SECTION 08 36 20 - HANGAR DOORS

PART 1 - GENERAL

1.1 SUMMARY

A. This Section includes the following types of hangar doors:

1. Insulated steel framed, steel bottom rolling doors with prefinished siding on all exposed surfaces. Total length as indicated on the drawings.

B. Related Sections include the following:

1. Division 07 Section “Metal Wall Panels” and “Insulated-core Metal Wall Panels” for cladding of hangar doors.
2. Division 08 Section “Structured-Polycarbonate-Panel Assemblies” and “Glazing” for cladding and openings in hangar doors.
3. Division 26 Section "Conductors and Cables" for electrical service and connections for powered operators, and accessories.
4. Division 26 Section "Disconnect Switches and Circuit Breakers" for disconnect switches and circuit breakers for powered operators.

1.2 PERFORMANCE REQUIREMENTS

A. Structural Performance: Provide steel bottom rolling doors capable of withstanding the effects of gravity and lateral loads and is designed so that horizontal and vertical deflections of the door structural members shall not exceed L/360 under full design wind load when the door is in the closed position. In addition, the door shall be designed so that deflection of any horizontal or vertical door member shall not exceed 2.5 inches under full design wind load, and the following loads and stresses without evidencing permanent deformation of door components:

1. Wind Load: Uniform pressure (velocity pressure) as indicated on Structural Drawings.

B. Door manufacturer is required to coordinate with the contractor in the development of the exact installation details, and provide weights and door loadings to steel manufacturer.

C. Provide all necessary accessories not specifically noted as by building manufacturer and as required for complete installation.

D. The doors shall be engineered to resist all anticipated loads without sagging, bowing, nor conflicting with its smooth and efficient operation. Doors shall be equipped with completely pre-wired drive including all necessary mounting hardware and limit switches to prevent door from traveling beyond designed opening width. Electrically power slide door systems shall be opened and closed by means of power driven bottom roller or rollers with manual release clutches for manual operation in the event of power failure. The sliding doors shall have a control box with a minimum of three buttons marked as follows:
1. OPEN- “open button”, 2. STOP- “stop button”, and 3. CLOSE- “close button”. Door opening and closing rate shall be approximately 40 feet per minute. Electronically operated slide door system shall permit the door to be stopped and positively locked in position at any degree of door opening. Slide door shall be equipped with limit switches that automatically stop door operation at the full-open and full-closed positions. The door shall be fully automatic and fully controlled through the control box that is standard mounted to the lead edge of the drive panel, and sensing device to automatically reverse door if an obstruction is encountered. The door shall be capable of being operated from one side of the door. Hinge pins shall be minimum ¾ inch diameter aluminum. Button rollers shall have mask bearings, extra heavy-duty roller bearings on 3-inch 15-inch wheels. Provide automatic jamb latches that activate when door is fully closed. The door shall be capable of being manually operated in the event of a power outage.

1.3 SUBMITTALS

A. Product Data: For each type and size of steel bottom rolling door and accessory. Include details of construction relative to materials, dimensions of individual components, profiles, and finishes. Provide roughing-in diagrams, operating instructions, and maintenance information. Include the following:

1. Setting drawings, templates, and installation instructions for built-in or embedded anchor devices.
2. Summary of forces and loads on walls and jambs.
3. Motors: Show nameplate data and ratings; characteristics; mounting arrangements; size and location of winding termination lugs, conduit entry, and grounding lug; and coatings.

B. Delegated Design Submittal: Submit design calculations covering door structure, all operating devices, mechanical systems and "U" value. A Registered Professional Engineer shall prepare and sign structural calculations.

C. Shop Drawings: For special components and installations not dimensioned or detailed in manufacturer's data sheets.

1. Detail all components of the door and track assembly. Indicate interface with other building components. Show all details for construction, installation and operation; size, shapes and thickness of materials, joints and connections; reinforcing; hardware; mechanical devices; electrical devices; and all design and detail data for work of other trades affected by hangar doors.
2. Wiring Diagrams: Detail wiring for power, signal, and control systems. Differentiate between manufacturer-installed and field-installed wiring and between components provided by door manufacturer and those provided by others.

