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**Part 1            General**

**1.1                REFERENCES**

- .1 American Society for Testing and Materials (ASTM International)
  - .1 ASTM A653/A653M-01a, Specification for Steel Sheet, Zinc-Coated (Galvanized) or Zinc-Iron Alloy-Coated (Galvannealed) by the Hot-Dip Process.
- .2 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.
- .3 Canadian Standards Association (CSA International)
  - .1 G40.20/G40.21-98, General Requirements for Rolled or Welded Structural Quality Steel/Structural Quality Steel.
  - .2 CSA W59-03 Welded Steel Construction .
- .4 Canadian Steel Door Manufacturers' Association, (CSDMA).
  - .1 CSDMA, Specifications for Commercial Steel Doors and Frames, 1990.
  - .2 CSDMA, Recommended Selection and Usage Guide for Commercial Steel Doors, 1990.
- .5 National Fire Protection Association (NFPA)
  - .1 NFPA 80-99, Standard for Fire Doors and Fire Windows.
  - .2 NFPA 252-99, Standard Methods of Fire Tests of Door Assemblies.
- .6 Underwriters' Laboratories of Canada (ULC)
  - .1 CAN4-S104-80(R1985), Fire Tests of Door Assemblies.
  - .2 CAN4-S105-85(R1992), Fire Door Frames Meeting the Performance Required by CAN4-S104.
- .7 CAN/ULC-S702-97, Thermal Insulation, Mineral Fibre, for Buildings.
- .8 CAN/ULC-S704-01, Thermal Insulation, Polyurethane and Polyisocyanurate Boards, Faced.

**1.2                DESIGN REQUIREMENTS**

- .1 Design exterior frame assembly to accommodate to expansion and contraction when subjected to minimum and maximum surface temperature of -35oC to 35oC.
- .2 Maximum deflection for exterior steel entrance screens under wind load of 1.2 kPa not to exceed 1/175th of span.

**1.3                SHOP DRAWINGS**

- .1 Submit shop drawings in accordance with Section 01 33 00.

- .2 Indicate each type of door, material, steel core thicknesses, mortises, reinforcements, location of exposed fasteners, openings, glazed, arrangement of hardware and finishes.
- .3 Indicate each type frame material, core thickness, reinforcements, glazing stops, location of anchors and exposed fastenings reinforcing and 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.

#### **1.4 REQUIREMENTS**

- .1 Steel fire rated doors and frames: labelled and listed by an organization accredited by Standards Council of Canada in conformance with CAN4-S104M ,NFPA 252 for ratings specified or indicated.
- .2 Provide fire labelled frame products for those openings requiring fire protection ratings, as scheduled. Test products in strict conformance with CAN4-S104, ASTM E152 or 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.

#### **Part 2 Products**

##### **2.1 MATERIALS**

- .1 Hot dipped galvanized steel sheet: to ASTM A653M, ZF75, minimum base steel thickness 1.6 mm, and 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 A653M, ZF001.

##### **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.

##### **2.3 ADHESIVES**

- .1 Honeycomb cores and steel components: heat resistant, spray grade, resin reinforced neoprene/rubber (polychloroprene) based, low viscosity, contact cement.
- .2 Lock-seam doors: fire resistant, resin reinforced polychloroprene, high viscosity, sealant/adhesive.

**2.4 PRIMER**

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

**2.5 PAINT**

- .1 Field paint steel doors and frames in accordance with Section 09 90 00 – Painting. Provide final finish shall be free of scratches or other blemishes.

**2.6 ACCESSORIES**

- .1 Door silencers: single stud rubber/neoprene type.

**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 Interior frames: 1.9 mm welded type construction.
- .4 Blank, reinforce, drill and tap frames for mortised, templated 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 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.

**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 o.c. 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.
- .2 Interior doors: non insulated, honeycomb 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 and electronic 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 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 Manufacturer's nameplates on doors are permitted. Location of nameplates to be on hinge side of door concealed from view.
- .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 or 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.

## **2.11 DOORS: HONEYCOMB/BONDED CORE CONSTRUCTION**

- .1 Form each face sheet for interior doors from 1.6 mm sheet steel with honeycomb core laminated under pressure to face sheets.

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**Part 3 Execution**

**3.1 INSTALLATION GENERAL**

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

**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.

**3.3 DOOR INSTALLATION**

- .1 Install doors and hardware in accordance with hardware templates and manufacturer's instructions and Section 08 71 10 - 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, top of carpet, noncombustible sill and thresholds: 13 mm.
- .3 Adjust operable parts for correct function.

**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.

**END OF SECTION**

**Part 1 General**

**1.1 REFERENCES**

- .1 Aluminum Association Designation System For Aluminum Finishes (AA)- 1997
  - .1 DAF 45 1997, Designation System For Aluminum Finishes.
- .2 Architectural Aluminum Manufacturers Association (AAMA)
  - .1 AAMA CW-10-97, Curtain Wall Manual #10 Care and Handling of Architectural Aluminum From Shop to Site.
  - .2 AAMA 607.1-76, Specifications and Inspection Methods for Clear Anodic Finishes for Architectural Aluminum.
- .3 American Society for Testing and Materials (ASTM)
  - .1 ASTM B 209M-95, Specification for Aluminum and Aluminum-Alloy Sheet and Plate Metric.
  - .2 ASTM B 221M-96, Specification for Aluminum-Alloy Extruded Bars, Rods, Wire, Profiles, and Tubes.
  - .3 ASTM E 283-91, Test Method for Determining the Rate of Air Leakage Through Exterior Windows, Curtain Walls, and Doors Under Specified Pressure Differences Across the Specimen.
  - .4 ASTM E 330-97e1, Test Method for Structural Performance of Exterior Windows, Curtain Walls, and Doors by Uniform Static Air Pressure Difference.
  - .5 ASTM E 331-96, Test Method for Water Penetration of Exterior Windows, Curtain Walls, and Doors by Uniform Static Air Pressure Difference.
  - .6 ASTM E 1105-96, Test Method for Field Determination of Water Penetration of Installed Exterior Windows, Curtain Walls, and Doors by Uniform or Cyclic Static Air Pressure Difference.
- .4 Canadian Standards Association (CSA)
  - .1 CAN/CSA-S157-M83, Strength Design in Aluminum.
  - .2 CSA W59.2-M1991(1998), Welded Aluminum Construction.

