufacturing
   c. Hager Companies

2. Characteristics:
   a. Provide mounting systems as shown in Hardware Headings.
   b. Provide Push/Pull sets of type and size as shown in Hardware Headings.

N. Protective Plates:
1. Acceptable manufacturers:
   a. Ives*
   b. Rockwood Manufacturing
   c. Hager Companies

2. Characteristics:
   a. Provide manufacturers standard exposed fasteners for door trim units consisting of either machine screws or self-tapping screws.
   b. Materials: Stainless Steel, .050 inch US 18 gage
   c. Fabricate protection plates not more than 2 inches less than door width on hinge side and not more than 1 inch less than door width on pull side.
   d. Heights:
      1) Kick plates to be 10 inches in height.
      2) Mop plates to be 10 inches in height.
      3) Armor plates to be 36 inches in height. Armor plates on fire doors to comply with NFPA 80.

O. Thresholds:
1. Acceptable manufacturers:
   a. National Guard Products, Inc.*
   b. Hager Companies
   c. Pemko Manufacturing

2. Types: Indicated in Hardware Headings.

P. Door Seals/Gasketing:
1. Acceptable manufacturers:
   a. National Guard Products, Inc.*
   b. Hager Companies
   c. Pemko Manufacturing

2. Types: Indicated in Hardware Headings.

Q. Silencers:
1. Acceptable manufacturers:
   a. Hager Companies

b. Ives
c. Rockwood Manufacturing

2. Three each for single doors; two each for pairs of doors and four each for double egress doors.

R. Key Cabinet and System:
1. Acceptable manufacturers:
a. Telkee, Inc.* AWC-450-S

2. Provide a key control system including envelopes, labels, tags with self-locking key clips, receipt forms, 3-way visible card index, temporary markers, permanent markers, and standard metal cabinet, all as recommended by system manufacturer.
a. Provide complete cross index system set up by key control distributor, and place keys on markers and hooks in the cabinet as determined by the final key schedule.
b. Provide hinged-panel type cabinet for wall mounting.

2.02 MATERIALS AND FABRICATION

A. 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 applicable hardware units by applicable ANSI/BHMA A156 series standards for each type of hardware item and with ANSI/BHMA A156.18 for finish designations indicated. Do not furnish "optional" materials or forming methods for those indicated, except as otherwise specified.

B. Fasteners: Provide hardware manufactured to conform to published templates, generally prepared for machine screw installation.
1. Do not provide hardware that has been prepared for self-tapping sheet metal screws, except as specifically indicated.
2. Furnish 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 this other work as closely as possible including "prepared for paint" surfaces to receive painted finish.
3. Provide concealed fasteners for hardware units that are exposed when door is closed except to the extent no standard units of type specified are available with concealed fasteners.
4. Use thru-bolts for installation of all exit devices, closers and overhead stops. Coordinate with wood doors and metal doors and frames. Where thru-bolts are used, as a means of reinforcing the work, provide sleeves for each thru-bolt or use sex screw fasteners.

