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**PART 1**      **GENERAL**

**1.1**      **RELATED SECTIONS**

- .1      Section 01 33 00 - Submittal Procedures.
- .2      Section 01 74 21 - Construction/Demolition Waste Management and Disposal.
- .3      Section 07 21 29.03 - Sprayed Insulation – Polyurethane Foam.
- .4      Section 07 92 00 - Joint Sealants.
- .5      Section 08 14 16 - Flush Wood Doors
- .6      Section 08 71 00 - Door Hardware.
- .7      Section 08 80 50 - Glazing.
- .8      Section 09 91 23 - Interior Painting.

**1.2**      **REFERENCES**

- .1      American Society for Testing and Materials (ASTM)
  - .1      ASTM A653/A653M, Specification for Steel Sheet Zinc-Coated (Galvanized) or Zinc-Iron Alloy-Coated (Galvanized) by the Hot Dip Process.
- .2      Canadian General Standards Board (CGSB)
  - .1      CAN/CGSB-1.181, Ready-Mixed Organic Zinc-Rich Coating.
  - .2      CGSB 41-GP-19Ma, Rigid Vinyl Extrusions for Windows and Doors.
- .3      Canadian Standards Association (CSA)
  - .1      G40.20/G40.21, General Requirements for Rolled or Welded Structural Quality Steel/Structural Quality Steel.
  - .2      CSA W59, Welded Steel Construction (Metal Arc Welding).
- .4      Canadian Steel Door Manufacturers' Association, (CSDMA).
  - .1      CSDMA, Specifications for Commercial Steel Doors and Frames.
  - .2      CSDMA, Recommended Selection and Usage Guide for Commercial Steel Doors.
- .5      National Fire Protection Association (NFPA)
  - .1      NFPA 80, Standard for Fire Doors and Fire Windows.
  - .2      NFPA 252, Standard Methods of Fire Tests of Door Assemblies.
- .6      Underwriters' Laboratories of Canada (ULC)

- .1 CAN4-S104M, Fire Tests of Door Assemblies.
- .2 CAN4-S105M, Fire Door Frames Meeting the Performance Required by CAN4-S104.
- .3 CAN/ULC-S701, Thermal Insulation, Polystyrene, Boards and Pipe Covering.
- .4 CAN/ULC-S702, Thermal Insulation, Mineral Fibre, for Buildings.
- .5 CAN/ULC-S704, Thermal Insulation, Polyurethane and Polyisocyanurate Boards, Faced.

### **1.3 DESIGN REQUIREMENTS**

- .1 Design door assembly to withstand minimum 1,000,000 swing cycles in accordance with ANSI A151.1, with no failure of any design features of the door.
- .2 Design exterior frame assembly to accommodate to expansion and contraction when subjected to minimum and maximum surface temperature of -35 °C to 35 °C.
- .3 Maximum deflection for exterior steel entrance screens under wind load of 1.2 kPa not to exceed 1/175th of span.
- .4 Steel fire rated doors and frames: labelled and listed by an organization accredited by Standards Council of Canada in conformance with CAN4-S104 and NFPA 252 for ratings specified or indicated.
- .5 Provide fire labelled frames for openings requiring fire protection ratings. Test products in conformance with CAN4-S104 and NFPA 252 and listed by nationally recognized agency having factory inspection services and construct as detailed in Follow-Up Service Procedures/Factory Inspection Manuals issued by listing agency to individual manufacturers.

### **1.4 SUBMITTALS**

- .1 Indicate each type of door, material, steel core thicknesses, mortises, reinforcements, location of exposed fasteners, openings, glazed, louvred, arrangement of hardware and fire rating and finishes.
- .2 Indicate each type frame material, core thickness, reinforcements, glazing stops, location of anchors and exposed fastenings and reinforcing firerating and finishes.
- .3 Include schedule identifying each unit, with door marks and numbers relating to numbering on drawings and door schedule.
- .4 Submit one 300 x 300 mm top corner sample of each type door.
- .5 Submit one 300 x 300 mm corner sample of each type of frame.
  - .1 Show butt cutout, glazing stops.

## **1.5 DELIVERY STORAGE AND HANDLING**

- .1 Deliver, store, handle and protect doors and frames in accordance with Section 01 61 00-Common Product Requirements.
- .2 Deliver, handle and store doors and frames at the job site in such a manner as to prevent damage.
- .3 Store doors and frames under cover with doors stored in a vertical position on blocking, clear of floor and with blocking between doors to permit air circulation.

## **1.6 QUALITY ASSURANCE**

- .1 Conform to requirements to ANSI A117.1
- .2 Company specializing in manufacturing products specified with a minimum of five (5) years documented experience.

