



**FF100, FOUR-FOLD DOORS  
CONSULT MANUFACTURER FOR ADDITIONAL OPTIONS OR MODIFICATIONS.**

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 with surface mounted tube frames.
- 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 20 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 guarantee against all defects in material and workmanship for a period of three (3) years from the date of acceptance.
- B. (Option) A five (5) year warranty.

## PART 2 - PRODUCTS

### 2.1 MANUFACTURERS

- A. Manufacturers: Four-Fold industrial metal doors manufactured by Door Engineering and Manufacturing, 400 Cherry Street, Kasota, MN 56050, (800)-959-1352. Equal products by other manufacturers approved in advance.

### 2.2 MATERIALS

- A. Structural Steel: ASTM A36/A36M.
- B. Steel Sheets: Steel sheets of commercial quality, complying with ASTM A366/A366M cold-rolled steel sheet, or A569/A569M hot-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 FF100 Series Solid Sheeted Four-Fold Doors as manufactured by Door Engineering and Manufacturing, LLC; Kasota, MN.
- B. Construction: Door framing shall be 14-gauge structural steel tube with 14-gauge steel sheet on the exterior and interior faces. Sheeting shall be formed on the vertical edges with no visible welds 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 TS6x4x0.25, designed to anchor to masonry wall construction or weld to steel structure. All hinges, track supports and operator supports shall be factory attached.
- D. Door Finish: Prime Paint with manufacturers' standard structural primer.  
  
(Option) Factory applied exterior grade powdercoat. Customer to select from manufacturers standard RAL color chart furnished with submittal package.
- 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. All bearings shall be completely concealed within the hinge barrel. All hinge pins shall be minimum 3/4" diameter hardened steel.
- F. Weather stripping: Material shall be adjustable, readily replaceable and provide a substantially weather-tight installation. Weather stripping at center shall be 1/16" cloth inserted neoprene. Weather stripping at sill shall be 1/16" cloth inserted neoprene on interior and exterior. Weather stripping shall be retained continuously.
- G. Perimeter Weatherstripping: Provide jamb and head weatherstripping of 1/16" cloth-inserted neoprene bulb (or closed cell neoprene).

## 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 free wheeling mode for 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. The motor shall be wound for three phase 208/260/480 VAC, 60 Hertz operation.
- 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. Control circuits shall not exceed a nominal 110 volts.
  - 1. Controls shall include a programmable logic controller with digital message display. Controller shall include programmable close timers and programmable inputs/outputs.
  - 2. 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.
  - 3. Enclosures shall be NEMA 4 with disconnect switch.
  - 4. 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.
  - 5. Limit switches shall be provided to stop the travel of the door in its fully open or fully closed position. Provide auxiliary limit switch to be used for HVAC or exhaust removal system.
  - 6. Safety edges: Provide electric safety edges on leading edge of all doors to reverse door upon contact with obstruction. Provide wireless safety edge transmitters with low battery alarm.
  - 7. Photo eyes: Provide interior and exterior thru-beam type photo eyes, NEMA 4 rated.
  - 8. Radio controls: Provide one (1) radio receiver and one (1) single button remote per door. Remotes to open and close doors with single button.
  - 9. (OPTIONAL) Loop Detectors: Provide "pulse on exit type" loop detector to activate auto close timer once loop has been activated and cleared, include hand/auto switch to deactivate timer. G.C. to coordinate installation of preformed loop with installer prior to exterior apron being poured.
  - 10. Wiring: Door manufacturer shall supply controls only. Electrical contractor shall install controls and furnish and install conduits and wiring for jobsite power and control wiring.

## 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 with all parts properly fastened and mounted. All moving parts shall be tested, 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