**1.2 SYSTEM DESCRIPTION**

- .1 Vertical glazed aluminum store front wall system includes tubular aluminum sections with self supporting, supplementary support framing, shop fabricated, factory prefinished, vision glass, spandrel panel, anchorage and attachment devices.
- .2 Assembled system to permit re-glazing of individual glass (and infill panel) units without requiring removal of structural mullion sections.

**1.3 PERFORMANCE REQUIREMENTS**

- .1 Design and size components to withstand dead and live loads caused by pressure and suction of wind, acting normal to plane of system as calculated in accordance with NBC.

- .2 Design and size components to withstand seismic loads and sway displacement as calculated in accordance with NBC.
- .3 Limit mullion deflection with full recovery of glazing materials.
- .4 Size glass units and glass dimensions to limits established in CAN/CGSB-12.20.
- .5 Provide system to accommodate, without damage to components or deterioration of seals:
  - .1 Movement within system.
  - .2 Movement between system and perimeter framing components.
  - .3 Dynamic loading and release of loads.
  - .4 Deflection of structural support framing.
- .6 Sound attenuation through wall system (exterior to interior): STC 45, measured in accordance with AAMA T1R - A1 - ASTM E 413.
- .7 Limit air infiltration through assembly to 0.0003 m<sup>3</sup>/s/m<sup>2</sup> of wall area, measured at a reference differential pressure across assembly of 75 Pa as measured in accordance with AAMA 501 and ASTM E 283.
- .8 Vapour seal with interior atmospheric pressure of 25 mm sp, 22°C, 40% RH: No failure.
- .9 Water leakage: none, when measured in accordance with AAMA 501, ASTM E 331, and ASTM E 1105.
- .10 System to provide for expansion and contraction within system components caused by a cycling temperature range of 95°C over a 12 hour period without causing detrimental affect to system components.
- .11 Drain water entering joints, condensation occurring in glazing channels, or migrating moisture occurring within system, to the exterior by a weep drainage network.
- .12 Ensure no vibration harmonics, wind whistles, noises caused by thermal movement, thermal movement transmitted to other building elements, loosening, weakening, or fracturing of attachments or components of system occur.

#### **1.4 PRODUCT DATA**

- .1 Submit product data in accordance with Section 01 33 00 - Submittal Procedures.
- .2 Provide component dimensions, describe components within assembly, anchorage and fasteners, glass.

#### **1.5 SHOP DRAWINGS**

- .1 Submit shop drawings in accordance with Section 01 33 00 - Submittal Procedures.
- .2 Indicate system dimensions, framed opening requirements and tolerances, adjacent construction, anticipated deflection under load, affected related Work, weep drainage network, expansion and contraction joint location and details, and field welding required.

## **1.6 SAMPLES**

- .1 Submit samples in accordance with Section 01 33 00 - Submittal Procedures.

## **1.7 PRE-INSTALLATION MEETING**

- .1 Convene one week before starting work of this section.

## **1.8 DELIVERY, STORAGE, AND HANDLING**

- .1 Deliver, store, handle and protect materials in accordance with Section 01 61 00.
- .2 Handle work of this section in accordance with AAMA CW-10.
- .3 Protect prefinished aluminum surfaces with wrapping / strippable coating. Do not use adhesive papers or sprayed coatings which bond when exposed to sunlight or weather.

## **1.9 ENVIRONMENTAL REQUIREMENTS**

- .1 Do not install sealants when ambient and surface temperature is less than 5°C.
- .2 Maintain this minimum temperature during and after installation of sealants.

## **1.10 SEQUENCING**

- .1 Coordinate work of this section with installation of firestopping, flashing placement and components or materials.

## **Part 2 Products**

### **2.1 MATERIALS**

- .1 Extruded aluminum: ASTM B 221M.
- .2 Sheet aluminum: ASTM B 209M.
- .3 Infill panel (spandrel): in accordance with Section 08 80 50.
- .4 Fasteners: stainless steel and aluminum.
- .5 Bituminous paint: CAN/CGSB1.108, without thinner.
- .6 Vertical glass units: in accordance with Section 08 80 50.
- .7 Sealant: in accordance with Section 07 92 10

### **2.2 COMPONENTS**

- .1 Mullion profiles, frame profile, and door profile as indicated on the drawings.
- .2 Acceptable material system:

- .1 Alumicor 1800
- .2 Kawneer 450
- .4 Door Hardware: as indicated in schedule

### **2.3 FABRICATION**

- .1 Fabricate system components with minimum clearances and shim spacing around perimeter of assembly, yet enabling installation and dynamic movement of perimeter seal.
- .2 Fabricate spandrel infill panels to Section 08 80 50 and seal edge seals around perimeter of panel assembly, enabling installation and minor movement of perimeter seal.
- .3 Accurately fit and secure joints and corners. Make joints flush, hairline, and weatherproof.
- .4 Prepare components to receive anchor devices. Install anchors.
- .5 Arrange fasteners and attachments to ensure concealment from view.
- .6 Prepare system components to receive hardware specified in Schedule
- .7 Visible manufacturer's identification labels not permitted.

### **2.4 FINISHES**

- .1 Finish coatings: conform to AA designations.
- .2 Interior exposed aluminum surfaces: AAMA AA A41 anodized to 215-R1, minimum 0.7 mils thickness, prepared with a mechanical chemical pre-treatment, anodized to clear colour.
- .3 Shop and touch-up primer for steel components: SSPC 25 Paint red oxide.
- .4 Touch-up primer for galvanized steel surfaces: SSPC 20 Paint zinc rich.
- .5 Concealed steel items: galvanized in accordance with ASTM A 123 to 600 gm/m<sup>2</sup>.
- .6 Apply one coat of bituminous paint to concealed aluminum and steel surfaces in contact with cementitious or dissimilar materials.

