PART 1 - GENERAL

1.1 RELATED SECTIONS

.1 Section 01 33 00 - Submittal Procedures.

.2 Section 07 92 10 - Joint Sealing

.3 Section 08 71 10 - Door Hardware

.4 Section 09 91 23 - Interior Painting.

.5 Section 16 Wiring for electronic hardware.

1.2 REFERENCES

All reference standards shall be current issue or latest revision at the date of building permit issue. This specification refers to the following standards, specifications or publications:

.1 American Society for Testing and Materials (ASTM International)
- .1 ASTM A 653/A653M, Specification for Steel Sheet, Zinc-Coated (Galvanized) or Zinc-Iron Alloy-Coated (Galvannealed) by the Hot-Dip Process.
- .2 ASTM B 29, Specification for Refined Lead.
- .3 ASTM B 749, Specification for Lead and Lead Alloy Strip, Sheet and Plate Products.

.2 Canadian General Standards Board (CGSB)
- .1 CAN/CGSB-1.181, Ready-Mixed Organic Zinc-Rich Coating.
- .2 CGSB 41-GP-19Ma, Rigid Vinyl Extrusions for Windows and Doors.

.3 Canadian Standards Association (CSA International)
- .1 G40.20/G40.21, General Requirements for Rolled or Welded Structural Quality Steel/Structural Quality Steel.
- .2 CSA W59, Welded Steel Construction (Metal Arc Welding) (Metric Version).

.4 Canadian Steel Door Manufacturers' Association, (CSDMA).
- .1 CSDMA, Specifications for Commercial Steel Doors and Frames.
- .2 CSDMA, Recommended Selection and Usage Guide for Commercial Steel Doors.

.5 National Fire Protection Association (NFPA)
- .1 NFPA 80, Standard for Fire Doors and Fire Windows.
- .2 NFPA 252, Standard Methods of Fire Tests of Door Assemblies.

.6 Underwriters' Laboratories of Canada (ULC)
- .1 CAN4-S104, Fire Tests of Door Assemblies.
- .2 CAN4-S105, 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 01 33 00 - Submittal Procedures.

.2 Indicate each type of door, material, steel core thicknesses, mortises, reinforcements, location of exposed fasteners, openings, glazed, arrangement of hardware and fire rating and finishes.

.3 Indicate each type frame material, core thickness, reinforcements, glazing stops, location of anchors and exposed fastenings fire rating finishes.

.4 Include schedule identifying each unit, with door marks and numbers relating to numbering on drawings and door schedule.

1.5 REQUIREMENTS

.1 Steel fire rated doors and frames: labeled 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 labeled frame products for those openings requiring fire protection ratings, as scheduled. Test products in strict conformance with CAN4-S104, ASTM E 152 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.

1.6 SAMPLES

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

.2 If requested, submit one 300 x 300 mm top butt corner sample of each type door.

.3 If requested, submit one 300 x 300 mm corner sample of each type of frame.
.1 Show butt cutout glazing stops 300 mm long removable mullion connection snap-on trim with clips.

1.7 WASTE MANAGEMENT AND DISPOSAL

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

.2 Divert unused paint and sealant materials from landfill to official hazardous material collections site.

PART 2 - PRODUCTS

2.1 MATERIALS

.1 Hot dipped galvanized steel sheet: to ASTM A 653M, ZF75, 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 A 653M, ZF75.

.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/m³ minimum sanded to required thickness.

.2 Stiffened: face sheets, honeycomb or insulated core as indicated.
.1 Expanded polystyrene: CAN/ULC-S701, density 16 to 32 kg/m³.

.3 Temperature rise rated (TRR): core composition to limit temperature rise on unexposed side of door to 250° C at 60 minutes. Core to be tested as part of a complete door assembly, in accordance with CAN4-S104, ASTM E 152 or NFPA 252, covering Standard Method of Tests of Door Assemblies and listed by nationally recognized testing agency having factory inspection service.

.4 Thermal insulation material must:
.1 not require being labeled as poisonous, corrosive, flammable or explosive under the Consumer Chemical and Container Regulations of the Hazardous Products Act;
.2 be manufactured using a process that uses chemical compounds with the minimum ozone depletion potential (ODP) available.

