

Approved: 2007-12-31

**Part 1 General**

**1.1 RELATED REQUIREMENTS**

- .1 Section 07 92 00 – Joint Sealants
- .2 Section 08 36 19 – Multi-Leaf Vertical Lift Doors.

**1.2 REFERENCES**

- .1 American Society for Testing and Materials International (ASTM)
  - .1 ASTM A653/A653M-06a, Specification for Steel Sheet, Zinc-Coated (Galvanized) or Zinc-Iron Alloy-Coated (Galvannealed) by the Hot-Dip Process.
- .2 Canada Green Building Council (CaGBC)
  - .1 LEED Canada-NC Version 1.0-2004, LEED (Leadership in Energy and Environmental Design): Green Building Rating System Reference Package For New Construction and Major Renovations (including Addendum 2007).
  - .2 LEED Canada-CI Version 1.0-2007, LEED (Leadership in Energy and Environmental Design): Green Building Rating System Reference Guide For Commercial Interiors.
- .3 Canadian General Standards Board (CGSB)
  - .1 CAN/CGSB-1.181-99, Ready-Mixed Organic Zinc-Rich Coating.
  - .2 CGSB 41-GP-19Ma-84, Rigid Vinyl Extrusions for Windows and Doors.
- .4 Canadian Standards Association (CSA International)
  - .1 CSA-G40.20-04/G40.21-04, General Requirements for Rolled or Welded Structural Quality Steel/Structural Quality Steel.
  - .2 CSA W59-03, Welded Steel Construction (Metal Arc Welding).
- .5 Canadian Steel Door Manufacturers' Association (CSDMA)
  - .1 CSDMA, Recommended Specifications for Commercial Steel Doors and Frames, 2000.
  - .2 CSDMA, Selection and Usage Guide for Commercial Steel Doors, 1990.
- .6 National Fire Protection Association (NFPA)
  - .1 NFPA 80-99, Standard for Fire Doors and Fire Windows.
  - .2 NFPA 252-03, Standard Methods of Fire Tests of Door Assemblies.
- .7 Underwriters' Laboratories of Canada (ULC)
  - .1 CAN/ULC-S701-01, Standard for Thermal Insulation, Polystyrene, Boards and Pipe Covering.
  - .2 CAN/ULC-S702-97, Standard for Thermal Insulation, Mineral Fibre, for Buildings.
  - .3 CAN/ULC-S704-03, Standard for Thermal Insulation, Polyurethane and Polyisocyanurate Boards, Faced.

- .4 CAN4-S104-M80, Standard Method for Fire Tests of Door Assemblies.
- .5 CAN4-S105-M85, Standard Specification for Fire Door Frames Meeting the Performance Required by CAN4-S104.

### **1.3 SYSTEM DESCRIPTION**

- .1 Design Requirements:
  - .1 Design exterior frame assembly to accommodate to expansion and contraction when subjected to minimum and maximum surface temperature of -35 degrees C to 35 degrees C.
  - .2 Maximum deflection for exterior steel entrance screens under wind load of 1.2 kPa not to exceed 1/175th of span.
  - .3 Steel fire rated doors and frames: labelled and listed by an organization accredited by Standards Council of Canada in conformance with CAN4-S104 NFPA 252 for ratings specified or indicated.
  - .4 Provide fire labelled frames for openings requiring fire protection ratings. Test products in conformance with CAN4-S104 and listed by nationally recognized agency having factory inspection services.

### **1.4 ACTION AND INFORMATIONAL SUBMITTALS**

- .1 Provide submittals in accordance with Section 01 33 00 – Submittal Procedures.
- .2 Provide product data: in accordance with Section 01 33 00 – Submittal Procedures.
- .3 Provide shop drawings: in accordance with Section 01 33 00 – Submittal Procedures.
  - .1 Submit drawings stamped and signed by professional engineer registered or licensed in the Province of Manitoba, Canada.
  - .2 Indicate each type of door, material, steel core thicknesses, mortises, reinforcements, location of exposed fasteners, openings, glazed, arrangement of hardware, fire rating, and finishes.
  - .3 Indicate each type frame material, core thickness, reinforcements, glazing stops, location of anchors and exposed fastenings reinforcing, fire rating, finishes.
  - .4 Include schedule identifying each unit, with door marks and numbers relating to numbering on drawings and door schedule.
  - .5 Submit test and engineering data, and installation instructions.

### **1.5 DELIVERY, STORAGE AND HANDLING**

- .1 Deliver, store and handle materials in accordance with Section 01 11 00 – General Instructions.
- .2 Waste Management and Disposal:
  - .1 Separate waste materials for reuse & recycling.

