SECTION  – aluminum doors, frames and sidelites

1. General
   1. summary
      1. This Section includes requirements for supply and installation of the following:
         1. Interior aluminum doors, frames and sidelites, and all associated hardware to provide a complete installation.
   2. REFERENCE Standards
      1. Aluminum Association (AA):
         1. Aluminum Design Manual, Latest Edition
      2. American Architectural Manufacturers Association (AAMA):
         1. AAMA 501-05, Methods of Test for Exterior Walls
         2. AAMA 611-12, Voluntary Specification for Architectural Anodized Aluminum
         3. AAMA 1503-09, Voluntary Test Method for Thermal Transmittance and Condensation Resistance of Windows, Doors, and Glazed Wall Sections
      3. American National Standards Institute (ANSI):
         1. ANSI H35.1-2006, Alloy and Temper Designation Systems for Aluminum
         2. ANSI/BHMA A156.1-2013, Butts and Hinges
         3. ANSI/BHMA A156.3-2001, Exit Devices
         4. ANSI/BHMA A156.4-2013, Door Controls - Closers
         5. ANSI/BHMA A156.5-2010, Cylinders and Input Devices for Locks
         6. ANSI/BHMA A156.6-2010, Architectural Door Trim
         7. ANSI/BHMA A156.8-2010, Door Controls - Overhead Stops and Holders
         8. ANSI/BHMA A156.16-2002, Auxiliary Hardware
         9. ANSI/BHMA A156.21-2009, Thresholds
      4. American Society for Testing and Materials (ASTM):
         1. ASTM A653/A653M-06, Standard Specification for Steel Sheet, Zinc Coated (Galvanized) or Zinc Iron Alloy Coated (Galvannealed) by the Hot Dip Process.
         2. ASTM A167-99 (R2004), Stainless and Heat-Resisting Chromium-Nickel Steel Plate, Sheet, and Strip.
         3. ASTM B209/209M-04, Standard Specification for Aluminum and Aluminum-Alloy Sheet and Plate
         4. ASTM B221/B221M-05, Standard Specification for Aluminum and Aluminum-Alloy Extruded Bars, Rods, Wire, Profiles, and Tubes
         5. ASTM B308/B308M-02, Standard Specification for Aluminum-Alloy 6061-T6 Standard Structural Profiles
         6. ASTM B429-02, Standard Specification for Aluminum-Alloy Extruded Structural Pipe and Tube
         7. ASTM E330-02, Standard Test Method for Structural Performance of Exterior Windows, Curtain Walls, and Doors by Uniform Static Air Pressure Difference
         8. ASTM E331-00, Standard Test Method for Water Penetration of Exterior Windows, Skylights, Doors, and Curtain Walls by Uniform Static Air Pressure Difference
         9. ASTM E783-02(2010), Standard Test Method for Field Measurement of Air Leakage Through Installed Exterior Windows and Doors
         10. ASTM E1105-00(2008), Standard Test Method for Field Determination of Water Penetration of Installed Exterior Windows, Skylights, Doors, and Curtain Walls, by Uniform or Cyclic Static Air Pressure Difference
      5. Canadian Standards Association (CSA):
         1. CAN/CSA G40.20/G40.21-04, General Requirements for Rolled or Welded Structural Quality Steel/Structural Quality Steels
         2. CSA W47.1-09, Certification of Companies for Fusion Welding of Steel Structures
         3. CSA W47.2-11, Certification of Companies for Fusion Welding of Aluminum.
         4. CSA W59-03(2008), Welded Steel Construction (Metal Arc Welding), Metric.
         5. CSA W59.2-M1991(R2013), Welded Aluminum Construction
      6. Canadian Welding Bureau (CWB Group Industry Services):
         1. CWB 112E, 93-1, Welding Symbols Study Guide
         2. CWB 113E, 94-1, Weld Quality and Examination Methods Study Guide
      7. The Society for Protective Coatings (SSPC)/National Association of Corrosion Engineers (NACE International):
         1. Surface Preparation Guidelines:
            1. SSPC-SP COM Surface Preparation Commentary for Steel and Concrete Substrates
            2. SSPC-PS Guide 12.00, Guide to Zinc-Rich Coating Systems
   3. QUALITY ASSURANCE
      1. The Contractor executing work of this section shall have a minimum of five (5) years continuous experience in the successful fabrication and installation of aluminum doors and frames of type and quality shown and specified. Submit proof of experience upon Consultant's request.
      2. The installation shall be in conformity with laws, by-laws and regulations which govern the design and installation of aluminum doors and frames and the CSA, CGSB and ASTM standards specified.
      3. The work shall be supervised by competent foremen in the shop and during erection. Workmen shall be skilled in their respective trades.
   4. ADMINISTRATIVE REQUIREMENTS
      1. Pre-Construction Meeting: Conduct a pre-construction meeting in accordance with   
         Section 01 31 19 – Project Meetings, on site to review methods and procedures related to aluminum doors and frames including, but not limited to, the following:
         1. Review and finalize construction schedule and verify availability of materials, installer's personnel, equipment, and facilities needed to make progress and avoid delays.
   5. SUBMITTALS
      1. Provide submittals in accordance with Section 01 33 00 – Submittal Procedures.
      2. Shop Drawings:
         1. Related items shown on shop drawings which are not intended to be supplied as part of the work of this section, shall be so identified. All dimensions shall be clearly noted and methods of fastening and anchoring detailed. Show accurately and identify all adjacent materials.
         2. Drawings to show in full size detail all elements of assembly and construction including all variations of details required for aluminum doors and frames arrangement shown on the drawings.
         3. Design drawings shall bear the stamp of a professional engineer experienced in the design and fabrication methods pertaining to aluminum doors and frames, and who are licenced to practice in the Province of the Work.