## **1.7 WARRANTY**

- .1 Provide a written warranty for work of this section from manufacturer for failure due to defective materials and from contractor for failure due to defective installation workmanship, for one (1) year respectively.

# **PART 2 PRODUCTS**

## **2.1 MATERIALS**

- .1 Hot dipped galvanized steel sheet: to ASTM A653/A653M, ZF75, minimum base steel thickness in accordance with CSDMA Table 1 - Thickness for Component Parts.
- .2 Reinforcement channel: to CSA G40.20/G40.21, Type 44W, coating designation to ASTM A653/A653M, ZF75.

## **2.2 DOOR CORE MATERIALS**

- .1 Stiffened: face sheets welded insulated core.
  - .1 Expanded polystyrene: CAN/ULC-S701, density 16 to 32 kg/m<sup>3</sup>.
  - .2 Polyurethane: to CAN/ULC-S704 rigid, modified polyisocyanurate, closed cell board. Density 32 kg/m<sup>3</sup>.
- .2 Temperature rise rated (TRR): core composition to limit temperature rise on unexposed side of door to 250 °C at 60 minutes. Core to be tested as part of a complete door assembly, in accordance with CAN4-S104, ASTM E152 or NFPA 252, covering Standard Method of Tests of Door Assemblies and listed by nationally recognized testing agency having factory inspection service.
- .3 Thermal Insulation material must:

- .1 Not require being labelled as poisonous, corrosive, flammable or explosive under the Consumer Chemical and Container Regulations of the Hazardous Products Act.
- .2 Be manufactured using a process that uses chemical compounds with the minimum zone depletion potential (ODP) available.

## **2.3 ADHESIVES**

- .1 Polystyrene and polyurethane cores: heat resistant, epoxy resin based, low viscosity, contact cement.

## **2.4 PRIMER**

- .1 Touch-up prime CAN/CGSB-1.181.

## **2.5 ACCESSORIES**

- .1 Door silencers: single stud rubber/neoprene type. except where acoustic seals or weatherstrips are specified.
- .2 Fabricate glazing stops as formed channel, minimum 16 mm height, accurately fitted, butted at corners and fastened to frame sections with counter-sunk oval head sheet metal screws.
- .3 Door bottom seal: Section 08 71 00 – Door Hardware.
- .4 Metallic paste filler: to manufacturer's standard.
- .5 Fire labels: metal riveted.
- .6 Sealant: Section 07 92 00 – Joint Sealants.
- .7 Provide low expanding, single component polyurethane foam sealant installed at head and jamb perimeter of door frame for sealing to building air barrier, vapour retarder and door frame. Foam sealant width to be adequate to provide required air tightness and vapour diffusion control to building air barrier and vapour retarder foam interior. Refer to Section 07 21 29.03 Sprayed Insulation – Polyurethane Foam.
- .8 Glazing: Section 08 80 50 – Glazing.
- .9 Make provisions for glazing as indicated and provide necessary glazing stops.
  - .1 Provide removable stainless steel glazing beads for dry glazing of snap-on type.
  - .2 Design exterior glazing stops to be tamperproof.
- .10 Finish Painting: to Section 09 91 23 – Interior Painting.

## **2.6 FRAMES FABRICATION GENERAL**

- .1 Fabricate frames in accordance with CSDMA specifications.

- .2 Fabricate frames to profiles and maximum face sizes as indicated.
- .3 Interior frames: 1.6 mm welded type construction.
- .4 Blank, reinforce, drill and tap frames for mortised, template hardware, and electronic hardware using templates provided by finish hardware supplier. Reinforce frames for surface mounted hardware.
- .5 Protect mortised cutouts with steel guard boxes.
- .6 Prepare frame for door silencers, 3 for single door, 2 at head for double door.
- .7 Manufacturer's nameplates on frames and screens are not permitted.
- .8 Conceal fastenings except where exposed fastenings are indicated.
- .9 Provide factory-applied touch up primer at areas where zinc coating has been removed during fabrication.
- .10 Insulate exterior frame components with polyurethane insulation.

## **2.7 FRAME ANCHORAGE**

- .1 Shim and anchor new doors in accordance with CAN/CSA A440.4.
- .2 Provide appropriate anchorage to floor and wall construction.
- .3 Locate each wall anchor immediately above or below each hinge reinforcement on hinge jamb and directly opposite on strike jamb.
- .4 Provide 2 anchors for rebate opening heights up to 1520 mm and 1 additional anchor for each additional 760 mm of height or fraction thereof.
- .5 Locate anchors for frames in existing openings not more than 150 mm from top and bottom of each jambs and intermediate at 660 mm o.c. maximum.

