

SECTION 08 33 00- VERTICAL BI-FOLD DOORS

PART 1 - GENERAL

1.1 SECTION INCLUDES

- A. Lift-strap bifold doors.

1.2 RELATED SECTIONS

- A. Structural Metal Framing – Drawing S001
- B. Section 13 34 19 – Metal Building Systems; metal wall panels, insulation and scrim.
- C. Division 26; for required electrical work

1.3 REFERENCES

- A. ASTM E 84 - Standard Test Method for Surface Burning Characteristics of Building Materials

1.4 SUBMITTALS

- A. Submit under provisions of Section 01 30 00 - Administrative Requirements.
- B. Product Data: Submit manufacturer's specification sheets for each door, product data and installation instructions. Include details of construction relative to materials, dimensions of individual components, profiles, and finishes.
- C. Shop Drawings: Submit shop drawings for approval prior to fabrication. Include detailed plans, elevations, details of framing members, required clearance, anchors and accessories. Include relationship with adjacent materials. The model and type of door, operators and controls shall be clearly shown. Door weight, method of suspension, operation, and all fastenings shall be indicated. Provide roughing-in diagrams, Include the following:
 - 1. Summary of forces and loads on walls and jambs.
 - 2. Setting drawings, templates, and installation instructions for built-in or embedded anchor devices.
 - 3. Safety decal placement guide manual / warning labels.
 - 4. Electrical system manual for the door system.
 - a. Electrical schematics.
 - b. Electrical wiring diagram.
 - 5. Diagrams of potentially hazardous locations related to the operation of the door.
 - 6. Shop drawings shall be certified by a professional engineer registered in the jurisdiction where the project is located.

1.5 QUALITY ASSURANCE

- A. Source Limitations: Obtain doors through one source from a single manufacturer.
- B. Manufacturer Qualifications: Engage a firm experienced in manufacturing doors similar to those indicated for this Project and with a record of successful in-service performance.
- C. Installer Qualifications: Engage an experienced installer who is an authorized representative of the door manufacturer for both installation and maintenance of units required for this Project.

1.6 DELIVERY, STORAGE, AND HANDLING

- A. Deliver materials and products in manufacturer's labeled protective packages. Store and handle in strict compliance with manufacturer's written instructions and recommendations. Protect from damage from weather, excessive temperatures and constructions operations.
- B. Inspect doors upon delivery for damage. Minor damages may be repaired provided refinished items are equal in all respects to new work and acceptable to Architect. Otherwise, remove and replace damaged items as directed.
- C. Place door frame units on minimum 4 inches (102 mm) high wood blocking. Store doors components and packages at building site under cover. Avoid use of non-vented plastic or canvas shelters which could create humidity chamber. If cardboard wrapper on door becomes wet, remove carton immediately.
- D. Store the sheet, panels, components and other manufactured items so that they will not be damaged or deformed. Store metal sheets or panels so that water accumulations will drain freely. Do not store sheets or panels in contact with other materials which might cause staining.
- E. Handle materials to avoid damage.

1.7 PROJECT CONDITIONS

- A. Maintain environmental conditions (temperature, humidity, and ventilation) within limits recommended by manufacturer for optimum results. Do not install products under environmental conditions outside manufacturer's recommended limits.

1.8 SEQUENCING

- A. Ensure that products of this section are supplied to affected trades in time to prevent interruption of construction progress.

1.9 WARRANTY

- A. Warranty: Furnish manufacturer's standard limited 2 year written warranty against defects in materials and workmanship, and against problems which arise through normal anticipated usage of the door during the warranty period. The warranty shall be signed by the manufacturer.
 - 1. Additional Warranty: In addition to the warranty specified above, the door manufacturer shall warrant the original lift straps for a period of five years, against defects in material.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

- A. Acceptable Manufacturer: Schweiss Doors, which is located at: 72121 470th St.; Hector, MN 55342; Toll Free Tel: 800-746-8273; Tel: 507-426-8273; Fax: 507-426-7408; Email: [request info \(schweiss@bifold.com\)](mailto:request_info@schweiss@bifold.com); Web: www.bifold.com|www.hydraulicdoors.com
- B. Products by other manufacturers may be submitted if meeting the intent of this specification.

