Part 1 General

1.1 Related Sections

.1 Section 01330 - Submittal Procedures.

.2 Section 07900 - Joint Sealers: Caulking of joints between frames and other building components.

.3 Section 08700 - Door Hardware: Supply of finish hardware, including weather stripping and mounting heights.

.4 Section 09900 – Finish Painting.

1.2 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 ASTM B29-92(1997), Specification for Refined Lead.
- .3 ASTM B749-97, Specification for Lead and Lead Alloy Strip, Sheet and Plate Products.

.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-M1989(R2001), Welded Steel Construction (Metal Arc Welding) (Metric Version).

.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.

1.3 Design Requirements

.1 Design exterior frame assembly to accommodate to expansion and contraction when subjected to minimum and maximum surface temperature of -35°C to 35°C.

.2 Maximum deflection for exterior steel entrance screens under wind load of 1.2 kPa not to exceed 1/175th of span.

1.4 Shop Drawings

.1 Submit shop drawings in accordance with Section 01330 - Submittal Procedures.

.2 Indicate each type of door, material, steel core thicknesses, mortises, reinforcements, location of exposed fasteners, openings, 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, firerating 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.

1.5 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 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-S104and 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,], minimum base steel thickness in accordance with CSDMA Table 1 - Thickness for Component Parts.

.2 Reinforcement: to CSA G40.20/G40.21, Type 44W, coating designation to ASTM A653M,.

.3 Composites: balance of core materials used in conjunction with lead: in accordance with manufacturers' proprietary design.

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^3 minimum sanded to required thickness.

.2 Stiffened: face sheets welded, honeycomb / insulated core.

.1 Polyurethane: to CAN/ULC-S704 rigid, modified poly/isocyanurate, closed cell board. Density 32 kg/m^3.

.3 Temperature rise rated (TRR): core composition to limit temperature rise on unexposed side of door to 250^{o}C at 30 minutes. Core to be tested as part of a complete door assembly, in accordance with CAN4-S104, ASTM E152 or NFPA 252, covering Standard Method of Tests of Door Assemblies and listed by nationally recognized testing agency having factory inspection service.

2.3 Adhesives

.1 Honeycomb cores and steel components: heat resistant, spray grade, resin reinforced neoprene/rubber (polychloroprene) based, low viscosity, contact cement.

.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.

2.5 Paint

.1 Field paint steel doors and frames in accordance with Sections 09900 – Finish Painting. Protect weather strips from paint. Provide final finish shall be free of scratches or other blemishes.

2.6 Accessories

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

.2 Exterior and interior top and 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 Door bottom seal: neoprene.

.5 Metallic paste filler: to manufacturer's standard.

.6 Fire labels: metal rivited.

.7 Sealant: as per section 07900.

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: 1.6 mm welded thermally broken type construction.

.4 Interior frames: 1.6 mm welded type construction.

.5 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.

.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 Manufacturer's nameplates on frames and screens are not permitted.

.9 Conceal fastenings except where exposed fastenings are indicated.

.10 Provide factory-applied touch up primer at areas where zinc coating has been removed during fabrication.

.11 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 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.

.7 Securely attach lead to inside of frame profile from return to jamb soffit (inclusive) on door side of frame only.

2.10 Door Fabrication General

.1 Doors: swing type, flush.

.2 Exterior doors: hollow steel] construction. Interior doors: honeycomb construction.

.3 Fabricate doors with longitudinal edges [locked seam] [locked seamed, adhesive assisted] [welded]. Seams: [visible] [grind welded joints to a flat plane, fill with metallic paste filler and sand to a uniform smooth finish].

.4 Doors: manufacturers' proprietary construction, tested and/or engineered as part of a fully operable assembly, including door, frame, gasketing.

.5 Blank, reinforce, drill doors and tap for mortised, templated hardware and electronic hardware.

.6 Factory prepare holes 12.7 mm diameter and larger except mounting and through-bolt holes, on site, at time of hardware installation.

.7 Reinforce doors where required, for surface mounted hardware. Provide flush steel top caps to exterior doors. Provide inverted, recessed, spot welded channels to top and bottom of interior doors.

.8 Provide factory-applied touch-up primer at areas where zinc coating has been removed during fabrication.

.9 Provide fire labelled doors for those openings requiring fire protection ratings, as scheduled. Test such products in strict conformance with [CAN4-S104] and list by nationally recognized agency having factory inspection service and construct as detailed in Follow-Up Service Procedures/Factory Inspection Manuals issued by listing agency to individual manufacturers.

.10 Manufacturer's nameplates on doors are not permitted.

2.11 Doors: Honeycomb Core Construction

.1 Form each face sheet for exterior doors from 1.6 mm sheet steel with polyurethane core laminated under pressure to face sheets.

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

2.12 Hollow Steel Construction

.1 Form each face sheet for exterior doors from 1.6 mm sheet steel.

.2 Form each face sheet for interior doors from 1.6 sheet steel.

.3 Reinforce doors with vertical stiffeners, securely welded laminated] to each face sheet at 150 mm on centre maximum.

.4 Fill voids between stiffeners of exterior doors with polyurethane core.

.5 Fill voids between stiffeners of interior doors with honeycomb core.

2.13 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 form interior parts with continuous interlocking thermal break.

.4 Apply insulation.

Part 3 Execution

3.1 Installation General

.1 Install labelled steel fire rated doors and frames to NFPA 80 except where specified otherwise.

.2 Install doors and frames to CSDMA Installation Guide.

3.2 Frame Installation

.1 Set frames plumb, square, level and at correct elevation.

.2 Secure anchorages and connections to adjacent construction.

.3 Brace frames rigidly in position while building-in. Install temporary horizontal wood spreader at third points of door opening to maintain frame width. Provide vertical

support at centre of head for openings over 1200 mm wide. Remove temporary spreaders after frames are built-in.

.4 Make allowances for deflection of structure to ensure structural loads are not transmitted to frames.

.5 Caulk perimeter of frames between frame and adjacent material.

.6 Maintain continuity of air barrier and vapour retarder.

3.3 Door Installation

.1 Install doors and hardware in accordance with hardware templates and manufacturer's instructions and Section 08710 - 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 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 RELATED SECTIONS

.1 Section 01330 - Submittal Procedures.

.2 Section 01780 - Closeout Submittals.

.3 Section 05500 - Metal Fabrications.

.4 Section 06101 - Rough Carpentry Short Form.

.5 Section 06200 - Finish Carpentry.

.6 Section 07213 - Batt and Blanket Insulation.

.7 Section 07900 - Joints Sealers.

.8 Section 08700 - Door Hardware.

1.2 REFERENCES

.1 Aluminum Association (AA).

.1 DAF 45-03, Designation System for Aluminum Finishes.

.2 American Architectural Manufacturers Association (AAMA).

.1 AAMA 609-93, Voluntary Guide Specification for Cleaning and Maintenance of Architectural Anodized Aluminum.

.3 American Society for Testing and Materials International, (ASTM).

.1 ASTM E330-02, Standard Test Method for Structural Performance of Exterior Windows, Doors, Skylights and Curtain Walls by Uniform Static Air Pressure Difference.

.4 Canadian General Standards Board (CGSB).

.1 CGSB 1.40-97, Primer, Structural Steel, Oil Alkyd Type.

.2 CAN/CGSB-12.1-M90, Tempered or Laminated Safety Glass.