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 09 91 23 - Interior Painting and 09 91 13 - Exterior Painting. Protect weatherstrips 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 Metallic paste filler: to manufacturer's standard.

.5 Fire labels.

.6 Sealant: as per Section 07 92 10 - Joint Sealing.

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: 1.6 mm (16 gauge), construction as indicated.

.4 Blank, reinforce, drill and tap frames for mortised, templated 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.

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

.8 Conceal fastenings except where exposed fastenings are indicated.

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

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 Fabricate frame products for openings in sections, splice joints for field assembly.

.8 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, with provision for glass and/or louvre openings as indicated.

.2 Exterior doors: insulated construction. Interior doors: hollow steel construction.

.3 Fabricate doors with longitudinal edges locked seam. Seams: visible.

.4 Blank, reinforce, drill doors and tap for mortised or templated hardware.

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

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

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

.8 Provide fire labeled 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.

.9 Manufacturer's nameplates on visible faces of doors are not permitted.

2.11 DOORS: HONEYCOMB 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.

2.12 HOLLOW STEEL CONSTRUCTION

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

.2 Reinforce doors with vertical stiffeners, securely fastened to each face sheet at 150 mm on centre maximum.

.3 Fill voids between stiffeners of interior doors with fiberglass core.

.4 Fill voids between stiffeners of interior doors with fiberglass honeycomb temperature rise rated core.

PART 3 - EXECUTION

3.1 INSTALLATION GENERAL

.1 Install labeled 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 vapour retarder.

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 as follows.
- .1 Hinge side: 1.0 mm.
- .2 Latchside and head: 1.5 mm.
- .3 Finished floor, top of carpet 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 RELATED SECTIONS

.1 Section 01 33 00 - Submittal Procedures.

.2 Section 01 78 00 - Closeout Submittals.

.3 Section 07 21 16 - Blanket Insulation.

.4 Section 07 27 13 – Self Adhered Vapor Retarders.

.5 Section 07 92 10 - Joint Sealing.

.6 Section 08 71 10 - Door Hardware.

.7 Electrical - Wiring Devices.

.8 Electrical - Wire and Box Connectors - 0-1000 V.

1.2 REFERENCES

All reference standards shall be current issue or latest revision at the date of building permit issue. This specification refers to the following standards, specifications or publications:

.1 Aluminum Association (AA).
- .1 DAF 45, Designation System for Aluminum Finishes.

.2 American Society for Testing and Materials International, (ASTM).
- .1 ASTM E 330, Standard Test Method for Structural Performance of Exterior Windows, Doors, Skylights and Curtain Walls by Uniform Static Air Pressure Difference.

.3 Canadian General Standards Board (CGSB).
- .1 CGSB 1.40, Primer, Structural Steel, Oil Alkyd Type.
- .2 CAN/CGSB-12.1, Tempered or Laminated Safety Glass.
- .3 CAN/CGSB-12.20, Structural Design of Glass for Buildings.

.4 Canadian Standards Association (CSA International).
- .1 CAN/CSA-G40.20/G40.21, General Requirements for Rolled or Welded Structural Quality Steel/Structural Quality Steel.
- .2 CAN/CSA G164, 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 E 330 under wind load of 1.2 kpa.

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

.3 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 01 33 00 - Submittal Procedures.
- .2 Submit two copies of WHMIS MSDS - Material Safety Data Sheets in accordance with Section 01 33 00 - Submittal Procedures. Indicate VOC's for caulking materials during application and curing.

1.5 SHOP DRAWINGS

.1 Submit shop drawings in accordance with Section 01 33 00 - 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 If requested, submit samples in accordance with Section 01 33 00 - Submittal Procedures.

.2 If requested, 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 Manufacturer's Instructions:
- .1 Submit manufacturer's installation instructions.

.5 Manufacturers' Field Reports: Submit two copies of manufacturers field reports.

1.7 CLOSEOUT SUBMITTALS

.1 Provide maintenance data for cleaning and maintenance of aluminum finishes for incorporation into manual specified in Section 01 78 00 - 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.

PART 2 - PRODUCTS

2.1 MATERIALS

.1 Aluminum extrusions: Aluminum Association alloy AA 6063-T6 anodizing quality.