2.03 HARDWARE FINISHES

A. Match items to the manufacturer's standard color and texture finish for the latch and lock sets.

B. Provide finishes that match those established by ANSI or, if none established, match the Architect'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 to indicate hardware finishes are those listed in ANSI/BHMA A156.18, "Materials and Finishes," including coordination with the traditional U.S. finishes shown by certain manufacturers for their products.
   1. Hinges: 630 (US32D) Satin Stainless Steel
   2. Continuous Geared Hinges: 628 (US28) Clear Anodized Aluminum
   3. Continuous Pinned Barrel Hinges: 630 (US32D) Satin Stainless Steel
   4. Flush Bolts: 626 (US26D) Satin Chrome Plated Brass/Bronze
   5. Locks: 630 (US32D) Satin Stainless Steel
   6. Manually Programmable Access Control Locks: 626 (US26D) Satin Chrome Plated Brass/Bronze
   7. Exit Devices: 628 (US28) chassis, 689 (powder coated) covers, and 630 (US32D) touchpads
   8. Door Closers: 689 Powder Coat Aluminum
   9. Push Plates: 630 (US32D) Satin Stainless Steel
   10. Pull Plates: 630 (US32D) Satin Stainless Steel
   11. Push Pull Sets: 630 (US32D) Satin Stainless Steel
   12. Protective Plates: 630 (US32D) Satin Stainless Steel
   13. Wall Stops: 630 (US32D) Satin Stainless Steel
   14. Floor Stops: 626 (US26D) Satin Chrome Plated Brass/Bronze
   15. Overhead Holders: 630 Satin Stainless Steel
   16. Thresholds/Weatherstripping: 627/628 (US27/US28) Aluminum

PART 3 – EXECUTION

3.01 INSTALLATION

A. Mount hardware units at heights indicated in following applicable publications, except as specifically indicated or required to comply with governing regulations and except as otherwise directed by Architect.
   1. "Recommended Locations for Builders Hardware for Standard Steel Doors and Frames" by the Door and Hardware Institute.
   2. "Recommended Locations for Builders Hardware for Custom Steel Doors and Frames" by the Door and Hardware Institute.
   3. NWWDA Industry Standard I.S.1.7, "Hardware Locations for Wood Flush Doors."

B. Install each hardware item in compliance with the manufacturer's instructions and recommendations. Where cutting and fitting is required to install hardware onto or into surfaces that are later to be painted or finished in another way, coordinate removal, storage, and reinstallation or application of surface protection with finishing work specified in the Division 9 Sections. 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 that 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 complying with requirements specified in Division 7 Section "Joint Sealers".

F. Weatherstripping and Seals: Comply with manufacturer's instructions and recommendations to the extent installation requirements are not otherwise indicated.

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 that cannot be adjusted to operate freely and smoothly or as intended for the application made.
   1. Where door hardware is installed more than one month prior to acceptance or occupancy of a space or area, return to the installation 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 function properly with final operation of heating and ventilating equipment.

B. Clean adjacent surfaces soiled by hardware installation.

C. Door Hardware Supplier's Field Service
   1. Inspect door hardware items for correct installation and adjustment after complete installation of door hardware.
   2. Instruct Owner's personnel in the proper adjustment and maintenance of door hardware and hardware finishes.
   3. File written report of this inspection to the Architect.

D. Door Hardware Manufacturers' Field Service
   1. Prior to project completion, representatives of the lock, exit device and overhead closer manufacturers shall inspect all units and certify that all units are installed in accordance with the manufacturer's instructions, and are regulated properly and functioning correctly.
   2. A written report of the inspection results shall be provided to the Architect and shall include the appropriate certificates.

END OF SECTION

PART 1 – GENERAL

1.01 SUMMARY

A. Section Includes: Aluminum Curtain Wall Systems:
Unless otherwise shown use:
1. YKK AP Series YHC 300 OG (Outside Glazed) Impact Resistant Aluminum Curtain Wall System **(08910.A1)**.
2. YKK AP Series YHC 300 SSG (Structural Silicone Glazed) Impact Resistant Aluminum Curtain Wall System **(08910.A2)**.
3. Monolithic Glass: 9/16" Laminate of Saf-GlasTM by Security Impact Glass; Annealed, heat strengthened, or tempered as required. Makeup: ¼" hs gray/ .90 pvb / ¼" hs clear.
4. Glazing: Dow Corning® 995 Structural Silicone Adhesive.

