

**PART - 1      GENERAL**

**1.1          SUMMARY**

- .1 Section Includes: Labour, Products, equipment, and services necessary to complete the work of this Section, including but not limited to:
  - .1 Hollow metal doors and frames, non-rated.
  - .2 Metal frames for Wood doors, refer to Section 08 14 00.
  - .3 Interior glazed steel frames, including transom frames, sidelight frames, and borrowed lights and screens.
  - .4 Pre-wired hollow metal doors and frames with CSA approved wiring system, including CSA approved conduit and fittings, where indicated on Hardware Schedule.
- .2 Related Requirements
  - .1 Comply with Conditions of the Contract and Division 01, General Requirements.

**1.2          REFERENCES**

- .1 American Society for Testing and Materials (ASTM):
  - .1 ASTM A568/A568M, Standard Specification for Steel, Sheet, Carbon, Structural, and High-Strength, Low-Alloy, Hot-Rolled and Cold-Rolled, General Requirements for
  - .2 ASTM A653/A653M, Standard Specification for Steel Sheet, Zinc-Coated (Galvanized) or Zinc-Iron Alloy-Coated (Galvannealed) by the Hot-Dip Process.
  - .3 ASTM A924/A924M, Standard Specification for General Requirements for Steel Sheet, Metallic-Coated by the Hot-Dip Process.
  - .4 ASTM E90, Standard Test Method for Laboratory Measurement of Airborne Sound Transmission Loss of Building Partitions and Elements
  - .5 ASTM E413, Classification for Rating Sound Insulation.
- .2 Canadian Standards Association (CSA):
  - .1 CSA-W59: Welded Steel Construction.
- .3 Canadian General Standards Board (CGSB):
  - .1 CAN/CGSB-1.40, Anti-corrosive Structural Steel Alkyd Primer.
  - .2 CAN/CGSB-1.181, Ready-Mixed Organic Zinc-Rich Coating.
  - .3 CAN/CGSB-82.5: Insulated Steel Doors.
- .4 Underwriters' Laboratories of Canada (ULC):
  - .1 CAN/ULC-S104-15, Standard Method for Fire Tests of Door Assemblies
  - .2 CAN/ULC-S105-2016(R2020), Standard Specification for Fire Door Frames Meeting the Performance Required by CAN/ULC-S104.
  - .3 CAN/ULC-S106-15 (R2020), Standard Method for Fire Tests of Window and Glass Block Assemblies.
  - .4 CAN/ULC-S702: Standard for Thermal Insulation, Mineral Fibre, for Buildings.
  - .5 CAN/ULC-S704: Standard for Thermal Insulation, Polyurethane and Polyisocyanurate Boards, Faced.

- .6 Underwriters Laboratories of Canada, List of Equipment and Materials.
- .5 DHI (Door Hardware Institute) - The Installation of Commercial Steel Doors and Steel Frames, Insulated Steel Doors in Wood Frames and Builder's Hardware.
  - .1 ANSI/DHI A115.1G-1994: Installation Guide for Doors and Hardware.
- .6 CSDFMA (Canadian Steel Door and Frame Manufacturers Association).
- .7 NFPA 80 - Fire Doors, Fire Windows.
- .8 NFPA 252 - Fire Tests for Door Assemblies.
- .9 SDI-100 - Standard Steel Doors and Frames.
- .10 Steel Door Institute: ANSI/SDI A250.8-17, Specifications for Standard Steel Doors and Frames (SDI-100).
- .11 NAAMM HMMA 802: Manufacturing of Hollow Metal Doors and Frames.
- .12 NAAMM HMMA 805: Recommended Selection and Usage Guide for Hollow Metal Doors and Frames.
- .13 NAAMM HMMA 840: Guide Specification for Installation and Storage of Hollow Metal Doors and Frames.