.2 Sheet aluminum: Aluminum Association alloy AA-M12C22A41 anodizing quality.

.3 Steel reinforcement: to CAN/CSA-G40.20/G40.21, grade 300 W

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

.5 Weatherstrip: replaceable metal backed wool pile.

.6 Door bumpers: black neoprene.

.7 Door bottom seal: adjustable door seal of anodized extruded aluminum frame and vinyl weather seal, surface mounted with drip cap.

.8 Isolation coating: bituminous paint.

.9 Glazing materials: as per Section 08 80 50 - Glazing.

.10 Sealants: as per Section 07 92 10 - Joint Sealing, colour selected by Contract Administrator.

2.2 ALUMINUM DOORS - Exterior

.1 Standard of Acceptance: Kawneer 560 Insulclad Thermal Entrance
- .1 Construct doors of porthole extrusions with minimum wall thickness of 3 mm.
- .2 Door stiles nominal 141.3 mm wide plus or minus 6 mm.
- .3 Top rail nominal 141.3 mm wide plus or minus 6 mm.
- .4 Bottom rail nominal 254 mm wide plus or minus 6 mm.
- .5 Center rail nominal 127 mm wide plus or minus 6 mm.
- .6 Reinforce mechanically-joined corners of doors to produce sturdy door unit.
- .7 Glazing stops: interlocking snap-in type for dry glazing. Exterior stops: tamperproof type.
- .8 Finish: Kawneer Permacoat AAMA 2604, Powder Coating Colour: Hartford Green

.2 Hardware: coordinate with Section 08 71 10 - Door Hardware

2.3 ALUMINUM FRAMES

.1 Construct frames of aluminum extrusions with minimum wall thickness of 3 mm.

.2 Frame members for applied stops.

2.4 ALUMINUM FINISHES

.1 Finish exposed surfaces of aluminum components in accordance with Aluminum Association Designation System for Aluminum Finishes.
- .1 Kawneer Permacoat AAMA 2604, Powder Coating Colour: Hartford Green

.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 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 08 71 10 - Door Hardware - General.

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

.3 Adjust operable parts for correct function.

.4 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 08 80 50 - 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 07 92 10 - Joint Sealing. Conceal sealant within the aluminum work except where exposed use is permitted by Contract Administrator.

3.5 CLEANING

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

.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.

End of Section

PART 1 - GENERAL

1.1 RELATED SECTIONS

.1 Section 01 33 00 - Submittal Procedures.

.2 Section 01 78 00 - Closeout Submittals.

.3 Section 07 92 10 - Joint Sealing.

.4 Section 07 21 16 - Blanket Insulation.

.5 Section 07 21 19 – Foamed in Place Insulation.

1.2 REFERENCES

All reference standards shall be current issue or latest revisions at the date of building permit issue. This specification refers to the following standards, specifications or publications:

.1 National Building Code of Canada (NBC)

.2 North American Fenestration Standard (NAFS)
- .1 AAMA/WDMA/SCA 101/I.S.2/A440-8, NAFS – North American Fenestration Standard, Specification for Windows, Doors and Skylights.

.3 Canadian Standards Associations (CSA) International
- .1 CSA-A440.2, Energy Performance of Windows and Other Fenestration Systems
- .2 CSA-A440.3, User Guide to 440.2
- .3 CSA-A440.4, Window and Door Installation.
- .4 CSA-A440SI, Canadian supplement to AAMA/WDMA/CSA 101/I.S.2/A440, NAFS- North American Fenestration Standard, Specification for Windows, Doors and Skylights.
- .5 CSA-440.7, Window and Door Installation.

.4 Canadian General Standards Board (CGSB)
- .1 CAN/CGSB-1.40, Anticorrosive Structural Steel Alkyd Primer.
- .2 CAN/CGSB-79.1, Insect Screens
- .3 CAN/CGSB-12.8, Insulating Glass Units
- .4 CAN/CGSB-12.20M, Structural Design for Glass Buildings.

1.3 SHOP DRAWINGS

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

.2 Indicate materials and details in full size scale for head, jamb and sill, profiles of components, interior and exterior trim, junction between combination units, elevations of unit, anchorage details, description of related components and exposed finishes fasteners, and caulking. Indicate location of manufacturer's nameplates.

