SPEC WRITER NOTES:
1. Delete between / ----- / not applicable to project. Also delete any other item or Article not applicable in section and renumber paragraphs.
2. Industry cautions against use of manually initiated power assisted revolving door when it shall be used in conjunction with building usage by elderly, due to possibility of door automatically advancing after being manually pushed to start power assist mechanism and catching elderly off balance.
3. Industry recommends that provision be made for installation of either automatic single acting swing doors or automatic horizontal sliding doors on either side of revolving entrance doors for use by handicapped persons. Industry can provide a revolving entrance door package (10 foot diameter unit) to accommodate handicapped persons, as indicated below, but to date there has not been a Federal compliance act issued formerly for this item.

PART I - GENERAL

1.1 DESCRIPTION

A. Section includes: Revolving entrance doors including enclosures and related components as follows:
   1. 3-wing // conventional manual // manually initiated power assisted // automatic // revolving doors.
   2. 4-wing // conventional manual // manually initiated power assisted // automatic // revolving doors.

/B. Include automatic operator. //
/C. Adjacent sidelights and transom framing.//

1.2 RELATED WORK

A. Sealing Joints. Section 07 92 00, JOINT SEALANTS.
B. Aluminum hinged doors and storefront construction: Section 08 41 13, ALUMINUM-FRAMED ENTRANCES AND STOREFRONTS.
C. Door operators: Section 08 71 13, AUTOMATIC DOOR OPERATORS.
D. Lock cylinders: Section 08 71 00, DOOR HARDWARE.
E. Glazing: Section 08 80 00, GLAZING.
F. Finish Color: Section 09 06 00, SCHEDULE FOR FINISHES.
G. Revolving darkroom doors: Section 08 34 36, DARKROOM DOORS.
H. Electrical Rough-in and Final Connections are specified in Division 26, ELECTRICAL.
I. Lighting: Section 26 51 00, INTERIOR LIGHTING.

1.3 QUALIFICATIONS

A. Qualifications:

1. Approval is required of products or service of proposed manufacturer suppliers and installers, and will be based upon submission by Contractor of certification that:
   a. Manufacturer who regularly and presently, for last five years has manufactured and installed revolving entrance doors as one of its principal products.
   b. Installer: Approved by manufacturer.
   c. Manufacturer's product submitted has been in satisfactory and efficient operation on minimum of three installations similar and equivalent to this project for past three years.

1.4 SUBMITTALS

SPEC WRITER NOTE: List below items intended for use in project, necessary for review prior to manufacture. Refer to Section 01 33 23, SHOP DRAWINGS, PRODUCT DATA, AND SAMPLES for submittal requirements. Include additional submittal requirements for items specified.

A. In accordance with Section 01 33 23, SHOP DRAWINGS, PRODUCT DATA, AND SAMPLES.
B. Manufacturer's Literature and Product Data:
   1. Manufacturer's standard details and fabrication methods.
   2. Data on finishing, hardware, components, and accessories.
   3. Recommendations for maintenance and cleaning of exterior surfaces.
C. Shop Drawings:
   1. Submit complete fabrication, installation, and associated components shop drawings.
   2. Identify enclosures, speed control units, and other component parts, not included in manufacturer’s product data, by name and material and showing design, construction, installation, and anchorage.
   3. Layout and installation details, including relation to adjacent work.
4. Elevation at 1:50 (1/4 inch) scale.
5. Hardware, show mounting heights.
6. Detail sections of typical composite members.
8. Anchors and reinforcements.
10. Equipment wiring diagram and electrical circuitry diagram for electric powered doors.

D. Samples:
1. Submit pairs of samples of each specified color and finish on 300 mm (12 inch) long section by width of each tubular, or extruded shape section or 300 mm (12-inch) wide sections of sheet shapes.
2. Where normal color variations are anticipated, include 2 or more units in set indicating extreme limits of color variations.

E. Quality Control Submittals:
1. Test Reports: Provide certified test reports from a qualified independent testing laboratory showing that revolving entrance door assembly has been tested in accordance with specified test procedures and complies with performance characteristics indicated.
2. Manufacturer’s Certificates:
   a. Stating that aluminum has been given specified thickness of anodizing or organic coating finish.
   b. Indicating manufacturer’s and installer’s meet qualifications as specified.
   c. Submit list of equivalent size installations which have had satisfactory and efficient operation.

