SECTION 08 39 53

BLAST RESISTANT DOORS AND FRAMES

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\*\* NOTE TO SPECIFIER \*\* AMBICO LIMITED; specialized doors and door frames.  
This section is based on the products of AMBICO LIMITED, which is located at:  
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Web: <https://www.ambico.com>   
 [ [Click Here](https://www.arcat.com/arcatcos/cos40/arc40356.html) ] for additional information.  
AMBICO manufactures specialized doors and door frames. Located in Canada's capital city of Ottawa, Ontario, AMBICO LIMITED operates from an office and manufacturing facility covering one city block. The formula for AMBICO's success includes quality driven, laboratory tested, specially manufactured products.  
Our decorative line of products includes recessed panel, brass clad, bronze clad, as well as stainless steel doors and door frames. AMBICO's exceptional line of engineered door and frame products include acoustic wood, acoustic steel, bullet resistant steel, blast resistant, lead lined, oversized and stainless steel.  
AMBICO services our products with an expert team of engineers and sales personnel. Our selected network of manufacturer's representatives and independent distributors enhances our ability to provide dedicated client service across North America and throughout the world.

1. GENERAL
   1. SECTION INCLUDES

\*\* NOTE TO SPECIFIER \*\* Delete items below not required for project.

* + 1. Blast resistant steel doors and frames.
    2. Blast resistant steel overhead doors.
    3. Sliding blast resistant doors.
  1. RELATED SECTIONS

\*\* NOTE TO SPECIFIER \*\* Delete any sections below not relevant to this project; add others as required.

* + 1. Section 05 50 00 - Metal Fabrications.
    2. Section 07 91 23 - Backer Rods.
    3. Section 08 11 00 - Metal Doors and Frames.
    4. Section 08 71 00 - Door Hardware.
    5. Section 09 91 23 - Interior Painting.
    6. Section 26 05 00 - Common Work Results for Electrical.
  1. REFERENCES

\*\* NOTE TO SPECIFIER \*\* Delete references from the list below that are not actually required by the text of the edited section.

* + 1. ASCE - Design of Blast Resistant Buildings in Petrochemical Facilities.
    2. ASTM A36/A36M - Standard Specification for Carbon Structural Steel.
    3. ASTM A653/A653M - Standard Specification for Steel Sheet, Zinc-Coated (Galvanized) or Zinc-Iron Alloy-Coated (Galvannealed) by the Hot-Dip Process.
    4. ASTM A1011/A1011M Standard Specification for Steel, Sheet and Strip, Hot-Rolled, Carbon, Structural, High-Strength Low-Alloy, High-Strength Low-Alloy with Improved Formability, and Ultra-High Strength.
    5. ASTM E330 - Standard Test Method for Structural Performance of Exterior Windows, Doors, Skylights and Curtain Walls by Uniform Static Air Pressure Difference.
    6. ASTM F2247 - Standard Test Method for Metal Doors Used in Blast Resistant Applications (Equivalent Static Load Method).
    7. ASTM F2927 - Standard Test Method for Door Systems Subject to Airblast Loadings.
    8. Canadian Steel Door Manufacturers Association (CSDMA), Selection and Usage Guide for Steel Doors and Frames.
    9. HMMA 802 - Manufacturing of Hollow Metal Doors and Frames.
    10. HMMA 840 - Installation and Storage of Hollow Metal Doors and Frames.
    11. NFPA 80 - Standard for Fire Doors and Other Opening Protectives.
    12. PIP STC01018 - Blast Resistant Building Design Criteria.
    13. TM5-1300 - Structures to Resist the Effects of Accidental Explosions.
    14. UL10C Standards for Positive Pressure Fire Tests of Door Assemblies.
    15. U.S. Department of Defense (DoD) - Unified Facilities Criteria.
  1. PERFORMANCE REQUIREMENTS

\*\* NOTE TO SPECIFIER \*\* 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 door schedule.

* + 1. Structural Performance:
       1. Provide doors capable of withstanding a peak reflected pressure of \_\_\_\_\_ kPa (\_\_\_\_ psi) tested to ASTM F2247, ASTMF2927, or proven suitable by engineering calculations.
       2. Duration: \_\_\_\_\_ msec.
       3. Impulse: \_\_\_\_\_ psi-msec.
       4. Rebound (0-100%): [\_\_\_\_\_].
       5. Ductility ratio (1-20): [\_\_\_\_\_\_].
       6. End Rotation (1-12): [\_\_\_\_\_] degrees.