      3. Samples:
         1. Submit full size section approximately 305mm (12") long of frame showing finish and profile for Consultant's review.
      4. Maintenance Data and Operating Instructions:
         1. On completion of work of this section, supply maintenance and glazing instructions for insertion in maintenance manual.
   6. STORAGE, DELIVERY, HANDLING AND PROTECTION
      1. Coordinate deliveries to comply with construction schedule and arrange ahead for strategic off the ground, under cover storage locations. Do not load any areas beyond the design limits.
      2. Adequately protect and crate all components against damage, dirt, disfigurement, and weather.
      3. Exercise extreme care in handling units to prevent damage and scratched surfaces.
      4. Cover and protect the work of other sections in the area of work from damage. Make good all damage to the satisfaction of the Consultant.
      5. Be responsible for damage to the work until the building is complete and accepted by the Owner. In case of damage, material shall be completely removed and replaced with new.
      6. Provide safe and adequate equipment on the site to execute the work, hoisting, scaffolding, staging, safety protection equipment, tools, plant, and other equipment required for the completion of the work.
   7. WARRANTY
      1. Warrant work of this section against any defects in materials and workmanship in accordance with the General Conditions but for an extended period of ten (10) years and agree to promptly and without cost to Owner make good defects which become evident during warranty period. Without restricting the generality of the warranty, defects shall include deformation of members, breaking of glass due to thermal or structural movement, discolouration of finishes and failure of sealants.
      2. Warrant insulating glass units in accordance with General Conditions for a period of five (5) years. Warrant that units will be free from material obstruction of vision as a result of dust or film formation on internal glass surfaces by any cause other than extrinsic glass breakage.
      3. Warrant that any unit failing shall be removed and replaced without cost to the Owner.
2. Products
   1. MANUFACTURERS
      1. Basis-of-Design products are named in this Section; additional manufacturers offering similar aluminum framed entrance and storefront systems may be incorporated into the work provided they meet the performance requirements established by the named products.
      2. Acceptable Materials Manufacturers: Subject to compliance with requirements specified in this Section and as established by the Basis-of-Design Materials, manufacturers offering products that may be incorporated into the Work include but are not limited to, the following:
         1. PC350 Elite Door Frame System by PC350 Architectural Walls.
   2. MATERIALS
      1. Aluminum:
         1. Extrusions: AA6063-T5 alloy, anodizing quality, conforming to ASTM B221-92a.
         2. Plate and Sheet: AA1100-H14 alloy, anodizing quality unless otherwise indicated minimum 0.125" thick, conforming to ASTM B209-92a.
         3. Thresholds and Sills: AA6061-T6 alloy, anodizing quality, conforming to ASTM B221-92a.
         4. Exposed surfaces of aluminum shall be free of die marks, scratches, blisters, "leave-off" marks, or other blemishes, whether left unfinished or finished.
         5. Aluminum Welding Materials: Conforms to CSA W59.2.
      2. Structural Steel Sections and Steel Plate:
         1. Conforms to CAN/CSA-G40.20/G40.21, Grade 300W. Hollow steel sections shall conform to CAN/CSA-G40.20/G40.21, Grade 350W, Class H.
         2. Steel Welding Materials: Conforms to CSA W59.
      3. Galvanized Steel Sheet:
         1. Commercial grade, stretcher levelled, or temper rolled conforming to ASTM A525 with galvanized zinc G90 (Z275) coating conforming to ASTM A526/A526M.
      4. Glazing and Glazing Materials: As indicated in Section 08 80 00 - Glazing.
      5. Sealant Materials:
         1. Perimeter Sealant: Multi-component, chemical curing epoxidized polyurethane type sealant conforming to ASTM C920, 'Dymeric 240' by Tremco (Canada) Ltd., or CWS/CCS by Dow Corning, or approved equal. Colour as selected later by Consultant.
         2. Threshold Sealant: Oil based sealant conforming to CAN/CGSB-19.6.
         3. Backer Rod: Round open cell foam, extruded polyethylene, Shore A hardness of 20, tensile strength 140 to 200 kPa, oversized 30-50%, compatible with sealant and primer, non-adhering to sealant, 'Ethafoam SB' by Dow Chemical Canada Inc., or 'Sof Rod' by Tremco (Canada) Ltd., or approved equal.
         4. Joint Primers: As recommended by sealant manufacturer.
         5. Solvents, Cleaning Agents, and Other Accessory Materials: As recommended by sealant manufacturer in writing.
         6. Bond Breakers: Where required, shall be polyethylene tape (or equal) as recommended by manufacturer of sealant in writing.
      6. Zinc Rich Paint:
         1. Ready mixed, zinc rich primer conforming to CAN/CGSB-1.181, 'Sealtight Galvafroid Zinc-Rich Coating' by W.R. Meadows of Canada Limited, or 'Zinc Clad No.7 Organic Zinc Rich Primer' by Sherwin Williams Company of Canada Ltd.
      7. Bituminous Paint: Conforming to CAN/CGSB-1.108, Type 2.
      8. Fasteners: "400" Series stainless steel, or "300" Series stainless steel.
      9. Aluminum Flashings: As indicated in Section 07 62 00 – Sheet Metal Flashing and Trim.
      10. Aluminum Sills:
          1. Extruded or formed type aluminum sills, minimum 3/32" thick, with three coat fluoropolymer thermal setting enamel finish to match aluminum caps.
   3. components