1.5 DELIVERY, STORAGE AND HANDLING
Comply with Curtain Wall Manual No. 10.

1.6 APPLICABLE PUBLICATIONS
A. Publications listed below form a part of this specification to extent referenced. Publications are referenced in text by basic designation only.

B. American Architectural Manufacturers Association (AAMA):
   Curtain Wall Manual No. 10-Care and Handling of Architectural Aluminum from Shop to Site.
C. American National Standards Institute/Builders Hardware and Manufacturers Association (ANSI/BHMA):
   A156.10-11 ............ Power Operated Pedestrian Doors
   A156.19-07 ............ Power Assist and Low Energy Power Operated Doors.

D. American Society for Testing and Materials (ASTM):
   A167-99(R2009) ........ Stainless and Heat-Resisting Chromium-Nickel Steel Plate, Sheet and Strip.
   B209-07................. Aluminum and Aluminum-Alloy Sheet and Plate.
   B221-08 ............ Aluminum-Alloy Extruded Bars, Rods, Wire, Shapes, and Tubes.
   E283-04 ............... Determining Rate of Air-Leakage through Exterior Windows, Curtain Walls, and Doors Under Specified Pressure Differences Across this Specimen.
   E330-02(R2010) ........ Structural Performance of Exterior Windows, Curtain Walls, and Doors by Uniform Static Air Pressure Difference.
   E331-00(R2009) ........ Water Penetration of Exterior Windows Curtain Walls and Doors by Uniform Static Air Pressure Difference.

E. National Association of Architectural Metal Manufacturer (NAAMM):
   AMP 500 Series ........ Metal Finishes Manual.

1.7 WARRANTY

Warranty: Submit manufacturer's written warranty for materials and installation, in accordance with Section 00 72 00, GENERAL CONDITIONS requirements except that warranty period shall be extended to include three (3) years for revolving door units and five (5) years for speed control units and operator units.

PART 2 – PRODUCTS

2.1 SYSTEM DESCRIPTION

SPEC WRITER NOTE: Select desired door operation listed below and coordinate requirements of options listed below which are required for selected door operation.

A. Design Requirements:
1. Definitions:
   a. Manual Operation—Door operation provided by hand pressure applied against a movable revolving door surface which shall allow friction free door operation, through an adjustable speed control unit, of approximately 9 to 12 RPM maximum.
   b. Power Assist Operation: Door operation provided by hand pressure applied against a movable revolving door surface which shall turn on power assist electric operator and revolve door at rate of 2 to 10 RPM for one turn. Subsequent pushing on door shall reinstate one revolution.
   c. Automatic Operation: Door operation provided by use of a microwave motion detector placed to cover entire throat of entrance to revolving door to detect someone approaching door. This actuation shall cause door to revolve at rate of 4–8 RPM (adjustable) for one complete turn after actuating signal is removed, then stop and quarter point.
   d. Locate motor and controls for revolving doors in conditioned space.

   SPEC WRITER NOTE: Make material requirements agree with applicable requirements specified in referenced Applicable Publications. Update and specify in both only that, which applies to project.

2.2 MATERIALS

A. Aluminum:
   1. Extruded: Provide alloy and temper recommended by manufacturer for type of use and finish indicated, but with not less strength and durability properties specified in ASTM B221 for 6063-T5.
      a. Provide main extrusions not less than 3 mm (0.125 inch) thick unless otherwise specified.
      b. Provide extruded aluminum glazing stops and other applied trim extrusions with a minimum wall thickness of 1.5 mm (0.062 inch).
   2. Aluminum Sheet:
      a. ASTM B209, alloy 5005–H34, except alloy used for color anodized aluminum shall be as required to produce specified color.
      b. Not less than 2 mm (0.080 inch) thick unless otherwise specified.
B. Stainless Steel: ASTM A167 stainless steel sheet and formed members of //Type 302/304 alloy// minimum 1.5 mm (0.0598 inch) thick unless otherwise specified.

SPEC WRITER NOTE: It is not recommended that tinted glass be used in revolving door wings due to potential of not being able to see person on other side of door.