### 1.3 **SUBMITTALS**

- .1 Shop drawings: Indicate each type of door and frame, door and frame elevations, configurations, material, steel core thicknesses, mortises, reinforcements, anchor types and spacing, location of exposed fasteners, openings, arrangement of hardware, cut-outs for hardware, glazing, louvers, finishes, and fire rating.
- .2 Product Data: Submit manufacturer's literature and data sheets illustrating door and frame construction.
  - .1 Ensure data sheets provide required information including detailed instructions for installing as well as maintaining, preserving, and keeping materials in clean and safe conditions. Provide adequate warning of maintenance practices or cleaning agents detrimental to specified materials.
- .3 Samples: Submit samples indicating 1 cut-away corner sample and minimum 300 mm square for each type of door to indicated following:
  - .1 Core.
  - .2 Reinforcing.
  - .3 Facing.
  - .4 Frame.
- .4 Submit a copy of NAMMA-HMMA 840 to the contractor responsible for the storage and installation of hollow metal doors and frames.

### 1.4 **QUALITY ASSURANCE**

- .1 Qualifications: Provide evidence that the:
  - .1 Manufacturer has fabricated product of types under this Section, for projects of similar size and scope, for a continuous period of not less than five (5) years prior to award of Subcontract, has personnel and plant equipment capable of fabricating steel door and frame product of the types specified and has a written quality control system in place.

- .2 Product supplier is a qualified direct distributor of the products to be furnished, and has in his regular employ, an AHC, CDC, or person of equivalent experience, available at reasonable times to consult with the Consultant, Subcontractor and/or Owner.
- .3 Installer is a firm with five (5) years continuous experience prior to the award of Subcontract, in installing product covered by this Section and Section 08 71 00, is knowledgeable of the manufacturers' and ANSI/NFPA 80 requirements relating to the installation of labelled fire rated products covered by this section and Section 08 71 00 Door Hardware.
- .2 Quality Criteria:
  - .1 Ensure all door and frame Products meet the performance requirements specified herein. Fabricate assemblies on strict accordance with reviewed submittal drawings.
  - .3 Conform to Canadian Steel Door and Frame Manufacturers Association standards.
  - .4 Welding: to CSA W59.
- 1.5 **DELIVERY, STORAGE, AND HANDLING**
  - .1 Brace and protect assemblies to prevent distortion during shipment. Store in a secure dry location.
  - .2 Store doors vertically, resting on planks, with blocking between to allow air to circulate.
- 1.6 **WARRANTY**
  - .1 Steel door and frame Products provided under this Section, touched up only with zinc-rich rust inhibitive primer where coating has been removed during its manufacture, shall be warranted by the manufacturer for a period of ten (10) years from the date of supply:
    - .1 Against rust perforation, when stored, installed and finish painted in accordance with manufacturer's published instructions.
    - .2 For finish paint adhesion, when stored and cleaned in accordance with manufacturer's application recommendation, and finish painted with commercial quality paint in accordance with Section 09 91 00 and to paint manufacturer's application recommendations.

## **PART - 2 PRODUCTS**

### **2.1 DESIGN AND PERFORMANCE REQUIREMENTS**

- .1 Ensure door and frame Products are fabricated in strict accordance with CSDMA recommendations and manufacturer's requirements. Ensure steel is free of scale, pitting, coil breaks, surface blemishes, buckles, waves, and other defects. Ensure Product quality meets standards set by Canadian Steel Door Manufacturers Association (CSDMA).
- .2 Ensure door and frame assembly meets acceptance criteria of ANSI A224.1 and is certified as Level "A" (1,000,000 cycles) and Twist Test Acceptance Criteria (deflection not to exceed 6 mm/13.6 kg (1/4"/30 lb) force, total deflection at 136 kg (300 lb) force not to exceed 64 mm (2-1/2") and permanent deflection not to exceed 3 mm (1/8")) when tested in accordance with ANSI A250.4. Ensure tests are conducted by an independent nationally recognized accredited laboratory.

### **2.2 MATERIALS**

- .1 Sheet Steel: Commercial grade steel to ASTM A568/A568M, Class 1, hot-dip galvanized to ASTM A653/A653M, ZF120 (A40), known commercially as "Colourbond", "Satincoat", or

"Galvanneal". Steel sheet thicknesses specified are base metal thicknesses prior to galvanizing.