### **2.5 SOURCE QUALITY CONTROL**

- .1 Perform work in accordance with AAMA CW-I-9.
- .2 Manufacturer qualifications: company specializing in manufacturing the Products specified in this section with minimum three years documented experience.
- .3 Installer qualifications: company specializing in performing the work of this section and approved by manufacturer.

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**Part 3 Execution**

**3.1 EXAMINATION**

- .1 Verify dimensions, tolerances, and method of attachment with other work.
- .2 Verify wall openings are ready to receive work of this section.

**3.2 INSTALLATION**

- .1 Install door system in accordance with manufacturer's instructions.
- .2 Attach to structure to permit sufficient adjustment to accommodate construction tolerances and other irregularities.
- .3 Provide alignment attachments and shims to permanently fasten system to building structure. Clean weld surfaces; apply protective primer to field welds and adjacent surfaces.
- .4 Align assembly plumb and level, free of warp or twist. Maintain assembly dimensional tolerances and align with adjacent work.
- .5 Coordinate installation of fire stop insulation, specified in Section 07840, at each floor slab edge and intersection with vertical construction and where indicated.
- .6 Install glass, spandrel panels in accordance with Section 08 80 50 – Glazing.
- .7 Install perimeter sealant to method required to achieve performance criteria. Type, backing materials, and installation criteria in accordance with Section 07 92 10 - Joint Sealers.
- .8 Install door hardware to manufacturer's standard locations.

**3.3 SITE TOLERANCES**

- .1 Maximum variation from plumb: 1.5 mm/m non-cumulative or 12 mm/30 m, whichever is less.
- .2 Maximum misalignment of two adjoining members abutting in plane: 0.8 mm.
- .3 Maximum sealant space between door system and adjacent construction: 13 mm.

**3.4 CLEANING**

- .1 Remove protective material from prefinished aluminum surfaces.
- .2 Wash down surfaces with a solution of mild detergent in warm water, applied with soft, clean wiping cloths. Take care to remove dirt from corners. Wipe surfaces clean.
- .3 Remove excess sealant by moderate use of mineral spirits or other solvent acceptable to sealant manufacturer.

**3.5            PROTECTION**

- .1      Protect finished Work from damage.

**END OF SECTION**

**Part 1 General**

**1.1 REFERENCES**

- .1 Aluminum Association Designation System For Aluminum Finishes (AA)- 1997.
  - .1 DAF 45 2003, Designation System For Aluminum Finishes.
- .2 American Architectural Manufacturers Association (AAMA).
  - .1 AAMA CW-DG-1-96, Aluminum Curtain Wall Design Guide Manual.
  - .2 AAMA CW-10-97, Care and Handling of Architectural Aluminum From Shop to Site.
  - .3 AAMA CW-11-85, Design Wind Loads for Buildings and Boundary Layer Wind Tunnel Testing.
  - .4 AAMA T1R-A1-02, Sound Control for Fenestration Products.
  - .5 AAMA 501-94, Methods of Test for Exterior Walls.
- .3 American Society for Testing and Materials International, (ASTM).
  - .1 ASTM B209-02a, Specification for Aluminum and Aluminum-Alloy Sheet and Plate.
  - .2 ASTM B221-02, Specification for Aluminum-Alloy Extruded Bars, Rods, Wire, Profiles, and Tubes.
  - .3 ASTM E283-91(1999), Test Method for Determining the Rate of Air Leakage Through Exterior Windows, Curtain Walls, and Doors Under Specified Pressure Differences Across the Specimen.
  - .4 ASTM E330-02, Standard Test Method for Structural Performance of Exterior Windows, Doors, Skylights, and Curtain Walls, by Uniform Static Air Pressure Difference.
  - .5 ASTM E331-00, Standard Test Method for Water Penetration of Exterior Windows, Skylights, Doors, and Curtain Walls, by Uniform Static Air Pressure Difference.
  - .6 ASTM E413-87(1999), Classification for Rating Sound Insulation.
  - .7 ASTM E1105-00, Standard Test Method for Field Determination of Water Penetration of Installed Exterior Windows, Skylights, Doors, and Curtain Walls, by Uniform or Cyclic Static Air Pressure Difference.
- .4 Canadian Standards Association (CSA International).
  - .1 CAN3-S157-M83(R2002), Strength Design in Aluminum.
  - .2 CSA W59.2-M1991(R2003), Welded Aluminum Construction.

**1.2 SYSTEM DESCRIPTION**

- .1 Vertical glazed aluminum curtain wall system includes thermally broken tubular aluminum sections with self supporting, supplementary support framing, shop fabricated, factory prefinished, vision glass, related flashings, anchorage and attachment devices.

- .2 Assembled system to permit re-glazing of individual glass units without requiring removal of structural mullion sections.

### **1.3 PERFORMANCE REQUIREMENTS**

- .1 Design and size components to withstand dead and live loads caused by pressure and suction of wind, acting normal to plane of system as calculated in accordance with NBC.
- .2 Design and size components to withstand seismic loads and sway displacement as calculated in accordance with NBC.
- .3 Size glass units and glass dimensions to limits established in CAN/CGSB-12.20.
- .4 Provide system to accommodate, without damage to components or deterioration of seals:
  - .1 Movement within system.
  - .2 Movement between system and perimeter framing components.
  - .3 Dynamic loading and release of loads.
  - .4 Deflection of structural support framing.
- .5 Thermal Resistance: System (excluding vision areas) completely fill voids with insulation to obtain maximum RSI.
- .6 Limit air infiltration through assembly to  $0.25 \text{ m}^3/\text{s}/\text{m}^2$  of wall area, measured at a reference differential pressure across assembly of 75 Pa as measured in accordance with AAMA 501 and ASTM E283.
- .7 Vapour seal with interior atmospheric pressure of 25 mm sp, 22 degrees C, 40% RH: No failure.
- .8 Water leakage: none, when measured in accordance with AAMA 501, ASTM E331, and ASTM E1105.
- .9 System to provide for expansion and contraction within system components caused by a cycling temperature range of 95 degrees C over a 12 hour period without causing detrimental affect to system components.
- .10 Drain water entering joints, condensation occurring in glazing channels, or migrating moisture occurring within system, to the exterior by a weep drainage network.
- .11 Maintain continuous air barrier and vapour retarder throughout assembly, primarily in line with inside pane of glass and heel bead of glazing compound. Position thermal insulation on exterior surface of air barrier and vapour retarder.
- .12 Ensure no vibration harmonics, wind whistles, noises caused by thermal movement, thermal movement transmitted to other building elements, loosening, weakening, or fracturing of attachments or components of system occur.