2.2 LIFT-STRAP BIFOLD DOORS

- A. General, Size:
 - 1. Clear Opening Width: 60'-0".
 - 2. Clear Opening Height (Above Finished Floor Elevation): 20'-0".
 - 3. Overall Height of Door (Clear Height plus Wedge): 24'-0".
- B. General, Door Design Criteria:
 - 1. The doors shall be designed to the same loading requirements for live, dead and wind loads as the building.
 - 2. The doors shall be engineered to resist all anticipated loads without sagging, bowing or conflicting with its smooth and efficient operation.
 - 3. The design shall be furnished, approved and sealed by a professional engineer registered in the jurisdiction where the Project is located.
- C. General, Building Design Criteria:
 - 1. The building header shall be designed to accommodate horizontal and vertical building deflections to support the bifold door in all positions (with the proper lateral bracing).
 - 2. The building's door columns shall be framed of the proper design and size to reinforce the opening (with lateral bracing) and to carry all loads and vibrations imposed thereon.
 - 3. The bifold door shall have solid footing with sill directly underneath the door frame and extending outward from the door to provide a base for the door's weather seal. This also prevents flow of water into, or under, the door installation.
 - 4. The finished floor of the building shall be designed to prevent flow of water under the door installation. Sills shall have a slight slope outward of the bifold door to prevent water flow under the door installation.
- D. General, Electrical Requirements:
 - 1. The Electrical Contractor shall furnish and install a prewired electrical door operating mechanism to control each bifold door.
 - 2. The Electrical Contractor is responsible and required to completely install the prewired electrical door operating mechanism, push button controls, devices and electrical conduit and wiring to the door operating controls.
 - 3. The electrical door mechanism and control shall be field wired by the Electrical Contractor. Not the door manufacturer.
 - 4. Control panel with up/down/off switch pre-wired to motor, and over-ride controls with the required number of adequately sized insulated electrical conductors.

E. General, Electric Power Operator:

1. Electrical controls and devices shall conform to the requirements of the current National Electrical Code 513, NEMA, and be UL approved.
2. Provide UL Listed Electric Operator, size and type as recommended by the manufacturer.
3. The operator is furnished complete and consists of a motor and factory-wired control panels consisting of main fused disconnect switch, magnetic reversing starters, limit switches and push button controls, control circuit transformers, relays, and timing devices.
4. Manufacturer's standard warning devices.

F. Bifold Door Framework Fabrication / Construction Requirements:

1. Doors shall be of the electrically operated bifold canopy type and shall be integral with the building design.
2. When in the open position the doors shall have a slight slope to direct drainage away from the building.
3. Door shall be hinged horizontally at the top and center, and be arranged to open by moving frame out and up.
4. Door frames shall have pre-located top hinges to align with the building truss members.
5. Door shall be self-contained with only the top hinges, bottom door rollers and column followers/ wind rails.
6. The door framework shall consist of jig welded steel tube sections engineered by the door manufacturer to resist all anticipated loads without sagging, bowing or conflicting with its smooth operation.
7. Structural steel door framing members shall be ASTM A500 Grade B square structural welded steel tubing.
8. All labor, materials, accessories, equipment and services necessary to furnish a complete installation of a bifold door as indicated by the manufacturer including frame, sections, brackets, guides, tracks, hardware, operators and installation instructions.
9. Shop connections shall be welded.
10. Field connections shall be bolted or welded as applicable.

G. Top Driveshaft / Lift Drums Mounted on Subframes:

1. The solid steel driveshaft with lift drums mounted on its own subframe, runs continuously along entire door width, providing an even lift of the door at all times.
2. The drive shaft shall be attached to the top subframe with (greaseable) bearing mounts wherever there is a strap drum installed, to minimize stress on the shaft.
3. Solid driveshaft and lift drums shall be in sufficient amount to give 5:1 safety factor.
4. Lift Straps:
 - a. The door power unit shall be operated by a system of lifting straps (not cables), lifting drums, and drive shafts.
 - b. Lift straps are routed from the take-up drums, through guide rollers attached to the header of the building, and attached to an adjustable retainer on the lower door truss thereby transmitting forces directly to the header of the building and relieving door of unnecessary stresses.
 - c. Lift straps and lift drums shall be manufacturer's standard adequately sized to give a 5:1 safety factor.

H. Bottom Driveshaft / Lift Drums Mounted on Top Frame:

1. The solid steel driveshaft with lift drums mounted on bottom cord of door runs continuously along entire door width providing an even lift of the door at all times.

