

*This section includes Blast Resistant, Steel, Overhead Door Assemblies, with integral electric operators and accessories. This section includes proprietary, descriptive and performance type specification requirements. Edit to avoid conflicting requirements.*

## **Part 1            General**

### **1.1                SECTION INCLUDES**

*This article includes a summary of the content of this section which will not be included in other sections. This article is NOT intended to be used as a trade or other form of jurisdictional content.*

- .1        Blast-resistant steel overhead doors [and panels].
- .2        Factory supplied overhead door hardware and electric operators.
- .3        [Factory supplied and installed blast resistant glass and glazing.]
- .4        [Blast resistant glazing.]

### **1.2                RELATED SECTIONS**

*This article references other specification sections that inter-rely on this section. This listing should include those sections that describe subjects or products that affect this section directly.*

- .1        Section [\_\_\_\_\_ - \_\_\_\_\_]: Masonry mortar fill of metal frames.
- .2        Section 05 50 00 – Metal Fabrications: Steel channel frame to suit metal door and operator.
- .3        Section 07 92 00 - Joint Sealing: Caulking between frame and adjacent construction.
- .4        Section 08 36 23.13- Blast Resistant Steel Door and Frame Assemblies
- .5        Section 09 91 00 - Painting: Field painting of doors and panels
- .6        Division 26 05 20 – Electrical: Electrical wiring, conduit, and disconnects for operator.

### **1.3                REFERENCES**

*List reference standards that are included within the text of this section. Delete references that do not apply to this project.*

- .1        ASTM A36/A36M-14 - Standard Specification for Carbon Structural Steel.
- .2        ASTM A653/A653M-15e1 - Standard Specification for Steel Sheet, Zinc-Coated (Galvanized) or Zinc-Iron Alloy-Coated (Galvannealed) by the Hot-Dip Process.
- .3        AISC 325-17 - AISC Steel Construction Manual.
- .4        ASCE – Design of Blast Resistant Buildings in Petrochemical Facilities.
- .5        UFC 3-340-02 - Structures To Resist The Effects Of Accidental Explosions.

- .6 UFC 4-010-01 - DoD Minimum Antiterrorism Standards For Buildings.
- .7 ASTM F2247-11(2017) Standard Test Method for Metal Doors Used in Blast Resistant Applications (Equivalent Static Load Method).
- .8 ASTM F2927-12 Standard Test Method for Door Systems Subject to Airblast Loadings.

#### **1.4 SUBMITTALS**

- .1 Section [01 33 00]: Submission procedures.
- .2 Product Data: Provide product data on door construction and [\_\_\_\_\_].
- .3 Shop Drawings: Indicate door elevations, operator and counterbalance, internal reinforcement, location of cut-outs for hardware [and glazing].
- .4 Test Data:
  - .1 Submit independent test data from a recognized licensed laboratory indicating compliance with the blast-resistance requirements.
  - .2 When blast resistance is not supported by prototype tests, design calculations by a licensed professional engineer shall be accepted.
- .5 Installation Instructions: Submit manufacturer's installation instructions.

#### **1.5 QUALITY ASSURANCE**

- .1 Provide Products of this section from a single manufacturer, unless components are referenced specifically in other sections.
- .2 Manufacturer: Minimum 10 years documented experience manufacturing Blast Resistant Steel Overhead Door Assemblies.
- .3 Pre-installation Meeting: Convene a pre-installation meeting [2] [\_\_\_] weeks before start of installation of overhead door, overhead door hardware and overhead door operator assemblies. Require attendance of relevant subcontractors, consultants, and manufacturer's representative. Review installation and coordination with other work.

#### **1.6 DELIVERY, STORAGE AND PROTECTION**

- .1 Section [01 61 00]: Transport, handle, store, and protect products.
- .2 Remove overhead door panels, overhead door hardware and overhead door operators from wrappings or coverings upon receipt on site and inspect for damage.
- .3 Store in vertical position, spaced with blocking to permit air circulation between components.
- .4 Store materials out of water and covered to protect from damage.
- .5 Clean and touch up scratches or disfigurement caused by shipping or handling with zinc-rich primer.

**1.7 WARRANTY**

- .1 Manufacturer's Limited Warranty: One (1) year from date of supply, covering material and workmanship.