### **1.4 PRODUCT DATA**

- .1 Submit product data in accordance with Section 01 33 00 - Submittal Procedures.

- .2 Provide component dimensions, describe components within assembly, anchorage and fasteners, glass and infill, internal drainage details and water flow diagrams.

## **1.5 SHOP DRAWINGS**

- .1 Submit shop drawings in accordance with Section 01 33 00 - Submittal Procedures.
- .2 Indicate system dimensions, framed opening requirements and tolerances, adjacent construction, anchor details anticipated deflection under load, affected related Work, weep drainage network, expansion and contraction joint location and details, and field welding required.

## **1.6 SAMPLES**

- .1 Submit samples in accordance with Section 01 33 00 - Submittal Procedures.
- .2 Submit two samples mm in size illustrating prefinished aluminum surface, finish, colour, texture, specified glass units, insulated infill panels, glazing materials illustrating edge and corner.

## **1.7 DELIVERY, STORAGE, AND HANDLING**

- .1 Deliver, store, handle and protect materials in accordance with Section 01 61 00 - Common Product Requirements.
- .2 Handle work of this section in accordance with AAMA CW-10.
- .3 Protect prefinished aluminum surfaces. Do not use adhesive papers or sprayed coatings which bond when exposed to sunlight or weather.

## **1.8 ENVIRONMENTAL REQUIREMENTS**

- .1 Do not install sealants when ambient and surface temperature is less than 5 degrees C.
- .2 Maintain this minimum temperature during and after installation of sealants.

## **1.9 SEQUENCING**

- .1 Coordinate work of this section with installation of fire stopping, air barrier placement, vapour retarder placement, flashing placement, and components or materials.

## **Part 2 Products**

### **2.1 MATERIALS**

- .1 Extruded aluminum: ASTM B221.
- .2 Sheet aluminum: ASTM B209.

- .3 Fasteners: galvanized steel aluminum as required, exposed fasteners finish to match curtain wall.
- .4 Bituminous paint: CAN/CGSB 1.108, without thinner.
- .5 Glasl glass units: in accordance with Section 08 80 50.
- .6 Sealant:
  - .1 As recommended by manufacturer.
  - .2 In accordance with Section 07 92 10.

## **2.2 COMPONENTS**

- .1 Mullion profiles, frame profile, and door profile as indicated on the drawings.
- .2 Flashings: finish as selected, to match curtain wall mullion sections where exposed, secured with concealed fastening method.
- .3 Acceptable material systems:
  - .1 Alumicor 2500 Curtain Wall.
  - .2 Kawneer 1600 Curtain Wall.

## **2.3 FABRICATION**

- .1 Fabricate system components with minimum clearances and shim spacing around perimeter of assembly, yet enabling installation and dynamic movement of perimeter seal.
- .2 Accurately fit and secure joints and corners. Make joints flush, hairline, and weatherproof.
- .3 Prepare components to receive anchor devices. Install anchors.
- .4 Arrange fasteners and attachments to ensure concealment from view.
- .5 Reinforce framing members for external imposed loads.
- .6 Visible manufacturer's identification labels not permitted.

## **2.4 FINISHES**

- .1 Finish coatings: conform to AA designations.
- .2 Exposed aluminum surfaces: AAMA AA A41 class II, anodized to 215-R1, minimum 0.4 mils thickness.
- .3 Exposed aluminum surfaces: AAMA AA A41 anodized to 215-R1, minimum 0.7 mils thickness, prepared with a mechanical chemical pre-treatment, clear anodized .
- .4 Touch-up primer for galvanized steel surfaces: SSPC 20 Paint zinc rich.

- .5      Concealed steel items: galvanized in accordance with ASTM A123 to 600 gm/m<sup>2</sup>. Primed with iron oxide paint.
- .6      Apply two coats of bituminous paint to concealed aluminum and steel surfaces in contact with cementitious or dissimilar materials.

## **2.5            SOURCE QUALITY CONTROL**

- .1      Perform work in accordance with AAMA GSM-1, AAMA CW-I-9.
- .2      Manufacturer qualifications: company specializing in manufacturing the products specified in this section with minimum five years documented experience.
- .3      Installer qualifications: company specializing in performing the work of this section with minimum five years documented experience and approved by manufacturer.
- .4      Design structural support framing components to CAN3 S157 under direct supervision of a Professional Structural Engineer experienced in design of this Work and licensed in the Province of Manitoba.
- .5      Perform welding Work in accordance with CSA W59.2.

## **Part 3            Execution**

### **3.1            EXAMINATION**

- .1      Verify dimensions, tolerances, and method of attachment with other work.
- .2      Verify wall openings and adjoining air barrier and vapour retarder materials are ready to receive work of this section.

### **3.2            INSTALLATION**

- .1      Install curtain wall system in accordance with manufacturer's instructions.
- .2      Install Systems as indicated on drawings.
- .3      Attach to structure to permit sufficient adjustment to accommodate construction tolerances and other irregularities.
- .4      Provide alignment attachments and shims to permanently fasten system to building structure. Clean weld surfaces; apply protective primer to field welds and adjacent surfaces.
- .5      Align assembly plumb and level, free of warp or twist. Maintain assembly dimensional tolerances and align with adjacent work.
- .6      Provide thermal isolation where components penetrate or disrupt building insulation.
- .7      Install sill flashings.