SPEC NOTE: Modify the following paragraphs to reflect the aluminum door and frame manufacturer’s system components. This Section is designed to the system identified in Para 2.1.2.1 above.

* + 1. Door Frame System: Provide frames with the following characteristics:
       1. Rectilinear design.
       2. 44.5mm (1-3/4”) face profile.
       3. Snap on Trim: 32mm (1-1/4”) Aluminum or 44.5mm (1-3/4”) Aluminum.
       4. (0.070”) rabbet wall thickness.
       5. Throat Sizes: 89mm (3-1/2”) up to 184mm (7-1/4”).
    2. Swing Doors:
       1. Door construction shall consist of butt joined corners with reinforcing at top and bottom corners consisting of an aluminum bracket not less than 4.75mm (0.187”) thick with a 7.5mm (0.30”) bolt and an aluminum retaining bracket on the inside section of the side rails.
       2. The bracket shall be welded to the top and bottom of the door stile through an access hole. All butt joints shall be welded on the concealed corners to form a true and square corner. Welds shall be of maximum penetration without weld holes or discoloration.
       3. Door glass stops shall be square for 6mm (¼”) or 10mm (3/8”) glass or 25mm (1”) sealed unit and be dry glazed with glazing spline. Application of door stops by compression fit, wedged, and hooked into rails and stiles by means of mechanical fit.
       4. Wall thicknesses shall be 3.2mm (0.125”) on exposed surfaces and 4.75mm (0.187”) on internal webs.