2. The drive shaft shall be attached to the door frame with (grease-able) bearing mounts wherever there is a strap drum installed, to minimize stress on the shaft.
 3. Solid driveshaft and lift drums shall be in sufficient amount to give 5:1 safety factor.
 4. Lift Straps:
 - a. The door power unit shall be operated by a system of lifting straps (not cables), lifting drums and drive shafts.
 - b. Lift straps attached to a retainer on the upper door frame passing through a strap guide attached at the top chord of the door frame, thereby transmitting forces directly to header of building and relieving door of unnecessary stresses.
 - c. The Lift straps shall have adjustable slack take-up device to keep proper tension on each lift strap.
 - d. The lift drums shall be properly shielded to avoid any potential hazards to people.
 - e. Lift straps and lift drums shall be manufacturer's standard adequately sized in sufficient amount to give 5:1 safety factor.
- I. Heavy Duty Hinges:
1. Heavy Duty Steel Hinges furnished complete. Each Hinge set shall be 10.50 inches (267 mm) wide, pins shall be 11/16 inch (17.5 mm) diameter minimum.
- J. Door Truss:
1. As sized by the Hangar Door manufacturer.
- K. Heavy Duty Side Rollers: The bifold doors shall include 3 inches (76 mm) Heavy Duty minimum guide rollers with sealed bearings on bottom of door at jamb location.
- L. Column Followers / Wind Rails:
1. System provided by the door manufacture to hold the base of the door securely against the building when the door is in the closed position. Solid square columns secure only in the closed position = Wind Rails.
- M. Wind Pins:
1. Automatic Wind Pins: Center wind pins 1 inch (25 mm) diameter minimum - provide a sturdy installation to automatically engage/ disengage. Automatic side latches required with automatic wind pins.
- N. Latching System:
1. Automatic Latches: Provide automatic latch.
- O. Paint: The door frame members and parts shall be factory primer finished with gray primer.
- P. Top and Bottom Rubber Seals:
1. Provide manufacturer's standard seal continuous at top, bottom of each door.
 2. The door shall be equipped with neoprene weather stripping at heads and jambs to prevent flow of moisture into the door installation. Sills shall have a special fabric reinforced high grade rubber astragal. The entire door perimeter shall be weather tight.
- Q. Weather Seal - Kit: The sides, and center of each bifold can be sealed off with a special weather stripping. The center of the door shall have a self-sticking foam cushion seal. The entire door perimeter shall be weather tight.

- R. Electric Power Operator: Electrical controls and devices shall be designed to meet National Electrical Code Section 513. Controls are pre-wired and factory tested.
- S. Electric Motor / Voltage / Phase:
1. Electric Motor / Voltage / Phase - Standard.
 - a. Service: 208, 240, 480 or 575 VAC, 60 Hz three phase. 4 wire service.
 - b. Three Phase motors shall be totally enclosed.
 - c. The size of the motor shall be as recommended by the manufacturer.
 - d. Door operator shall be pre-wired at factory complete with 24 V.A.C. control system.
- T. Gear Motor:
1. The gear motor is equipped with an electric brake, which will stop and hold door in any position of door travel.
 2. 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.
 3. A magnetic starter, with 24V control unit for reliability is standard.
 4. Design operator so motor may be removed without disturbing limit switch adjustment and without affecting emergency auxiliary operator.
- U. Control Stations:
1. Two Button Constant Hold Control Station - for opening and closing the bifold door.
 - a. 2-button constant contact dead man switch, prevents operator from leaving control panel while door is in motion, either up or down.
 - b. When the operator takes his hand off the up /down button, the door immediately stops regardless of its opening / closing position.
 - c. The motor automatically stops when the door reaches either the full open or closed position.
 2. Radio Control System:
 - a. 3-channel coaxial receiver to open, close, and stop door per operator.
 - b. Multifunction remote control transmitter. (Quantity of 2 per door). Important: When the operator takes his hand off the remote control transmitter, the door immediately stops regardless of its opening / closing position.
- V. Limit Switches:
1. Heavy duty limit switch box shall be weatherproof.
 2. Heavy duty limit switch box shall provide adjustable switches interlocked with motor controls and set to automatically stop door at fully opened and fully closed positions.
- W. Electrical Disconnect:
1. Provide electrical disconnect to completely disable the door, for service, maintenance, emergency backup operations.
 2. Mount disconnect so it is accessible from floor level.
- X. Additional Equipment:
1. Top Limit Override Safety Switches:
 - a. Upper override switch that disconnects power to door if upper limit fails or if limits are overridden.