.3 Provide manufacturers fabrication dimensions for all window components (cut sheets) for all window types and configurations.

.4 Indicate on shop drawings, dimensions, relation to construction of adjacent work, air and vapour seal with adjacent construction materials, component anchorage and locations, anchor methods, shim methods and material, and hardware installation details. Include also opening dimensions, frames opening tolerances and affected related work and installation requirements. Provide shop drawings for anchor and shim methods and materials, sealed by an engineer registered in the Province of Manitoba.

1.4 PERFORMANCE REQUIREMENTS

.1 Laboratory testing of each composite window type by an independent testing laboratory is mandatory. Written test results, indicating that each window type has met the specifications in accordance with NAFS must be received prior to the installation of any windows on site. Results will provide full descriptions of the composite window tested. All windows for installation will be identical to the tested specimens. Any supplier/installer proposed revision to the window make-up may require additional testing.

.1	Performance Class:	LC
.2	Performance Grade:	min 3.5
.3	Positive Design Pressure	1680 Pascals or 35 psf

.4	Water Penetration Test Pressure	260 Pascals or 5.25 psf
.5	Canadian Air Infiltration/Exfiltration	A3 Level, 0.5L/sm^2 or 0.1 cfm/ft^2

.2 Design frames in exterior walls to accommodate expansion and contraction within services temperature range of -40°C to 75°C.

.3 The fixed window thermal transmittance U-value shall be between a 1.4 – 1.7 W/(m²x°C) when tested in accordance with AAMA 1503.1 and CAN/CSA-A440.2. The operable window thermal transmittance U-Value shall be between 1.4 – 1.7 W/(m²x°C) when tested in accordance with AAMA 1503.1 and CAN/CSA-A440.2.

.4 Accommodate, without damage to components or deterioration of seals:
- .1 Expansion and contraction within system caused by a cycling temperature changes without causing detrimental affect to system components including buckling, failure of joint seals, or undue stress on fasteners.
- .2 Movement between system and perimeter framing components.
- .3 Dynamic loading and release of loads.
- .4 Deflection of structural support framing.

.5 System Internal Drainage: Drain water entering joints, condensation occurring in glazing channels, or migrating moisture occurring within the system, to the exterior by a weep drainage network.

.6 Air and Vapour Seal: 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.

.7 Thermal Movement: Design sections to permit movement caused by thermal expansion and contraction of PVC to suite glass, infill, and perimeter opening construction.

.8 Windows shall satisfy egress requirements as specified in the National Building Code and shall conform to the local requirements of the Authorities Having Jurisdiction.

.9 Design glass, glazing system, mullions and frames to support a live load of 1.46 kN/m acting vertically, 1.61kN/m acting horizontally at any point up to 1070mm above the floor or, 0.73kN/m at 1070mm above the floor or 0.73kN/m at 1070mm above the floor, whichever produces the greatest effect.

.10 Mullions to have L/175 deflection limit rating as per NAFS using Mullion Assembly (MA) designation.

.11 Costs for the initial independent testing of window Type A will be included in the contract. Any costs incurred for additional testing for items not meeting the specifications including costs for transportation and for the required modifications will be borne by contractor.

1.5 MOCK UP

.1 Upon commencement of the contract, one typical unit window shall be prepared as a sample of the work, including insulation and interior casing/finishing. Work shall not proceed until the sample unit has been approved by the Contract Administrator. The quality of the sample unit installation shall be maintained through the balance of the project.

1.6 TEST REPORTS

.1 Submit test reports to the City and Contract Administrator for all window units, including combination windows indicating that each window type has met the specifications in accordance with NAFS, CAN/CSA-A440 and CGSB Standards, must be received prior to the installation of any windows on site. Test reports are to be from an independent certified testing laboratory to determine compliance. Results will provide full descriptions of the composite windows tested. All windows for installation will be identical to the tested specimen or smaller. Differences between the tested window and the installed window to be noted on the shop drawings. Any supplier/installer proposed revision to the window make-up may require additional testing. Standard testing and test reports to be done at no additional cost to the City.