.3 CAN/CGSB-12.20-M89, Structural Design of Glass for Buildings.

.5 Canadian Standards Association (CSA International).

.1 CAN/CSA-G40.20/G40.21-98, General Requirements for Rolled or Welded Structural Quality Steel/Structural Quality Steel.

.2 CAN/CSA G164-M92, Hot Dip Galvanizing of Irregularly Shaped Articles.

1.3 SYSTEM DESCRIPTION

.1 Design Criteria.

.1 Design frames and doors in exterior walls to:

.1 Accommodate expansion and contraction within service temperature range of -35 to 35 degrees C.

.2 Limit deflection of mullions to maximum 1/175th of clear span when tested to ASTM E330 under wind load of 1.2 kpa

.3 Movement within system.

.4 Movement between system and perimeter framing components or substrate.

.2 Size glass thickness and glass unit dimensions to limits in accordance with CAN/CGSB-12.20.

.3 Design door system to provide average thermal resistance of:

.1 Door system (excluding vision glass areas): RSI of [0.50].

.2 Vision glass areas: RSI of [0.67].

.4 Provide continuous air barrier and vapour retarder through door system. Primarily in line with inside pane of glass and heel bead of glazing compound.

1.4 SUBMITTALS

.1 Product Data:

.1 Submit manufacturer's printed product literature, specifications and data sheets in accordance with Section 01330 - Submittal Procedures.

1.5 SHOP DRAWINGS

.1 Submit shop drawings in accordance with Section 01330 - Submittal Procedures.

.2 Indicate materials and profiles and provide full-size, scaled details of components for each type of door and frame. Indicate:

.1 Interior trim and exterior junctions with adjacent construction.

.2 Junctions between combination units.

.3 Elevations of units.

.4 Core thicknesses of components.

.5 Type and location of exposed finishes, method of anchorage, number of anchors, supports, reinforcement, and accessories.

.6 Location of caulking.

.7 Each type of door system including location.

.8 Arrangement of hardware and required clearances.

.3 Submit catalogue details for each type of door and frame illustrating profiles, dimensions and methods of assembly.

1.6 SAMPLES

.1 Submit samples in accordance with Section 01330 - Submittal Procedures.

.2 Submit one 300 x 300 mm corner sample of each type door and frame.

.3 Submit sample showing glazing detail, reinforcement, finish and location of manufacturer's nameplates.

.4 Frame sample to show glazing stop, jointing detail, finish.

.5 Manufacturer's Instructions:

.1 Submit manufacturer's installation instructions.

1.7 CLOSEOUT SUBMITTALS

.1 Provide maintenance data for cleaning and maintenance of aluminum finishes for incorporation into manual specified in Section 01780 - Closeout Submittals.

1.8 QUALITY ASSURANCE

.1 Test Reports: certified test reports showing compliance with specified performance characteristics and physical properties.

.2 Certificates: product certificates signed by manufacturer certifying materials comply with specified performance characteristics and criteria and physical requirements.

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

1.9 DELIVERY, STORAGE, AND HANDLING

.1 Storage and Protection:

.1 Apply temporary protective coating to finished surfaces. Remove coating after erection. Do not use coatings that will become hard to remove or leave residue.

.2 Leave protective covering in place until final cleaning of building.

1.10 WASTE MANAGEMENT AND DISPOSAL

.1 Remove from site and dispose of packaging materials at appropriate recycling facilities.

Part 2 Products

2.1 MATERIALS

.1 Aluminum extrusions: Aluminum Association alloy AA6063-T5 or T6 anodizing quality.

.2 Sheet aluminum: Aluminum Association alloy AA5005-H32 anodizing quality.

.3 Steel reinforcement: to CAN/CSA-G40.20/G40.21,

.4 Fasteners: stainless steel, finished to match adjacent material.

.5 Weatherstrip: [replaceable] [mohair] [[metal] [plastic] backed wool pile].

.6 Door bumpers: black neoprene.

.7 Door bottom seal: [operable and automatic] [adjustable] door seal of anodized extruded aluminum frame and vinyl weather seal, [recessed in door bottom] [surface mounted with drip cap], closed ends, [automatic retract mechanism when door is open] [___].

.8 Isolation coating: [alkali resistant] [bituminous paint] [epoxy resin solution].

.9 Glass: tempered glass to CAN/CGSB-12.1, Type[1] [2], Class [A] [B].

.10 Glazing materials: [___].

.11 Sealants: [___], [___] colour [selected by [Departmental Representative] [Contract Administrator] [Consultant] [___]].

2.2 ALUMINUM DOORS

.1 Construct doors of porthole extrusions with minimum wall thickness of [2.4] [3] mm.

.2 Door stiles nominal [___] mm wide plus or minus [6] [___] mm.

.3 Top rail nominal [___] mm wide plus or minus [6] [___]mm.

.4 Bottom rail nominal [___] mm wide plus or minus [6] [___] mm.

.5 Reinforce mechanically-joined corners of doors to produce sturdy door unit.

.6 Glazing stops: interlocking snap-in type for dry glazing. Exterior stops: tamperproof type.

.7 Provide thermally broken doors for exterior.

.8 Hardware: [___].

2.3 ALUMINUM FRAMES

.1 Construct [thermally broken] [and] [insulated] frames of aluminum extrusions with minimum wall thickness of [___] mm.

.2 Frame members [___] x [___] mm nominal size, for [flush glazing] [applied stops].

2.4 ALUMINUM FINISHES

.1 Finish exposed surfaces of aluminum components in accordance with Aluminum Association Designation System for Aluminum Finishes.

.1 Clear anodic finish: designation AA-[___].

.2 Integral colour anodic finish: designation AA-[___], [___] colour [to match [Departmental Representative's] [Contract Administrator's] [Consultant's] [___] sample].

.3 Impregnated colour anodic finish: designation AA-[___], [___] colour [to match [Departmental Representative's] [Contract Administrator's] [Consultant's] [___] sample].

.4 Electrolytically deposited colour anodic finish: designation AA-[___], [___] colour [to match [Departmental Representative's] [Contract Administrator's] [Consultant's] [___] sample].

.2 Appearance and properties of anodized finishes designated by the Aluminum Association as Architectural Class 1, Architectural Class 2, and Protective and Decorative.

2.5 STEEL FINISHES

.1 Finish steel clips and reinforcing steel with [steel primer to CGSB 1.40] [zinc coating to CSA G164].

2.6 FABRICATION

.1 Doors and framing to be by same manufacturer.

.2 Fabricate doors and frames to profiles and maximum face sizes as shown. [Provide minimum [22] [___] mm bite for insulating glazed units] [___].

.3 Provide structural steel reinforcement as required.

.4 Fit joints tightly and secure mechanically.

.5 Conceal fastenings.

.6 Mortise, reinforce, drill and tap doors, frames and reinforcements to receive hardware using templates provided under Section [08710 - Door Hardware] [___].

.7 Isolate aluminum from direct contact with dissimilar metals, concrete and masonry.

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.

3.2 INSTALLATION

.1 Set frames plumb, square, level at correct elevation in alignment with adjacent work.

.2 Anchor securely.

.3 Install doors and hardware in accordance with hardware templates and manufacturer's instructions.

.4 Adjust operable parts for correct function.

.5 Make allowances for deflection of structure to ensure that structural loads are not transmitted to frames.