- .8 Coordinate installation of fire stop insulation, specified in Section 07 84 00, at each floor slab edge and intersection with vertical construction where indicated.
- .9 Co-ordinate attachment and seal of perimeter air barrier and vapour retarder materials.
- .10 Pack fibrous insulation in shim spaces at perimeter of assembly to maintain continuity of thermal barrier.
- .11 Install associated flashings.
- .12 Install glass in accordance with Section 08 88 00 - Glazing, to glazing method required to achieve performance criteria. exterior wet/dry method of glazing. Place sealant on the up-slope side of the pressure plate cover caps; finish the surface with a slope to encourage drainage over the cap.
- .13 Install perimeter sealant to method required to achieve performance criteria. Type, backing materials, and installation criteria in accordance with Section 07 92 10 - Joint Sealers.

### **3.3 SITE TOLERANCES**

- .1 Maximum variation from plumb: 1.5 mm/m non-cumulative or 12 mm/30 m, whichever is less.
- .2 Maximum misalignment of two adjoining members abutting in plane: 0.8 mm.
- .3 Maximum sealant space between curtain wall and adjacent construction: 13 mm.

### **3.4 MANUFACTURER'S FIELD SERVICES**

- .1 Curtain wall Glass product manufacturers to provide field surveillance of installation of their Products.
- .2 Monitor and report installation procedures, unacceptable conditions.

### **3.5 CLEANING**

- .1 Remove protective material from prefinished aluminum surfaces.
- .2 Wash down surfaces with a solution of mild detergent in warm water, applied with soft, clean wiping cloths. Take care to remove dirt from corners. Wipe surfaces clean.
- .3 Remove excess sealant by moderate use of mineral spirits or other solvent acceptable to sealant manufacturer.

### **3.6 PROTECTION**

- .1 Protect finished Work from damage.

**END OF SECTION**

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**Part 1 General**

**1.1 REFERENCES**

- .1 Canadian Steel Door and Frame Manufacturers' Association (CSDFMA).
  - .1 CSDFMA Canadian Metric Guide for Steel Doors and Frames (Modular Construction): standard hardware location dimensions.
- .2 ANSI/BHMA Standards A156 Series
- .3 CSA B651-04 Accessible Design for the Built Environment.

**1.2 SUBMITTALS**

- .1 Product Data:
  - .1 Submit manufacturer's printed product literature, specifications and data sheet in accordance with Section 01 33 00 - Submittal Procedures.
  - .2 Submit contract hardware list in accordance with Section 01 33 00 - Submittal Procedures.
  - .3 Indicate specified hardware, including make, model, material, function, size, finish and other pertinent information.
- .2 Samples:
  - .1 Submit samples in accordance with Section 01 33 00 - Submittal Procedures.
  - .2 Identify each sample by label indicating applicable specification paragraph number, brand name and number, finish and hardware package number.
  - .3 After approval samples will be returned for incorporation in the Work.
- .3 Manufacturer's Instructions: Submit manufacturer's installation instructions
- .4 Closeout Submittals: Provide operation and maintenance data for door closers, locksets, door holders for incorporation into manual specified in Section 01 78 00 - Closeout Submittals.

**1.3 QUALITY ASSURANCE**

- .1 Pre-installation Meetings: conduct pre-installation meeting to verify project requirements, manufacturer's installation instructions and manufacturer's warranty requirements.
- .2 Certificates: product certificates signed by manufacturer certifying materials comply with specified performance characteristics and criteria and physical requirements.

**1.4 REQUIREMENTS REGULATORY AGENCIES**

- .1 Hardware for doors in fire separations and exit doors certified by a Canadian Certification Organization accredited by Standards Council of Canada.

**1.5 DELIVERY, STORAGE, AND HANDLING**

- .1 Packing, Shipping, Handling and Unloading:

- .1 Deliver, store, handle and protect materials in accordance with Section 01 61 00 - Common Product Requirements.
- .2 Package each item of hardware including fastenings, separately or in like groups of hardware, label each package as to item definition and location.
- .2 Storage and Protection: Store finishing hardware in locked, clean and dry area.

## **1.6 MAINTENANCE**

- .1 Extra Materials:
  - .1 Provide maintenance materials in accordance with Section 01 78 00 - Closeout Submittals.
  - .2 Supply two sets of wrenches for door closers, locksets and fire exit hardware.

## **Part 2 Products**

### **2.1 HARDWARE ITEMS**

- .1 Use one manufacturer's products only for similar items.
- .2 Manufacture hardware to ANSI/BHMA standard for each specific item.

### **2.2 DOOR HARDWARE AND SCHEDULE**

- .1 As indicated in Schedule

### **2.3 MISCELLANEOUS HARDWARE**

- .1 Indexed key control system: to ANSI/BHMA A156.28, designated by letter E and numeral identifiers, wall mounted type.

### **2.4 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.

### **2.5 KEYING**

- .1 Doors, to be keyed as noted in Hardware Schedule and as directed. Prepare detailed keying schedule in conjunction with Contract Administrator.

- .2 Provide keys in duplicate for every lock in this Contract.
- .3 Provide three masterkeys for each MK or GMK group.
- .4 Stamp keying code numbers on keys and cylinders.
- .5 Provide construction cores.
- .6 Provide all permanent cores and keys to Contract Administrator.

### **Part 3 Execution**

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

- .1 Compliance: comply with manufacturer's written data, including product technical bulletins, product catalogue installation instructions, product carton installation instructions, and data sheets.
- .2 Furnish door and frame manufacturers with complete instructions and templates for preparation of their work to receive hardware.
- .3 Furnish manufacturers' instructions for proper installation of each hardware component.