## **Part 2 Products**

### **2.1 MATERIALS**

- .1 Sheet steel: commercial grade steel zinc coated by hot dipped process to ASTM A653M2F-75, ASTM A755M-95, ASTM A924M-95.
  - .1 Frames: 16mm welded construction.
  - .2 Floor anchors: 1.6 mm steel.
  - .3 Guard boxes: minimum 0.8 mm steel.
  - .4 Doors: 1.2 mm base thickness.

### **2.2 DOOR CORE MATERIALS**

- .1 Honeycomb construction:
  - .1 Structural small cell, 24.5 mm maximum kraft paper 'honeycomb', weight: 36.3 kg per ream minimum, density: 16.5 kg/m<sup>3</sup> minimum sanded to required thickness.
- .2 Hollow steel: vertically stiffened with steel ribs and all voids filled with semi-rigid fibrous insulation, minimum density 24 kg/m<sup>3</sup> conforming to CSA A101-1975, Type 7A.

### **2.3 ADHESIVES**

- .1 Honeycomb cores and steel components: heat resistant, spray grade, resin reinforced neoprene/rubber (polychloroprene) based, low viscosity, contact cement.
  - .1 Adhesive: maximum VOC content 50 g/L to SCAQMD Rule 1168.
- .2 Polystyrene and polyurethane cores: heat resistant, epoxy resin based, low viscosity, contact cement.
- .3 Lock-seam doors: fire resistant, resin reinforced polychloroprene, high viscosity, sealant/adhesive.

### **2.4 PRIMER**

- .1 Touch-up prime CAN/CGSB-1.181.
  - .1 Maximum VOC limit 50 g/L to GC-03.

### **2.5 PAINT**

- .1 Field paint steel doors and frames in accordance with Sections 09 91 23 - Interior Painting, 09 91 13 - Exterior Painting. Protect weatherstrips from paint. Provide final finish free of scratches or other blemishes.
  - .1 Maximum VOC emission level 50 g/L to GS-11.

### **2.6 ACCESSORIES**

- .1 Door silencers: single stud rubber/neoprene type.
- .2 Exterior, interior, top, bottom caps: rigid polyvinylchloride extrusion conforming to CGSB 41-GP-19Ma.

- .3 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.
- .4 Fire labels: metal rivited.
- .5 Sealant: as per Section 07 92 00 – Joint Sealing.
  - .1 Maximum VOC limit 250 g/L[to SCAQMD Rule 1168.
- .6 Make provisions for glazing as indicated and provide necessary glazing stops.
  - .1 Provide removable stainless steel glazing beads for use with glazing tapes and compounds and secured with countersunk stainless steel screws.
  - .2 Design exterior glazing stops to be tamperproof.

## **2.7 FRAMES FABRICATION GENERAL**

- .1 Fabricate frames in accordance with CSDMA specifications.
- .2 Fabricate frames to profiles and maximum face sizes as indicated.
- .3 Exterior frames: 1.2 mm welded type construction.
- .4 Interior frames: 1.2 mm welded type construction.
- .5 Blank, reinforce, drill and tap frames for mortised, templated hardware, [electronic hardware] using templates provided by finish hardware supplier. Reinforce frames for surface mounted hardware.
- .6 Protect mortised cutouts with steel guard boxes.
- .7 Prepare frame for door silencers, 3 for single door, 2 at head for double door.
- .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.

## **2.8 FRAME ANCHORAGE**

- .1 Provide appropriate anchorage to floor and wall construction.
- .2 Locate each wall anchor immediately above or below each hinge reinforcement on hinge jamb and directly opposite on strike jamb.
- .3 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.
- .4 Locate anchors for frames in existing openings not more than 150 mm from top and bottom of each jambs and intermediate at 660 mm on centre maximum.

## **2.9 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.

## **2.10 DOOR FABRICATION GENERAL**

- .1 Doors: swing type, flush, with provision for glass and/or louvre openings as indicated.
- .2 Exterior doors: hollow steel construction. Interior doors: hollow steel construction.
- .3 Fabricate doors with longitudinal edges welded. Seams: grind welded joints to a flat plane, fill with metallic paste filler and sand to a uniform smooth finish.
- .4 Blank, reinforce, drill doors and tap for mortised, templated hardware.
- .5 Factory prepare holes 12.7 mm diameter and larger except mounting and through-bolt holes, on site, at time of hardware installation.
- .6 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.
- .7 Provide factory-applied touch-up primer at areas where zinc coating has been removed during fabrication.
- .8 Provide fire labelled doors for those openings requiring fire protection ratings, as scheduled. Test such products in 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.
- .9 Manufacturer's nameplates on doors are not permitted.

## **2.11 HOLLOW STEEL CONSTRUCTION**

- .1 Form face sheets for exterior doors from 1.6 mm sheet steel.
- .2 Form face sheets for interior doors from 1.6 sheet steel.
- .3 Reinforce doors with vertical stiffeners, securely welded to face sheets at 150 mm on centre maximum.
- .4 Fill voids between stiffeners of exterior doors with fibreglass core.
- .5 Fill voids between stiffeners of interior doors with fibreglass core.

