



## BI FOLD HANGAR DOORS

**WELL BILT BI FOLD System.** Hangar doors in general, are considered a product that is customized for each application. Well Bilt Industries offers a wide array of options and modifications for each application. Well Bilt Industries will take the time to explain the options to help guide for quality, value and extended service life. Call Well Bilt Industries today to discuss the many options and benefits that make Well Bilt Industries a leader in Hangar doors for over three decades. 1-800-940-BILT

### PART 1 - GENERAL

#### 1.01 References

Listed below are publications that contain reference material that are applicable to portions of the hangar doors. Bi Fold hangar doors specifications vary from door to door depending upon geographic location so these references shall be used for basic design criteria only.

- A. AISI SG-973 Cold Form Design Manual
- B. ASTM A366/A 36M Commercial Steel Sheet, Carbon Cold Rolled
- C. ASTM A569/A 569M Commercial Steel Sheet and strip Hot Rolled
- D. ASTM A36 36M Carbon Structural Steel
- E. NEMA ICS 1 Industrial Control and Systems
- F. NEMA ICS 6 Industrial Controls and Systems Enclosures
- G. NFPA 70 National Electric Code
- H. SSPC Primers and paint, Gray and Red Oxide primers

#### 1.02 DESIGN REQUIREMENTS

##### A. Bi Folding Door System

The design of the Bi Folding Hangar Doors shall be designed by Well Bilt Industries in accordance with the specified criteria to insure that the hangar door shall operate as specified and not interfere with the structure or associated trim components. The door shall fit tightly and be built without warping or sagging of members. The performance requirements shall include a Bi Folding Vertical lifting door that allows for thermal movement and prevent the door from buckling from ambient and surface temperatures. Operating range of the Bi Folding Door system shall be between minus 30 degrees Fahrenheit to 140 degrees Fahrenheit. Door system is operated by lifting cables that draw the bottom of the door in a vertical direction along columns or channels mounted on the exterior of the structure.

##### B. Wind Loads

Bi Folding hangar doors shall be designed per the geographic regions external wind pressures. Design pressures shall be based upon the governing authority or specified by the lead design engineer for each project as it may apply. The Bi Folding door may be fitted with internal and external truss systems as required.



C. Deflection

Bi fold Hangar Door systems shall be designed with maximum deflections:

Positive upward deflection of 1"

Negative downward deflection of 1"

Design of the structure shall allow for the weight of the door system.

E. Cold Form Members

Cold Form members shall be used in locations on the door framing as required. Cold form will typically be comprised of angles and flat bar only.

F. Hardware

Fastening hardware shall conform to domestic hardware and provide markings to the grade of hardware on the head of the fastener for visual identification.

### 1.03 SUBMITTALS

Approval of the shop drawings is required prior to fabrication of the Bi Folding hangar door systems.

A. Shop Drawings

- a. Hangar Door operation and general maintenance manuals specific to Bi Folding hangar Doors.
- b. Fabrication drawings showing detailed construction of the Bi Folding hangar door framing including top and side rail framing, door locks, top hinge assemblies, break point hinges, cam followers and auto or manual lock systems.
  - i. Details in shop drawings shall denote weld identifications, connection hardware, and cylinder ram system locations
- c. Wiring schematics information including field wiring, location of junction boxes, physical locations of devices, including motors, rotary limit switches and override limits.
- d. Power Transmission System:  
Detailed description of the power train shall be shown including, gear reduction, sprockets, chains and drum assemblies.

B. Design Data

- a. Submit design data structural and mechanical calculations
- b. Miscellaneous weather seals and accessories

### 1.04 QUALITY ASSURANCES

A. Manufacture's Qualifications:

Bi Folding hangar Door manufacture shall be one who is regularly engaged in the production of two piece vertical hangar doors of the type and size associated for the project. The manufacture shall have experience with the installation and have qualified representatives that can field visit the site if issues arise. The Manufacturer shall a certification program for installers to attend to receive training for the correct installation of the hangar door and the operator systems.

B. Installers Qualifications:

Installers shall have experience in installing Bi Folding hangar doors and the knowledge and equipment to handle the members safely without warping or bending the materials during installation.



Installer must be aware that the structure may have a greater deflection and the building will need to be "pre-loaded" prior to the permanent attachment to the building.

C. Delivery, Storage and Handling

All materials that are not shop installed shall be placed in dry storage. Structural steel shall be stored on blocking above the earth pavement to prevent damage.

Hangar door materials to be checked off on the bill of lading sign off and accepted or noted as missing or damaged.

## **PART 2 – PRODUCT SCOPE**

### **2.01 BI FOLDING HANGAR DOORS**

Bi Folding Hangar Door panels shall be manufactured by Well bilt Industries USA, LLC in accordance with the shop drawings and specifications and options denoted by the owner or architect.

A. Door Manufacture to provide trained personnel to oversee the fabrication of the Bi Folding hangar door system. The supervision will insure that the door system is manufactured in strict accordance with the approved shop drawings.

B. Hardware

Provide hangar door hardware that meets the design criteria and the actual loads including dead load and wind loads as specified for the project.

C. Power Transmission System

Motor horse power, gear ratio, sprockets and chain will be sufficient to lift the load built into the design.

a. Electric motors to be capable of a duty cycle no less than 200% of the required run time. Motors and systems can be modified if the system will require unusual duty cycles.

b. Electric brakes

Motor Brakes for bi folding doors shall be installed on each motor to arrest the motor operation.

c. Gear reduction shall be dual output shafting with a gear case that is sealed. Output shafting to be keyed with applicable sizing of the gear reducer.

d. Rotary Limit Switches and variable frequency drives shall be used when specified.

e. Actuators shall be incorporated into the Bi Folding door system when applicable for use with the automated locking system.

f. Drums and Cables

Drum sizes will be a minimum of 3" diameter to reduce the horizontal travel of the cable spooling. Cables to match the lifting capacity of the system and designed so that the door can support the weight of the door with a cable out of service.

g. Cam followers

Provide ball bearing cam followers for the bottom of the door system. Followers to contain needle bearings sealed, affixed to cold rolled shafting.