#### **3.2 INSTALLATION**

- .1 Install hardware to standard hardware location dimensions in accordance with Canadian Metric Guide for Steel Doors and Frames (Modular Construction) prepared by Canadian Steel Door and Frame Manufacturers' Association.
- .2 Where door stop contacts door pulls, mount stop to strike bottom of pull.
- .3 Install hardware to CSA B651-04 Accessible Design for the Built Environment.
- .4 Provide key control cabinet to Contract Administrator.
- .5 Use only manufacturer's supplied fasteners. Failure to comply may void manufacturer's warranties and applicable licensed labels. Use of "quick" type fasteners, unless specifically supplied by manufacturer, is unacceptable.
- .6 Remove construction cores, locks when directed by Engineer; install permanent cores and check operation of locks.

#### **3.3 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 provide tight fit at contact points with frames.

**3.4 CLEANING**

- .1 Perform cleaning after installation to remove construction and accumulated environmental dirt.
- .2 Clean hardware with damp rag and approved non-abrasive cleaner, and polish hardware in accordance with manufacture's instructions.
- .3 Remove protective material from hardware items where present.
- .4 Upon completion of installation, remove surplus materials, rubbish, tools and equipment barriers.

**3.5 KEYING SYSTEM AND CABINET**

- .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 Contract Administrator.

**3.6 DEMONSTRATION**

- .1 Maintenance Staff Briefing:
  - .4 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.
- .2 Demonstrate operation, operating components, adjustment features, and lubrication requirements.

**3.6 SCHEDULE**

- .1 DOOR D1 and D8

|      |                                    |                  |     |     |
|------|------------------------------------|------------------|-----|-----|
| 6 EA | HINGE                              | 3CB1 4.5 X 4 NRP | 652 | IVE |
| 2 EA | PANIC HARDWARE                     | 2227L            | 689 | VON |
| 2 EA | SURFACE CLOSER                     | 4111 EDA         | 689 | LCN |
| 2 EA | OVERHEAD STOP 100S SERIES          |                  | 630 | GLY |
| 2 EA | KICKPLATE K10A 12" X WIDTH TO SUIT |                  | 630 | STD |
- .2 Door D2

|      |                   |                  |     |     |
|------|-------------------|------------------|-----|-----|
| 6 EA | HINGE             | 3CB1 4.5 X 4 NRP | 652 | IVE |
| 2 EA | MANUAL FLUSH BOLT | FB458            | 626 | IVE |

|    |         |                   |                          |     |     |
|----|---------|-------------------|--------------------------|-----|-----|
|    | 1 EA    | DEADBOLT          | B660P                    | 626 | SCH |
|    | 2 EA    | ROLLER LATCH      | RL30 (TOP MOUNT)         | 626 | IVE |
|    | 2 EA    | PULL              | 2009-1                   | 630 | STD |
|    | 2 EA    | OVERHEAD STOP     | 410S SERIES              | 630 | GLY |
| 3  | DOOR D3 |                   |                          |     |     |
|    | 6 EA    | HINGE             | 3CB1 4.5 X 4             | 652 | IVE |
|    | 2 EA    | PANIC HARDWARE    | 2227L                    | 689 | VON |
|    | 2 EA    | SURFACE CLOSER    | 4111                     | 689 | LCN |
|    | 2 EA    | KICKPLATE         | K10A 12" X WIDTH TO SUIT | 630 | STD |
|    | 2 EA    | OVERHEAD STOP     | 410S SERIES              | 626 | GLY |
| .4 | DOOR D4 |                   |                          |     |     |
|    | 6 EA    | HINGE             | 3CB1 4.5 X 4             | 652 | IVE |
|    | 1 EA    | PANIC HARDWARE    | 22DT                     | 689 | VON |
|    | 1 EA    | PANIC HARDWARE    | 22 NL                    | 689 | VON |
|    | 1 EA    | SURFACE CLOSER    | 4111                     | 689 | LCN |
|    | 1 EA    | AUTO OPERATOR     | 4642                     | 689 | LCN |
|    | 2 EA    | OVERHEAD STOP     | 100S SERIES              | 630 | GLY |
|    | 2 EA    | KICKPLATE         | K10A 12" X WIDTH TO SUIT | 630 | STD |
|    | 1 EA    | THRESHOLD         | CT11                     | 627 | KNC |
|    | 2 EA    | SWEEP             | W-13S                    | 628 | KNC |
|    | 2 EA    | WEATHERSTRIP      | W-20N (TOP ONLY)         | 628 | KNC |
|    | 2 SET   | WEATHERSTRIP      | W-50                     | 628 | KNC |
|    | 2 EA    | WALL SWITCH PLATE | 7910-956                 | 630 | LCN |
|    | 1 EA    | REM. MULLION      | KR4954                   | 689 | VON |
| .5 | DOOR D5 |                   |                          |     |     |
|    | 3 EA    | HINGE             | 3CB1 4.5 X 4             | 652 | IVE |
|    | 1 EA    | PRIVACY SET       | AL40S SAT                | 626 | SCH |
|    | 1 EA    | OVERHEAD STOP     | 410 SERIES               | 630 | GLY |
| .6 | DOOR D6 |                   |                          |     |     |
|    | 3 EA    | HINGE             | 3CB1 4.5 X 4             | 652 | IVE |
|    | 1 EA    | STOREROOM LOCK    | AL80PD SAT               | 626 | SCH |
|    | 1 EA    | SURFACE CLOSER    | P1461                    | 689 | LCN |
|    | 1 EA    | KICKPLATE         | K10A 12" X WIDTH TO SUIT | 630 | STD |
|    | 1 EA    | FLOOR STOP        | S101/S103                | 626 | STD |
| .7 | DOOR D7 |                   |                          |     |     |
|    | 3 EA    | HINGE             | 3CB1 4.5 X 4             | 652 | IVE |
|    | 1 EA    | PULL              | 2412                     | 630 | STD |
|    | 1 EA    | PUSH PLATE        | K11A - 5                 | 630 | STD |
|    | 1 EA    | SURFACE CLOSER    | 1461                     | 689 | LCN |
|    | 1 EA    | KICKPLATE         | K10A 12" X WIDTH TO SUIT | 630 | STD |

1 EA FLOOR STOP S101/S103 626 STD

**END OF SECTION**

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**Part 1 General**

**1.1 REFERENCES**

- .1 ANSI/BHMA A156.9-1982, Cabinet Hardware.
- .2 ANSI/BHMA A156.11-1991, Cabinet Locks.
- .3 ANSI/BHMA A156.16-1981, Auxiliary Hardware.
- .4 ANSI/BHMA A156.18-1987, Materials and Finishes.