3.3 GLAZING

.1 Glaze aluminum doors and frames in accordance with Section [08800 - Glazing] [___].

3.4 CAULKING

.1 Seal joints to provide weathertight seal at outside [and air, vapour seal at inside] [___].

.2 Apply sealant in accordance with Section [07900 - Joint Sealers] [___]. Conceal sealant within the aluminum work except where exposed use is permitted by [Departmental Representative] [Consultant] [___].

3.5 FIELD QUALITY CONTROL

.1 Have manufacturer of products supplied under this Section review Work involved in handling, installation/application, protection and cleaning of its product[s], and submit written reports in acceptable format to verify compliance of Work with Contract.

.2 Manufacturer's field services: 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.

.3 Schedule site visits to review Work at stages listed:

.1 After delivery and storage of products, and when preparatory Work on which Work of this Section depends is complete, but before installation begins.

.2 [Twice] [___] during progress of Work at [25%] and [60%] [___]complete.

.3 Upon completion of Work, after cleaning is carried out.

.4 Obtain reports within [three] [___] days of review and submit.

3.6 CLEANING

.1 Perform cleaning of aluminum components in accordance with AAMA 609.1 - Voluntary Guide Specification for Cleaning and Maintenance of Architectural Anodized Aluminum.

.2 Perform cleaning as soon as possible after installation to remove construction and accumulated environmental dirt.

.3 Clean aluminum with damp rag and approved non-abrasive cleaner.

.4 Remove traces of primer, caulking, epoxy and filler materials; clean doors and frames.

.5 Clean glass and glazing materials with approved non-abrasive cleaner.

.6 Upon completion of installation, remove surplus materials, rubbish, tools and equipment barriers.

END OF SECTION

Part 1 General

1.1 RELATED SECTIONS

.1 Section 01330 - Submittal Procedures.

.2 Section 06200 - Finish Carpentry.

.3 Section 06666 - Plastic Laminates.

.4 Section 08110 - Steel Doors and Frames.

.5 Section 08700 - Door Hardware.

.6 Section 08800 - Glazing.

1.2 REFERENCES

.1 Architectural Woodwork Manufacturers Association of Canada (AWMAC).

.1 Quality Standards for Architectural Woodwork 1998.

.2 Canadian General Standards Board (CGSB).

.1 CAN/CGSB-71.19-M88, Adhesive, Contact, Sprayable.
.2 CAN/CGSB-71.20-M88, Adhesive, Contact, Brushable.

.3 Canadian Standards Association (CSA International).

.1 CSA O115-M1982(R2001), Hardwood and Decorative Plywood.
.2 CAN/CSA O132.2 Series-[90(R1998)], Wood Flush Doors.
.3 CAN/CSA-O132.5-M1992(R1998), Stile and Rail Wood Doors.

.4 Environmental Choice Program (ECP).

.1 CCD-045-[92], Sealants and Caulking Compounds.
.2 CCD-046-[92], Adhesives.

1.3 SUBMITTALS

.1 Product Data:

.1 Submit manufacturer's printed product literature, specifications and data sheet in accordance with Section 01330 - Submittal Procedures.

.2 Shop Drawings:

.1 Submit shop drawings in accordance with Section 01330 - Submittal Procedures.Indicate door types and cutouts for [lights] [and] [louvres], sizes, core construction, transom panel construction and cutouts.

1.4 SAMPLES

.1 Submit samples in accordance with Section 01330 - Submittal Procedures.

.2 Submit one 300 x 300 mm corner sample of each type wood door.

.3 Show door construction, core, glazing detail and faces.

.4 Manufacturer's Instructions:

.1 Submit manufacturer's installation instructions.

1.5 QUALITY ASSURANCE

.1 Test Reports: certified test reports showing compliance with specified performance characteristics and physical properties.

.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 Storage and Protection:

.1 Protect doors from dampness. Arrange for delivery after work causing abnormal humidity has been completed.

.2 Store doors in well ventilated room, off floor, in accordance with manufacturer's recommendations.

.3 Protect doors from scratches, handling marks and other damage. [Wrap] [Crate] [___] doors.

.4 Store doors away from direct sunlight.

Part 2 Products

2.1 WOOD FLUSH DOORS

.1 Solid core: to CAN/CSA-O132.2.1.

.1 Construction:

.1 Solid wood core:

.1 Glued block core.

.2 Framed block glued core.

.3 Framed block nonglued core.

.4 Stile and rail core.

.5 5-ply construction.

.2 Face Panels:

.1 Hardwood; veneer grades: Grade I (Premium) Maple species.

.3 Adhesive: [Type I (waterproof)] [Type II (water resistant)] for [interior] [exterior] doors.

2.2 TRANSOM AND SIDE PANELS

.1 Construction: to match adjacent door.

.2 Meeting edges of doors and transom panels: square.

.3 Veneer of doors and transom panels: colour matched.

2.3 FABRICATION

.1 Vertical edge strips to match face veneer.

.2 Bevel vertical edges of single acting doors 3 mm in 50 mmon lock side and 1.5 mm in 50 mm on hinge side.

.3 Radius vertical edges of double acting doors to 60 mm radius.

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.

3.2 INSTALLATION

.1 Unwrap and protect doors in accordance with CAN/CSA-O132.2 Series, Appendix A.

.2 Install doors and hardware in accordance with manufacturer's printed instructions Adjust hardware for correct function.

.3 Install stops.

.4 Secure transom and side panels by means of countersunk screws concealed by means of wood plugs matching panel in grain and colour.

3.3 ADJUSTMENT

.1 Re-adjust doors and hardware just prior to completion of building to function freely and properly.

3.4 CLEANING

.1 Perform cleaning as soon as possible after installation to remove construction and accumulated environmental dirt.

.2 Remove traces of primer, caulking; clean doors and frames.

.3 Clean glass and glazing materials with approved non-abrasive cleaner.

.4 On completion of installation, remove surplus materials, rubbish, tools and equipment barriers.

END OF SECTION

Part 1 General

1.1 QUALITY ASSURANCE

.1 Furnish services of an Architectural Hardware Consultant (AHC) for preparation of hardware shop drawings, keying, co-ordination with other Sections, consultation with the City and the Contract Administrator and for On-Site inspections.

.2 Inspect all hardware after installation by the Manufacturer's Representative who shall certify in writing to the City, that all hardware has been supplied and installed in accordance with the specifications and reviewed Shop Drawings, and are functioning properly.

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

.4 Provide to applicable Sections templates and information required for proper preparation and application of hardware in ample time to facilitate progress of Work.

.5 Before supplying and installing any hardware, carefully check Hardware Schedule, Drawings and Specifications. Verify door hands, door and frame material and operating conditions, and assure that hardware will fit work to which it is to be attached. Advise Contract Administrator in writing of required revisions.

.6 Templates: Check Hardware Schedule, Drawings and Specifications, and Supply promptly to applicable Sections any templates, template information and Manufacturer's literature, required for proper preparation for hardware, in ample time to facilitate progress of work.

.7 Provide services of competent mechanics for the installation of hardware. Make adjustments necessary to leave hardware in perfect working order. Provide written summary of work completed and status of all items, including any adjustments, revisions or modifications.

.8 Maintenance Seminar: Instruct the City regarding proper care, cleaning and general maintenance.

.9 Source Limitations: Obtain each type of product from a single Manufacturer.