B. Contractor can submit substitutions, subject to the requirements stated in the specifications.

C. Related Sections:
1. Section 08410, Aluminum Swing Doors ; Section 07820, Aluminum Sloped Glazing Systems.

1.02 SYSTEM DESCRIPTION

A. Performance Requirements: Provide aluminum curtain wall systems that comply with performance requirements indicated, as demonstrated by testing manufacturer's assemblies in accordance with South Florida Building Code Protocol PA 201-94 for Large Missile Impact and Test Protocol PA 202-94 & PA 203-94 for Cycle Loads.
1. Wind Loads: Completed curtain wall system shall withstand wind pressure loads normal to wall plane indicated:
   a. Structural Performance:
      1) Positive Pressure: 90 psf.
      2) Negative Pressure: 90 psf.

   b. Structural Safety Factor Performance:
      1) Positive Pressure: 135 psf.
      2) Negative Pressure: 135 psf.

2. Deflection: Maximum allowable deflection in any member when tested in accordance with ASTM E 330 with allowable stress in accordance with AA Specifications for Aluminum Structures:
   a. Without Horizontals: L/175 or 3/4" (19.1mm) maximum. .
   b. With Horizontals: L/175 or L/240 + 1/4" (6.4mm) for spans greater than 13'-6" (4.1m) but less than 40'-0" (12.2m).

3. Thermal Movement: Provide for thermal movement caused by 180 degrees F (82.2 degrees C) surface temperature, without causing buckling stresses on glass, joint seal failure, undue stress on structural elements, damaging loads on fasteners, reduction of performance, or detrimental effects.
4. Air Infiltration: Completed curtain wall systems shall have 0.01 CFM/FT^2 (0.18 m^3/h·m^2) maximum allowable infiltration when tested in accordance with ASTM E 283-84 at differential static pressure of 6.24 PSF (299 Pa).
5. Water Infiltration: No uncontrolled water, other than condensation, on indoor face of any component when tested in accordance with ASTM E 331-86 at test pressure differential of 20 PSF (958 Pa). Water test to be performed immediately after design pressure test.
6. Thermal Performance: When tested in accordance with AAMA 1503.1-88 Condensation Resistance Factor (CRF), and ASTM C 236-89 Thermal Transmittance (U Value) as follows:
   a. CRF: A minimum of 70 for the framing system.
   b. U Value: 0.63 BTU/HR/FT^2/°F or less.
   The CRF for the glazed system as a whole will be affected by the characteristics of the glass specified.

1.03 SUBMITTALS

A. General: Prepare, review, approve, and submit specified submittals in accordance with "Conditions of the Contract" and Division 1 Submittals Sections. Product data, shop drawings, samples, and similar submittals are defined in "Conditions of the Contract."

B. Product Data: Submit product data for each type curtain wall series specified.

C. Shop Drawings: Submit shop drawings showing layout, profiles, and product components, including anchorage, accessories, finish colors and textures.

D. Samples: Submit verification samples for colors on actual aluminum substrates indicating full color range expected in installed system.

E. Quality Assurance/Control Submittals:
   1. Test Reports: Submit certified test reports showing compliance with specified performance characteristics and physical properties.
   2. Installer Qualification Data: Submit installer qualification data.

F. Closet Submittals:
   1. Warranty: Submit warranty documents specified herein.
   2. Project Record Documents: Submit project record documents for installed materials in accordance with Division 1 Project Closeout (Project Record Documents) Section.

1.04 QUALITY ASSURANCE

A. Qualifications:
   1. Installer Qualifications: Installer experienced (as determined by contractor) to perform work of this section who has specialized in the installation of work similar to that required for this project. If requested by Owner, submit reference list of completed projects.
   2. Manufacturer Qualifications: Manufacturer capable of providing field service representation during construction, approving acceptable installer and approving application method.

B. Mock-Ups (Field Constructed): Install at project site a job mock-up using acceptable products and manufacturer approved installation methods. Obtain Owner's and Architect's acceptance of finish color, and workmanship standard.
   1. Mock-Up Size.
   2. Maintenance: Maintain mock-up during construction for workmanship comparison; remove and legally dispose of mock-up when no longer required.
   3. Incorporation: Mock-up may be incorporated into final construction upon Owner's approval.