- h. Drive shaft  
Drive shaft shall be a minimum of 1" cold rolled steel mounted on pillow blocks and steady ride system that is fitted with grease fittings at each location.
- D. Weather Stripping (Top & Bottom )  
Provide weather stripping that is easily replaceable on the horizontal bottom and head of the door. Material shall be EPDM with cloth insertion and be attached 12" O.C. The installer will insure that the top weather seal is installed properly per the manufactures instruction. Failure to install the weather strip correctly will void all warranties.
- E. Primer:  
Red Oxide, Gray industrial primer, SSPC 25 over prepared surface by means of blasting or surface wire wheel depending on the quality of steel.
- F. Electric Operators of Bi Fold Hangar Doors:
  - a. Electrical Distribution: Contractor shall supply power to the control enclosure.
  - b. Enclosures: Control panels shall be enclosed a NEMA 4 boxes to allow for water tight enclosure; installers of the electrical connections shall note to not drill into the top of the enclosure to prevent water infiltration. All conduit runs should come from the bottom of the enclosure when practical.
  - c. Contactors and Controls: Each system to be designed for the application and size of the Bi Fold hangar door system. Systems shall include reversing contactors, operation control buttons that open, close and stop the system. System will allow for contactors to be interlocked with limit switches for opening limits and closing limits. Interlocks for personnel door when applicable.
  - d. Motors: Electric Motors will be sized according and power systems requirements shall match the architects phasing of the electrical system. Fusing of the system will be at the discretion of the design professional.

## 2.02 MANUFACTURING & ASSEMBLY

- A. Bi Folding Hangar Door Panels:
  - a. Door Panel to be manufacture from square and rectangular tubing. Panel framing shall be shop welded and assembled fully in the shop to insure the door can be assembled in the field. Door panel shall be designed to have exterior panel connection no less than 5 feet from any horizontal member. Bi fold Door systems that require splicing shall be field welded per the standards set for in the shop drawings and meet AWS specifications.
  - b. Exterior truss system shall be fully welded to prevent water intrusion. Truss shall be designed as a welded member with the door panel and factory welded.
  - c. Wind and Locking Pins  
Each door panel shall be fitted with a cold roll drop pins located in the door panel for securing the door to the finished floor. Depending on the size of the door system pin placement and quantity will vary per the engineering.
  - d. Hinges:  
Door system shall be shipped with five (5) barrel hinges with grease fittings. Pins for the door system shall be cold rolled stock with welded ends to prevent unintended removal or movement.



- e. Anti Sail devices  
Devices that limit the door from being moved in a upward direction caused from wind are to be fitted to each side of the door and will be constructed from cold rolled stock.

## **2.03 OPERATION OF PANELS**

### **Bi Folding Hangar Door System operation**

The doors shall be upward vertical motion doors pivoting on hinges at the head of the door system and intermediately at the center of the panel. Door to contain a wedge that maintains the door from deflecting or folding on to itself.. Doors are actuated by means of multiple drums with cable driven by a drive shaft working in sequence.

#### **A. Motor operation of Bi Folding Hangar Doors**

##### **a. Electric motors:**

Motors shall be sized in accordance and configuration of the power supply from 120v,208v, 230, or 460v in single and 3 phase.

##### **b. Controls:**

Hangar doors shall be controlled by means of constant pressure push buttons mounted on the interior of the door panel or remotely. Push buttons shall stop the movement of the door when pressure is release. The Control Boxes shall be NEMA ICS 6 type 4 boxes in the interior. Operation may be automatic or remotely actuated depending upon the owners requirements.

#### **B. Accessories**

##### **a. Warning Devices:**

Warning devices such as bells, horns and strobes may be added to the operation of the controls to notify the area of the movement of the Door Panel. Devices are to be located on the operation hangar wall.

## **PART 3 – EXECUTION**

### **3.01 ERECTION & INSTALLTION**

- A. Inspection of the existing conditions prior to installation of the door system. Installer should review the structure insuring the header supporting frame is installed in accordance with the design. The opening shall be square and plumb. The door should not be installed until the primary structure is correctly installed and all trades have completed the sequences of work.
- B. Bi Folding door system shall be installed in a workman like manner and assembly shall be in accordance with the shop drawings and installation manuals. Door systems that require a splice due to the size of the door system shall be placed upon cribbage or blocking that completely levels the door panel prior to splice. Slices that are welded are to be welded per the AWS specifications for field welding.
- C. Clean any surfaces abraded, bolts and field welds and field coat surfaces with primer.



### **3.02 QUALITY CONTROL FIELD TESTING**

- A. Test the Bi Fold door upon completion to insure proper operation. Owner's representative shall be present to approve the installation of door systems. Adjust door as required to provide the correct operation if necessary. Provide written report to Owner and door manufacture stating door was successfully operational.
- B. Manufacture Representative Commissioning.  
At the Owners discretion additional commissioning inspection may be performed by Well Bilt Industries to inspect the overall operation and installation of the door system. The commissioning shall include a written report as well as photographic evidence of the correct installation.
- C. Warranty  
Owner shall be provided a Standard one year warranty for the door system by Well Bilt Industries. Warranty shall be warranting the hangar door free from defects of materials and labor for a period of one year. Warranty shall be transferable for up to one year. Note that installation not conforming to the installation manual will void warranty and all liability of door system.

Extended Warranties are available and must be agreed to in writing at time of purchase.

**END OF SECTION**