1.2 REGULATORY REQUIREMENTS

.1 Ensure hardware for fire-rated openings complies with requirements of authorities having jurisdiction, with door and frame Manufacturer's tested assemblies, and that hardware items bear labels acceptable to authorities having jurisdiction.

Part 2 Products

2.1 MATERIALS

.1 Type and Design: Matching in all respects to samples of hardware and finishes approved by City. Use one Manufacturer's products for all similar items.

.2 Metal Finishes: Free from defects, clean and unstained, and of uniform colour.

.3 Fire Rated Doors: Meeting requirements of ULC as part of fire rated door assembly, with ULC or WHI label, or as acceptable to authority having jurisdiction.

.4 Fasteners: Screws, bolts, expansion shields and other fastening devices as required for satisfactory installation and operating of hardware.

.1 Same finish as hardware to which it is to be fastened.

.5 Supply hardware complete with all necessary screws, bolts and other fastening of suitable size and type to anchor the hardware in position neatly and properly in accordance with the best practices and to the Contract Administrator's approval.

.6 Fastenings: All fastenings shall harmonize with the hardware materials and finishes.

.7 Hardware for fire rated and labelled door and frame assemblies: ULC listed or as accepted by authorities having jurisdiction.

.8 Following Manufacturer's are acceptable subject to review by the City of samples and list of items proposed.

.1 Hinges:

.1 All Doors: Full mortised, stainless steel, minimum 114 mm x 102 mm, heavy weight, 5 knuckles, ball bearing, stainless steel screws.

.2 Non Removal Pin: Out swinging exterior doors and where scheduled.

.3 Stamp hinge catalogue numbers on face of leaf of each hinge at factory to enable easy recognition of hinge material and manufacture after doors are hung.

.4 Where doors are required to swing to 180 degrees, Supply and Install hinges of sufficient throw to clear trim.

.2 Locksets:

.1 Type and Finish: Heavy duty, stainless steel construction, orb handle and raised escutcheon.

.2 Backset: 125 mm for exterior doors, 70 mm for interior doors.

.3 Cylinders: 6 pin cylinders.

.4 Strikes: Stainless Steel, ANSI standard size with curved lip strikes for latch bolts and no lip strikes for dead locks. Provide complete with wrought boxes finished to match strike.

.3 Closers:

.1 Hydraulically controlled and full rack and pinion operation, clear anodized aluminium arm and full cover.

.2 Adjustable closing speed, latch speed and back check control.

.3 Adjustable swing power.

.4 Install all necessary attaching brackets, mounting channels, cover plates where necessary for correct application of door closers.

.5 Parallel arms at out swinging exterior doors and at interior doors where specified.

.6 Delayed action for barrier free application.

.7 Coordinate closers with overhead holders.

.4 Construction Keying:

.1 Equip lock cylinders in construction system.

.2 The construction key system to be inoperative once the City's keys are inserted in the cylinders.

.5 Push Plates and Kickplates:

.1 Length: 40 mm (1½") less than door width for single doors and 20 mm (¾") less than door width for doors in pairs.

.2 Thickness: 1.3 mm (0.050"), free of rough or sharp edges. Corners and edges to be slightly radiuses.

.3 Installation: 3M tape.

.6 Surface Bolts:

.1 Stainless steel top and bottom bolts, chain pull for top bolt.

.2 Dust free strikes.

.7 Door Stops:

.1 Surface mount, stainless steel retainer, half dome shaped neoprene stop.

.2 Install floor stops in manner so as not to create a tripping hazard and allows maximum opening of doors.

.3 Supply and Install door stops of height to engage doors.

.8 Astragals: Stainless steel bar with neoprene bulb.

.9 Weatherstrippings: Surface mounted extruded aluminium housing with neoprene bulb having spring mounted adjustment, 770A by Zero International.

.10 Door Bottoms: Surface mounted, extruded aluminium housing, pressure spring loaded neoprene bulb, 365A by Zero International.

.11 Thresholds: Extruded aluminium, high seat, except flat saddle for barrier free application.

2.2 KEYING SYSTEM

.1 Lay out keying system for building in consultation with the City. Keying system shall include keying alike, keying differently, keying in groups, master keying and grand-master keying locks and exit devices as required.

.2 Prepare and submit keying chart and related explanatory data for approval. Do not order cylinders until written confirmation of keying arrangements is received from the City.

.3 Stamp keys "DO NOT DUPLICATE".

.4 Provide two (2) change keys for each lock. Three (3) keys for each submaster level and six (6) grand master keys. In the case of keyed alike groups, supply six (6) cut keys only and supply the balance as blanks.

.5 Supply 1 Key Control System complete with cabinet and necessary components as Lund Model 1201, 2 tag system.

.6 Confirm with Contractor and the City for shipping directions.

Part 3 Execution

3.1 PREPARATION

.1 Thoroughly check design and provide required hardware for openings to required detail.

.2 Trim undesignated openings with hardware of equal quality and design to that specified for similar opening.

.3 Furnish door and frame Manufacturers with complete instructions and templates for preparation of their Work to receive hardware.

3.2 INSTALLATION

.1 Install finish hardware to template in accordance with Manufacturer's written instructions. Do not modify finish hardware without Manufacturer's written approval.

.2 Install finish hardware for fire rated doors in accordance with NFPA 80 requirements.

.3 Install finish hardware secure, plumb, level, and true to line.

.4 Cut and fit to substrates avoiding damage and weakening. Reinforce attachment substrate as necessary for proper installation and operation.

.5 Size cutouts so that hardware item completely covers cut out.

.6 Mortise work to correct location and size without gouging, splintering, and causing irregularities in exposed finish work.

.7 Where cutting and fitting is required on substrates to be painted or similarly finished, install, fit, and adjust hardware prior to finishing.

.8 Remove hardware and place in original packaging.

.9 Re-install hardware after finishing operation is complete.

.10 Install hardware items affixed to concrete and masonry with machine screws and threaded metal expansion shields.

.11 Set, fit and adjust hardware according to Manufacturer's templates and instructions. Hardware shall operate freely. Protect installed hardware from damage and paint spotting.

.12 Consult with manufacturer of security hardware items such as door monitoring equipment, card reader access equipment, electric strikes, and electric hinges operated by card access equipment and combination magnetic door holder releases/door closers and install in accordance with Manufacturer's recommendations under the Contractor's supervision Sections Fire Detection and Alarm System. Use templates as supplied by Manufacturer for predrilling doors and frames.

.13 Pre-drill kickplates and doors before attachment of plates. Apply with water resistant adhesive and countersunk stainless steel screws.

.14 Weatherstrip exterior doors. Install effectively to tightly seal entire perimeter of door. Secure in place with non-ferrous screws, in accurate alignment.

.15 Maintain integrity of weather seal at head of doors fitted with closers. Adapt weatherstripping as required to achieve specified performance and provide any necessary accessories.

.16 After installation of hardware under this Section, check opening units for correct fit and uniformity of space around perimeter of units, or between units. Provide smoothly operating opening units free from binding.

3.3 FIELD QUALITY CONTROL

.1 Have hardware Manufacturer's Representative visit Site and submit written report of each visit to Site, giving storage conditions and installation details, date and name of hardware Manufacturer's Representative.