C. Pre-Installation Meetings: Conduct pre-installation meeting to verify project requirements, substrate conditions, manufacturer's installation instructions, and manufacturer's warranty requirements.

1.05 PROJECT CONDITIONS/SITE CONDITIONS

A. Field Measurements: Verify actual measurements/openings by field measurements before fabrication; show recorded measurements on shop drawings. Coordinate field measurements, fabrication schedule with construction progress to avoid construction delays.

1.06 WARRANTY

A. Project Warranty: Refer to "Conditions of the Contract" for project warranty provisions.

B. Manufacturer's Warranty: Submit, for Owner's acceptance, manufacturer's standard warranty document executed by authorized company official. Manufacturer's warranty is in addition to, and not a limitation of, other rights

Owner may have under the Contract Documents.

1. Beneficiary: Issue warranty in the legal name of the project Owner.
2. Warranty Period: 10 years commencing on Date of Substantial Completion.
3. Warranty Acceptance: Owner is sole authority who will determine acceptability of manufacturer's warranty documents.

PART 2 – PRODUCTS

2.01 MANUFACTURERS (Acceptable Manufacturers/Products)

The design is based upon the following manufacturer. Substitute manufacturers will be accepted subject to fulfilling the requirements herein.

A. Acceptable Manufacturers: YKK AP America Inc.
7680 The Bluffs
Austell, GA 30168
Telephone: 678-838-6000 Fax: 678-838-6001
1. Curtain Wall System: YKK AP YHC 300 OG Curtain Wall System.

B. Curtain Wall Framing System:
1. Description: Framing System shall be thermally improved. Horizontal and vertical members shall have a nominal face dimension of 3 inches, depth as indicated on the shop drawings. Framing system shall provide a flush glazes appearance on all sides with no protruding glass stops.
2. Glazing: Manufacturer's standard EPDM glazing gaskets to inhibit water infiltration at the exterior and Dow Corning 995 Structural Silicone Adhesive with fixed stops at the interior; interior spacers/gaskets are to be silicone.

2.02 MATERIALS

A. Extrusions: ASTM B 221 (ASTM B 221M), 6063-T5 Aluminum Alloy.

B. Aluminum Sheet::
1. Anodized Finish: ASTM B 209 (ASTM B 209M), 5005-H14 Aluminum Alloy, 0.050 inch (1.27 mm) minimum thickness.
2. Painted Finish: ASTM B 209 (ASTM B 209M), 3003-H14 Aluminum Alloy, 0.080 inch (1.95 mm) minimum thickness.

2.03 ACCESSORIES

A. Manufacturer's Standard Accessories:
1. Fasteners: Zinc plated steel concealed fasteners; Hardened aluminum alloys or AISI 300 series stainless steel fasteners. Joint fasteners may be concealed.
2. Sealant: Non-skinning type, AAMA 803.3.
3. Glazing: Setting blocks, edge blocks, and spacers in accordance with ASTM C 864, shore durometer hardness as recommended by manufacturer; Exterior glazing EPDM gaskets, in accordance with ASTM C 864, designed to lock into gasket reglet, interior by means of silicone spacer and Structural Silicone Adhesive.

2.04 RELATED MATERIALS (Specified In Other Sections)

A. Glass: Refer to Division 8 Glass and Glazing Section for glass materials.

2.05 FABRICATION

A. Shop Assembly: Fabricate and assemble units with joints only at intersection of aluminum members with hairline joints; rigidly secure, and sealed in accordance with manufacturer's recommendations.

B. Fabrication Tolerances:
   1. Material Cuts: Square to 1/32 inch (0.8 mm) off square, maximum, over largest dimension; proportionate amount of 1/32 inch (0.8 mm) on other two dimensions.
   2. Maximum Offset: 1/64 inch (0.4 mm) in alignment between two consecutive members in line, end to end.
   3. Maximum Offset: 1/64 inch (0.4 mm) between framing members at glazing pocket corners.
   4. Joints (Between adjacent members in same assembly): Hairline and square to adjacent members.