.2 Pay all costs for specified examination, testing work performed by independent certified testing laboratory. Contractor costs for site supervision and coordination is deemed to be part of overhead included in the Contract Price. Materials failing to meet specified requirements shall be replaced or repaired and retested as directed by the City and Contract Administrator, with all

costs involved in retesting borne by the Contractor.

.3 Overall U-Value of each window type to be tested as outlined in AAMA 1503.1 and CSA-A440.2 U-value shall be between 1.4-1.7 W/(m²x°C).

.4 Testing for compliance with A440 and A440.2 to be done on the same window. (ie. IF steel reinforcement is used for structural testing, steel reinforcement must be included in the energy simulations).

1.7 MAINTENANCE DATA

.1 Provide operation and maintenance data for windows for incorporation into manual specified in Section 01 78 00 - Closeout Submittals.

1.8 WARRANTY

.1 Provide written warranty for window sashes and frames against material or manufacturing defects occurring within 20 years from date of substantial performance.

.2 Provide written warranty for glazing seal failure against material or manufacturing defects occurring within 10 years from the date of substantial performance.

1.9 CLOSEOUT SUBMITTALS

.1 Provide operation and maintenance data for windows for incorporation into manual specified in Section 01 78 00 - Closeout Submittals.

PART 2 - PRODUCTS

2.1 MATERIALS

.1 Materials: to CSA-A440/A440.1 supplemented as follows:

.2 All windows of similar material to be by same manufacturer.

.3 Main frame: fiberglass.

.4 Glass: as per Section 08 80 50 – Glazing.

.5 Isolation coating: alkali resistant bituminous paint.

2.2 WINDOW TYPE AND CLASSIFICATION

.1 Type:
- .1 Fixed fiberglass: with insulating glass.
  - .1 Acceptable material: Duxton 325 Series or approved equal.
- .2 Fixed fiberglass: with insulating glass.
  - .1 Acceptable material: Duxton 650 Series or approved equal.

2.3 FABRICATION

.1 Fabricate in accordance with CSA-A440/A440.1 supplemented as follows:

.2 Fabricate units square and true with maximum tolerance of plus or minus 1.5 mm for units with a diagonal measurement of 1800 mm or less and plus or minus 3 mm for units with a diagonal measurement over 1800 mm.

.3 Face dimensions detailed are maximum permissible sizes.

.4 Brace frames to maintain squareness and rigidity during shipment and installation.

.5 Finish steel clips and reinforcement with 380 g/m² zinc coating to CAN/CSA-G164.

2.4 FIBERGLASS FINISHES

.1 Finish exposed interior and exterior surfaces of fiberglass components in metallic silver to match Galvalume Plus AZ 180 finish.

2.5 ISOLATION COATING

.1 Isolate aluminum from following components, by means of isolation coating:

.1 Dissimilar metals except stainless steel, zinc, or white bronze of small area.
.2 Concrete, mortar and masonry.
.3 Wood.

2.6 GLAZING

.1 Glaze windows in accordance with CSA-A440/A440.1 as per Section 08 80 50 - Glazing.

2.7 AIR BARRIER AND VAPOUR RETARDER

.1 Equip window frames with site installed air/ vapour barrier material for sealing to building air/ vapour barrier as follows:
  .1 Material: identical to, or compatible with, building air barrier and vapour retarder materials to provide required air tightness and vapour diffusion control throughout exterior envelope assembly.

PART 3 - EXECUTION

3.1 WINDOW INSTALLATION

.1 Install in accordance with CSA-A440/A440.1.

.2 Arrange components to prevent abrupt variation in colour.

3.2 SILL INSTALLATION

.1 Install metal sills with uniform wash to exterior, level in length, straight in alignment with plumb upstands and faces. Use one piece lengths at each location.

.2 Secure sills in place with anchoring devices located at ends and evenly spaced 600 mm on centre in between.

.3 Fasten expansion joint cover plates and drip deflectors with self tapping stainless steel screws.

3.3 CAULKING

.1 Seal joints between windows and window sills with sealant. Bed sill expansion joint cover plates and drip deflectors in bedding compound. Caulk between sill upstand and window-frame. Caulk butt joints in continuous sills.

.2 Apply sealant in accordance with Section 07 92 10 - Joint Sealing. Conceal sealant within window units except where exposed use is permitted by Contract Administrator.

3.4 SCHEDULE

.1 Window series and colour.