.2 Before completion of Work but after hardware installation, have hardware Manufacturer's Representative inspect work and submit certificate to Contract Administrator stating that final inspection has been made and that hardware of proper type has been properly installed and adjusted, is in good working order and condition, and is in conformance with Contract requirements.

3.4 ADJUSTMENTS AND CLEANING

.1 Adjust and clean hardware according to Manufacturer's written instructions.

.2 Turn over construction keys and extractor key to the City and provide any required adjustment or modifications prior to Substantial Performance of the Contract.

.3 Hand over to the City Grand-master and master keys, Change Keys, Control Keys and Permanent Cylinders and core. The City will be responsible for interchanging temporary construction cores with permanent cylinder cores in locks. Temporary construction cores will be returned to Contractor.

3.5 EXTENDED WARRANTY

.1 Warrant work against defects in materials and quality of performance for a period of five (5) years for door closers and two (2) years for other hardware.

END OF SECTION

1. GENERAL

1.1 General Requirements

.1 This Section includes glazing Work not specified in other Sections. Refer to other Sections for other glazing.

1.2 Submittals

.1 Provide samples of materials as requested. Label samples with manufacturer's name, with registered name of product, weight, and quality of glazing material.

.2 Provide maintenance data of glass and glazing system used in this Project including cleaning instructions for incorporation into manual.

1.3 Quality Assurance

.1 Perform Work in accordance with recommendations of Glazing Association of North America (GANA). Size glass to Code requirements and verify that openings for glazing are correctly sized and within tolerance.

.2 Glass Lites: Float, tempered, laminated or heat strengthened and in thicknesses in accordance with requirements of glass manufacturer as substantiated by the glass manufacturer's stress analysis for each location required, unless otherwise indicated.

.3 Design Conditions: Conforming to requirements of Division 8 Sections Curtain Wall and Entrances.

.4 Use a safety factor of 2.5:1 minimum for glass design.

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.

1.5 Warranty

.1 Submit a 10 year warranty from Total Performance, against defects in the insulating glass units and warrant them to be free from material obstruction of vision as a result of dust or film formation on the internal glass surfaces by any cause, under design conditions, other than extrinsic glass breakage, but including breakage due to thermal shock and temperature differential due to inherent glass faults.

.1 The glass coatings will not discolour, oxidize, delaminate, or have scratches and pinholes and shall be uniform in thickness and uniform in colour throughout each glass unit and from glass unit to glass unit.

.2 Insulating glass units will be free from condensation, fogging material obstruction of vision as a result of dust or film formation on the internal glass surfaces by any cause under normal conditions.

.3 The insulating glass units will not change their mechanical design properties and shall not in any way deteriorate, degrade, delaminate or change their visual appearance.

2. PRODUCTS

2.1 Materials

.1 Float Glass: CAN/CGSB-12.3, clear, glazing quality, minimum 6 mm (1/4") thick.

.2 Tempered Safety Glass: CAN/CGSB-12.1 Type 2, Class B, minimum 6 mm(1/4") thick, heat treated using the horizontal tong free method, with roll-wave distortion parallel to bottom edge of glass as installed.

.3 Heat Strengthened Glass: ASTM C1048 Type HS, minimum 6 mm (1/4") thick, heat treated using the horizontal tong free method, with roll-wave distortion parallel to bottom edge of glass as installed.

.4 Laminated Safety Glass: CAN/CGSB-12.1, Type 1, Class B, fabricated with minimum 1.6 mm clear polyvinylbutyral interlayer between 2 lites of minimum 3 mm (1/8") thick glass, minimum overall 7.6 mm (5/16") thick. Treat exposed edges of laminated glass susceptible to degradation by organic solvents and glazing compounds.

.5 Wired Glass: Clear, 6 mm (1/4") thick, polished Georgian 12 mm (1/2") square wire-reinforced, float glass, having the required fire resistance rating based on ULC testing.

.6 Tinted Glass: Heat absorbing glass, Solargray by PPG.

.7 Low Emissivity Coating: Solarban 60 by PPG.

.8 Ceramic Frit Coated Glass: Ceramic enamel applied by silk-screened process on No. 2 surface.

.9 Spandrel Glass: CAN2-12.9-M, minimum 6 mm (1/4") thickness or as indicated on Drawings, heat strengthened glass.

.10 Safety Scrim Backing: Self adhering polyester or polyethylene film 0.05 mm to 0.125 mm (2 mils to 5 mils) thick.

2.2 Accessories

.1 Glazing materials, primers and cleaning solvents: Mutually compatible, standard colours.

.2 Insulated Glass Unit Spacer Core: Extruded, thermoset polymer structural silicone foam tape with integrally incorporated desiccants, resistant to ozone, sunlight, oxidation, black, Super Spacer Premium Plus by Edgetech.

.3 Glazing Compound: CAN2-19.13, one component silicone base.

.4 Glazing Tape, Preshimed: Extruded, ribbon shaped, non-drying, non-skinning, non-oxidizing polyisobutylene tape with continuous synthetic rubber spacer rod, sufficiently wide and thick as to completely cover bite area of glazing unit when unit is pushed into place.

.5 Glazing Tape: Extruded, ribbon-shaped, non-drying, non-skinning, non-oxidizing, reinforced, polyisobutylene tape of sufficient width and thickness, 6 mm (1/4") minimum, to permit a continuous seal.

.6 Shims, Spacers and Setting Blocks: 45, 50 and 90 Durometer A hardness plus/minus 5 respectively, neoprene rubber. Resistance to sunlight, weathering, oxidation and permanent deformation under load shall be prime essentials of shims, spacers and setting blocks.

.7 Glazing Gaskets: Neoprene, EPDM, thermoplastic or other approved material, of sufficient thickness to be 25% compressed when installed. Gaskets shall have a 13.8 MPa (2000 psi) tensile strength, Durometer A hardness of 50, plus/minus 5, resistance to permanent set 30% maximum, minimum elongation at break of 300% and resistance to ozone showing no cracks.

.8 Safety Decals: 50 mm (2") diameter round, self-adhesive, pressure-sensitive, black, non-facing, decals with clear, colourless, non-yellowing adhesive.

2.3 Fabrication

.1 Accurately size glass to fit openings allowing clearances recommended by Glass Association of North America. Cut glass clean and free of nicks and damaged edges. Grind smooth and polish exposed glass edges. Do not cut or abrade tempered, heat treated, or coated glass.

2.4 Fabrication – Insulating Glass Units

.1 Insulating glass units: CAN2-12.8, double and triple glazed, composed of lites of minimum 6 mm thick glass separated by a 13 mm wide dehydrated air space, double sealed and atmospheric pressure equalized to prevent bowing of the glass lites in the vertical position. Edges of glass shall be straight cut, free of nicks and other imperfections conducive to breakage. Coatings used in structural glazing shall be edge deleted 10 mm.

.1 Sealing System: At Contractor's option, dual seal with polyisobutylene primary and polysulfide secondary sealants, or dual seal with polyisobutylene primary and silicone secondary sealants.

.2 Set spacer core straight and even into glass units with a maximum variation in line of spacer core of plus or minus 2 mm (0.080") and the primary seal not extend past the inside edge of spacer core by more than 1.6 mm (0.060"). Weld or vulcanize spacer core corners and joints.

2.5 Glass And Glazing Types

.1 Exterior Vision Units: Double glazed Insulating glass units, tinted glass outer lite, clear glass inner lite with low emissivity coating on No. 3 surface.