\*\* NOTE TO SPECIFIER \*\* Delete if not required.

* 1. REGULATORY REQUIREMENTS
     1. Installed Door and Frame Assembly: Conform to NFPA 80 for fire rated class as scheduled or as indicated.
  2. SUBMITTALS
     1. Submit under provisions of Section 01 30 00 - Administrative Requirements.
     2. Product Data: Manufacturer's data sheets on each product to be used, including:
        1. Preparation instructions and recommendations.
        2. Storage and handling requirements and recommendations.
        3. Installation methods.
     3. Shop Drawings: Indicate door and frame elevations, internal reinforcement, anchor types, closure methods, finishes, location of cut-outs for hardware, and cut-outs for glazing and for louvers.

\*\* NOTE TO SPECIFIER \*\* Delete selection samples if colors have already been selected.

* + 1. Test Data:
       1. Submit independent test data from a recognized licensed laboratory indicating compliance with the blast-resistance requirements. Assembly calculations shall be in conformance with structural blast performance and shall be certified by a licensed professional engineer.
       2. When blast resistance is not supported by prototype tests, design calculations by a licensed professional engineer shall be accepted provided that the prototype demonstrates adequacy under the blast effects specified.
  1. QUALITY ASSURANCE

\*\* NOTE TO SPECIFIER \*\* Delete if not required.

* + 1. Perform Work to requirements of CSDMA (Canadian Steel Door Manufacturers Association) standards.

\*\* NOTE TO SPECIFIER \*\* Delete if not required.

* + 1. Perform Work to requirements of HMMA (Hollow Metal Manufacturers Association) standards.
    2. Manufacturer: Minimum 5 years documented experience manufacturing blast resistant door and frame assemblies.
    3. Installer Qualifications: Minimum 2 years experience installing similar products.

\*\* NOTE TO SPECIFIER \*\* Include a mock-up if the project size and/or quality warrant taking such a precaution. The following is one example of how a mock-up on a large project might be specified. When deciding on the extent of the mock-up, consider all the major different types of work on the project.

* + 1. Mock-Up: Provide a mock-up for evaluation of surface preparation techniques and application workmanship.
       1. Finish areas designated by Architect.
       2. Do not proceed with remaining work until workmanship is approved by Architect.
       3. Rework mock-up area as required to produce acceptable work.
  1. PRE-INSTALLATION MEETINGS
     1. Convene minimum two weeks prior to starting work of this section. Require attendance of parties directly affecting work of this section, including contractor, architect, installer, and manufacturer's representative. Review installation and coordination with other work.
  2. DELIVERY, STORAGE, AND HANDLING
     1. Comply with manufacturer's recommendations including the following:
        1. Deliver and store products in manufacturer's unopened packaging bearing the brand name and manufacturer's identification.
        2. Comply with HMMA 840.
        3. Weld minimum two temporary jamb spreaders per frame prior to shipment.
        4. Remove doors and frames from wrappings or coverings upon receipt on site and inspect for damage.
        5. Store in vertical position, spaced with blocking to permit air circulation between components.
        6. Store materials out of water and covered to protect from damage.
        7. Clean and touch up scratches or disfigurement caused by shipping or handling with zinc-rich primer.
        8. Handle materials to avoid damage.
  3. PROJECT CONDITIONS
     1. 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.
  4. SEQUENCING
     1. Ensure that products of this section are supplied to affected trades in time to prevent interruption of construction progress.
  5. WARRANTY
     1. Manufacturer's Limited Warranty: Five years from date of supply, covering material and workmanship.

\*\* NOTE TO SPECIFIER \*\* Overhead doors only. Delete if not required.

* + 1. Manufacturer's Limited Warranty: One year from date of supply, covering material and workmanship.

1. PRODUCTS
   1. MANUFACTURERS
      1. Acceptable Manufacturer: AMBICO LIMITED, which is located at: 1120 Cummings Ave.; Ottawa, ON, Canada K1J 7R8; Toll Free Tel: 888-423-2224; Tel: 613-746-4663; Fax: 800-465-8561; Email: [request info (specialized@Ambico.com)](https://admin.arcat.com/users.pl?action=UserEmail&company=AMBICO+LIMITED&coid=40356&rep=&fax=800-465-8561&message=RE:%20Spec%20Question%20(08393abl):%20%20&mf=); Web: <https://www.ambico.com>

\*\* NOTE TO SPECIFIER \*\* Delete one of the following two paragraphs; coordinate with requirements of Division 1 section on product options and substitutions.