P2 Doors: Narrow stile door with 50.8mm (2”) wide stiles, 60.3mm (2-3/8”) top rail and 104.7mm (4-1/8”) bottom rail

P5 Doors: Wide stile door with 127mm (5”) wide stiles, 139.7mm (5-½”) top rail and 177.8mm (7”) bottom rail.

* + - 1. Door Type: (Narrow)(Wide).

SPEC NOTE: Delete the following paragraph if there are no Sliding Doors on the Project.

* + 1. Sliding Doors:
       1. Door construction shall consist of butt joined corners with reinforcing at top and bottom corners consisting of an aluminum bracket not less than 4.75mm (0.187”) thick with a 7.5mm (0.30”) bolt and an aluminum retaining bracket on the inside section of the side rails.
       2. The bracket shall be welded to the top and bottom of the door stile through an access hole. All butt joints shall be welded on the concealed corners to form a true and square corner. Welds shall be of maximum penetration without weld holes or discoloration.
       3. Door glass stops shall be square for 6mm (¼”) or 10mm (3/8”) glass or 25mm (1”) sealed unit and be dry glazed with Santoprene glazing spline. Application of door stops by compression fit, wedged, and hooked into rails and stiles by means of mechanical fit.
       4. Door Type: Narrow stile door with 50.8mm (2”) wide stiles, 60.3mm (2-3/8”) top rail and 104.7 (4-1/8”) bottom rail.
  1. DOOR HARDWARE
     1. Manufacturer’s heavy-duty hardware units in sizes and types as required to meet intended use as indicated on Drawings.
     2. Provide door hardware in accordance with the requirements of this Section; using products that are recommended and supplied by entrance system manufacturer; in accordance with referenced standards, meeting requirements for description, quality, type, and function listed in hardware schedule.
  2. FABRICATION
     1. Fabricate aluminum-framed glass swing doors in sizes indicated. Include a complete system for assembling components and anchoring doors.
     2. Fit and assemble as far as possible in factory and fabricate with:
        1. Metal sections drilled, tapped, welded, braced as required for the proper installation and fixing of all components and accessories, and supplied complete with all necessary anchors, clips, bolts, screws, for the installation.
        2. Members possessing sharply defined profiles, straight, square and true with surfaces in proper planes and exposed finished surfaces and edges smooth and free from defects.
        3. Fabricate the components to accommodate and interface with work of other sections by means of rabbets, interlocks, miscellaneous angles, trim and filler sections as required.
        4. Framing, bracing, reinforcing, and anchors having structural properties adequate to safely sustain and stresses to which they will be subjected.
        5. Provision for proper expansion and contraction.
        6. Joints and intersections shall be accurately formed and tightly fitted.
        7. Bolts tight and threads nicked to prevent loosening of nuts, bolting and screwed work made as inconspicuous as possible.
        8. Preparation for glazing as required.
        9. Cut, drill, tap and reinforce each sliding door for locks, casters, hangers, and hardware. Lock cylinders will be supplied by hardware section.
        10. Accurately prepare and reinforce with backing plates to ensure adequate strength, cut-outs, recesses, and mortising required for Best lock cylinders and other hardware. Install lock cylinders.
  3. FINISHES
     1. Finish designations prefixed by AA comply with the system established by the Aluminum Association for designating aluminum finishes.
     2. Protect finish with strippable protective film.

SPEC NOTE: select class 1 finish for highly corrosive exterior environments (sea salt). select class 2 finish for standard exposure.