.2 Exterior Spandrel Glass: Single glazed clear glass, ceramic frit coating and scrim backing on No.2 surface.

3. EXECUTION

3.1 Inspection

.1 Verify dimensions at the Site before proceeding with fabrication or glazing units.

.2 Ensure that openings are free from distortion, and that surfaces are free from protrusions that will obstruct face and edge clearances.

.3 Ensure that ferrous metals are painted or zinc coated; and that surfaces are suitable for adhesion of the glazing materials.

.4 Ensure that operable units to be glazed are adjusted for proper operation.

.5 Ensure that ambient and surface temperatures are above 5°C.

3.2 Preparation

.1 Free rabbets, stops and glass edges of dust, dirt, moisture, oil and other foreign matter detrimental to or obstructing the glazing material.

3.3 Installation - General

.1 Handle and install glass in accordance with manufacturer's directions. Prevent nicks, abrasions and other damage likely to develop stress on edges.

.2 Without limitations, cracked or scratched glass, shrinking, cracking, staining, hardening, sagging of glazing materials; loosening or rattling of glass; leaking of glazed joints will be rejected.

.3 Remove and replace glazing stops in original locations, using original fasteners, securely set and undamaged.

.4 Use setting blocks and spacers as required to properly support the glass, centred in place in the glazing space independent of the materials and to uniformly distribute its load.

.5 Use a minimum of 2 setting blocks, located at the quarter points. Locate spacers at jamb edges of glass, uniformly spaced at 600 mm (24") o.c. maximum, and 300 mm (12") maximum from top and bottom.

.6 Assess coloured glass units for colour uniformity and arrange to avoid abrupt variation in appearance.

.7 Set glass properly centred with uniform bite and face and edge clearance, free from twist, warp or other distortion likely to develop stress.

.8 Leave labels on glass until it has been set and inspected and approved. Leave glass whole and without cracks, scratches or other defects and with setting in perfect condition at completion, to the approval of the Contract Administrator.

.9 Remove rejected, broken or damaged glass due to defective materials or improper setting and replace with perfect materials. Units producing distorted vision will be rejected and replaced at the reasonable discretion of the Contract Administrator.

3.4 Cleaning

.1 Clean and make good to the approval of the Contract Administrator, surfaces soiled or otherwise damaged in connection with the Work of this Section. Pay the cost of replacing finishes or materials that cannot be satisfactorily cleaned.

.2 Upon completion of the Work, remove all debris, equipment and excess material resulting from the Work of this Section from the Site.

END OF SECTION

Part 1 General

1.1 SYSTEM DESCRIPTION

.1 Wind Loads: Design and install curtain wall system to withstand positive and negative wind and service pressure loads normal to wall plane, to requirements of the building code.

.2 Thermal Movement: Provide for thermal movement caused by design temperatures required by the building code and a 82°C surface temperature, without causing buckling stresses on glass, joint seal failure, undue stress on structural elements, damaging loads on fasteners, reduction of performance, or detrimental effects.

.3 Curtain Wall System Performance Criteria: Comply with the following performance requirements, demonstrated by testing manufacturer's assemblies in accordance with test methods indicated.

.1 Elastic Deflection Limits of Vertical Mullions: Tested in accordance with ASTM E330. Deflection limits shall be such that the integrity of the glass and air seals are maintained at design loading. Permanent deformation of members due to applied loads are not permitted. Deflection limitation shall be lesser of the following:

.1 L/175 of clear span for spans up to 4.1 m; L/240 of clear spans plus 6 mm for spans greater than 4.1 m.

.2 An amount that restricts edge deflection of individual glazing lites to 19 mm.

.2 Elastic Deflection Limit of Horizontal Mullions: Limited to amount not exceeding that which reduces glazing bite to less than 75% of design dimension and which reduces edge clearance between framing members and glazing or other fixed components to less than 3 mm, as tested to ASTM E330.

.3 Air Infiltration/Exfiltration: Tested in accordance with ASTM E283, maximum 0.3 L/s/m^2 (0.06 cfm/ft^2) at a static air pressure differential of 300 Pa (6.24 psf).

.4 Water Infiltration: No uncontrolled water on indoor face of any component when tested in accordance with ASTM E331 at test pressure differential of 380 Pa (8 psf).

.4 Entrance System Performance Criteria: Comply with the following performance requirements, demonstrated by testing manufacturer's assemblies in accordance with test methods indicated.

.1 Air Infiltration/Exfiltration: Tested in accordance with ASTM E 283, at a static air pressure differential of 75 Pa (1.57 psf), based on door leaf module of 900 x 2100 mm (36” x 84”).

.1 Single Door and Frame: Maximum 2.83 m^3/h/m (0.50 cfm/ft.) of perimeter crack.

.2 Pair of Doors and Frame: Maximum 5.66 m^3/h/m (1.0 cfm/ft.) of perimeter crack.

.2 Structural: Door corner structural strength test using a dual moment loading criteria, minimum 132 kg (290 kg).

.3 Forced Entry Resistance: Tests performed simultaneously with 136 kg (300 lbs) forces applied to the active door panel within 75 mm (3") of the locks in the direction that opens the door and 68 kg (150 lbs) forces applied in both perpendicular directions to the 136 kg (300 lbs) force simultaneously.

1.2 QUALITY CONTROL

.1 Installer: Trained and approved by the manufacturer and having a minimum three years experience in the installation of the work described in this Section and can show evidence of satisfactory completion of projects of similar size, scope and type. If requested, provide letter of certification from Manufacturer stating that installer is certified applicator of its products, and is familiar with proper procedures and installation requirements required by the Manufacturer.

.2 Maintenance Seminars: Provide, to the City, training seminars and recommendations on product maintenance procedures.

.3 Pre-Installation Meeting: Two (2) weeks prior to commencing work of this Section, arrange for Manufacturer's technical representative to visit the site and review preparatory and installation procedures to be followed, conditions under which the work will be done, and inspect the surfaces to receive the work of this Section. Advise the Contract Administrator of the date and time of the meeting.

.4 Manufacturer's Site Inspection: Have the Manufacturer's technical representative inspect the Work at suitable intervals during application and at conclusion of the work of this Section, to ensure the Work is correctly installed. When requested, submit manufacturer's inspection reports and verification that the work of this Section is correctly installed.

1.3 SUBMITTALS

.1 Shop Drawings: Submit Shop drawings in accordance with 01300, bearing the seal and signature of a Professional Engineer registered in the Province of Manitoba. Include plans, elevations, sections, details, hardware, attachments to other work, and the following:

.1 Mullion details, including reinforcement and stiffeners.

.2 Joinery details.

.3 Expansion provisions.

.4 Flashing and drainage details.

.5 Thermal-break details.

.6 Glazing details.

.7 Cleaning provisions.

.2 Structural Analysis Report: Bearing signature and seal of Professional Engineer registered in the Province of Manitoba responsible for its preparation and used to determine the following:

.1 Structural test pressures and design pressures from basic wind speeds.

.2 Deflection limitations of glass framing systems.

.3 Samples: Submit sample sections of component parts of curtain wall system including frame, sash, sill, glazing, and waterproofing method.

.4 Product Test Reports: Submit report from an independent testing laboratory, indicating products meet or exceed performance requirements.

.1 Base report on evaluation of comprehensive tests performed within the last four (4) years by a qualified testing agency, for each type, grade, and size of aluminium curtain wall system. Test results based on use of down-sized test units will not be accepted.