## **2.12 THERMALLY BROKEN DOORS AND FRAMES**

- .1 Fabricate thermally broken doors by using insulated core and separating exterior parts from interior parts with continuous interlocking thermal break.
- .2 Thermal break: rigid polyvinylchloride extrusion conforming to CGSB 41-GP-19Ma.

- .3 Fabricate thermally broken frames separating exterior parts from interior parts with continuous interlocking thermal break.
- .4 Apply insulation.

### **Part 3 Execution**

#### **3.1 MANUFACTURER'S INSTRUCTIONS**

- .1 Compliance: comply with manufacturer's written recommendations or specifications, including product technical bulletins, handling, storage and installation instructions, and datasheets.

#### **3.2 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.

#### **3.3 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 & vapour retarder.

#### **3.4 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 and thresholds as follows.
  - .1 Hinge side: 1.0 mm.
  - .2 Latchside and head: 1.5 mm.
  - .3 Finished floor, and thresholds: 13 mm.
- .3 Adjust operable parts for correct function.
- .4 Install louvres.

#### **3.5 FINISH REPAIRS**

- .1 Touch up with primer finishes damaged during installation.

- .2 Fill exposed frame anchors surfaces with imperfections with metallic paste filler and sand to a uniform smooth finish.

### **3.6 GLAZING**

- .1 Install glazing for doors in accordance with Section 08 50 00 - Windows.

**END OF SECTION**

## **Part 1            General**

### **1.1                RELATED REQUIREMENTS**

- .1        Section 07 92 00 – Joint Sealants
- .2        Section 08 11 00 – Metal Doors and Frames.

### **1.2                REFERENCES**

- .1        The Aluminum Association Inc. (AAI)
  - .1        Designation System for Aluminum Finishes -2003.
- .2        American Society for Testing and Materials International (ASTM)
  - .1        ASTM A1008/A1008M-06a, Standard Specification for Steel, Sheet, Cold-Rolled, Carbon, Structural, High-Strength Low-Alloy and High-Strength Low-Alloy with Improved Formability.
  - .2        ASTM A653/A653M-06a, Standard Specification for Steel Sheet, Zinc-Coated (Galvanized) or Zinc-Iron Alloy-Coated (Galvannealed) by the Hot-Dip Process.
  - .3        ASTM D523-89(1999), Standard Test Method for Specular Gloss.
  - .4        ASTM D822-01(2006), Standard Practice for Filtered Open-Flame Carbon-Arc Exposures of Paint and Related Coatings.
- .3        Canadian General Standards Board (CGSB)
  - .1        CAN/CGSB-1.105-M91, Quick-Drying Primer.
  - .2        CAN/CGSB 1.181-99, Ready Mixed Organic Zinc Rich Coating.
- .4        Canadian Standards Association (CSA International)
  - .1        CAN/CSA-G164-M92(R1998), Hot Dip Galvanizing of Irregularly Shaped Articles.

### **1.3                SYSTEM DESCRIPTION**

- .1        Design Requirements:
  - .1        Design exterior door assembly to withstand windload of 1 kPa with a maximum horizontal deflection of 1/240 of opening width.
  - .2        Design door panel assemblies with minimum thermal insulation factor 2.0 RSI.
  - .3        Design door assembly torsion springs to withstand minimum 10,000 total life cycle.

### **1.4                ACTION AND INFORMATIONAL SUBMITTALS**

- .1        Provide submittals in accordance with Section 01 33 00 – Submittal Procedures.
- .2        Provide product data: in accordance with Section 01 33 00 – Submittal Procedures
- .3        Provide shop drawings: in accordance with Section 01 33 00 – Submittal Procedures.
  - .1        Submit drawings stamped and signed by professional engineer registered or licensed in the Province of Manitoba, Canada.

- .2 Indicate materials, operating mechanisms, required clearances and electrical connections.
- .4 Quality Control Submittals:
  - .1 Manufacturer's Instructions: manufacturer's installation instructions.
- .5 Closeout Submittals:
  - .1 Provide maintenance data for vertical lift door panels and hardware and components for incorporation into manual specified in Section 01 78 00 – Closeout Submittals.

## **1.5 DELIVERY, STORAGE AND HANDLING**

- .1 Deliver, store and handle materials on site in a clean, dry, and secure area.

## **Part 2 Products**

### **2.1 MATERIALS**

- .1 Steel sheet: commercial quality to ASTM A1008, with Class 1 matt finish.
- .2 Primer: to CAN/CGSB-1.105 for steel surfaces.
- .3 Insulation: to meet design criteria.
- .4 Glazing: three vision lights 610 mm x 178 mm, high impact polymer frame, insulated.