**Part 2 Products**

**2.1 MANUFACTURERS**

*List the manufacturers acceptable for this project. Edit the subsequent descriptive specifications of Part 2, to identify project requirements and to eliminate any conflict with specified manufacturer's products.*

- .1 AMBICO Limited  
 1120 Cummings Avenue  
 Ottawa, Ontario K1J 7R8  
 Toll Free Phone 888-423-2224  
 Phone 613-746-4663  
 Toll Free Fax 800-465-8561  
 Fax 613-746-4721
- .2 Other Acceptable Manufacturers:
  - .1 [\_\_\_\_\_].
  - .2 [\_\_\_\_\_].
- .3 Substitutions: [Refer to Section 016000.] [Not permitted.]

**2.2 PERFORMANCE REQUIREMENTS**

*Include this article if all doors should meet the same performance requirement; otherwise, specify individual performance for door types in Part 2 or in a schedule. Specify either static performance or dynamic performance in consultation with the factory.*

- .1 Structural Performance (Static loading): Provide doors capable of withstanding explosive pressure of [\_\_\_\_\_] kPa ([\_\_\_\_\_] psi), as tested to ASTM F2247.
  - .1 Rebound: 0-100% [\_\_\_\_\_]
  - .2 Response: [Elastic (no damage)] [Inelastic (minor damage)].

**[OR]**
- .2 Structural Performance (Dynamic loading): Provide doors capable of withstanding a peak reflected pressure of [\_\_\_\_\_] kPa ([\_\_\_\_\_] psi), as tested to ASTM F2927.
  - .1 [Duration: [\_\_\_\_\_] msec] [Impulse: [\_\_\_\_\_] psi-msec].
  - .2 Rebound: [0-100%] [True rebound]
  - .3 Ductility ratio : 1-20 [\_\_\_\_\_]
  - .4 End rotation : 1-12 [\_\_\_\_\_] degrees.

**2.3 MATERIALS**

- .1 Sheet Steel: Galvanized steel to ASTM A653/A653M.
  - .1 Exterior doors: [ZF75 (A25)] coating designation.
  - .2 Interior doors: [ZF001 (A01)] coating designation.

- .2 Structural Steel: ASTM A36.
- .3 Reinforcement [Channel]: To CSA G40.20/G40.21, coating designation to ASTM A653/A653M, [ZF75] ([A25]).
- .4 Core Insulation: Minimum U-value of 0.18.
- .5 Primer: Rust inhibitive zinc phosphate.

## 2.4 FABRICATION

- .1 Manufacture doors and frames to achieve specified [static] [dynamic] blast resistance performance in accordance with [UFC 4-010-01 and UFC 3-340-02] [ASTM F2247-11(2017) and ASTM F2927-12 ]
- .2 Steel Doors: Overhead door type.
  - .1 Sheet steel faces, thickness, design, and core suitable to achieve specified blast performance.
  - .2 Blast-resistant construction, welded, filled and sanded with visible edge seams.
- .3 Top and Bottom Channels: Full width, forming a ship lap joint between sections.
- .4 Weld hardware reinforcement plates in place.
- .5 Weight Box: Structural steel, insulated on exposed surfaces. Provide internal angle guides to enclose and guide the counterweights for the full travel. Counterweight shall have internal angle guides to enclose and guide the counterweights for the full travel. The weight box shall be braced at the building structure by the door erector.
- .6 Guide Assembly: Structural steel, insulated on exposed surfaces. Cover base and guide with 6 mm (1/4") thick steel plate. The guide assembly shall be braced at the building structure by the door erector.
- .7 Guide Angles: Structural steel, not less than 6 mm (1/4") thick. Provide continuous vertical angles for door blades to ride, welded to the weight box and guide assembly.
- .8 Section Guides: Provide each door section with a continuous member that mates with the guide angles. Bolt section guides to the door section for easy field installation or replacement.
- .9 Provide steel pick up members with rubber chock absorbing cushions on the top of each section will ensure smooth and silent operation.
- .10 Top and Bottom Channels: shall be full width and shall form a ship-lap joint between sections.