Window	Type	Series	Int. Colour	Ext. Colour
W1	Fibreglass	650	Metallic Silver to match roof	Metallic Silver to match roof
W2	Fibreglass	650	Metallic Silver to match roof	Metallic Silver to match roof
W3	Fibreglass	650	Metallic Silver to match roof	Metallic Silver to match roof
W4	Fibreglass	650	Metallic Silver to match roof	Metallic Silver to match roof
W5	Fibreglass	650	Metallic Silver to match roof	Metallic Silver to match roof
W6	Fibreglass	325	Metallic Silver to match roof	Metallic Silver to match roof

End of Section

PART 1 - GENERAL

1.1 RELATED SECTIONS

.1 Section 01 61 00 – Common Product Requirements

.2 Section 01 78 00 – Closeout Submittals

.3 Section 08 11 14 – Metal Doors and Frames

.4 Section 08 11 16 – Aluminum Doors and Frames

.5 Section 26 – Wiring Device

1.2 REFERENCES

All reference standards shall be current issue or latest revision at the date of building permit issue. This specification refers to the following standards, specifications or publications:

.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 Canadian General Standards Board (CGSB).
- .1 CAN/CGSB-69.17, Bored and Preassembled Locks and Latches.
- .2 CAN/CGSB-69.18/ANSI/BHMA A156.1, Butts and Hinges.
- .3 CAN/CGSB-69.19/ANSI/BHMA A156.3, Exit Devices.
- .4 CAN/CGSB-69.20/ANSI/BHMA A156.4, Door Controls (Closers).
- .5 CAN/CGSB-69.21/ANSI/BHMA A156.5, Auxiliary Locks and Associated Products.
- .6 CAN/CGSB-69.22/ANSI/BHMA A156.6, Architectural Door Trim.
- .7 CAN/CGSB-69.24/ANSI/BHMA A156.8, Door Controls - Overhead Holders.
- .8 CAN/CGSB-69.26/ANSI/BHMA A156.10, Power-operated Pedestrian Doors.
- .9 CAN/CGSB-69.28/ANSI/BHMA A156.12, Interconnected Locks and Latches.
- .10 CAN/CGSB-69.29/ANSI/BHMA A156.13, Mortise Locks and Latches.
- .11 CAN/CGSB-69.30/ANSI/BHMA A156.14, Sliding and Folding Door Hardware.
- .12 CAN/CGSB-69.31/ANSI/BHMA A156.15, Closer/Holder Release Device.
- .13 CAN/CGSB-69.32/ANSI/BHMA A156.16, Auxiliary Hardware.
- .14 CAN/CGSB-69.33/ANSI/BHMA A156.17, Self-closing Hinges and Pivots.
- .15 CAN/CGSB-69.34/ANSI/BHMA A156.18, Materials and Finishes.
- .16 CAN/CGSB-69.35/ANSI/BHMA A156.19, Power Assist and Low Energy Power Operated Doors.
- .17 CAN/CGSB-69.36/ANSI/BHMA A156.20, Strap and Tee Hinges and Hasps.

1.3 SUBMITTALS

.1 Hardware List:
- .1 Submit contract hardware list in accordance with Section 01 33 00 - Submittal Procedures.
- .2 Indicate specified hardware, including make, model, material, function, size, finish and other pertinent information.

.2 Manufacturer's Instructions:
- .1 Submit manufacturer's installation instructions.

.3 Closeout Submittals
- .1 Provide operation and maintenance data for door closers, locksets, door holders and fire exit hardware for incorporation into manual specified in Section 01 78 00 - Closeout Submittals.

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 - 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:
- .1 Store finishing hardware in locked, clean and dry area.

1.6 WASTE DISPOSAL AND MANAGEMENT

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

1.7 MAINTENANCE

.1 Provide maintenance data and materials in accordance with Section 01 78 00 - Closeout Submittals.

.2 Data:

.1 Provide maintenance data, parts lists and manufacturer's instructions for each type of door closer, lockset, door holder and fire exit hardware.

.2 Brief maintenance staff regarding proper care, cleaning and general maintenance.

.3 Extra Materials:

.1 Provide two (2) sets of special wrenches for door closers, locksets and fire exit hardware and other tools applicable to each different or special hardware component.