### **2.2 PREFINISHED STEEL SHEET**

- .1 Prefinished steel with factory applied silicone modified polyester.
  - .1 Class F2S.
  - .2 Final colour selected by DFO Representative from manufacturer's standard range.
  - .3 Specular gloss: 30 units +/-5 in accordance with ASTM D523.
  - .4 Coating thickness: not less than 20 micrometres.
  - .5 Resistance to accelerated weathering for chalk rating of 8, colour fade 5units or less and erosion rate less than 20% to ASTM D822 as follows:
    - .1 Outdoor exposure period 1000 hours.
    - .2 Humidity resistance exposure period 1000 hours.

### **2.3 DOORS**

- .1 Fabricate door blades of minimum 45 mm thick insulated steel sheet as indicated.
- .2 Install glazing for vision panels. Sizes and number of lights as indicated.
- .3 Apply shop coat of primer after fabrication of door.

### **2.4 GUIDES**

- .1 Provide steel channel guides for bottom blade and steel angle guides for other blades.
- .2 Mount one set of guides to weight box and attach other set to structural steel channel or reinforced plate to form guide assembly.

- .3 Provide 6 mm thick steel base plate to bottom of guide assembly and secure assembly to door jamb opposite to weight box.
- .4 Install heavy duty channel spreader joining guides at top.

## **2.5 WEIGHT BOX**

- .1 Construct weight box from 4 mm thick steel plate and 6 mm thick base plate.
- .2 Reinforce weight box with formed horizontal stiffeners. Make weight box cover removable for servicing and maintenance.
- .3 Arrange for vertical loads to be carried by weight box and guide assembly.

## **2.6 COUNTERBALANCE**

- .1 Counterbalance blades utilizing individually counter-balanced weight for standard operation.
- .2 House cast iron weights in weight box with angle guides for each weight set.
- .3 Attach counterweights to blades with preformed, galvanized aircraft cable having minimum of 7 to 1 safety factor.
- .4 Use 4 cables for bottom blade and 2 cables for other blades above bottom blade.
- .5 Suspend cables over series of sheaves with machined grooves, rotating on sealed ball bearings mounted on cold rolled steel shaft.
- .6 Secure bottom blade cables to malleable iron threaded drums, rotating on self-aligning sealed bearing.

## **2.7 ELECTRICAL OPERATOR**

- .1 Power supply: 240 V, 1 phase, 60 Hz.
- .2 Motor frame to comply with NEMA 56  $\frac{3}{4}$  and 1 hp all phases, UL listed.
- .3 Construction:
  - .1 Totally enclosed, fan cooled – TEFC construction
- .4 Reduction: primary reduction is worm gear in oil bath. Secondary reduction is by chain and sprocket.
- .5 Duty cycle: accommodate medium usage, up to 5000 cycles per year.
  - .1 Brake: DC disc type with selectable Progressive Braking for smooth stopping.
  - .2 Clutch: Adjustable torque-limiter type.
  - .3 Limit System: Limit Lock limit system, magnetic type providing absolute positioning with push to set and remote setting capabilities. Limit System shall remain synchronized with the door during manual operation and supply power interruptions.
- .6 Control System: Microprocessor based with relay motor controls on a single board. System incorporates a 16 character Liquid Crystal Display (LCD) to display the system status. System shall include the following:
  - .1 Capable of monitoring and reporting on a variety of operating conditions, including: Current operating status, Current command status, Motor movement

- status, Current error status (if applicable), Hoist Interlock status (if applicable), External Interlock status, and 24VDC status.
- .2 A delay-on-reverse operating protocol.
- .3 Maximum run timers in both directions of travel that limit motor run time in the event a clutch slips or some other problem occurs.
- .4 Provisions for connection of single and/or 3-button control stations.
- .5 On board open, close and stop control keys for local operation.
- .6 Trolley operators with an inherent secondary reversal system.
- .7 Mounting:
  - .1 Single trolley for workshop door, dual trolley for boat storage door.
- .8 Release:
  - .1 Manual disconnect door arm.
- .9 Secondary Reversal:
  - .1 When the clutch is detected slipping in the close direction the operator will reverse the door to the open limit. For door/operator protection only and not intended for entrapment protection.
- .10 Operator Controls:
  - .1 Push-button and key operated control stations with open, close, and stop buttons.
  - .2 Controls for interior location.
  - .3 Controls surface mounted.
  - .4 Optional card reader control.

## **2.8 ACCESSORIES**

- .1 Install vinyl sealing gaskets for meeting edges of door blades and lintel closure and steel stopper with foam rubber pad for bottom of each angle guide.
- .2 Finish ferrous hardware items with minimum zinc coating of 300 g/m<sup>2</sup> to CSA G164.
- .3 Provide electrically interlocking bolt which locks door in closed position and disconnects power supply.
- .4 Provide back-up chain hoist in event of power failure.