D. Samples for Verification: Of each type of exposed finish required, prepared on Samples of size indicated below and of same thickness and material indicated for Work. Where finishes involve normal color and texture variations, include Sample sets showing the full range of variations expected.
1. Panel: 6 inches square.

E. Installer Certificates: Signed by manufacturer certifying that installers comply with specified requirements.

1.4 QUALITY ASSURANCE

A. Installer Qualifications: Engage an experienced installer who is an authorized representative of the steel bottom rolling door manufacturer for both installation and maintenance of units required for this Project. Mechanics shall be skilled and experienced in the erections of hangar doors of type and size required for this project.

B. Manufacturer Qualifications: Engage a firm experienced in steel bottom rolling doors similar to those indicated for this Project and with a record of successful in-service performance.

1. Installation of the door(s) shall be supervised by a manufacturer's representative and shall be in accordance with approved shop drawings.

C. Source Limitations: Obtain steel bottom rolling doors through one source from a single manufacturer.

1. Obtain operators and controls from the steel bottom rolling door manufacturer.

D. Listing and Labeling: Provide electrically operated fixtures specified in this Section that are listed and labeled.

1. The Terms "Listed" and "Labeled": As defined in NFPA 70, Article 100.
2. Warranty: The steel bottom rolling door system, including all associated mechanical and electrical components, shall be guaranteed by the manufacturer for three years from the date of Project Acceptance of the building against all defects in materials, workmanship and problems which arise through the normal anticipated use of the door.

1.5 ASSIGNMENT OF SPECIALISTS

A. Certain sections of the Specifications require that specialists who are recognized experts in the operation to be performed shall perform specific construction activities. The specialists must be engaged for those activities, and assignments are requirements over which the Contractor has no choice or option. Nevertheless, the ultimate responsibility for fulfilling Contract requirements remains with the Contractor.

B. Material provided under this Section shall be engineered and assembled into a product manufactured by one of the manufacturers specified in this section.

PART 2 - PRODUCTS

2.1 MANUFACTURERS
A. Manufacturers: Subject to compliance with requirements, provide products from one of the following:

1. Aero Systems, Corp.
2. D.P. Industries Inc.
3. International Door, Inc.
4. JB Mathews Co./Aero-Door
5. REID Steel
7. Wilson Doors

B. Source Limitations: Manufacturer shall obtain and is responsible of all components specified within this section for a complete hanger door installation.

2.2 FABRICATION

A. Doors: Door leaves shall be of welded or bolted construction. Joints shall develop 100 percent of the strength of the framing members. Vertical members shall be continuous throughout the height of the door. When required, prepare splices to facilitate field assembly in accordance with standard practice. Frames and framing members shall be true to dimensions and square in all directions; no leaf shall be bowed, warped, or out of line in the vertical or horizontal plane of the door opening by more than 1/8 inch in 20 feet. Provide diagonal bracing so that the completed leaf assembly will be braced to withstand shipping, assembly, and operational loads. Exposed welds and welds which would interfere with the installation of various parts such as cover sheets shall be sufficiently ground smooth to remove all encumbrances.

B. Locking Devices: Do not provide locking devices on motor-operated hangar doors.

C. Tractor Pulls: Provide tractor pulls so that leaves can be towed by a tractor or similar equipment in the event of power failure. The tractor shall be designed for drive force to tow door or 5000 pounds whichever is greater. Minimum thickness steel plate shall be 3/8 inch.

D. Track Cleaners: Provide a device to clear debris from the rail head and wheel flange grooves as the leaf is moved.

E. Bottom rollers shall be solid steel with tapered roller bearings, and a greaseable axle assembly. Bottom rollers shall be removable for purposes of repair, without disturbing any other door components except the drive rollers. Bottom rollers shall be of steel plate, having a minimum tread diameter of 15 inches or as required for the actual roller loading. Construct roller assemblies to permit removal of the rollers without removing the door leaf from its position on the rail.

