

## SECTION 083513 – FOUR-FOLD BAY DOORS

### PART 1 - GENERAL

#### 1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 1 Specification Sections, apply to this Section.

#### 1.2 SUMMARY

- A. This Section includes Four-Fold metal doors, tested and approved for High Velocity Hurricane Zones, up to 120psf and approved by Florida Building Code, #FL32280 Level-E.
- B. Operation of Four-Fold metal doors includes overhead mounted electro-mechanical operators.

#### 1.3 SUBMITTALS

- A. General: Submit each item in this Article according to the Conditions of the Contract and Division 1 Specification Sections.
- B. Product Data for each type of product specified consisting of manufacturer's technical Product Data and installation instructions for each type of door required, including data substantiating that products comply with requirements.
- C. Submittal Drawings showing fabrication and installation of Four-Fold metal doors including plans, elevations, sections, details of components, hardware, operating mechanism, and attachments to the other units of Work. Include wiring diagrams for coordination with electrical trade.

#### 1.4 QUALITY ASSURANCE

- A. Doors shall be designed to withstand external or internal horizontal wind loads of 120 pounds minimum per square foot. The maximum allowable deflection shall not exceed 1/120 of the span. Fiber stresses in main members shall be limited to 27,000 pounds per square inch. Steel frames shall be designed in accordance with the AISC "Steel Construction Manual".

#### 1.5 DELIVERY, STORAGE AND HANDLING

- A. Store delivered materials and equipment in dry locations with adequate ventilation, free from dust and water, and so as to permit access for inspection and handling.
- B. Handle materials carefully to prevent damage.

#### 1.6 WARRANTY

- A. The door manufacturer shall provide a written standard five-year (5) limited warranty for material and workmanship from date of Owner acceptance.

- B. The door manufacturer shall provide a written finish warranty for a minimum period of five (5) years from date of Owner acceptance.
- C. State that all door and control work that becomes defective during the warranty period shall be repaired promptly to the requirement of these specifications and at no cost to the owner.

## PART 2 – PRODUCTS

### 2.1 MANUFACTURERS – BASIS-OF-DESIGN

- A. Manufacturers: Four-Fold industrial metal doors manufactured by Door Engineering and Manufacturing, 101 Power Dr, Mankato, MN 56001, (800)-959-1352. Equal products by other manufacturers may be approved in advance, including State of Florida (FBC) approval.

### 2.2 MATERIALS

- A. Steel Tube: ASTM A513 and ASTM A500/A500M
- B. Steel Sheets: Steel sheets of commercial quality, complying with ASTM A1008 cold-rolled steel sheet.
- C. Hardware: Manufacturer's standard components.
- D. Fasteners: Zinc-coated steel.

### 2.3 FOUR-FOLD DOORS

- A. Basis-of-Design Product: The drawings and specifications are based on the FF701 Series, Glazed or Solid Sheeted Four-Fold Doors as manufactured by Door Engineering and Manufacturing, LLC; Mankato, MN.
- B. Construction: Door framing shall be minimum 11-gauge structural steel tube with 14-gauge sheet steel on the exterior and interior faces. Sheeting shall be formed on the vertical edges with no visible welds or caulked sheet edges on the interior or exterior panel faces. All frames and framing members shall be true to dimension and square in all directions, and no door 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. Exposed welds and welds which interfere with the installation of various parts shall be ground smooth and flush.
- C. Surface Mounted Tube Frame: Supply pre-hung tube frame system constructed of TS6x6x0.25", designed to anchor to masonry wall construction or weld to steel structure. All hinges, track supports, and operator supports shall be factory attached.
- D. Factory finish: Operator and operating hardware shall be factory powder coated manufacturer's standard primer. Panels, frame and all other hardware shall be finished as follows:

- a. All exposed steel shall be finished with manufacturer's standard zinc rich primer and polyurethane top coat, PPG Spectracron or equal. Color shall be RAL#3001.
- E. Operating Hardware: Hardware shall include guide tracks and brackets, trolleys, center guides, not less than three pairs of jamb and fold hinges per opening, and all bolts, nuts, fasteners, etc. necessary for complete installation and operation. Jamb hinges shall be dual shear and have two thrust bearings and two needle bearings. Jamb hinges shall be gusseted. Fold hinges shall be dual shear with two thrust bearings. Fold hinges shall be stainless steel. All bearings shall be completely sealed within the hinge barrel and include grease zerks. All hinge pins shall be minimum 3/4" diameter hardened steel. All trolleys shall be equipped two (2) Nylatron rollers.
- F. Hinge Guards: Provide plastic guards at jamb hinges to prevent access through hinge space.
- A Additional requirements for door operator:
    - a. Monitored edge interface module.
    - b. Timer close module.
    - c. Photo eye NEMA 4X rated retro-reflective.
    - d. Auxiliary input/output module.
    - e. Three-button open/close/stop push button control box.
- G. Weatherstripping: Material shall be adjustable and readily replaceable and provide a substantially weather-tight installation. Weatherstripping at center shall be 1/16" EPDM and include no exposed fasteners on the exterior side of the panel. Weatherstripping at sill shall include two 1/16" EPDM sweeps with an aluminum retainer. The retainer shall be attached to the door with adhesive.
- H. Perimeter Weatherstripping: Provide full perimeter jamb and head weatherstripping.
- a. Vision Panels: Level E: 11/16" Impact rated glazing
- I. Hurricane Locking System: Locking bolts shall be completely concealed within the door panel. Locking bolts shall extend into the floor and into the header tube. A limit switch shall disable the operator when the locks are engaged.
- J. Cremona locking bolts: provide two sets of cremona locking bolt assemblies operable from floor level by handle. Provide top and bottom keepers. Cremona bolt assembly should be located on the head panel close to the fold hinges.