**1.2 SUBMITTALS**

- .1 Product Data:
  - .1 Submit manufacturer's printed product literature, specifications and data sheet in accordance with Section 01 33 00 - Submittal Procedures.
- .2 Samples:
  - .1 Submit samples in accordance with Section 01 33 00.
- .3 Hardware List:
  - .1 Submit contract hardware list in accordance with Section 01 33 00.
  - .2 Indicate specified hardware, including make, model, material, function, finish and other pertinent information.
- .4 Manufacturer's Instructions:
  - .1 Submit manufacturer's installation instructions.
- .5 Closeout Submittals:
  - .1 Provide maintenance data, parts list, and manufacturer's instructions for incorporation into maintenance manual specified in Section 01 78 00 .

**1.3 QUALITY ASSURANCE**

- .1 Pre-installation Meetings: conduct pre-installation meeting to verify project requirements, manufacturer's installation instructions and manufacturer's warranty requirements.

**1.4 DELIVERY, STORAGE, AND HANDLING**

- .1 Packing, Shipping, Handling and Unloading:
  - .1 Deliver, store, handle and protect materials in accordance with Section 01 61 00 .
  - .2 Package items of hardware including fastenings, separately or in like groups of hardware, label each package as to item definition and location.
- .2 Storage and Protection:
  - .1 Store cabinet hardware in locked, clean and dry area.

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**Part 2 Products**

**2.1 HARDWARE ITEMS**

- .1 Use one manufacturer's product for all similar items.

**2.2 CABINET HARDWARE AND MISCELLANEOUS HARDWARE**

- .1 Hinges: Blum 110° concealed self-closing with six-way adjustment finish to 26D.
- .2 Pulls, doors and drawers: Richeleu panel products #33205, finish 195 mat nickel, 96 mm c.c. 8/32 screw.
- .3 Drawer slides side mounted zinc plated cold roll steel, full extension type, 100 lb capacity .
  - .1 Typical drawers: Accuride 3832SC, 18"-20".
- .4 Locks for doors and drawers: finish to 170.
  - .1 Acceptable manufacturer: Abloy high security exec office furniture locks OF200E
- .5 Adjustable built-in shelving standards for cabinets: KV255AL. finish nickel.
- .6 Shelving Clips for cabinets: KV256AL, finish nickel.
- .7 Metal brackets for countertops: as indicated on drawings.

**2.3 FASTENINGS**

- .1 Supply screws, bolts, expansion shields and other fastening devices required for satisfactory installation and operation of hardware.
- .2 Exposed fastening devices to match finish of hardware.
- .3 Use fasteners compatible with material through which they pass.

**Part 3 Execution**

**3.1 MANUFACTURER'S INSTRUCTIONS**

- .1 Compliance: comply with manufacturer's written data, including product technical bulletins, product catalogue installation instructions, product carton installation instructions, and data sheets.

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**3.2 INSTALLATION**

- .1 Install hardware to standard hardware location dimensions in accordance with manufacturer's recommendations and to project design requirements.
- .2 Keying: as per The City's instructions.

**3.3 ADJUSTING**

- .1 Adjust cabinet hardware for optimum, smooth operating condition.
- .2 Lubricate hardware and other moving parts.
- .3 Adjust cabinet door hardware to provide tight fit at contact points with frames.

**3.4 CLEANING**

- .1 Perform cleaning after installation to remove construction and accumulated environmental dirt.
- .2 Clean hardware with damp rag and approved non-abrasive cleaner, and polish hardware in accordance with manufacture's instructions.
- .3 Remove protective material from hardware items where present.
- .4 Upon completion of installation, remove surplus materials, rubbish, tools and equipment barriers.

**3.5 DEMONSTRATION**

- .1 Maintenance Staff Briefing.
  - .1 Brief maintenance staff regarding:
    - .1 Proper care, cleaning, and general maintenance of projects complete hardware.
- .2 Demonstrate operation, operating components, adjustment features, and lubrication requirements.

**END OF SECTION**

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**Part 1        General**

**1.1            REFERENCES**

- .1        AN ANSI/ASTM E330- 02, Test Method for Structural Performance of Exterior Windows, Doors, Skylights and Curtain Walls by Uniform Static Air Pressure Difference
- .2        Canadian General Standards Board (CGSB).
  - .1        CAN/CGSB-12.1-M90, Tempered or Laminated Safety Glass.
  - .2        CAN/CGSB-12.8-M90 Insulating Glass Units.
- .3        Canadian Standards Association (CSA International).
  - .1        CSA A440.2-98, Energy Performance Evaluation of Windows and Sliding Glass Doors.
  - .2        CSA Certification Program for Windows and Doors 2000.
- .4        Flat Glass Manufacturers Association (FGMA).
  - .1        FGMA Glazing Manual.

**1.2            SYSTEM DESCRIPTION**

- .1        Performance Requirements:
  - .1        Provide continuity of building enclosure vapour and air barrier using glass and glazing materials as follow:
    - .1        Utilize inner light of multiple light sealed units for continuity of air and vapour seal. Size glass to withstand wind loads, dead loads and positive and negative live loads in accordance with ASTM E 300-97el..