.2 Core Materials:

.1 Interior Doors:

- .1 Steel Stiffened: vertically stiffened with 0.912 mm steel ribs at 152mm o.c. maximum, with all voids filled completely with semi-rigid mineral wool insulation. Fabricate door faces with a single sheet of steel welded to steel stiffeners.
- .2 Honeycomb: Structural small cell, 25 mm maximum kraft paper 'honeycomb'; weight: 36.3 kg per ream minimum; density: 16.5 kg/m<sup>3</sup> minimum. Provide items sanded to required thickness.
- .3 Insulation – Standard non-insulated doors: Loose batt type, density: 1.5 pcf (24kg/m<sup>3</sup>) minimum, conforming to ASTM C665.

2.3 **ACCESSORIES**

- .1 Glazing Stops: rolled steel channel shape, 0.9 mm minimum thickness, butted corners; prepared for countersink style tamper-proof screws.
- .2 Reinforcements: regular galvanneal steel, thicknesses as follows:
  - .1 Flush Bolt, Lock and Strike Reinforcement: minimum 1.6 mm (16 ga).
  - .2 Hinge Reinforcements: minimum 3.5 mm (10 ga).
  - .3 Door Closer and Holder Reinforcements: minimum 2.6 mm thick (12 ga) steel.
  - .4 Reinforcement for Surface Applied Hardware: minimum 1.2 mm thick (18 ga) steel.
  - .5 Concealed Door Closer or Holder Reinforcements: minimum 2.6 mm thick (12 ga) steel.
  - .6 Top and Bottom End Channels: minimum 1.2 mm thick (18 ga) steel.
  - .7 Jamb Spreaders: minimum 0.912 mm thick (20 ga) steel
- .3 Anchors: regular galvanneal steel, as follow:
  - .1 T-Strap Type: 1.2 mm thick.
  - .2 Stirrup-strap Type: 50 x 250mm size, 1.6 mm thick.
  - .3 Jamb Floor Type: 1.6 mm thick.
  - .4 Stud Type: 1.0mm thick.
- .4 Conduit and Fittings: 20 mm o.d. EMT conduit and fittings, as specified in Division 26.
- .5 Bituminous Coating: fibrous asphalt emulsion.
- .6 Mortar Guard Boxes: regular galvanneal steel, 0.8 mm thick.
- .7 Joint Sealer: as specified in Section 07 92 00.
- .8 Frame thermal break: Rigid PVC extrusion to CGSB 41-GP-19Ma.
- .9 Fasteners for Stops: Cadmium plated steel, counter sunk flat or oval head sheet metal Phillips screws.

- .10 Adhesives:
  - .1 Steel Components: Heat resistant, spray grade, resin reinforced neoprene/rubber (polychloroprene) based, low viscosity, contact cement.
  - .2 Polyisocyanurate Cores: Heat resistant, epoxy resin based, low viscosity, contact cement.
  - .3 Lock-Seam Doors: Fire resistant, RRPC, fire resistant, high viscosity sealant/adhesive.
- .11 Resilient bumpers: Round, black rubber, stud mount.
- .12 Primer: Zinc rich primer.
- .13 Standard Duty Interior Hollow Metal Doors and Transom Panels:
  - .1 1.2 mm thick (18 ga) minimum commercial quality steel sheet faces, flush design, paintable galvalume finish.
  - .2 Vertical Stiffeners: 0.912 mm thick (20 ga) minimum steel sheet.
  - .3 Glazing Stops: 0.912 mm thick (20 ga) minimum steel sheet, formed, drilled and countersunk for fastenings.
- .14 Heavy Duty Interior Hollow Metal Doors and Transom Panels:
  - .1 Face Sheets: 1.519 mm thick (16 ga) minimum steel sheet.
  - .2 Vertical Stiffeners: 0.912 mm thick (20 ga) minimum steel sheet.
  - .3 Glazing Stops: 1.519 mm thick (16 ga) minimum steel sheet, formed, drilled and countersunk for fastenings.
- .15 Interior Hollow Metal Door Frames and Transom Frames: Minimum 1.60 mm (0.063") 16 gauge thick steel, cold-rolled commercial quality steel; paintable galvalume finish; sizes as indicated on Door Schedule and Drawings.