## **Part 3 Execution**

### **3.1 MANUFACTURER'S INSTRUCTIONS**

- .1 Compliance: comply with manufacturer's written recommendations or specifications, including product technical bulletins, handling, storage and installation instructions, and datasheets.

### **3.2 INSTALLATION**

- .1 Install doors and hardware.
- .2 Touch up doors with primer where painted finish damaged during fabrication.

- .3 Install electrical motor, controller units, pushbutton stations, relays and other electrical equipment for door operation.
- .4 Installation includes electric wiring from power supply located near door opening.
- .5 Lubricate springs and adjust door operating components to ensure smooth opening and closing of doors.
- .6 Adjust operable parts for correct function.
- .7 Adjust weatherstripping to form weathertight seal.

**3.3 FIELD QUALITY CONTROL**

- .1 Manufacturer's Field Services:
  - .1 Provide manufacturer's field services consisting of product use recommendations and periodic site visits for inspection of product installation in accordance with manufacturer's instructions.

**END OF SECTION**

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**Part 1 General**

**1.1 RELATED REQUIREMENTS**

- .1 Section 13 34 19 – Metal Building Systems.

**1.2 REFERENCES**

- .1 Aluminum Association (AA)
  - .1 AA DAF 45-03(R2009), Designation System for Aluminum Finishes.
- .2 Canadian General Standards Board (CGSB)
  - .1 CAN/CGSB-1.40-97, Anticorrosive Structural Steel Alkyd Primer.
- .3 CSA International
  - .1 CSA-A440-[00]/A440.1-00(R2005), A440-00, Windows/Special Publication A440.1-00, User Selection Guide to CSA Standard A440-00, Windows. CAN/CSA-A440.2-09, Fenestration Energy Performance.
  - .2 CAN/CSA-Z91-02(R2008), Health and Safety Code for Suspended Equipment Operations.
- .4 Green Seal Environmental Standards (GS)
  - .1 GS-11-11, Paints and Coatings.

**1.3 ACTION AND INFORMATIONAL SUBMITTALS**

- .1 Submit in accordance with Section 01 33 00 – Submittal Procedures.
- .2 Product Data:
  - .1 Submit manufacturer's instructions, printed product literature and data sheets for windows and include product characteristics, performance criteria, physical size, finish and limitations.
- .3 Shop Drawings:
  - .1 Submit drawings stamped and signed by professional engineer registered or licensed in Manitoba, Canada.
  - .2 Indicate materials and details in full size scale for head, jamb and sill, profiles of components, interior and exterior trim, junction between combination units elevations of unit, anchorage details, location of isolation coating, description of related components and exposed finishes, fasteners, and caulking. Indicate location of manufacturer's nameplates.

**1.4 CLOSEOUT SUBMITTALS**

- .1 Submit in accordance with Section 01 78 00 – Closeout Submittals.
- .2 Operation and Maintenance Data: submit operation and maintenance data for windows for incorporation into manual.

## **1.5 QUALITY ASSURANCE**

- .1 Certifications: product certificates signed by manufacturer certifying materials comply with specified performance characteristics and criteria and physical requirements.

## **1.6 DELIVERY, STORAGE AND HANDLING**

- .1 Deliver, store and handle materials in accordance with manufacturer's written instructions.
- .2 Delivery and Acceptance Requirements: deliver materials to site in original factory packaging, labelled with manufacturer's name and address.
- .3 Storage and Handling Requirements:
  - .1 Store materials off ground, indoors, in dry location and in accordance with manufacturer's recommendations in clean, dry, well-ventilated area.
  - .2 Store and protect windows from nicks, scratches, and blemishes.
  - .3 Replace defective or damaged materials with new.
- .4 Packaging Waste Management: remove for reuse and recycling of pallets, crates, padding, and packaging.

## **Part 2 Products**

### **2.1 MATERIALS**

- .1 Materials: to CSA-A440/A440.1 supplemented as follows:
- .2 All windows by same manufacturer.
- .3 Sash: thermally broken.
- .4 Main frame: thermally broken.
- .5 Glass: Comply with ASTM E2190
- .6 Interior Exterior aluminum facings: extruded aluminum of type and size as detailed; minimum 3 mm thick, complete with joint covers, jamb drip deflectors, chairs, anchors & anchoring devices.
- .7 Isolation coating: alkali resistant bituminous paint.
- .8 Sealants:
  - .1 VOC limit 250 g/L maximum to SCAQMD Rule 1168.

### **2.2 WINDOW TYPE AND CLASSIFICATION**

- .1 Type:
  - .1 Fixed: with insulating glass, double glazing, argon filled.
- .2 Classification rating: to CSA-A440/A440.1.
  - .1 Air tightness: A3.
  - .2 Water tightness: B7.
  - .3 Wind load resistance: C5.