C. Glass and Glazing Material:
   1. As specified in Section 08 80 00, GLAZING.
   2. Accommodate up to 25 mm (1 inch) glazing.
   3. Revolving door wings:
      a. Doors:
         1) Wings: 6 mm (1/4 inch) tempered,
         2) Clear tempered for use in flat sheets.
   4. Curved Enclosure Walls:
      a. Walls: //8 mm (5/16 inch) // //11 mm (7/16 inch) // laminated glass.
      b. Clear laminated for use in curved sheets.
      c. Tinted laminated for use in curved sheets.

D. Glazing Cushions: Channel shaped of rubber, vinyl or polyethylene plastic. Terminate flanges flush with top of beads.

2.3 REVOLVING DOOR

SPEC WRITER NOTES:
1. Many jurisdictions and structural performance codes do not permit use of revolving doors to satisfy emergency egress requirements. If codes permit use of revolving doors, determine factors to consider such as door width, acceptable building types, amount of exit width credit given, or similar limits. Size doors to comply with code requirements.
2. Ensure drawings indicate item stated in 2.2A. Use stock manufactured sizes.
3. Handicap Requirements: Although there is no formal handicap compliance requirement enacted as yet for revolving door industry, the industry will work with designer to design revolving doors for handicapped person usage. There is a 10 foot diameter revolving door unit for use by handicapped persons. Contact your revolving door manufacturer to review and discuss design considerations.
4. Designer may also consider use of automatic swing out doors or automatic horizontal doors for use by handicapped persons adjacent to revolving door if space permits.

   a. Automatic Doors: Shall comply with ANSI/BHMA A156.10.

A. Design Requirements:
1. Drawings indicate size, profile and dimensional requirements of revolving entrance door assemblies required.
2. Enclosures: Circular metal panel and glass panel enclosure walls.
3. Canopy/Ceiling: Canopy ceiling, manual locks, operator, control, brake, sensor switch detectors power assisted.
4. Doors and Locks:
6. Power Assisted Operation: //List Doors Nos.//
7. Automatic Operation. //List Doors Nos.//
8. Design Wind Velocity: // To design pressure of .06 kPa (1.25 lb/sq ft) //____//
9. Water Infiltration: Comply with requirements of ASTM E331. Test pressure difference at which water penetration is to be determined, shall be 137 Pa (2.86 lbf/ft²) //_____ //.

B. Performance Requirements:
1. Comply with performance requirements specified, by testing manufacturer's assemblies according to test methods indicated.
2. Air Infiltration: Limit air leakage rate not to exceed 385462 cm³/m² (1.25 cfm) per m² (square foot) of door area when tested in accordance with ASTM E283 at test pressure differential of 7 kg/m² (1.567 psf).
3. Water Infiltration: Unless otherwise specified, failure criteria of this test method shall be defined as water penetration beyond the vertical plane intersecting the innermost projection of testing specimen not including interior trim and hardware, when tested in accordance with ASTM E331 at test pressure of 137 Pa (2.86 lbf/ft²)

2.4 FABRICATION
   A. Aluminum Doors:
1. Cut and fit all related components in accordance with manufacturer’s recommendations.

2. Joints tightly bolted together.
   a. Bolt joints to produce hairline joints.
   b. Finish material prior to fabrication.
   c. Glass stops snap-in type.
   d. Assemble to prevent welds or adhesives from blemishing finished surfaces.
   e. Screws, and other fastenings, equally spaced, countersunk, and finished to match adjacent surfaces.
   f. Enclosure constructed so that clearance is maintained and weather seal assured.
   g. Canopy:
      1) Provide canopy to match contour of enclosure.
      2) Canopy sides furnished in aluminum panel. Use aluminum clad plywood 1 mm/19 mm (.040/.75 inch) for interior ceiling. Optional: Exterior roof fabricated from 2 mm (.090) anodized aluminum.
   h. Weather-stripping:
      1) Provide EPDM sweep to door wings, sills, canopy and inner stiles, and combination EPDM/felt sweep to outer stiles and door wings.
      2) Weather-stripping attached to wings easily adjustable and removable without dismantling wings.
   i. Push Bars: Provide one on each wing.
   j. Deadlocks: Provide two with cylinders.

C. Dissimilar Metals: Separate dissimilar metals with bituminous paint or other operator that will prevent galvanic action.