.5 Maintenance Data and Operating Instructions: On completion of work, supply three (3) copies of maintenance and glazing instructions for insertion in maintenance manual.

1.4 DELIVERY, STORAGE, AND HANDLING

.1 Store in a dry, protected area on Site, in original undamaged containers with Manufacturer's labels and seals intact.

.2 Factory apply strippable coating or protective wrappings on exposed surfaces of aluminium. Do not remove protection until completion of building.

1.5 WARRANTIES

.1 Warrant the work of this Section in accordance with the requirements of the Contract Documents.

.2 Warrant the following:

.1 The curtain walls will be structurally sound and free from distortion, deflection, misalignment and will be weathertight.

.2 The metals will not warp, buckle, oil can, distort and their finishes will not crack, peel, rust, pit, or otherwise corrode, discolour or fade.

.3 The gaskets, tapes and sealants will be free from deterioration or dislocation from sunlight, weather or oxidation. The gasketing shall be free from permanent deformation under load.

.4 The air/vapour barrier will be continuous with the building air/vapour barriers.

Part 2 Products

2.1 MANUFACTURERS

.1 Specified Products: The design for the work of this Section is based on the products named. Products by other manufacturers similar in function, design, performance, and construction complying with requirements of this Section may be incorporated into the Work subject to Contract Administrator’s acceptance.

.1 Curtain Wall Framing: Thermally broken, 7500 Series by Kawneer or equal

.2 Entrance Doors: Thermally broken, 360 Insulclad by Kawneer or 400A Insuldor by Alumicor.

.3 Vestibule Framing: Non-thermally broken, Trifab 450 Series by Kawneer or 800 Series by Alumicor..

2.2 MATERIALS

.1 Aluminium Association Alloy AA6063-T5 for extruded shapes, commercial quality AA1100-H14 aluminium sheet for formed shapes.

.2 Steel: CAN3-G40.21-M Grade 300W.

.3 Flashing: Aluminium, finished to match framing, minimum 24 gauge.

.4 Bolts, Screws, Anchors and Fasteners: Stainless steel or aluminium for aluminium connections; cadmium plated steel may be used at interior side of air barriers; galvanized steel elsewhere.

.5 Slip washers: Teflon coated steel or aluminium washers.

.6 Loose Insulation: Glass fibre or mineral wool, CSA A101-M, Type I, Loose, light density insulation.

.7 Foam Insulation: Enerfoam by Dow Chemical.

.8 Temporary Strips and Safety Markings: Supply 25 mm (1") wide, light reflecting, easily removable, pressure sensitive tape applied over glass lites in windows. Windows shall have corner to corner cross stripes from aluminium frames.

.9 Rust Inhibiting Primer: CAN/CGSB-1.40-M.

.10 Isolation Coating: CAN/CGSB-1.108-M, acid and alkali resistant.

2.3 METAL AIR/VAPOUR BARRIERS (SPANDREL BACK PANS)

.1 Sheet Metal: Minimum 20 gauge sheet steel, galvanized, complying with ASTM A653/653M, zinc coating Z275.

.2 Spandrel Insulation: Mineral fibre board insulation, CavityRock by Roxul or CW50 by Fibrex, complete with compatible fire retardant insulation adhesive.

.3 Stick Clips: 25 mm (1") diameter perforated disc base with integral [3 mm|1/8"] square sharpened pin of moulded polyvinylchloride in lengths to suit insulation thickness.

.1 Insulation Retainers: 25 x 25 mm (1" x 1") galvanized sheet steel, punched to catch on pins.

.2 Adhesive for apply clips: High-strength, resilient adhesive having a drying time of 0 to 30 minutes (rapid initial set), and 24 hours final set. Adhesive shall be compatible with the specified insulation adhesive, insulation and galvanized steel.

.4 Gun Welded Pins: Alternative at the Contractor's option to stick clips, 3 mm ($^1/_8$") diameter galvanized steel pins with cup heads, of length to suit insulation thickness and suitable for gun shot welding to the back pans.

.5 Stiffeners: Hot or cold rolled steel or galvanized sheet steel sections, to the requirements of this Section.

2.4 SEALANTS

.1 Joint Primer, Surface Conditioners and Cleaning Agents: As recommended by respective glazing and sealant compound manufacturer.

.2 Joint Backing Material**:** Polyethylene foam rope, closed cell type, out-sized minimum 50% larger than joint width and compatible with joint sealant.

.3 Sealant: Non-bleeding, non-migrating, non-sagging, capable of supporting their own weight, standard colour.

.1 Sealant between aluminium framing and adjacent structures: CAN/CGSB-19.24-M, Type 2, Class B, multi-component, urethane based.

.2 Sealant in concealed-sealing of thin joints in metal work: Non-hardening, polyisobutylene or partially vulcanized rubber base.

2.5 FABRICATION – CURTAIN WALL AND WINDOW FRAMES

.1 Form work true to detail, free from defects impairing appearance, strength and durability.

.2 Fabricate aluminium frames with an integral, concealed, low-conductance thermal barrier; located between exterior materials and members exposed on interior side; in a manner that eliminates direct metal-to-metal contact.

.3 Apply sealant to joints within units and components, including junction of frames to provide air/vapour and watertight joints. Do such sealant application in a concealed manner.

.4 Provide punched louvres or holes through exterior glazing flange for venting and drainage.

.5 Design mullions and framing members to accommodate glazing units.

.6 Design, fabricate and install brackets and anchorage devices attached to warm side of thermal break. Make allowance for unevenness and dimensional difference in structure, expansion and contraction of framing members without creating undesirable stresses in components to adequately sustain curtain wall system, movements in structure, and superimposed wind and rain loads.

.7 Reinforce and prepare curtain wall frames for related hardware where applicable.

.8 Fabricate system with drained glazing cavity between sealed unit and frame into which it is secured to drain out of curtain wall system to exterior.

.9 Form continuous sills, stools and flashings with intermediate clips, anchor devices and reinforcement in shop and as far as practical assemble units in shop. Supply filler and closure pieces as required. Fill corners and other open areas within construction with loose insulation.

.10 Ensure corners of formed work are mitred and closely fitted. Apply back-up sealants designed for this purpose, on inside of joints in aluminium work by this trade. Provide drainage towards exterior at bottom of glazing rebates.

.11 Deburr and make smooth sharp milled edges and corners of sash frames.

.12 Construct and erect work free of exposed fasteners. If unavoidable, ensure fasteners are tamper proof.

.13 Factory glaze and weatherstrip entrances as far as practicable. Secure weatherstripping properly to prevent shrinkage or movement. Ensure it is easily replaceable without use of special tools and is resistant to deterioration by weathering or aging.

.14 Apply two (2) shop coats of rust inhibiting primer to steel components. Take other necessary measures to prevent future deterioration due to corrosion and electrolysis during fabrication.

.15 Welding of component members is permitted providing it does not in any way mar surface appearance. Carry out welding with argon shielded electric arcs to ensure complete fusion of metal. Make joints tight, in true plane, ground and sand smooth, flush with base metal. Do welding on concealed surface.

2.6 FABRICATION –METAL AIR/VAPOUR BARRIERS

.1 Brake-form sheet metal air/vapour barriers to permit assembly using self-tapping screws, and attachment using power activated or pneumatic fixings or other means of secure fastening.