- .4 Forced Entry: F2.
- .5 Glazing: G1.

### **2.3 FABRICATION**

- .1 Fabricate in accordance with CSA-A440/A440.1 supplemented as follows:
- .2 Fabricate units square and true with maximum tolerance of plus or minus 1.5 mm for units with a diagonal measurement of 1800 mm or less and plus or minus 3 mm for units with a diagonal measurement over 1800 mm.
- .3 Face dimensions detailed are maximum permissible sizes.
- .4 Brace frames to maintain squareness and rigidity during shipment and installation.
- .5 Finish steel clips and reinforcement with 380 g/m<sup>2</sup> zinc coating to ASTM A123/A123M.

### **2.4 ALUMINUM FINISHES**

- .1 Finish exposed surfaces of aluminum components in accordance with Aluminum Association Designation System for Aluminum Finishes.
  - .1 Impregnated colour anodic finish: designation AA-A43 colour to match DFO Representative's sample.

### **2.5 GLAZING**

- .1 Glaze windows in accordance with CSA-A440/A440.1.
  - .1 Double paned, argon filled.

### **2.6 AIR BARRIER AND VAPOUR RETARDER**

- .1 Equip window frames with factory installed air barrier material for sealing to building air barrier & vapour retarder as follows:
  - .1 Material: identical to, or compatible with, building air barrier and vapour retarder materials to provide required air tightness and vapour diffusion control throughout exterior envelope assembly.
  - .2 Material width: adequate to provide required air tightness and vapour diffusion control to building air barrier and vapour retarder from interior.

## **Part 3 Execution**

### **3.1 EXAMINATION**

- .1 Verification of Conditions: verify conditions of substrates previously installed under other Sections or Contracts are acceptable for product installation in accordance with manufacturer's written instructions.
  - .1 Visually inspect substrate in presence of DFO Representative.
  - .2 Inform DFO Representative of unacceptable conditions immediately upon discovery.
  - .3 Proceed with installation only after unacceptable conditions have been remedied.

### **3.2 INSTALLATION**

- .1 Window installation:
  - .1 Install in accordance with CSA-A440/A440.1.
  - .2 Arrange components to prevent abrupt variation in colour.
- .2 Sill installation:
  - .1 Install metal sills with uniform wash to exterior, level in length, straight in alignment with plumb upstands and faces. Use one piece lengths at each location.
  - .2 Cut sills to fit window opening.
  - .3 Secure sills in place with anchoring devices located at ends joints of continuous sills and evenly spaced 600 mm on centre in between.
  - .4 Fasten expansion joint cover plates and drip deflectors with self-tapping stainless steel screws.
  - .5 Maintain 6 to 9 mm space between butt ends of continuous sills. For sills over 1200 mm in length, maintain 3 to 6 mm space at each end.
- .3 Caulking:
  - .1 Seal joints between windows and window sills with sealant. Bed sill expansion joint cover plates and drip deflectors in bedding compound. Caulk between sill upstand and window-frame. Caulk butt joints in continuous sills.
  - .2 Apply sealant in accordance with Section 07 92 00 - Joint Sealants. Conceal sealant within window units except where exposed use is permitted by DFO Representative.

### **3.3 CLEANING**

- .1 Progress Cleaning: clean in accordance with Section 01 11 00 – General Instructions.
  - .1 Leave Work area clean at end of each day.
- .2 Final Cleaning: upon completion remove surplus materials, rubbish, tools and equipment in accordance with Section 01 11 00 – General Instructions.
- .3 Waste Management: separate waste materials for reuse and recycling.
  - .1 Remove recycling containers and bins from site and dispose of materials at appropriate facility.

### **3.4 PROTECTION**

- .1 Protect installed products and components from damage during construction.
- .2 Repair damage to adjacent materials caused by window installation.

**END OF SECTION**

**Part 1 General**

**1.1 RELATED REQUIREMENTS**

- .1 Section 08 11 00 – Metal Doors and Frames.
- .2 Section 08 36 19 – Multi-Leaf Vertical Lift Doors.