1. Treads: Machine roller treads concentric with bearing seats. The clear distance between flanges shall not exceed the width of the rail by more than 1/8 inch at the tread nor more than ¼ inch at the edge of the flange. Machine internal bearing seats accurately for a press it. Heat treat rollers 18 inches or greater in diameter to obtain a rim hardness of 320 Brinnel.
2. Roller Bearings: Provide tapered roller or spherical bearings, either internal or cartridge type, arranged so that both horizontal and vertical loads shall be transferred to the rail only through the bearing. Bearings shall be tightly sealed and equipped with high-pressure grease fittings.

F. Fixed position top roller brackets shall allow for vertical travel: 4-inch minimum up and 4-inch minimum down from the lowest elevation of the as-erected supporting element. Opening requirements for locating vertical travel datum for fixed position roller brackets shall be field measured after roof deck, roofing, and fascia cladding are installed.

G. Fixed top roller bracket shall keep the door panels attached to the upper guide beams in the event of derailment from bottom tracks.

H. Brush seals shall be provided to seal the bottom. Two-ply fiber reinforced neoprene rubber shall be provided at the top of the slide door panels.

I. Weather Stripping: Provide adjustable and readily replaceable material. Provide on vertical edges, sills, and heads to afford a weather-tight installation.

1. Neoprene/EPDM: Use flap-type, two-ply, cloth-inserted neoprene (EPDM) or extruded, double flap, single or dual opposed solid neoprene material on vertical edges and sills. The two-ply material shall have a minimum thickness of 1/8 inch and shall be retained continuously for its full length and secured with rust-resistant fasteners 12 inches o.c. Extruded weather stripping with heavy center section shall be attached 12 inches o.c., but continuous bar may be omitted. Clearance between metal parts on vertical edges of leaves and between leaves and jambs which are to be weather-striped shall be as indicated.

J. Glazing: See Section 088000 “Glazing” for non blast insulated glazing type to be installed with the doors.

2.3 TRACKS, SUPPORTS, AND ACCESSORIES

A. Tracks: Provide steel track system, sized for door size and weight. Provide complete track assembly including brackets, bracing, and reinforcement for rigid support of guides for required door type and size.

2.4 HARDWARE

A. General: Provide heavy-duty, corrosion-resistant hardware, with hot-dip galvanized, stainless steel, or other corrosion-resistant fasteners, to suit door type.

B. Rollers: Provide heavy-duty rollers, with steel ball bearings in case-hardened steel races, mounted with varying projections to suit track.

C. Fabricate locking device assembly with lock, spring-loaded dead bolt, operating handle, cam plate, and adjustable locking bar to engage through slots in tracks.

D. Provide safety interlock switch to disengage power supply when door is locked.
2.5 ELECTRIC DOOR OPERATORS

A. General: Provide electric door operator assembly of size and capacity recommended and provided by door manufacturer for door specified, complete with electric motor and factory-rewired disconnect switch, motor controls, starter, gear-reduction unit, solenoid-operated brake, clutch, remote-control stations, control devices, integral gearing for locking door, and accessories required for proper operation. Coordinate location of assemblies with the Architect. Each door shall have its own motor. Each door shall have safe opening and closure systems, which shall be controlled by a handheld cable in order that the operator may walk clear of the door.

1. Comply with NFPA 70.

B. Disconnect Device: Provide hand-operated disconnect or mechanism for automatically engaging operator and releasing brake for emergency manual operation while disconnecting motor, without affecting timing of limit switch. Mount disconnects and operator so they are accessible from floor level. Include interlock device to automatically prevent motor from operating when emergency operator is engaged.

1. Provide control equipment complying with NEMA ICS 1, NEMA ICS 2, and NEMA ICS 6, with NFPA 70 Class 2 control circuit, maximum 24-V, ac or dc.
2. 480 Volt, 3 phase motors.