2.06 FINISHES AND COLORS

A. Anodized Finish: YKK AP AMERICA Anodized Finish:
   1. Clear: YKK AP YS1N with clear protective composite coating.

B. Anodize Finishing: Prepare aluminum surfaces for specified finish; apply shop finish in accordance with the following:
   1. Anodized Coating: Electrolytic color coating followed by an organic top coating applied to aluminum extrusions produced from quality controlled billets meeting AA-6063-T5.
      a. Exposed Surfaces shall be free of scratches and other serious blemishes.
      b. Extrusion shall be given a caustic etch followed by an anodic oxide treatment and sealed with an organic electrodeposition applied protective top coating.
      c. Overall coating thickness for finishes shall be a minimum of 0.7 mils.
      d. Coating shall conform to Aluminum Association (AA) Standard AAM12C22A4X. A4X designation shall signify an anodic coating of 0.4 mils minimum followed by an organic top coating of a minimum 0.3 mils.
      e. In addition to Aluminum Standard above, finish shall conform to the following:
         1) AAMA 605.2 Mortar Resistance Test Specification: Test Method per ASTM C207, 24 Hour Pat Test.
         2) CASS Corrosion Resistance Test: CASS 240/ASTM B368 Test Method.
         3) Other AAMA 605.2 Performance Tests specified in these specifications, such as: 7.3 Dry Film Hardness; 7.8.2 Salt Spray Resistance; 7.9.1.2 Color Retention, South Florida; 7.9.1.4 Gloss Retention.

C. Finishes Testing:
   1. Apply 0.5% solution NaOh, sodium hydroxide, to small area of finished sample area; leave in place for sixty minutes; lightly wipe off NaOh; Do not clean area further.
   2. Submit samples with test area noted on each sample.

PART 3 – EXECUTION

3.01 MANUFACTURER'S INSTRUCTIONS/RECOMMENDATIONS

A. Compliance: Comply with manufacturer's product data, including product technical bulletins, product catalog installation instructions, and product carton instructions.

3.02 EXAMINATION

A. Site Verification of Conditions: Verify substrate conditions (which have been previously installed under other sections) are acceptable for product installation in accordance with manufacturer's instructions.

3.03 PREPARATION

A. Adjacent Surfaces Protection: Protect adjacent work areas and finish surfaces from damage during product installation.

3.04 INSTALLATION

A. General: Install manufacturer's system in accordance with shop drawings, and within specified tolerances.
   1. Protect aluminum members in contact with masonry, steel, concrete, or dissimilar materials using nylon pads or bituminous coating.
   2. Shim and brace aluminum system before anchoring to structure.
   3. Verify curtain wall system allows water entering system to be collected in gutters and weeped to exterior. Verify weep holes are open, and metal joints are sealed in accordance with manufacturer's installation instructions.
   4. Seal metal to metal curtain wall system joints using sealant recommended by system manufacturer.

3.05 FIELD QUALITY CONTROL

A. Manufacturer's Field Services: Upon Owner's request, provide manufacturer's field service consisting of product use recommendations and periodic site visit for inspection of product installation in accordance with manufacturer's instructions.

B. Field Test: Conduct field test to determine watertightness of curtain wall system. Conduct test in accordance with NAAMM FC-1-76 at locations selected by Architect.
   1. Perform minimum of 1 tests. Perform test in Architect's presence.

3.06 ADJUSTING AND CLEANING

A. Adjusting: Adjust operating items as recommended by manufacturer.

B. Cleaning: The General Contractor shall clean installed products in accordance with manufacturer's instructions prior to Owner's acceptance, and remove construction debris from project site. Legally dispose of debris.

C. Protection: The General Contractor shall protect installed product's finish surfaces from damage during construction.

END OF SECTION