**1.2 REFERENCES**

- .1 American National Standards Institute (ANSI) / Builders Hardware Manufacturers Association (BHMA)
  - .1 ANSI/BHMA A156.1-2000, American National Standard for Butts and Hinges.
  - .2 ANSI/BHMA A156.2-2003, Bored and Preassembled Locks and Latches.
  - .3 ANSI/BHMA A156.3-2001, Exit Devices.
  - .4 ANSI/BHMA A156.4-2000, Door Controls - Closers.
  - .5 ANSI/BHMA A156.5-2001, Auxiliary Locks and Associated Products.
  - .6 ANSI/BHMA A156.8-2005, Door Controls - Overhead Stops and Holders.
  - .7 ANSI/BHMA A156.13-2000, Mortise Locks and Latches Series 1000.
  - .8 ANSI/BHMA A156.16-2002, Auxiliary Hardware.
  - .9 ANSI/BHMA A156.17-2004, Self-closing Hinges and Pivots.
  - .10 ANSI/BHMA A156.18-2006, Materials and Finishes.
- .2 Canadian Steel Door and Frame Manufacturers' Association (CSDMA)
  - .1 CSDMA Recommended Dimensional Standards for Commercial Steel Doors and Frames - 2009.

**1.3 ACTION AND INFORMATIONAL SUBMITTALS**

- .1 Submit in accordance with Section 01 33 00 – Submittal Procedures.
- .2 Product Data:
  - .1 Submit manufacturer's instructions, printed product literature and data sheets for door hardware and include product characteristics, performance criteria, physical size, finish and limitations.
- .3 Hardware List:
  - .1 Submit contract hardware list.
  - .2 Indicate specified hardware, including make, model, material, function, size, finish and other pertinent information.
- .4 Test Reports: certified test reports showing compliance with specified performance characteristics and physical properties.
- .5 Manufacturer's Instructions: submit manufacturer's installation instructions.

**1.4 CLOSEOUT SUBMITTALS**

- .1 Submit in accordance with Section 01 78 00 – Closeout Submittals.

- .2 Operation and Maintenance Data: submit operation and maintenance data for door hardware for incorporation into manual.

## **1.5 QUALITY ASSURANCE**

- .1 Regulatory Requirements:
  - .1 Hardware for doors in fire separations and exit doors certified by a Canadian Certification Organization accredited by Standards Council of Canada.
- .2 Certificates: product certificates signed by manufacturer certifying materials comply with specified performance characteristics and criteria and physical requirements.

## **1.6 DELIVERY, STORAGE AND HANDLING**

- .1 Deliver, store and handle materials in accordance with manufacturer's written instructions.
- .2 Delivery and Acceptance Requirements: deliver materials to site in original factory packaging, labelled with manufacturer's name and address.
- .3 Package items of hardware including fastenings, separately or in like groups of hardware, label each package as to item definition and location.
- .4 Storage and Handling Requirements:
  - .1 Store materials indoors and in accordance with manufacturer's recommendations in clean, dry, well-ventilated area.
  - .2 Store and protect door hardware from nicks, scratches, and blemishes.
  - .3 Protect prefinished surfaces with wrapping.
  - .4 Replace defective or damaged materials with new.

## **Part 2 Products**

### **2.1 HARDWARE ITEMS**

- .1 Use one manufacturer's products only for similar items.

### **2.2 DOOR HARDWARE**

- .1 Locks and latches:
  - .1 Bored and preassembled locks and latches: to ANSI/BHMA A156.2, series 4000 bored lock, grade 1, designed for function and keyed as stated in Hardware Schedule.
  - .2 Mortise locks with deadbolts: to ANSI/BHMA A156.13, series 1000 mortise lock, grade 1, designed for function and keyed as stated in Hardware Schedule.
  - .3 Knobs: plain design.
  - .4 Escutcheons: round.
  - .5 Normal strikes: box type, lip projection not beyond jamb.
  - .6 Cylinders: same make and finish as locksets; for installation in deadlocks provided with overhead doors as listed in hardware schedule. Key into keying system as directed. Provide one cylinder for each overhead door..

- .7 Finished – zinc coated and sealed
- .2 Butts and hinges:
  - .1 Butts and hinges: to ANSI/BHMA A156.1, designated by letter A and numeral identifiers, followed by size and finish, listed in Hardware Schedule.
  - .2 Self-closing hinges and pivots: to ANSI/BHMA A156.17, designated by letter K and numeral identifiers listed in Hardware Schedule.
- .3 Exit devices: to ANSI/BHMA A156.3, traditional touch bar, with concealed vertical rod mounting. Stainless steel base metal.
  - .1 Auxiliary item: door co-ordinator, type 21, for pairs of doors with overlapping astragals.
- .4 Door Closers and Accessories:
  - .1 Closer/holder release devices: to ANSI/BHMA A156.15, heavy duty, pull side mounted, full metal cover attached for vandal resistance on exterior man doors.
  - .2 Door co-ordinator: surface for pairs of doors with overlapping astragal.
- .5 Architectural door trim: to ANSI/BHMA A156.6, listed in Hardware Schedule and as listed below.
  - .1 Door protection plates: Type 6-322, 16 mm thick, unbevelled edges, width less 40 mm on push side of door and 25 mm on pull side of door than width of door x 305 mm high. Locate as noted on Hardware Schedule.
  - .2 Push plates: Type 6-312, beveled edges, 3 mm thick 150 mm x 400 mm size, stainless steel; on all doors.
  - .3 Push/Pull units: Type 6-312, 229 mm pull size, 3 mm plate thickness, stainless steel materials; on man doors.
- .6 Door bottom seal: operable and automatic adjustable door seal of aluminum frame and vinyl weather seal, surface mounted with drip cap, closed ends, automatic retract mechanism when door is open: on all exterior doors.
- .7 Thresholds: Type 6-340, 127 mm wide x full width of door opening, aluminum extruded mill finish, serrated surface; on all exterior doors. Fill underside of threshold with non-shrink grout.
- .8 Weatherstripping:
  - .1 Head and jamb seal:
    - .1 Extruded aluminum frame and nylon brush insert, clear anodized finish.
    - .2 Adhesive backed neoprene material.
- .9 Astragal: overlapping, extruded aluminum frame with vinyl insert, finished to match doors.