* + 1. Clear Anodized Finish:
       1. Class II Finish: Architectural Class II, clear coating 0.010 mm or thicker in accordance with AAMA 611.
    2. Black Coloured Anodized Finish:
       1. Class II Finish: Architectural Class II, integrally coloured or electrolytically deposited colour coating 0.010 mm or thicker in accordance with AAMA 611.

SPEC NOTE: select 2 coat for standard exterior projects; 3 coat for high end finish, corrosive exterior environments; acrylic enamel for interior projects.

* + 1. High Performance Organic Finish:
       1. 2 Coat PVDF or FEVE Coating:
          1. Manufacturer's standard 2 coat, thermo-cured system consisting of specially formulated inhibitive primer and colour topcoat, and apply coating to exposed metal surfaces in accordance with AAMA 2605 and with coating and resin manufacturers' written instructions.
          2. Colour: [As indicated in Section 09 06 05 Product and Finish Schedule.][As selected by Consultant from manufacturer's full product range.]
          3. Basis of Design Materials: PPG Duranar.
       2. Three Coat Fluoropolymer Thermo-setting Enamel:
          1. All aluminum entrance and storefront framing exposed in the finished work shall have three coat fluoropolymer thermo-setting enamel conforming to AAMA 605.2-90, minimum 1.6 mils dry film thickness.
          2. Pre-treat aluminum after fabrication and apply primer and finish coats in strict accordance with manufacturer's written instructions.
          3. Colour: [As indicated in Section 09 06 05 Product and Finish Schedule.][As selected by Consultant from manufacturer's full product range.]
          4. Basis of Design Materials: PPG 'Duranar XL.
       3. Acrylic Enamel Finish:
          1. 1 Coat Acrylic Extrusion Coating:
          2. AA‑C12 Chemical Finish, cleaned with inhibited chemicals; C40 Chemical Finish, conversion coating; Rx Acrylic Coating, manufacturer’s standard single coat factory spray applied acrylic coating; prepare, pre‑treat and apply coating to exposed metal surfaces to 0.020 mm or thicker in accordance with AAMA 2603 and with coating manufacturer’s written instructions.
          3. Colour: [As indicated in Section 09 06 05 Product and Finish Schedule.][As selected by Consultant from manufacturer's full product range.]
          4. Basis of Design Materials: PPG Duracron.
    2. Steel (Concealed):
       1. Hot-dip galvanized in accordance with CAN/CSA-G164, with minimum coating of 2 oz./sq.ft., or zinc rich paint.
    3. Isolate where necessary to prevent electrolysis due to dissimilar metal-to-metal contact or metal-to-masonry and concrete contact. Use bituminous paint, butyl tape or other approved divorcing material.

1. Execution
   1. PREPARATION
      1. Take field measurements from actual structure and verify prior to commencement of fabrication.
      2. Allow for dimensional tolerances and deviations from true planes permissible in the structural frame. Excessive deviations shall be reported to the Consultant in writing for correction. Commencement of the work implies acceptance of all conditions.
   2. INSTALLATION
      1. Erection shall be carried out by competent and skilled installers employed by the manufacturer.
      2. Install doors plumb, true and square complete with all necessary reinforcing and incidental components.
      3. All anchors and fastening to structure shall be designed to allow complete adjustment for levelling and positioning of the frame and for deflection and creep of the structure without imposing loads on the swing doors.
      4. The work shall be anchored and blocked as shown on the final shop drawings. Make provision for concealing anchors, clips, blocking and the like.
      5. Refer to drawings for location of each type of glass.
   3. ADJUSTING
      1. Immediately prior to final cleaning of glass and before handing over building to Owner, make good damage and disfigurement to this work, remove protective coatings, stains and foreign matter from exposed exterior and interior surfaces of glass and aluminum and leave in first-class condition to Consultant's satisfaction.
      2. Clean using soap and water, or water and approved solvents not injurious to aluminum, glass, glazing and sealant compounds. Do not use abrasives.

END OF SECTION