.2 Provide two (2) sets of maintenance tools and accessories supplied by hardware component manufacturer.

.3 Provide two (2) copies of all installation instructions, operating manuals, programming guides and product warranties.

PART 2 - PRODUCTS

2.1 HARDWARE ITEMS

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

.2 Actuator Bollard: 1050 x 150 square, #4 stainless steel bollard with internal mounting plate.

.3 Guide Rail: Curran Double Curve with Horizontal bars, 1 7/8" Ø 304 Stainless Steel, reinforced, 1050mm high or Approved Equal. Delete rubber bumpers.

2.2 DOOR SIGNAGE

.1 Washroom signs: Rockwood BF689, 200 x 200, metal sign, US10BL/614 finish (Satin Oxidized Bronze, Clear Coated), Grade 2 Braille translation, mechanically fastened to block wall with tamper proof fasteners or Approved Equal.

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.

2.4 KEYING

.1 Provide construction cores.

.2 City shall provide all permanent cores to be installed by Contractor.

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.

.2 Furnish metal 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.

.4 Install closers and stops to allow maximum door swing permitted by the hardware and adjacent construction.

.5 Where special placement is required, consult the City.

3.2 INSTALLATION

.1 Install hardware to meet the new Manitoba Amendments Article 3.8.3.3(3).

.2 Where door stop contacts door pulls, mount stop to strike bottom of pull.

.3 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.

.4 Remove construction cores when directed by Contract Administrator; 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.

.4 Demonstrate operation, operating components, adjustment features, and lubrication requirements.

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 SCHEDULE

Hardware Set#: 1

Single: D100A, D100B

4	Hinge (heavy weight)	T4A3386 NRP 4-1/2" x 4-1/2"	US26D	MK
1	Mortise Deadlock	MS1850S Schoolhouse Function	628	AD
1	Thumbturn	4066	628	AD
1	Cylinder	70 41 101	US32D	SA
1	BEST Core	By City		BE
1	Back to Back Pull Set	RM4210-72" Mtg-Type 5HD MP Y Baseplates	US32D	RO
1	Auto Operator	Besam SW200i	689	BM
1	Threshold	272A		PE
1	Weatherstrip and Sweep	By Door Supplier		
2	Full Height Actuator	639		NO
1	Actuator Bollard	42 x 6 x 6	SS	
1	Guide Rail	CE-922-H-X Recessed Mount, No Bumpers	Satin	CUR

Hardware Set#: 2
Single: D101, D102

4	Hinge	TA2714 NRP 4-1/2" x 4"	US26D	MK
1	Mortise Deadlock	L496 BD L583-363 10-078	626	SC
1	BEST Core	By City		BE
1	Back to Back Pull Set	RM4200-18" Mtg-Type 5HD	US32D	RO
1	Auto Operator	Besam SW100	689	BM
1	Armor Plate	K1050 12"	US32D	RO
1	Wall Stop	406	US32D	RO
2	Full Height Actuator	639		NO
1	Latchbolt Monitor	LML-1		SU
1	Door Louver	CDL 12x7	Clear Anod.	KNC
1	Washroom sign	BF689, metal	614	RO

Hardware Set#: 3
Single: D103

4	Hinge	TA2714 NRP 4-1/2" x 4"	US26D	MK
1	Storeroom Lock	28 70 10G04 LL	US26D	SA
1	BEST Core	By City		BE
1	Door Closer	1431 PS	EN	SA
1	Armor Plate	K1050 12"	US32D	RO
1	Latch Protector	320CXL	US32D	RO

End of Section

PART 1 - GENERAL

1.1 RELATED SECTIONS

.1 Section 01 33 00 - Submittal Procedures.

.2 Section 01 78 00 - Closeout Submittals.

1.2 REFERENCES

All reference standards shall be current issue or latest revisions at the date of building permit issue. This specification refers to the following standards, specifications or publications:

.1 American National Standards Institute (ANSI).
- .1 ANSI/ASTM E330, Test Method for Structural Performance of Exterior Windows, Doors, Skylights and Curtain Walls by Uniform Static Air Pressure Difference.