- b. This safety feature is designed to prevent the door from traveling beyond its recommended clear opening height. If the door passes its full clear opening height, it will activate the override and stop the door automatically.
2. Electric Photo Eye Sensors
 - a. Electric Photo Eye Sensors mounted near floor level prevent or stop and reverse the door when an obstruction breaks the detection beam. If the beam is broken, door will reverse to a fully open position.--Stop and Reverse When using this system use a Top Limit Override switch to shut the motored pump off when door reaches a full open position.
3. Warning Lights And Horn:
 - a. Warning Lights and Horn, which alerts persons in the area that door is opening or closing.
4. Emergency Operation - Auxiliary Backup System:
 - a. Type: Manual hand-crank.
 - b. The door shall be capable of being auxiliary operated in the event of a power outage.
 - c. Include disconnect device to prevent motor from operating when manually operating door.
 - d. Manual operation of door shall be designed to avoid damage to doors, safety edges, and electrical system.
 - e. Provide safety operating instructions: Observe all safety precautions according to the manufacturer's precautions.
5. Radio Control System:
 - a. 3-channel coaxial receiver to open, close, and stop door per operator.
 - b. Multifunction remote control transmitter. (Quantity of 2 per door). Important: When the operator takes his hand off the remote control transmitter, the door immediately stops regardless of its opening / closing position.

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Do not begin installation until substrates have been properly prepared.
- B. If substrate preparation is the responsibility of another installer, notify Architect of unsatisfactory preparation before proceeding.
- C. 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.
- D. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 LIFT STRAP BIFOLD DOOR INSTALLATION

- A. General

1. Door manufacturer is required to coordinate with the metal building manufacturer in the development of the exact installation details, and provide weights and door loadings to building manufacturer.
 2. Install door, track, and operating equipment complete with necessary hardware, jamb and head mold strips, anchors, inserts, hangers, and equipment supports according to Shop Drawing, manufacturer's written instructions, and as specified.
 3. Fasten vertical track assembly to framing at not less than 24 inches o.c. Hang horizontal track, hinges from structural overhead framing with angle or channel hangers welded and/or bolt fastened in place. Provide sway bracing, diagonal bracing, and reinforcement as required for rigid installation of track, hinges and door-operating equipment.
- B. Top and Bottom Limits Settings: Each bifold door has a recommended clear opening setting, specified by the manufacture. Do not over travel the door beyond the recommended setting.
- C. Exterior Wall Panels: Metal building erector to install the same exterior wall panels that are on the building, use the same type on the bifold doors. Install the proper trims that are recommended by the manufacturer.
- D. Insulation: The Metal Building erector shall supply and install batt fiberglass insulation with scrim as indicated on the Drawings
- E. Application of Proper Safety Markings:
1. Apply Proper Markings for any potentially hazardous locations related to the operation of the door.
 2. Follow the pictorial diagram included in the door installation manual.
- F. Installing Warning Labels:
1. Furnish warning labels for any potentially hazardous locations related to the operation of the door.
 2. Fasten warning labels to the bifold door frame and by the operator's station in accordance with manufacturer's instructions, no exceptions allowed.
- G. Installer Certificates: Signed by manufacturer certifying that installers comply w/ specified requirements.
- 3.2 ELECTRICAL WORK
- A. Install the prewired electrical door operating mechanism, push button controls, devices and electrical conduit and wiring to the door operating controls.
- B. Install temporary electrical wiring furnished by door manufacturer to be used for the initial set-up. Coordinate with licensed electrician to ensure that temporary wiring is removed and final hookup is performed by the licensed electrician in order to be eligible for manufacturer's warranty.
- 3.3 ADJUST AND CLEAN
- A. Lubricate, test adjust doors to operate easily, free from warp, twist, or distortion and fitting weather tight for entire perimeter.

- B. Prime Coat Touch Up:
 - 1. Immediately after erection, sand smooth any rusted or damaged areas of prime coat.
 - 2. Touch-up damaged coating and finishes and repair minor damage.
 - 3. Clean exposed surfaces using non-abrasive materials and methods recommended by manufacturer of material or product being cleaned, and apply touch up of compatible air drying primer.

 - C. Factory Finish Touch Up: Touch up all scratches, abrasions or other slight painting defects with the same type and color of paint as originally applied.

 - D. Final Adjustments:
 - 1. Lubricate bearings and moving parts, adjust open and closed limits and doors to operate easily, free from warp, twist, or distortion and fitting weathertight for the entire perimeter.
 - 2. Check and readjust operating finish hardware items, leaving doors undamaged and in complete and proper operating condition.
- 3.4 DEMONSTRATION
- A. Startup Services: Engage a qualified-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 startup and shut down, operating, troubleshooting, servicing, and preventative maintenance.
 - 3. Review data in the installation and maintenance manuals.
 - 4. Schedule training with Owner with at least seven days advance notice.

END OF SECTION