

**SECTION 08 42 33
REVOLVING DOOR ENTRANCES**

SPEC WRITER NOTES:

1. Delete between // // when not applicable to project. Also delete any other item or Articles not applicable in section and renumber paragraphs.
2. Industry cautions against use of manually initiated power assisted revolving door when it is 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 and some building codes require 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. Contact revolving door manufacturer to review.
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.

PART 1 - GENERAL

1.1 DESCRIPTION:

- A. This section specifies: Revolving entrance doors including enclosures and related components as follows:
 1. 3-wing //manual operation// //power assist operation// //automatic operation// revolving doors.
 2. 4-wing //manual operation// //power assist operation// //automatic operation// 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 Installation: Section 26 05 11, REQUIREMENTS FOR ELECTRICAL INSTALLATIONS.
- I. Lighting: Section 26 51 00, INTERIOR LIGHTING.

1.3 QUALITY ASSURANCE:

- A. Certify manufacturer has manufactured revolving entrance doors as one of its principal products for a minimum of five (5) years.
- B. Installer: A firm with a minimum of three (3) years' experience in type of work required by this Section and which is acceptable to manufacturers of primary materials.
- C. Certify 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 (3) years.

1.4 SUBMITTALS:

- 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 1:48 (1/4 inch/foot) scale.
 - 5. Hardware, show mounting heights.
 - 6. Detail sections of typical composite members.

7. Provisions for expansion and contraction.
8. Anchors and reinforcements.
9. Glazing details.
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 305 mm (12 inch) long section by width of each tubular, or extruded shape section or 305 mm (12 inch) wide sections of sheet shapes.
2. Where normal color variations are anticipated, include two (2) or more units in set indicating extreme limits of color variations.

E. Quality Assurance Submittals:

1. Test Reports: Submit 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 manufacturers and installer's meet qualifications as specified.
 - c. Submit list (minimum of five (5) of equivalent size installations which have had satisfactory and efficient operation.

F. Manufacturer warranty.

1.5 DELIVERY, STORAGE AND HANDLING:

- A. Comply with AAMA CW-10.

1.6 WARRANTY:

- A. Construction Warranty: Comply with FAR clause 52.246-21 "Warranty of Construction".
- B. Manufacturer Warranty: Manufacturer shall warranty their revolving door entrance for a minimum of three (3) // // years from date of installation and final acceptance by the Government. Submit manufacturer warranty.

1.7 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):
- CW-10-12.....Care and Handling of Architectural Aluminum
from Shop to Site
 - 2604-10.....Specification for High Performance Organic
Coatings on Architectural Aluminum Extrusions
and Panels
 - 2605-13.....High Performance Organic Coatings on
Architectural Extrusions and Panels
- 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
 - A156.27-11.....Power and Manual Operated Revolving Pedestrian
Doors
 - Z97.1-09.....Glazing Materials Used in Buildings, Safety
Performance Specifications and Methods of Test
- D. American Society of Civil Engineers (ASCE):
- ASCE 7-10.....Wind Load Provisions
- E. ASTM International (ASTM):
- A240/A240M-14.....Chromium and Chromium-Nickel Stainless Steel
Plate, Sheet, and Strip for Pressure Vessels
and For General Applications
 - B209-14.....Aluminum and Aluminum-Alloy Sheet and Plate
 - B209M-14.....Aluminum and Aluminum-Alloy Sheet and Plate
(Metric)
 - B221-14.....Aluminum-Alloy Extruded Bars, Rods, Wire,
Shapes, and Tubes
 - B221M-13.....Aluminum-Alloy Extruded Bars, Rods, Wire,
Shapes, and Tubes (Metric)
 - D1187/D1187M-97(R2011) .Asphalt-Base Emulsions for Use as Protective
Coatings for Metal
 - E283-04(R2012)Determining Rate of Air-Leakage through
Exterior Windows, Curtain Walls, and Doors
Under Specified Pressure Differences Across
this Specimen

E330/E330M-14.....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

F. Consumer Product Safety Commission (CPSC):

16 CFR 1201.....Architectural Glazing Standards and Related
Material

G. National Association of Architectural Metal Manufacturer (NAAMM):

AMP 500 Series.....Metal Finishes Manual

PART 2 - PRODUCTS

2.1 SYSTEM DESCRIPTION:

SPEC WRITER NOTE: Select desired door
operation listed below and coordinate
requirements of options listed below.

A. Design Requirements:

1. Definitions:

- a. Manual Operation: Door operation provided by hand pressure applied against a movable revolving door surface which allows friction free door operation, through an adjustable speed control unit, with a maximum of 12 RPM.
- b. Power Assist Operation: Door operation provided by hand pressure applied against a movable revolving door surface which turns on power assist electric operator and revolves door at rate of 2 to 10 RPM for one (1) turn. Subsequent pushing on door is to reinstate one (1) 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 is to cause door to revolve at rate of 4-8 RPM (adjustable) for one (1) 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 B221M (B221) for 6063-T5.
 - a. Provide main extrusions not less than 3 mm (0.125 inch) thick unless otherwise indicated in construction documents.
 - 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 B209M (B209), alloy 5005-H34, except alloy used for color anodized aluminum is to be as required to produce specified color.
 - b. Not less than 2 mm (0.080 inch) thick unless otherwise indicated in construction documents.