## **2.8 FRAMES: WELDED TYPE**

- .1 Welding in accordance with CSA W59.
- .2 Accurately mitre or mechanically joint frame product and securely weld on inside of profile.
- .3 Cope accurately and securely weld butt joints of mullions, transom bars, centre rails and sills.
- .4 Grind welded joints and corners to a flat plane, fill with metallic paste and sand to uniform smooth finish.

- .5 Securely attach floor anchors to inside of each jamb profile.
- .6 Weld in 2 temporary jamb spreaders per frame to maintain proper alignment during shipment.

## **2.9 DOOR FABRICATION GENERAL**

- .1 Doors: swing type, flush, with provision for glass and/or louvre openings as indicated.
- .2 Exterior doors: Steel Stiffened insulated, hollow steel construction. Interior doors: honeycomb hollow steel construction.
- .3 Fabricate doors with longitudinal edges locked seam for exterior and interior doors.
- .4 Doors: manufacturers' proprietary construction, tested and/or engineered as part of a fully operable assembly, including door, frame, gasketing and hardware in accordance with ASTM E330.
- .5 Blank, reinforce, drill doors and tap for mortised, templated hardware and electronic hardware.
- .6 Factory prepare holes 12.7 mm diameter and larger except mounting and through-bolt holes, on site, at time of hardware installation.
- .7 Reinforce doors where required, for surface mounted hardware. Provide flush steel top caps to exterior doors. Provide inverted, recessed, spot welded channels to top and bottom of interior doors.
- .8 Provide factory-applied touch-up primer at areas where zinc coating has been removed during fabrication.
- .9 Provide fire labelled doors for those openings requiring fire protection ratings, as scheduled. Test such products in strict conformance with CAN4-S104 ASTM E152 NFPA 252 and list by nationally recognized agency having factory inspection service and construct as detailed in Follow-Up Service Procedures/Factory Inspection Manuals issued by listing agency to individual manufacturers.
- .10 Manufacturer's nameplates on doors are not permitted.

## **2.10 HOLLOW STEEL CONSTRUCTION**

- .1 Form each face sheet for exterior doors from 1.2 mm sheet steel.
- .2 Form each face sheet for interior doors from 1.2 sheet steel.
- .3 Reinforce exterior doors with vertical stiffeners, securely welded to each face sheet at 150 mm on centre maximum.
- .4 Fill voids between stiffeners of exterior doors with polystyrene core.

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**PART 3**      **EXECUTION**

**3.1**            **INSTALLATION GENERAL**

- .1      Install labelled steel fire rated doors and frames to NFPA 80 except where specified otherwise.
- .2      Install doors and frames to CSDMA Installation Guide.

**3.2**            **FRAME INSTALLATION**

- .1      Set frames plumb, square, level and at correct elevation.
- .2      Secure anchorages and connections to adjacent construction.
- .3      Brace frames rigidly in position while building-in. Install temporary horizontal wood spreader at third points of door opening to maintain frame width. Provide vertical support at centre of head for openings over 1200 mm wide. Remove temporary spreaders after frames are built-in.
- .4      Make allowances for deflection of structure to ensure structural loads are not transmitted to frames.
- .5      Caulk perimeter of frames between frame and adjacent material.
- .6      Maintain continuity of air barrier and vapour retarder.
- .7      Fill frame cavities with spray-in polyurethane foam at sound-rated doors.

**3.3**            **DOOR INSTALLATION**

- .1      Install doors and hardware in accordance with hardware templates and manufacturer's instructions and Section 08 71 00 - Door Hardware.
- .2      Provide even margins between doors and jambs and doors and finished floor as follows.
  - .1      Hinge side: 1.0 mm.
  - .2      Latch side and head: 1.5 mm.
  - .3      Finished floor: 13 mm.
- .3      Adjust operable parts for correct function.
- .4      Install louvres.

**3.4**            **FINISH REPAIRS**

- .1      Touch up with primer finishes damaged during installation.
- .2      Fill exposed frame anchors and surfaces with imperfections with metallic paste filler and sand to a uniform smooth finish.

**3.5 GLAZING**

- .1 Install glazing for doors and frames in accordance with Section 08 80 50 - Glazing.

**3.6 COMMISSIONING**

- .1 Contractor to instruct maintenance personnel in operation and maintenance of doors and hardware.
- .2 Confirm operation and function for all doors and hardware.
- .3 Commissioning will be witnessed by Departmental Representative and Certificate will be signed by Contractor and Departmental Representative.

**END OF SECTION**