## 2.4 OPERATOR

- A. Each Four-Fold door shall be operated by an overhead mounted electro-mechanical drive unit designed for high cycle operation. Operator consists of an electric motor, gear reducer, and rotating drive arm. The door shall be operated with connecting rods attached to the rotating drive arm on the operator and to control arms attached to the jamb door section and to the door lintel. The connecting rods shall be positive drive, keeping the door under firm control at all times. The connecting rods shall be fitted with spherical bearings and control arms shall be equipped with oil impregnated bronze bearings on polished shafts.

- B. Operator shall be instantly reversible, open and close rapidly and start and stop gradually. Operator shall be adjustable to allow door to fully clear the opening. Operator shall automatically lock the door in the closed position. Operator shall be equipped with disengaging mechanism to convert to manual operation.
- C. Electric motor shall be of sufficient size to operate doors under normal operating conditions at no more than 75 percent of rated capacity. **See electrical drawings for power requirements.** Confirm power supplied prior to fabrication.
- D. Electric Controls: Controls shall be furnished by the door manufacturer and shall be complete for each door and built in accordance with the latest NEMA standards. Incoming electrical shall be 208/230VAC 3-phase, confirm prior to fabrication. Refer to the drawings for controls.
1. Refer to electrical drawings for door controller by C W Automation for control system. Coordinate with Palm Beach County for requirements.
  2. Control panel assemblies shall be UL listed as per NFPA70.
  3. Controls shall include a programmable logic controller with digital message display. Controller shall include programmable close timers and programmable inputs/output.
  4. Motor starters shall be magnetic reversing, factory wired with overload and under voltage protection, and equipped with mechanical interlocks. All control components shall be enclosed in one enclosure with a wiring diagram placed on the inside of the cover.
  5. Enclosures shall be NEMA 4 with disconnect switch.
  6. Pushbuttons (interior) for each door shall have one momentary pressure three-button push-button station marked "OPEN", "CLOSE" and "STOP". Push button enclosure shall be NEMA 4.
  7. Limit switches shall be provided to stop the travel of the door in its fully open or fully closed position. Provide cremone bolt limit switch to be used for HVAC or exhaust removal system.
  8. Safety edges: Provide monitored electric safety edges on leading edge of all doors to reverse door upon contact with obstruction.
  9. Photo eyes: Provide (1) exterior, jamb mounted, light Curtain type photo eyes, NEMA 4 rated. Photo eye shall cover from floor level to 72" above floor.
  10. Presence Sensor: Provide (1) interior, overhead mounted, presence sensor BEA IS40P or equal. Doors over 16' tall shall include LZR-Widescan or equal.
  11. Radio controls: Provide one (1) DIGITAL radio receiver and two (2) single button remotes per door. Remotes to open and close doors with single button.

12. Wiring: Door manufacturer shall supply controls and components only. Electrical contractor shall install controls and furnish and install conduits and wiring for jobsite power and control wiring.

## 2.4 SEQUENCE OF OPERATION

1. All doors are to be operated by a single wall switch located close to door for single operation use. Refer to drawings for location.
2. All front and rear doors are to operate with two separate mushroom button that activates the door timers and bay exhaust fans for five minutes.

## 2.5 SAFETY DEVICES

1. Macurco CM-6 Carbon Monoxide Detector
2. Macurco TX-6 Nitrogen Dioxide Detector
3. Door Monitoring laser beam
4. Omron Photo eye
5. Reversing bottom safety edge
6. Zero strike LED lights

## PART 3 - EXECUTION

### 3.1 INSTALLATION

- A. Install Four-Fold metal doors in strict accordance with the approved drawings by qualified door erection crews. All door openings shall be completely prepared by the general contractor prior to the installation of the doors. Permanent or temporary electric wiring shall be brought to the door opening before installation is started and shall be completed so as not to delay the inspection test.
- B. Doors shall be set plumb, level, and square, and with all parts properly fastened and mounted. All moving parts shall be tested and adjusted and left in good operating condition.

### 3.2 ADJUSTING AND CLEANING

- A. Inspection of the doors and a complete operating test will be made by the installer in the presence of the general contractor or architect as soon as the erection is complete. Any defects noted shall be corrected. After door approval in the above test, the general contractor must assume the responsibility for any damage or rough handling of the doors during construction until the building is turned over to the owner and final inspection is made.
- B. Clean surfaces and repaint abraded or damaged finished surfaces to match factory-applied finish.

END OF SECTION - 083513