## 2.4 **FABRICATION - GENERAL**

- .1 Blank, reinforce, drill and tap doors and frames for mortised hardware. Reinforce doors and frames for surface mounted hardware.
- .2 Apply, at factory, touch up primer to doors and frames manufactured from galvanized steel where coating has been removed during fabrication.
- .3 Make provisions in doors and frames to suit requirements of Section providing security devices.
- .4 Fabricate fire rated assemblies to ULC requirements and bearing ULC, ULI or Warnock-Hersey International Ltd., label, as acceptable to authorities having jurisdiction.
- .5 Locate fire rating labels on the inside of the frame hinge jamb and door hinge edge midway between the top hinge and the head of the door.

## 2.5 **FABRICATION - DOORS**

- .1 Fabricate doors to HMMA 802, and to the standards and specifications published by the Canadian Steel Door and Frame Manufacturer's Association.
- .2 Provide continuous faces free from joints, tool markings and abrasions; with hardware reinforcement plates welded in place.
- .3 Welding: to CSA W59. Grind exposed welds smooth and flush. Fill open joints, seams, and depressions with filler or by continuous brazing or welding. Grind and sand to a smooth, true, uniform finish.

- .4 Fabricate fire-rated doors in accordance with Canadian Fire Labelling Guide for Steel Doors and Frames as published by the Canadian Steel Door and Frame Manufacturer's Association.
- .5 Fabricate doors to accommodate scheduled glazing. Secure glazing stops to doors with counter sunk oval head sheet metal screws.
- .6 Attach fire rated label to each fire rated door unit.
- .7 Completely fill door cores with specified core materials.
- .8 Pre-wire door complete with CSA approved EMT metallic conduit and fittings for Electrolynx system where indicated on Hardware Schedule.
  - .1 Electrolynx wiring supplied by Section 08 71 00.
- .9 Preparation for hardware:
  - .1 Prepare doors for heavy weight oversize butt hinges, mortise locksets, rim and surface vertical rod exit devices, surface door closers and concealed overhead stops.
  - .2 Conform to approved finish hardware schedule.
  - .3 Blank, mortise, reinforce, and drill doors to receive template hardware, as required. Coordinate with Section 08 71 00.
  - .4 Where electrified hardware is specified on the approved hardware schedule, steel door and frame product, shall be provided with Electrolynx system consisting of CSA approved conduit, junction boxes and wire harness complete with modular plugs for coordinated connection directly to the electrified hardware.
- .10 Reinforce door edges with channel reinforcing.
- .11 Door faces of all steel doors shall be fabricated without visible seams, free of scale, pitting, coil brakes, buckles and waves.
- .12 Longitudinal edges of doors shall be mechanically interlocked and adhesive assisted.
- .13 Tack weld and fill seam between faces and door edges of doors
- .14 Bevel stiles minimum 3mm.
- .15 Coordinate louvre openings with Division 23.
- .16 Fabrication Tolerances:
  - .1 Fabricated door deformation (bow, cup, twist, warp) shall not exceed 3 mm when measured with a straight edge placed diagonally across door extending from top to bottom.
  - .2 Widths of door openings shall be measured from inside of frame jamb rebates with a tolerance of +1.5 mm, -1 mm.
  - .3 Unless builders' hardware requirements dictate otherwise, doors shall be sized so as to fit openings and allow a 3 mm clearance at jambs and head. Provide 19 mm clearance between bottom of door and finished floor (exclusive of floor coverings). Tolerances on door sizes shall be 1.2 mm.
  - .4 Provide doors with 1.5 mm clearance at heads and jambs, and no more than 3 mm door and threshold.