* + 1. Substitutions: Not permitted.
    2. Requests for substitutions will be considered in accordance with provisions of Section 01 60 00 - Product Requirements.

\*\* NOTE TO SPECIFIER \*\* Delete if not required.

* 1. BLAST RESISTANT STEEL DOORS AND FRAMES
     1. Sheet Steel: Galvanized steel to ASTM A653/A653M.
        1. Coating designation Z275 (G90) for exterior door assemblies.
        2. Coating designation ZF075 (galvaneal) for interior door assemblies.
     2. Reinforcement Channel: To CSA G40.20/G40.21, coating designation to ASTM A653/A653M, ZF75 (A25).
     3. Structural Plate: Hot rolled steel to ASTM A1011.

\*\* NOTE TO SPECIFIER \*\* Specify door thickness and other values with caution as they may vary in order to meet the blast performance ratings available. Higher ratings may require doors thicker than 1-3/4 inches (44 mm).

* + 1. Steel Doors, Sliding Type:
       1. Manufacture doors and in accordance with CDSMA or HMMA 802 as required by code or Authority Having Jurisdiction (AHJ).
       2. Sheet steel faces, thickness, design, and core suitable to achieve specified blast performance.

\*\* NOTE TO SPECIFIER \*\* Delete construction not required.

* + - 1. Construction: Longitudinal edges mechanically inter-locked.

\*\* NOTE TO SPECIFIER \*\* Delete seam finish not required.

* + - * 1. Visible edge seams.
        2. No visible edge seams.
      1. Construction: Longitudinal edges welded, filled and sanded.

\*\* NOTE TO SPECIFIER \*\* Delete seam finish not required.

* + - * 1. Visible edge seams.
        2. No visible edge seams.
      1. Top and Bottom Channels: Inverted, recessed, welded steel channels.
      2. Astragals: Metal astragals for double doors designed to conform to blast pressure rating.
      3. Weld structural steel channels flush to top and bottom of door.
      4. Weld hardware reinforcement plates in place.

\*\* NOTE TO SPECIFIER \*\* Specify door thickness and other values with caution as they may vary in order to meet the blast performance ratings available. Higher ratings may require doors thicker than 1-3/4 inches (44 mm).

* + 1. Steel Doors, Swing Type:
       1. Manufacture doors and in accordance with CDSMA or HMMA 802 as required by code or Authority Having Jurisdiction (AHJ).
       2. Sheet steel faces, thickness, design, and core suitable to achieve specified blast performance.

\*\* NOTE TO SPECIFIER \*\* Delete construction not required.

* + - 1. Construction: Longitudinal edges mechanically inter-locked.

\*\* NOTE TO SPECIFIER \*\* Delete seam finish not required.

* + - * 1. Visible edge seams.
        2. No visible edge seams.
      1. Construction: Longitudinal edges welded, filled and sanded.

\*\* NOTE TO SPECIFIER \*\* Delete seam finish not required.

* + - * 1. Visible edge seams.
        2. No visible edge seams.
      1. Top and Bottom Channels: Inverted, recessed, welded steel channels.
      2. Astragals: Metal astragals for double doors designed to conform to blast pressure rating.
      3. Weld structural steel channels flush to top and bottom of door.
      4. Weld hardware reinforcement plates in place.

\*\* NOTE TO SPECIFIER \*\* Frames at swing doors openings are provided as an integral part of the blast door and frame assembly. Frames at sliding doors shall be provided by Section 05 10 00 - Structural Metal Framing Structural Metal Framing.

* + 1. Steel Frames: Swing Type:
       1. Sheet steel and metal thickness appropriate to maintain door blast and fire ratings, mitred corners.
       2. Factory assembled and welded frames.

\*\* NOTE TO SPECIFIER \*\* Delete mullion not required.

* + - 1. Mullions for Double Doors: Fixed type.
      2. Mullions for Double Doors: Removable type.
      3. Provide three single silencers for single doors and mullions of double doors on strike side, and two single silencers on frame head at double doors without mullions.
    1. Steel Frames: Sliding Type:
       1. Sheet steel and metal thickness appropriate to maintain door blast and fire ratings, mitred corners.
       2. Sliding doors provided with door hangers, guides, and track which supplied loose by the door manufacturer.