- ### B. Stainless Steel: ASTM A240/A240M stainless steel sheet and formed members of //Type 302/304 alloy// minimum 1.5 mm (0.0598 inch) thick unless otherwise indicated in construction documents.

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.

- E. Bituminous Coating: ASTM D1187/D1187M; Cold-applied asphalt mastic, compounded for 0.4 mm (15 mil) dry film thickness per coat. Provide inert-type noncorrosive compound free of asbestos fibers, sulfur components, and other deleterious impurities.

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. Coordinate revolving door requirements with drawings.
3. Use stock manufactured revolving door sizes.

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.

SPEC WRITER NOTE: List door numbers requiring manual operation power assisted and automatic operation.

5. Manual Operation: // //.
6. Power Assisted Operation: Compliant with ANSI/BHMA A156.19 // //.
7. Automatic Operation: Compliant with ANSI/BHMA A156.10 // //.

B. Performance Requirements:

1. Comply with performance requirements specified, by testing manufacturer's assemblies according to test methods indicated in construction documents.
2. Air Infiltration: Maximum air leakage rate of 6.4 L/s per sq. m (1.25 cfm per sq. ft.) of door area when tested in accordance with ASTM E283 at test pressure differential of 75 Pa (1.57 lbf/sq. ft.).
3. Water Infiltration: Unless otherwise specified, failure criteria of this test method to 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/sq. ft.).

4. Design Wind Velocity: To design pressure of // .06 kPa (1.25 lb/sq. ft.) // // // kPa (// // lb/sq. ft.)//.
5. Seismic Performance: Revolving door entrances to withstand the effects of earthquake motions determined according to ASCE 7.

2.4 FABRICATION:

A. Aluminum Doors:

1. 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 infiltration performance requirements are met.
 - 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.//
 - 3) //Exterior roof fabricated from 2 mm (.090) anodized aluminum.//
 - 4) //Glass: // Clear // // Tinted // laminated glass ceiling with two plies of heat-strengthened or tempered glass separated by an interlayer.//
 - 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 (1) on each wing.
 - 1) // Shape: Round bars, 25 mm (1 inch) in diameter. //

2) // Shape: Flat bars, 13 mm thick and 38 mm wide (1/2 inch thick and 1-1/2 inch wide). //

j. Deadlocks: Provide two (2) with cylinders.

B. Dissimilar Metals: Separate dissimilar metals with bituminous coating that will prevent galvanic action.

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

SPEC WRITER NOTES:

1. Edit paragraphs below for type of door operation control that 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.

D. // 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. //

E. // 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.
6. Gear Case: Double sealed, corrosion-proof, cast iron.
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. //
- F. // 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 (1) 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 (1) turn and then stop. // Provide 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.

G. 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. Glazing to comply with testing requirements in 16 CFR 1201.

H. Ceiling Lights:

1. Provide two (2) 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: Moveable wings are optional equipment that may be required or desirable.

I. // 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 453 kg (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 to be disengaged.
3. Wings maintain their respective position but can be collapsed to emergency position, opening to exterior by exerting a force of 6.8-11.33 kg (15-25 pounds) at outside stile.

SPEC WRITER NOTE: Next paragraph specifies safety function equipment that is required for automatic/power assist units.

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 to go into EMERGENCY STOP MODE.
2. Door is to stop for four (4) seconds. Then restart at reduced speed and gradually accelerate to normal speed.

C. Entrapment Protection: Operator to revert to manual operation when power is off to prevent entrapment.

2.6 METAL FINISHES:

A. In accordance with NAAMM AMP 500 Series:

B. // Anodized Aluminum:

1. //AA-C22A41 Chemically etched .017 mm (0.7 mils) 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, .017 mm (0.7 mils) thick.
 - a. Color as indicated in Section 09 06 00, SCHEDULE FOR FINISHES.// //

C. // High-Performance Organic Finish: // Two-coat // // Three-coat // fluoropolymer finish complying with AAMA 2605 and containing not less than 70 percent PVDF resin by weight in color coat. Prepare, pretreat and apply coating to exposed metal surfaces to comply with coating and resin manufacturer's written instructions.

1. Color as indicated in Section 09 06 00, SCHEDULE FOR FINISHES. //

D. // Stainless Steel:

1. // Stainless Steel: No. 4 finish (bright directional polish). //

2. // Stainless Steel: No. 6 finish (satin directional polish). // //
- E. Hardware: Finish to match finish of doors.
- F. Steel Supports: Provide manufacturer's standard supports.
- G. 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.
- B. Electrical: Confirm electrical power requirements and rough-in(s) have been made before installation begins.

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 bituminous coating, as recommended by manufacturer.
- D. Sealants: Comply with requirements specified in Section 07 92 00, JOINT SEALANTS to provide weathertight installation.
 1. Set continuous sill members and flashings in full sealant bed.
 2. Seal perimeter of framing members with sealant.
- E. 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 in accordance with ANSI A156.27.
- D. Adjust pressure required to collapse doors wings 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. Submit test reports.
 2. Correct defects revealed by tests. Retest corrected areas until functions are operating properly. Submit corrected test reports.

3.7 DEMONSTRATION, TESTING, AND ACCEPTANCE:

- A. Instruct COR 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 to be operated for a period of fifteen (15) consecutive calendar days without breakdown.

3.8 PROTECTION:

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

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