.2 Make provision in barrier design to accommodate movement resulting from thermal changes and from structural deflections.

.3 Cut, fit and form metal air/vapour barriers as required to accommodate framing, anchors, connections, mechanical, and electrical appurtenances and other obstructions.

2.7 FABRICATION - ENTRANCE SYSTEM

.1 Preparation for Hardware: Drill and cut to template for hardware. Reinforce frames and door stiles to receive hardware in accordance with Manufacturer's Recommendations.

.2 Arrange fasteners and attachments to conceal from view.

.3 Accurately fit and secure joints and corners. Make joints hairline in appearance.

.4 Prepare components with internal reinforcement for door hardware.

.5 Door Frame

.1 Fabricate and assemble units with joints only at intersection of alumimium members with uniform hairline joints; rigidly secure, and sealed in accordance with Manufacturer's Recommendations.

.6 Doors

.1 Corner Construction: Mechanical clip fastening, sigma deep penetration plug welds and 30 mm ($1\ ^1/_8$") long fillet welds inside and outside of all four corners

.2 Glazing Stops: Manufacturer's standard snap-in glazing stops with EPDM glazing gaskets. Factory glaze doors.

.7 Door Hardware

.1 Hinges: Stainless steel, continuous hinges.

.2 Closers: Overhead concealed, barrier free, heavy duty, complete with integral stop arms or overhead door stops.

.3 Locks: Thumb piece on inside, high security deadbolt.

.4 Flushbolts, Pairs of Doors: Manual top and bottom concealed flush bolts.

.5 Push/Pulls: Full height and width of doors, round bar type, finish to match entrances.

.6 Weatherstripping: Manufacturer's standard pile type in replaceable rabbets for stiles; Manufacturer's standard EPDM bulb type in door frames.

.7 Thresholds: Barrier free, Mill finish aluminium threshold with elastomer weather-strip and counterflashed.

2.8 FABRICATION - ALUMINIUM TRIM

.1 Fabricate work and support members in a manner which will provide an installation free of exposed fastenings, with sufficient support and allowance for thermal movement.

.2 Fabricate trim, sills, corner pieces and filler pieces of 3 mm ($^1/_8$") thick plate aluminium to profiles shown, by welding prior to application of finish. Make all planes flat, free of visible distortion and with edges straight and true, corners square and bend of minimum radius. Provide concealed clips for fastening plate assemblies in place.

.3 Reinforce work as required to prevent warpage, oil canning, buckling effect and to meet design requirements. Weld marks shall not telegraph to the finished side.

.4 Provide inconspicuous weep holes to properly drain to exterior.

.5 Aluminium Sills: Extrude to size and shape as detailed, complete with end drip deflectors, expansion cover plates and necessary anchors.

2.9 ALUMINIUM FINISHES

.1 Prefinish exposed to view aluminium surfaces in high performance fluoropolymer metallic finish. Ensure aluminium finish is free from blemishes or scratches and uniform in colour and sheen. Pretreat aluminium and apply primer and finish coats in accordance with manufacturer's instructions.

.1 High performance fluoropolymer metallic finish: AA-C12C40R1x, chemical finish: cleaned with inhibited chemicals; chemical finish: conversion coatings; organic coating: Manufacturer's standard three coat, thermocured system consisting of specially formulated inhibitive primer, fluoropolymer color coat, and clear fluoropolymer topcoat, with both color coat and clear topcoat containing not less than 70% polyvinylidene fluoride resin by weight. Prepare, pretreat, and apply coating to exposed metal surfaces to comply with AAMA 2605 and with coating and resin Manufacturers' written instructions.

.1 Colour 1: Duranar XL UC51131XL Bright Silver Metallic by PPG.

.2 Colour 2: Duranar XL UC52061XL Concord Blue Metallic by PPG.

Part 3 Execution

3.1 INSTALLATION - GENERAL

.1 Apply isolation coating of approximately 0.76 mm (30 mil) dry film thickness, or other suitable permanent separator on concealed contact surfaces of dissimilar materials, before assembly or installation where there is possibility of corrosive or electrolytic action with concrete, masonry, mortar, or steel.

.2 Set work in its correct location, level, square and plumb and at proper elevations, with nominal face of framing aligned in a single vertical plane. Fasten and anchor framing in place. Install in accordance with manufacturer's instructions and reviewed shop drawings.

.3 Anchor component parts securely in place as indicated, by bolting or other permanent mechanical attachment system, which will comply with performance requirements and permit movement as intended or necessary.

.4 Clean and restore primer and bituminous paint to surfaces disturbed by field welding or other operations.

.5 Leave final installation water, air and weather tight.

.6 Set thresholds in bed of mastic and secure.

.7 Apply foam insulation where detailed.

3.2 INSTALLATION – AIR AND VAPOUR BARRIER

.1 Metal Spandrel Back Pans (Air/Vapour Barrier): Adhere insulation clips at 300 mm (12") o.c. both ways. Support clips in place until adhesive has set unless welded clips are used. Avoid burn through when welding clips. Notched trowel apply insulation adhesive over entire surface of barrier and around clips held with adhesive.

.1 Apply insulation to the cold-in-winter side of the metal air/vapour barriers erected. Cut insulation slightly over-size as required to ensure tight butt joints.

.2 Press insulation boards firmly to barrier impaling them on clips without bending clips. Butt insulation boards tightly. Install retainers to clips.

.3 Isolate metal air/vapour barriers with thermal breaks and spacers as indicated.

3.3 INSTALLATION - SEALANT

.1 Prepare and seal joints to provide weathertight seal.

.2 Apply sealant to joints between windows, sills, and other components in this Section and adjacent construction both inside and outside to provide weather tight seal on exterior and air/vapour seal on interior. Provide toe bead and/or heal bead of sealant around perimeter or sealed unit to prevent air leakage.

.3 Apply joint backing to achieve correct joint depth and shape in accordance with manufacturer's instructions.

.4 Mix, apply and cure sealant in strict accordance with manufacturer's instructions.

.5 Apply sealant in continuous full beads, using gun with proper size nozzle and sufficient pressure to fill voids and joints solid.

.6 Form surfaces smooth, free from ridges, wrinkles, sags, air pockets, embedded impurities.

.7 Tool exposed surfaces to slightly concave shape.

.8 Remove excess compound promptly as work progresses and upon completion.

.9 Glazing:

.1 Provide heel bead at bottom of interior edge of sealed units and up lower 75 mm (3") of each vertical to provide a vented glazing cavity.

.2 Neatly tool glazing compound at an angle sloping away from glass. Remove excess glazing compound from stops and glass.

3.4 ADJUST AND CLEAN

.1 Maintain work in a clean condition throughout construction period, without deterioration or damage at time of acceptance. Select methods of cleaning which will promote achievement of uniform appearance and stabilized colours and textures for materials that weather or age with exposure. Do not use abrasives.

.2 Adjust operating devices and leave in perfect working order.

.3 Immediately prior to cleaning of glass and before building is handed over to City, make good damage and disfigurement. Remove protective covering and coating from aluminium surfaces, inside and out, and clean surfaces, remove labels, stripes and protective devices and polish glass surfaces, immediately prior to final acceptance.

.4 Immediately before Substantial Performance, clean work thoroughly, inside and out. Demonstrate proper cleaning methods to City during final cleaning.

END OF SECTION