\*\* NOTE TO SPECIFIER \*\* AMBICO blast resistant steel door and frame assemblies are supplied with hinges and latching devices as an integral part of the tested assembly. All other hardware items may be supplied by Section 08 71 00 - Door Hardware. All other accessories specified in this section shall be supplied by the door and frame manufacturer.

* + 1. Accessories:
       1. Glazing Stops: Formed galvanized steel channel, corner construction; prepared for countersink style screws.

\*\* NOTE TO SPECIFIER \*\* Delete corner construction not required.

* + - * 1. Butted corners.
        2. Mitred corners.

\*\* NOTE TO SPECIFIER \*\* Delete if not required.

* + - * 1. Tamperproof screws.
      1. Glass: Type as tested or calculated to achieve fire and blast performance ratings.

\*\* NOTE TO SPECIFIER \*\* Delete glazing not required.

* + - 1. Glazing to be factory supplied.
      2. Glazing to be factory supplied and preinstalled.
      3. Primer: Rust inhibitive zinc chromate.
      4. Threshold and perimeter seals to be factory supplied.
    1. Pre-Installation Of Swinging Door Hardware:

\*\* NOTE TO SPECIFIER \*\* Delete hardware provisions not required.

* + - 1. Door Hardware:

\*\* NOTE TO SPECIFIER \*\* Delete hinge provision not required.

* + - * 1. Hinges: Heavy weight butt type to be factory supplied for field installation.
        2. Hinges: Heavy weight butt type to be factory supplied and pre-installed.
        3. Hardware shall be factory supplied.
        4. Hardware shall be factory supplied and pre-installed.
        5. Mortise lock.
        6. Exit device.
        7. Door silencers.
    1. Affix permanent metal nameplates to door and frame, indicating manufacturer's name, door tag, model number, and performance rating.

\*\* NOTE TO SPECIFIER \*\* Delete door finish not required.

* + 1. Factory Door Finish: Factory applied zinc chromate primer to be applied to all exposed surfaces.
    2. Factory Door Finish: Factory applied zinc chromate primer touch-up only, where product has been welded and ground smooth.
  1. BLAST RESISTANT STEEL OVERHEAD DOORS
     1. Performance: Manufacture doors and frames to achieve specified static, dynamic and blast resistance performance in accordance with UFC 4-010-01 and UFC 3-340-02 as applicable, and ASTM F2247-11(2017) and ASTM F2927-12 as applicable.
     2. Sheet Steel: Galvanized steel to ASTM A653/A653M.
        1. Coating designation ZF75 (A25) for exterior door assemblies.
        2. Coating designation ZF002 (A01) for interior door assemblies.
     3. Structural Steel: ASTM A36.
     4. Reinforcement Channel: To CSA G40.20/G40.21, coating designation to ASTM A653/A653M, ZF75 (A25).
     5. Core Insulation: Minimum U-value of 0.18.
     6. Steel Doors, Overhead Door Type:
        1. Manufacture doors and in accordance with CDSMA or HMMA 802 as required by code or Authority Having Jurisdiction (AHJ).
        2. Sheet steel faces, thickness, design, and core suitable to achieve specified blast performance.
        3. Blast resistant construction, mechanically interlocked shall be welded, filled and sanded with visible edge seams.
        4. Full width top and bottom channels, forming a ship-lap joint between sections.
        5. Weld structural steel channels flush to top and bottom of door.
        6. Weld hardware reinforcement plates in place.
        7. Install door silencers.
        8. Affix permanent metal nameplates to door and frame, indicating manufacturer's name, door tag, model number, and performance rating.
     7. Manual Operator: Roller chain and cables selected to provide 7:1 safety factor and shall be equipped with blade leveling screws.

\*\* NOTE TO SPECIFIER \*\* 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: The electric operator shall have the following characteristics:
       1. UL approved.
       2. Environmentally rated at Class I, Division II, Group C. Installation shall be in conformance with NEC.
       3. Heavy duty worm-gear reducer with a standard NEMA "C" flange.

\*\* NOTE TO SPECIFIER \*\* Delete power options not required.