## **2.3 FASTENINGS**

- .1 Use only fasteners provided by manufacturer. Failure to comply may void warranties and applicable licensed labels.
- .2 Supply screws, bolts, expansion shields and other fastening devices required for satisfactory installation and operation of hardware.

- .3 Exposed fastening devices to match finish of hardware.
- .4 Where pull is scheduled on one side of door and push plate on other side, supply fastening devices, and install so pull can be secured through door from reverse side. Install push plate to cover fasteners.
- .5 Use fasteners compatible with material through which they pass.

## **2.4 KEYING**

- .1 Doors keyed alike are master keyed as directed. Prepare detailed keying schedule in conjunction with DFO Representative.
- .2 Supply keys in duplicate for every lock in this Contract.
- .3 Supply 3 master keys for each master key or grand master key group.
- .4 Stamp keying code numbers on keys and cylinders.
- .5 Supply construction cores.
- .6 Hand over permanent cores and keys to DFO Representative.

## **Part 3 Execution**

### **3.1 INSTALLATION**

- .1 Manufacturer's Instructions: comply with manufacturer's written recommendations, including product technical bulletins, product catalogue installation instructions, product carton installation instructions, and data sheets.
- .2 Supply metal door and frame manufacturers with complete instructions and templates for preparation of their work to receive hardware.
- .3 Supply manufacturers' instructions for proper installation of each hardware component.
- .4 Install hardware to standard hardware location dimensions in accordance with CSDFMA Canadian Metric Guide for Steel Doors and Frames (Modular Construction).
- .5 Where door stop contacts door pulls, mount stop to strike bottom of pull.
- .6 Install key control cabinet.
- .7 Use only manufacturer's supplied fasteners.
  - .1 Use of "quick" type fasteners, unless specifically supplied by manufacturer, is unacceptable.
- .8 Remove construction cores when directed by DFO Representative.
  - .1 Install permanent cores and ensure locks operate correctly.

### **3.2 ADJUSTING**

- .1 Adjust door hardware, operators, closures and controls for optimum, smooth operating condition, safety and for weather tight closure.
- .2 Lubricate hardware, operating equipment and other moving parts.
- .3 Adjust door hardware to ensure tight fit at contact points with frames.

### **3.3 CLEANING**

- .1 Progress Cleaning: as follows.
  - .1 Leave Work area clean at end of each day.
  - .2 Clean hardware with damp rag and approved non-abrasive cleaner, and polish hardware in accordance with manufacturer's instructions.
  - .3 Remove protective material from hardware items where present.
  - .4 Final Cleaning: upon completion remove surplus materials, rubbish, tools and equipment.
- .2 Waste Management: separate waste materials for reuse, recycling.
  - .1 Remove recycling containers and bins from site and dispose of materials at appropriate facility.

### **3.4 DEMONSTRATION**

- .1 Keying System Setup and Cabinet:
  - .1 Set up key control system with file key tags, duplicate key tags, numerical index, alphabetical index and key change index, label shields, control book and key receipt cards.
  - .2 Place file keys and duplicate keys in key cabinet on their respective hooks.
  - .3 Lock key cabinet and turn over key to DFO Representative.
- .2 Maintenance Staff Briefing:
  - .1 Brief maintenance staff regarding:
    - .1 Proper care, cleaning, and general maintenance of projects complete hardware.
    - .2 Description, use, handling, and storage of keys.
    - .3 Use, application and storage of wrenches for door closers, locksets and fire exit hardware.
- .3 Demonstrate operation, operating components, adjustment features, and lubrication requirements.

### **3.5 PROTECTION**

- .1 Protect installed products and components from damage during construction.
- .2 Repair damage to adjacent materials caused by door hardware installation.

### **3.6 HARDWARE SCHEDULE**

- .1 Refer to JML drawing S-2 for hardware schedule.

**END OF SECTION**