D. Fasteners: Conceal fasteners wherever possible. Countersink heads of exposed fasteners.

**SPEC WRITER NOTES:**

1. Retain paragraph E. if manual operation speed control is required. Coordinate to define location of different type doors on drawings.
2. Speed Control: Factory set and depends on door diameter. Refer to local codes for maximum limit imposed on size of each door.

E. Manual Operation Speed Control:
1. Limit rotation speed of door by an adjustable mechanical speed control.
2. Braking pressure governing mechanism in direct proportion to pressure applied on door to prevent rapid acceleration, spinning or excessive speed.
3. Adjust speed and factory set to engage at 9-12 revolutions per minute.
4. Location: Manufacturer standard.

SPEC WRITER NOTES:
1. Retain paragraph F. if power-assisted speed control is required.
2. Industry does not recommend this type of door operation to be included in buildings designed for use by elderly, due to potential of allowing elderly persons to fall.

F. Power-Assisted Speed Control Unit:
1. Provide an electric or electric-hydraulic speed regulator to automatically rotate door wings.
2. Operator supplied with minimum 1/4 HP 500 RPM high torque. UL approved motor, gear box, and control panel. Provide adjustable speed control.
3. Speeds: Adjustable from 2 to 10 RPM.
4. Provide control switch at location indicated on drawings.
5. Control includes:
   a. On and Off.
   b. Power continuous cycle.
7. Gears: Case hardened (60 Rc) helical gears in synthetic, low temp oil bath lubrication.
8. Operator allow manual operation when power is removed.
9. Provide 38 mm (1-1/2 inch) solid steel shaft as main linkage to connect operator to revolving door.
10. Motor drive control enclosed to prevent EMI noise from affecting microprocessor control.
11. Microprocessor Control modular cards with edge connectors.

G. Automatic Door:
1. A Microwave Motion Detector:
a. Place at entrance to revolving door to provide total throat area coverage and be able to detect someone approaching door and cause door to revolve at rate set for one complete turn and then stop.
b. A momentary contact switch with 25 mm (1 inch) round push button placed at entrance to door. Provide switch mounting plate with Handicap Logo and words "PUSH BUTTON TO SLOW DOOR". Door to revolve at 2-3 RPM for one turn and then stop. An optional voice annunciator will say "DOOR IN SLOW SPEED, DO NOT PUSH."

SPEC WRITER NOTE: Use clear tempered glass in wings. Use laminated or safety glass in curved planes.

H. Glazing:
1. Glaze door wings and enclosure walls, with glass, minimum of 8 mm (5/16) thick, set in continuous glazing cushions as specified in Section 08 80 00, GLAZING.

I. Ceiling Lights:
1. Provide two 200 mm (8-inch) diameter flush recessed ceiling light fixtures within revolving door enclosure ceiling, complete with lamps and translucent lens.
2. Refer to Section 26 51 00, INTERIOR LIGHTING for lamp types to be used.

SPEC WRITER NOTE: Paragraph I, specifies optional equipment that may be required or desirable.

J. Movable Wings: (For Manual Operation Doors Only.)
1. Provide manufacturer's standard overhead carriage, guide support track, pivot mechanism, and other components necessary to permit folded door wings easily moved to one side.

2.5 SAFETY FEATURES
A. Magnetic Breakaway:
1. Wings held in their respective positions under normal conditions by electro-magnets capable of holding with 1,000 pounds (min.) force to maintain building integrity.
2. Upon signal from a smoke or fire alarm or remote emergency button (by others) power to door operator and magnets shall be removed.
3. Wings maintain their respective position but can be collapsed to emergency position, opening to exterior by exerting a force of 15-25 pounds at outside stile.
B. Back Pressure Sensing Circuit:
   1. Should door wings encounter an obstacle at any point in rotation that creates a back pressure on door of 15-25 pounds (adjustable) door shall go into EMERGENCY STOP MODE.
   2. Door shall stop for four (4) seconds.
   3. Then restart at reduced speed and gradually accelerate to normal speed.
C. Entrapment Protection: Operator revert to manual operation when power is off to prevent entrapment.

2.6 PROTECTION
Provide protection for aluminum against galvanic action, wherever dissimilar materials are in contact, by painting contact surfaces of dissimilar material with a heavy coat of bituminous paint (complete coverage), or by separating contact surfaces with a preformed neoprene tape having pressure sensitive adhesive coating on one side.