* + - 1. Power: 220 volt 3 phase, 60 Hz, TEFC.
      2. Power: 220 volt 1 phase, 60 Hz, TEFC.
      3. Power: \_\_\_\_ volt \_\_\_ phase, 60 Hz, TEFC.
      4. The unit shall have a minimum 220 volt, 3 phase motor and shall be TEFC.
      5. Electromechanical brake.
      6. Rotary screw type limit switches.
      7. Manual operation chain hoist.
      8. Electrical interlock for manual operation.
      9. Door speed 8 to 10 inches (203 to 254 mm) per second.
    1. Door Controls and Electrical Equipment:
       1. Integral piggyback control panel.
       2. Separate control panel located at the ground level, provided by the electrical division of the specifications.
       3. House door controls in a Class I, Division II metal box.
       4. Starter shall be 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.
       10. Protective urethane rubber hood over the Miller safety bar.
       11. 16 gage SOW coiled cord for revering safety bar.
       12. Control interface and interlock with auxiliary third-party locking and control system.
    2. Accessories:

\*\* NOTE TO SPECIFIER \*\* AMBICO blast resistant steel overhead door assemblies are supplied with overhead door hardware and electric operators as an integral part of the tested assembly. All other accessories specified in this section shall be supplied by the door manufacturer.

* + - 1. Glazing Stops: Formed galvanized steel channel, corner construction; prepared for countersink style screws.

\*\* NOTE TO SPECIFIER \*\* Delete corner construction not required.

* + - * 1. Butted corners.
        2. Mitred corners.

\*\* NOTE TO SPECIFIER \*\* Delete if not required.

* + - * 1. Tamperproof screws.
      1. Glass: Type as tested or calculated to achieve blast performance ratings specified.

\*\* NOTE TO SPECIFIER \*\* Delete glazing installation not required.

* + - 1. Glazing to be factory supplied and preinstalled.
      2. Glazing to be factory supplied and field installed.
      3. Weight Box: shall be constructed from structural steel members. 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.
      4. Guide Assembly: Shall be constructed from structural steel members with base and guide covered with 1inch (6 mm) thick steel plate. The guide assembly shall be braced at the building structure by the door erector.
      5. Guide Angles: Door blades shall ride on a continuous vertical structural steel angle and guides and shall not be less than 1/4 inch (6 mm) in thickness. The guide angles will be welded to the to the weight box and guide assembly. The weight box and guide assembly shall be braced at the building structure by the door erector on 48 inches (1200 mm) centers.
      6. Section Guides: Each door section shall have continuous member that shall mate with the guide angles. The section guides shall be bolted to the door section for easy field installation or replacement removal of the sections.
      7. Insulation of Weight boxes and Guides: Exposed surfaces of the weight boxes and guides shall be insulated with 1 inch (25 mm) thick polyurethane insulation and shall be back sheeted with 18 gage galvanized steel sheet.
      8. Weatherstripping: The vertical weather stripping shall be combination aluminum retainer and nylon brush set over insulation of the weight box and guides cover.
      9. 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.
      10. Safety Catches: in the case of a cable failure the upper blades will be equipped with heavy duty factory welded catches. The safety catches will prevent the upper sections from falling further than the section immediately below.
      11. Fail-Safety Device: The door will be equipped with a fail safety device that will provide the following features:
          1. Instantly locking bottom section into both weight box and guide when one or both counterweight chains are broken or slacked
          2. Instantly cuts power to the motor preventing further damage.
          3. Maximum permissible engagement is 6 inches (150 mm).
          4. Eliminates the need for side locks.
      12. Threshold and perimeter seals to be factory supplied.

\*\* NOTE TO SPECIFIER \*\* Delete door finish not required.

* + 1. Factory Door Finish: Factory applied zinc chromate primer to be applied to all exposed surfaces.
    2. Factory Door Finish: Factory applied zinc chromate primer touch-up only, where product has been welded and ground smooth.
    3. Finish Painting: Field finished per Section 09 91 23 - Interior Painting.

\*\* NOTE TO SPECIFIER \*\* Delete if not required.

* 1. SLIDING BLAST RESISTANT DOORS
     1. Sheet Steel: Galvanized steel to ASTM A653/A653M.
        1. Coating designation Z275 (G90) for exterior door assemblies.
        2. Coating designation ZF075 (galvaneal) for interior door assemblies.
     2. Reinforcement Channel: To CSA G40.20/G40.21, coating designation to ASTM A653/A653M, ZF75 (A25).
     3. Structural Plate: Hot rolled steel to ASTM A1011.