**1.3            SUBMITTALS**

- .1        Product Data:
  - .1        Submit manufacturer's printed product literature, specifications and data sheet in accordance with Section 01 33 00 - Submittal Procedures.
- .2        Shop Drawings:
  - .1        Submit shop drawings in accordance with Section 01 33 00 - Submittal Procedures.
- .3        Manufacturer's Instructions:
  - .1        Submit manufacturer's installation instructions.
- .4        Closeout Submittals: Provide maintenance data including cleaning instructions for incorporation into manual specified in Section 01 78 00 - Closeout Submittals.

## **1.4 ENVIRONMENTAL REQUIREMENTS**

- .1 Install glazing when ambient temperature is 10°C minimum. Maintain ventilated environment for 24 hours after application.
- .2 Maintain minimum ambient temperature before, during and 24 hours after installation of glazing compounds.

## **Part 2 Products**

### **2.1 MATERIALS: FLAT GLASS**

- .1 Safety glass: to CAN/CGSB-12.1, transparent, 6 mm thick.
  - .1 Type 2-tempered.
  - .2 Class B-float
  - .3 AFGD Matelux for interior.

### **2.2 MATERIALS: SEALED INSULATING GLASS**

- .1 Insulating glass units: Non-reflecting glass to CAN/CGSB-12.8, double unit, 25 mm overall thickness.
  - .1 Exterior, 6 mm laminated and interior light: 6.0 mm tempered glass, titanium sputtered (Comfort Ti-AC40) low emissivity coating on surface 3, and 12 mm air spaces with Edgetech Architectural S-Class Super Spacer.
    - .1 Colour: grey float AFGD

### **2.3 MATERIALS**

- .1 Sealant: one component compound, to CAN/CGSB-19.13, Class 2-40, neutral cure silicone gun grade, colour to match adjacent surfaces.

### **2.4 ACCESSORIES**

- .1 Setting blocks: Neoprene, 80-90 Shore A durometer hardness to ASTM D2240, length of 25 mm for each square meter of glazing, minimum 100 mm x width of glazing rabbet space minus 1.5 mm x height, to suit glazing method, glass light weight and area.
- .2 Spacer shims: Neoprene, 50-60 Shore A durometer hardness to ASTM D2240, 75 mm long x one half height of glazing stop x thickness to suit application. Self adhesive on one face.
- .3 Glazing tape:
  - .1 Preformed butyl compound 10-15 Shore A durometer hardness to ASTM D2240; coiled on release paper; size to suit application; black colour.
  - .2 Closed cell polyvinyl chloride foam, coiled on release paper over adhesive on two sides, maximum water absorption by volume 2%, designed for compression of 25%, to effect an air and vapour seal.

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**Part 3 Execution**

**3.1 MANUFACTURER'S INSTRUCTIONS**

- .1 Comply with manufacturer's written data, including product technical bulletins, product catalogue installation instructions, product carton installation instructions, and data sheets.

**3.2 EXAMINATION**

- .1 Verify that openings for glazing are correctly sized and within tolerance.
- .2 Verify that surfaces of glazing channels or recesses are clean, free of obstructions, and ready to receive glazing.

**3.3 PREPARATION**

- .1 Clean contact surfaces with solvent and wipe dry.
- .2 Seal porous glazing channels or recesses with substrate compatible primer or sealer.
- .3 Prime surfaces scheduled to receive sealant.

**3.4 INSTALLATION TEMPERED GLASS**

- .1 Install tempered glass with horizontal tempering, that is, with tempered distortion parallel with floor.

**3.5 INSTALLATION: EXTERIOR WET/DRY METHOD (PREFORMED TAPE AND SEALANT)**

- .1 Perform work in accordance with FGMA Glazing Manual, IGMAC and Laminators Safety Glass Association - Standards Manual for glazing installation methods.
- .2 Cut glazing tape to length and set against permanent stops, 6 mm below sight line. Seal corners by butting tape and dabbing with sealant.
- .3 Apply heel bead of sealant along intersection of permanent stop with frame ensuring full perimeter seal between glass and frame to complete continuity of air and vapour seal.
- .4 Place setting blocks at  $\frac{1}{4}$  points, with edge block maximum 150 mm from corners.
- .5 Rest glazing on setting blocks and push against tape and heel head of sealant with sufficient pressure to attain full contact at perimeter of light or glass unit.
- .6 Install removable stops with spacer strips inserted between glazing and applied stops 6 mm below sight line. Place glazing tape on glazing light or unit with tape flush with 16 mm below sight line.
- .7 Fill gap between glazing and stop with sealant to depth equal to bite of frame on glazing, maximum 9 mm below sight line.

- .8 Apply cap head of sealant along void between stop and glazing, to uniform line, flush with sight line. Tool or wipe sealant surface smooth.

### **3.6 INSTALLATION: INTERIOR - DRY METHOD (TAPE AND TAPE)**

- .1 Perform work in accordance with FGMA Glazing Manual, IGMAC, and Laminators Safety Glass Association - Standards Manual for glazing installation methods.
- .2 Cut glazing tape to length and set against permanent stops, projecting 1.6 mm above sight line.
- .3 Place setting blocks at  $\frac{1}{4}$  points, with edge block maximum 150 mm from corners.
- .4 Rest glazing on setting blocks and push against tape for full contact at perimeter of light or unit.
- .5 Place glazing tape on free perimeter of glazing in same manner described.
- .6 Install removable stop without displacement of tape. Exert pressure on tape for full continuous contact.
- .7 Knife trim protruding tape.

### **3.7 CLEANING**

- .1 Perform cleaning after installation to remove construction and accumulated environmental dirt. Remove traces of primer, caulking.
- .2 Remove glazing materials from finish surfaces.
- .3 Remove labels after work is complete.
- .4 Clean glass using approved non-abrasive cleaner in accordance with manufacture's instructions.
- .5 Upon completion of installation, remove surplus materials, rubbish, tools and equipment barriers.

### **3.8 PROTECTION OF FINISHED WORK**

- .1 After installation, mark light with an "X" by using removable plastic tape or paste. Do not mark heat absorbing or reflective glass units.

**END OF SECTION**