2.7 METAL FINISHES
A. In accordance with NAAMM AMP500 Series:
B. Anodized Aluminum:
   //1. AA-C22A41 Chemically etched medium matte with clear anodic coating, Class I Architectural, 0.7 mils thick.//
   //2. AA-C22A42 Chemically etched medium matte with integrally colored anodic coating, Class I Architectural, 0.7 mils thick.//
   //3. Fluorocarbon Finish: AAMA 605.2.//
C. Stainless Steel:
   1. Stainless Steel: No. 4 finish (bright directional polish).
   2. Stainless Steel: No. 6 finish (satin directional polish).
D. Hardware: Finish to match finish of doors.
E. Steel Supports: Provide manufacturer's standard supports.
F. Anchorages and Fastenings: Provide manufacturer's standard, concealed anchors and fasteners. Finish heads of exposed fasteners to match adjacent metal surfaces.
   1. Furnish inserts and anchorage devices in ample time to avoid delays in other work.
   2. Do not use exposed fasteners except where unavoidable for assembly of units and for application of hardware.
PART 3 – EXECUTION

3.1 EXAMINATION

A. Verification of Conditions:
   1. Examine openings for revolving entrance doors; determine they are proper size; plumb; square; and level before installation is started.
      SPEC WRITER NOTE: Use following paragraph for electric operation. Revise as necessary to satisfy project requirements.
   2. Examine setting surfaces, power wiring and conduit installation to verify they are proper for satisfactory, complete and operational installation.

3.2 PREPARATION

A. Coordination: Provide those responsible for related work with:
   1. Installation templates diagrams, details for setting equipment.
   2. Templates cast-in inserts for setting equipment.
   3. Electrical wiring diagrams details.
   4. Confirm electrical power requirements.

B. Electrical: Coordinate before any rough-in work begins to review project in relation to revolving entrance door and control equipment. Explain details and precautions necessary to assure proper installation.

3.3 INSTALLATION

A. Install revolving doors in accordance with manufacturer’s installation instructions and recommendations. Set anchors, secure to adjacent construction.

B. Cut and trim framing during installation only with approval of manufacturer and in accordance with manufacturer's recommendations.
   1. Restore finish, remove and replace members where cutting and trimming has impaired strength or appearance.
   2. Do not install members that are warped, bowed, deformed, or otherwise damaged or defaced that, impair strength or appearance. Remove members that have been damaged during installation.

C. Paint concealed contact surfaces of dissimilar materials, including metal in contact with masonry or concrete work, with heavy coating of bituminous paint, as recommended by manufacturer.

D. Set units in exact locations level, plumb, and true to line with uniform hairline joints and in alignment with surrounding storefront
framing/. Support on metal shim and secure in place by bolting to clip angles and supports anchored to supporting structure.

3.4 ADJUSTING
A. Adjust revolving doors to provide a tight fit at contact points and operate easily and rotate evenly.
B. Adjust weather-stripping to make even contact with surfaces.
C. Adjust speed control for required revolutions per minute.
D. Adjust pressure required to collapse doors to amount specified.
E. Fit and adjust hardware for ease of operation.
   1. Lubricate hardware and other moving parts.
   2. Readjust revolving entrance doors at completion of project.

3.5 CLEANING
A. Clean metal surfaces promptly after installation, exercising care to avoid damage to coatings.
B. Remove excess glazing and sealant compounds, dirt, and other substances.
C. Follow recommendations of revolving door manufacturer in selection of cleaning agents. Do not use cleaning agents containing ammonia or other compounds that might damage finished metal surfaces.

3.6 FIELD QUALITY CONTROL
A. Tests:
   1. Test operating functions in accordance with manufacturer's printed checklist.
   2. Correct defects revealed by tests. Retest corrected areas until functions are operating properly.

3.7 DEMONSTRATION, TESTING, AND ACCEPTANCE
A. Instruct Owner’s personnel in proper operation and maintenance of revolving entrance door equipment. Train personnel in procedures to follow in event of operational failures or malfunctions.
B. Acceptance: At completion of project, and as a condition of acceptance, revolving entrance door equipment and systems shall be operated for a period of fifteen (15) consecutive calendar days without breakdown.

3.8 PROTECTION
Protect finished surfaces from damage during erection, and after completion of work. Strippable plastic coatings on colored anodized finish are not acceptable.