\*\* NOTE TO SPECIFIER \*\* Specify door thickness and other values with caution as they may vary in order to meet the blast performance ratings available. Higher ratings may require thicker doors.

* + 1. Sliding Steel Doors:
       1. Manufacture doors and in accordance with CDSMA or HMMA 802 as required by code or Authority Having Jurisdiction (AHJ).
       2. Doors shall be compliant with DoD Unified Facilities Criteria designed to protect personnel from terrorist attack.
       3. Tested in accordance with ASTM F2927 and ASTM F2247.
       4. Sheet steel faces, thickness, design, and core suitable to achieve specified blast performance.

\*\* NOTE TO SPECIFIER \*\* Delete construction not required.

* + - 1. Construction: Longitudinal edges mechanically inter-locked.

\*\* NOTE TO SPECIFIER \*\* Delete seam finish not required.

* + - * 1. Visible edge seams.
        2. No visible edge seams.
      1. Construction: Longitudinal edges welded, filled and sanded.

\*\* NOTE TO SPECIFIER \*\* Delete seam finish not required.

* + - * 1. Visible edge seams.
        2. No visible edge seams.
      1. Top and Bottom Channels: Inverted, recessed, welded steel channels.
      2. Weld structural steel channels flush to top and bottom of door.
      3. Weld hardware reinforcement plates in place.
    1. Steel Frames:
       1. Sheet steel and metal thickness appropriate to maintain door blast and fire ratings, mitred corners.
    2. Accessories:
       1. Door Hardware: Manufacturer's standard.
          1. Sliding door hardware including track, brackets, hangers, and guides.

\*\* NOTE TO SPECIFIER \*\* Electric operators should be considered when door panels weigh more than 350 pounds. Delete electric operator if not required.

* + - 1. Electric Operator and Safety Device: Manufacturer's standard for blast resistance rating required.
      2. Perimeter Gasketing System: Manufacturer's standard for blast resistance rating required.
         1. Supply perimeter seal, bottom seal, and threshold.
      3. Primer: Rust inhibitive zinc chromate.
      4. Threshold and perimeter seals to be factory supplied.
    1. Affix permanent metal nameplates to door and frame, indicating manufacturer's name, door tag, model number, and performance rating.

\*\* NOTE TO SPECIFIER \*\* Delete door finish not required.

* + 1. Factory Door Finish: Factory applied zinc chromate primer to be applied to all exposed surfaces.
    2. Factory Door Finish: Factory applied zinc chromate primer touch-up only, where product has been welded and ground smooth.

1. EXECUTION
   1. EXAMINATION
      1. Do not begin installation until substrates have been properly prepared.
      2. If substrate preparation is the responsibility of another installer, notify Architect of unsatisfactory preparation before proceeding.
   2. PREPARATION
      1. Clean surfaces thoroughly prior to installation.
      2. Prepare surfaces using the methods recommended by the manufacturer for achieving the best result for the substrate under the project conditions.
   3. INSTALLATION
      1. Install components including doors, frames, and hardware in accordance with manufacturer's written instructions, approved submittals and in proper relationship with adjacent construction.

\*\* NOTE TO SPECIFIER \*\* Delete if glazing not required

* + - 1. Install factory-supplied glazing to door panels.
    1. Install doors and frames to CSDMA or HMMA 840 standards and in accordance with NFPA 80, and local authority having jurisdiction.
    2. Coordinate with wall construction for anchor placement.
    3. Set frames plumb, square, level and at correct elevation.
    4. Allow for deflection to ensure that structural loads are not transmitted to frame.
    5. Adjust operable parts for correct clearances and function.
  1. ERECTION TOLERANCES
     1. Installation tolerances of installed frame for squareness, alignment, twist and plumbness are to be no more than plus or minus 1/16 inch (1.5mm) in compliance with HMMA 841.
  2. FIELD QUALITY CONTROL
     1. Provide qualified manufacturer's representative to instruct installers on the proper installation and adjustment of door assemblies.
     2. Provide manufacturer's representative to inspect door installation, and test minimum five cycles of operation. Correct any deficient doors, accessories or operators.
  3. PROTECTION
     1. Protect installed products until completion of project.
     2. Touch-up, repair or replace damaged products before Substantial Completion.

END OF SECTION