## 2.5 ELECTRICAL OPERATORS AND ACCESSORIES

*Electrical operators shall be supplied by the Blast Resistant steel door manufacturer and shall be an integral part of the Blast Resistant Steel Overhead Door Assembly.*

- .1 Electric operator: UL approved.
  - .1 Heavy duty worm gear reducer with NEMA C flange.
  - .2 Power: [220] [\_\_\_\_] volt, [3] [1] phase, 60 Hz, TEFC.
  - .3 Electromechanical brake.
  - .4 Rotary screw type limit switches.
  - .5 Electrical interlock for manual operation.
  - .6 Hazardous locations: Class [ ], Division [ ], Group [ ].
- .2 Manual operator: Roller chain and cables, selected to provide 7:1 safety factor. Provide blade levelling screws.
- .3 Door control equipment:
  - .1 Integral piggyback control panel.
  - .2 Locate a separate control panel at the ground level, provided by others.
  - .3 House door controls in a [Class [ ], Division [ ] Type [ ] metal box.
  - .4 Starter: Heavy duty reversing type.
  - .5 Thermal overload relays.
  - .6 Control relays.
    - .7 Time delay on reversing.
    - .8 Timer to close the door.
    - .9 Miller reversing safety bar on the bottom of the door with additional protective urethane rubber hood.
    - .10 16 gage SOW coiled cord for reversing safety bar.
    - .11 Control interface and interlock with any third-party system.

## 2.5 ACCESSORIES

*AMBICO Blast Resistant, Steel Overhead Door assemblies are supplied with overhead door hardware and electric operators as an integral part of a tested assembly. All other accessories specified in this section shall be supplied by the door manufacturer.*

- .1 Multi-blade model # 45 Drive and Counterbalancing Mechanism: positive frictionless drive will consist of machined cable sheaves and steel sprockets mounted on a solid cold rolled steel shaft. All rotating elements will rotate on a heavy duty, grease-packed-for life, self-aligning flange bearing. The drive unit will be modular and will be mounted in a removable heavy gage drive housing. For maximum safety two cables shall be provided for each section as well as two roller chains for the bottom section. The drive and idler housings will be seated and bolted to the weight box and door guide assemblies for easy servicing. Counterweight sets will be suspended by heavy duty roller chains and preformed galvanized cables assuring the smooth travel of each door blade in both the upward and downward direction. Steel pick up members with rubber chock absorbing cushions on the top of each section will ensure smooth and silent operation. Roller chain and cables will be selected to provide 7:1 safety factor and shall be equipped with blade levelling screws.

- .2 Drive System: Positive, with machined cable sheaves and steel sprockets.
  - .1 Shaft: Cold rolled steel.
  - .2 Bearings: Heavy duty, grease packed-for-life, self-aligning flange type.
  - .3 Housing: Removable, heavy gauge steel.
  - .4 Seat and bolt the drive and idler housings to the weight box and door guide assemblies for easy servicing.
- .3 Counterweight sets: Suspended by heavy duty roller chains and preformed galvanized cables assuring the smooth travel of each door blade in both the upward and downward direction.
- .4 Safety Cables and Catches: Provide two for each section, and two roller chains for bottom section. Provide heavy duty factory welded catches, to prevent the upper sections from falling further than the section immediately below.
- .5 Fail-Safety Device:
  - .1 Instantly lock bottom section into both weight box and guide when one or both counterweight chains are broken or slacked.
  - .2 Instantly cut power to the motor preventing further damage.
  - .3 Maximum permissible engagement: 150 mm (6 inches).
- .6 Weatherstripping: Combination aluminum retainer and nylon brush set over insulation of the weight box and guides cover.
- .7 Nameplates: Affix permanent nameplates to door and frame, indicating manufacturer's name, model number, and performance rating.

## **2.6 GLAZING**

- .1 Glazing shall be designed in conformance with 2.2.
- .2 Glazing shall be factory supplied [and pre-installed] [and shipped loose ready for site installation by others].

## **2.7 FINISHES**

- .1 Factory Finish: Factory applied zinc phosphate primer [applied to all surfaces] [touch-up only where Product has been welded and ground smooth].
- .2 Finish Painting: finish painting shall be by Section 09 91 00.

## **Part 3 Execution**

### **3.1 INSTALLATION**

- .1 Install components to manufacturer's written instructions.
- .2 [Install factory supplied glazing to door panels.]

- .3 Brace weight box and guide assembly to the building structure at 1200 mm (48 inch) centres.
- .4 Adjust operable parts for correct clearances and function.
- .5 Finish paint in accordance with Section 09 91 00
- .6 Touch up painted finishes where damaged.

### **3.2 FIELD QUALITY CONTROL**

- .1 Provide qualified manufacturer's representative to instruct installers on the proper installation and adjustment of door assemblies. Field supervision to be conducted on-site by factory personnel during the initial installation period. Final commissioning of blast resistant, steel overhead door assembly shall occur in the presence of factory personnel.
- .2 Provide manufacturer's representative to inspect door installation, and test minimum five (5) cycles of operation. Correct any deficient doors, accessories or operators.

**END OF SECTION**