## 2.6 **FABRICATION - FRAMES**

- .1 Fabricate frames as welded unit. Knock down frames will not be allowed.
- .2 Conform to HMMA 802. Conform to HMMA 805 for frame thickness selection in relation to door thickness.
- .3 Transom Bars for Glazed Lights: Fixed type, of same profiles as jamb and head.
- .4 Welding: to CSA W59. Grind exposed welds smooth and flush. Fill open joints, seams, and depressions with filler or by continuous brazing or welding. Grind and sand to a smooth, true, uniform finish.
- .5 Mitre corners of frames. Cut frame mitres accurately and weld continuously on inside of frame.
- .6 Protect strike and hinge reinforcements and other openings with mortar guard boxes welded to frame.
- .7 Reinforce frames wider than 1.2 metres with roll formed steel channels fitted tightly into frame head, flush with top.
- .8 Fit frames with channel or angle spreaders, minimum two per frame, to ensure proper frame alignment. Install stiffener plates to spreaders between frame trim where required to prevent bending of trim and to maintain alignment when setting and during construction.
  - .1 Channel or angle spreaders are to be removed prior to installation and are not to be used as part of the installation process.
- .9 Attach fire rated label to each fire rated unit.
- .10 Fabricate frames to accommodate scheduled glazing. Secure glazing stops to frames with counter sunk oval head sheet metal screws.
- .11 Provide 3 bumpers on strike jamb for each single door.
- .12 Preparation for hardware:
  - .1 Prepare frames for heavy weight oversize butt hinges, mortise locksets, rim and surface vertical rod exit devices, surface door closers and concealed overhead stops.
  - .2 Conform to approved finish hardware schedule.
  - .3 Blank, mortise, reinforce, drill and tap frames to receive template hardware, as required. Coordinate with Section 08 71 00.
  - .4 Where electrified hardware is specified on the approved hardware schedule, steel door and frame product, shall be provided, consisting of CSA approved conduit, junction boxes and wire harness complete with modular plugs for coordinated connection directly to the electrified hardware. Refer to Finish Hardware Schedule for openings that require electrified hardware.
- .13 Fabrication Tolerances:
  - .1 Widths of door openings shall be measured from inside of frame jamb rebates with a tolerance of +1.5 mm, -1 mm.
  - .2 Manufacturing tolerances on formed frame profiles shall be 1 mm for faces, stop heights and jamb depths. Tolerances for throat openings and door rebates shall be 1.5 mm and 0.5 mm respectively. Hardware cutout dimensions shall be as per template dimensions, +0.38 mm, -0.

## **PART - 3 EXECUTION**

3.1 **INSTALLATION - GENERAL**

- .1 Touch up with primer galvanized finish damaged during installation.

3.2 **INSTALLATION - FRAMES**

- .1 Install frames plumb, square, aligned, without twist at correct elevation, to HMMA 840, ANSI/DHI A115.IG, Canadian Steel Door and Frame Manufacturers Association standards and manufacturer's instructions and templates.
- .2 Provide suitable anchors to suit construction. Use one base anchor and two wall anchors per jamb side for frames up to 1500 mm and one additional wall anchor per jamb side for each additional height of 750 mm or fraction thereof.
- .3 Secure anchorages and connections to adjacent construction.
- .4 Brace frames rigidly in position while building-in. Install temporary horizontal wood spreader at third points of door opening to maintain frame width. Remove temporary spreaders after frames are built-in.
- .5 Make allowances for deflection of structure to ensure structural loads are not transmitted to frames.
- .6 Coordinate installation of glass and glazing.
- .7 Seal openings between frames and walls as specified in Section 07 92 00.

3.3 **INSTALLATION - DOORS**

- .1 Install doors to HMMA 840, ANSI/DHI A115.IG, Canadian Steel Door and Frame Manufacturers Association standards and manufacturer's instructions and templates.
- .2 Coordinate installation of finish hardware.
- .3 Coordinate installation of glass and glazing.
- .4 Provide even margins between doors and jambs and doors and finished floor and thresholds as follows:
  - .1 Hinge side: 3 mm.
  - .2 Latchside and head: 3 mm.
  - .3 Finished floor for non-rated assemblies: 12 mm.
  - .4 Finished floor for rated assemblies: 6 mm.
- .5 Install louvres.

3.4 **ADJUSTING**

- .1 Adjust door for smooth and balanced door movement.

END OF SECTION