.2 American Society for Testing and Materials International, (ASTM).
- .1 ASTM C 542, Specification for Lock-Strip Gaskets.
- .2 ASTM D 790, Test Methods for Flexural Properties of Unreinforced and Reinforced Plastics and Electrical Insulating Materials.

.3 Canadian General Standards Board (CGSB).
- .1 CAN/CGSB-12.1, Tempered or Laminated Safety Glass.
- .2 CAN/CGSB-12.3, Flat, Clear Float Glass.
- .3 CAN/CGSB-12.8, Insulating Glass Units.
- .4 CAN/CGSB-12.10, Glass, Light and Heat Reflecting.

.4 Flat Glass Manufacturers Association (FGMA).
- .1 FGMA Glazing Manual .

1.3 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.
- .2 Size glass to withstand wind loads, dead loads and positive and negative live loads.
- .3 Limit glass deflection to 1/200 with full recovery of glazing materials.

1.4 SUBMITTALS

.1 Shop Drawings:
- .1 Submit shop drawings in accordance with Section 01 33 00 - Submittal Procedures.

.2 Manufacturer's Instructions:
- .1 Submit manufacturer's installation instructions.

.3 Closeout Submittals:
- .1 Provide maintenance data including cleaning instructions for incorporation into manual specified in Section 01 78 00 - Closeout Submittals.

PART 2 - PRODUCTS

2.1 MATERIALS: SEALED INSULATING GLASS

.1 Tempered insulating glass units: to CAN/CGSB-12.8, double unit.
- .1 Glass: to CAN/CGSB-12.3 CAN/CGSB-12.10.
- .2 Clear Safety and Security Window Film - Surface 2
- .3 Dual Argon XL Warm Edge.
- .4 Exterior Lite 6mm Grey TEMPERED, as manufactured by Cardinal or approved equal.
- .5 Interior Lite 5mm LowE366(s#3) TEMPERED, as manufactured by Cardinal or approved equal.

.2 Tempered insulating glass units: to CAN/CGSB-12.8, double unit.
- .1 Glass: to CAN/CGSB-12.3 CAN/CGSB-12.10.
- .2 Clear Safety and Security Window Film - Surface 2
- .3 Dual Argon XL Warm Edge.
- .4 Exterior Lite 6mm TEMPERED.
- .5 Interior Lite 5mm LowE366(s#3) TEMPERED, as manufactured by Cardinal or approved equal.

2.2 ACCESSORIES

.1 Setting blocks: Neoprene , 80-90 Shore A durometer hardness to ASTM D 2240, to suit glazing method, glass light weight and area.

.2 Spacer shims: Neoprene, 50-60 Shore A durometer hardness to ASTM D 2240, 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 with integral resilient tube spacing device, 10-15 Shore A durometer hardness to ASTM D 2240; coiled on release paper, 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.

.4 Clear Safety and Security Window Film: 3M Safety S40 (SH4CLARL) Safety and Security Window Film. Optically clear polyester film with a durable acrylic abrasion resistant coating over one surface and a pressure sensitive adhesive over the other. The film may be laminated to other clear polyester film layers to achieve the desired thickness of the film.

1. Physical / Mechanical Performance Properties:
   - a. Film Color: Clear.
   - b. Thickness: Nominal 4.0 mils (0.10 mm).
   - c. Tensile Strength (ASTM D 882): 25,000 psi.
   - d. Elongation: 130 percent.
   - e. Break Strength (ASTM D 882) (Per Inch Width): 100 lbs.

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

.1 Perform work in accordance with FGMA Glazing Manual.

.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 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 Fill gap between glazing and stop with sealant to depth equal to bite of frame on glazing, maximum 9 mm below sight line.

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

3.5 CLEANING

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

.2 Remove traces of primer, caulking.

.3 Remove glazing materials from finish surfaces.

.4 Remove labels after work is complete.

.5 Clean glass and mirrors using approved non-abrasive cleaner in accordance with manufacture's instructions.

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

3.6 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.

3.7 SCHEDULE

.1 Fibreglass exterior window types W1, W2, W3, W4, W5: tempered, security filmed, tinted insulated glass units.

.2 Fibreglass exterior window types W6: tempered, security filmed insulated glass units.

.3 Exterior doors: tempered, security filmed, tinted insulated glass units.

END OF SECTION