C. Electric Motors: Provide high-starting torque, reversible, continuous-duty, Class A insulated, electric motors, complying with NEMA MG 1, with overload protection, sized to start, accelerate, and operate door in either direction, from any position. Motor push button control station and all electrical components shall be installed in accordance with the National Electrical Code.

D. Obstruction Detection Device: Provide each motorized door with indicated external automatic safety sensor able to protect full width of door opening. Activation of sensor immediately stops door travel.

1. Photoelectric Sensor: Manufacturer's standard system designed to detect an obstruction in door opening without contact between door and obstruction.
   a. Self-Monitoring Type: Provide self-monitoring, 4-wire configured device.

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

2.6 METAL SIDING

A. On exterior side of hangar doors provide prefinished insulated metal panels with concealed fasteners. Basis-of-design: Centria Versawall panel, as indicated in Division 07 Section “Insulated Metal Wall Panels”.

B. On interior side of hangar doors provide perforated panel liner. Basis-of-design: Centria Quiet Wall System as indicated in Division 07 Section “Metal Wall Panels”, color: #179 Regal White.
C. Install in compliance with requirements of Division 07 Section, “Metal Wall Panels” and “Insulated Metal Wall Panels”.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Examine wall and overhead areas, including opening framing and blocking, with Installer present, for compliance with requirements for installation tolerances, clearances, and other conditions affecting performance of Work of this Section.

B. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 INSTALLATION

A. General: Install door, track, and operating equipment complete with necessary hardware, jamb and head mold strips, anchors, inserts, hangers, and equipment supports according to Shop Drawings, manufacturer's written instructions, and as specified.

B. Fasten vertical track assembly to framing at manufacturer’s recommended spacing. Provide sway bracing, diagonal bracing, and reinforcement as required for rigid installation of door-operating equipment.

C. The manufacturer of the hangar doors shall provide a qualified field engineer to supervise the installation and perform the inspection services specified hereinafter. The field engineer shall furnish duplicate copies of his report to the Contractor Quality Control Representative within 24 hours following each inspection. The Contractor shall furnish a copy of the field inspection engineer's report to the CQC Representative within 48 hours and shall perform the following:

1. Inspect doors during job site unloading, sub-assembly and prior to erection.
2. Inspect installation of rails and other embedded items before pouring of fill concrete to ensure that the elevation and alignment indicated have been complied with and that rails are level to the specified tolerance.
3. Recheck rails and other embedded items to verify the accuracy of dimensions.
4. Provide recommendations for any necessary corrective action.
5. Inspect final erection and assembly of door leafs for alignment and fit, and clearance between doors and building, and between individual door leafs.
6. Inspect setting of all seals in the closed position to assure an airtight installation.
7. Inspect the positioning and fit of pivot assemblies.
8. Inspect the mating of lock pins with receptacles.
9. Inspect all fasteners to assure that all screws and bolts are properly secured to prevent loosening.
10. Inspect all field welds in accordance with AWS D1.1/D1.1M.
11. Check all drive assemblies and lock pins for smooth operation and that all lubrication has been accomplished.
12. Verify that all gear boxes and bearings have been lubricated.
3.3 ADJUSTING

A. Lubricate bearings and sliding parts; adjust doors to operate easily, free from warp, twist, or distortion and fitting weathertight for entire perimeter.

B. Adjust belt-driven motors as follows:
   1. Use adjustable motor-mounting bases for belt-driven motors.
   2. Align pulleys and install belts.
   3. Tension belt according to manufacturer's written instructions.

3.4 DEMONSTRATION

A. Startup Services: Engage a factory-authorized service representative to perform startup services and to train Owner's maintenance personnel as specified below:
   1. Test and adjust controls and safeties. Replace damaged and malfunctioning controls and equipment.
   2. Train Owner's maintenance personnel on procedures and schedules related to operation, troubleshooting, servicing, and preventive maintenance.
   3. Send report of startup to Contracting Officer.

B. Schedule training with Owner with at least 7 days' advance notice.

END OF SECTION 08 36 20