1 GENERAL

1.01 GENERAL REQUIREMENTS

.1 Comply with requirements of Division 1.

1.02 RELATED WORK

.1 Section 08 80 00 Glazing.

1.03 REFERENCES

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

.2 American Architectural Manufacturers Association (AAMA).
  .1 AAMA 609, Voluntary Guide Specification for Cleaning and Maintenance of Architectural Anodized Aluminum.

.3 American Society for Testing and Materials International, (ASTM).
  .1 ASTM E330, Standard Test Method for Structural Performance of Exterior Windows, Doors, Skylights and Curtain Walls by Uniform Static Air Pressure Difference.
  .2 ASTM B221, Standard Specification For Aluminum and Aluminum Alloy Extruded Bars Rods, Wire Profiles and Tubes.

.4 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.

.5 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.

1.04 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 submit certificate of tests performed.
    .3 Accommodate movement within system.
    .4 Accommodate 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 Provide continuous air barrier through door system. Primarily in line with inside pane of glass and heel bead of glazing compound.

.4 Standard of acceptance:
.1 Exterior doors: wide stile with center rail, insulated.
.1 Kawneer 560 series (wide stile) Insulclad door;
.2 Alumicor Canadiana Series 600B (wide stile) Insuldoor;
.3 Prevost Series 2750 Insulated (wide stile) door;
.4 or approved equal.

.2 Exterior door frames:
.1 Kawneer 1602, with door adapters;
.2 Alumicor Series 1750 Slimline, with door adapters;
.3 Prevost 3800 Narrow, with door adapters;
.4 or approved equal.

1.05 SUBMITTALS

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

.2 Product Data: submit manufacturer's instructions, printed product litterature and data sheets for doors and frames and include product characteristics, performance criteria, dimensions, methods of assembly, finish and limitations.

.3 Shop drawings:
.1 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.

.4 Samples:
.1 Submit for review and acceptance of each unit.
.2 Samples will be returned for inclusion in the work.
.3 Submit one 300 x 300 mm corner sample of each type door and frame.
.4 Submit sample showing glazing detail, reinforcement, finish and location of manufacturer's nameplates.
.5 Frame sample to show glazing stop, door stop, jointing detail, finish.

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

1.06 CLOSEOUT SUBMITTALS

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

.2 Operation and Maintenance Data: submit operation and maintenance data for cleaning and maintenance of aluminum finishes for incorporation into manual.

1.07 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 and manufacturer's installation instructions.

1.08 DELIVERY, STORAGE AND HANDLING

.1 Deliver, store and handle materials in accordance with Section 01 61 00 – Common Product Requirements.

.2 Delivery and Acceptance Requirements: deliver materials to site in original factory packaging, labelled with manufacturer's name and address.
- .1 Apply temporary protective coating to finished surfaces. Remove coating after erection. Use coatings that are easy to remove and residue free.
- .2 Leave protective covering in place until final cleaning of building.

.3 Storage and Handling:
- .1 Store materials off ground, indoors in dry location and in accordance with manufacturer's recommendations in clear, dry well-ventilated area.
- .2 Store and protect aluminum doors and frames from nicks, scratches and blemishes.

1.09 WASTE MANAGEMENT AND DISPOSAL

.1 Separate and recycle waste materials in accordance with Section 01 74 21 – Construction Waste Management and Disposal.

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

.3 Dispose of corrugated cardboard, polystyrene, plastic packaging material in appropriate on-site bin for recycling in accordance with site waste management program.

.4 Divert used metal cut-offs from landfill by disposal into the on-site metals recycling bin.

1.10 WARRANTY

.1 At no cost to Owner remedy any defects in work of this Section due to faults in materials and/or workmanship for a period of five (5) years from date of Substantial Performance.

2 PRODUCTS

2.01 MATERIALS

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

.2 Sheet aluminum: Aluminum Association alloy AA1100-(H14) or AA5005-(H32 or H34) anodizing quality.

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

.4 Fasteners: aluminum, cadmium plated steel or stainless steel, finished to match adjacent material.

.5 Weatherstrip: replaceable wool pile with plastic fin.

.6 Door bumpers: black neoprene.

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

.8 Isolation coating: bituminous paint or epoxy resin solution.

.9 Glass:
.1 Exterior doors and frames: insulating glass as described in Section 08 80 00 – Glazing.

.10 Glazing materials: EPDM elastomeric extrusions or thermoplastic elastomer.

2.02 ALUMINUM DOORS

.1 Construct doors of porthole extrusions with minimum wall thickness of 3 mm, glazing moldings 1.3 mm thick.

.2 Door stiles nominal 127 mm wide plus or minus 6 mm.

.3 Top rail nominal 127 mm wide plus or minus 6 mm.

.4 Bottom rail nominal 254 mm wide plus or minus 6mm.

.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 Supply thermally broken doors and frame sections for exterior.

.8 Hardware: as indicated on drawings.

2.03 ALUMINUM FRAMES

.1 See System Description 1.4.

2.04 ALUMINUM FINISHES

.1 Finish exposed surfaces of aluminum components in accordance with Aluminum Association Designation System for Aluminum Finishes.
- .1 Clear anodized finish: AA-M10C22A42/A44 Architectural Class 1 # 14 on doors and frames.
- .2 Appearance and properties of anodized finishes designated by the Aluminum Association as Architectural Class 1,Architectural Class 2, and Protective and Decorative.

2.05 STEEL FINISHES

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

2.06 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.

.7 Reinforce interior horizontal head rail to receive automatic door operators.

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

.9 Visible manufacturer's identification labels not permitted.

3 EXECUTION

3.01 EXAMINATION

.1 Verification of Conditions: verify conditions of substrates previously installed under other Section are acceptable for aluminum doors and frames in accordance with manufacturer's written instructions.
- .1 Visually review substrate with Departmental Representative.
- .2 Inform Departmental Representative of unacceptable conditions immediately upon discovery.
- .3 have been remedied and receipt of approval to proceed by Departmental Representative.

3.02 INSTALLATION

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

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

.3 Anchor securely.

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

.5 Adjust door components to ensure smooth operation.

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

.7 Glaze aluminum doors and frames in accordance with Section 08 80 00 – Glazing.

.8 Seal joints to provide weather tight seal at outside and air, vapour seal at inside.

3.03 FIELD QUALITY CONTROL

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

.2 Manufacturer's field services: provide manufacturer's field services consisting of periodic site visits for inspection of product installation in accordance with manufacturer's instructions.

3.04 CLEANING

.1 Progress Cleaning: clean in accordance with Section 01 74 11 – 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.

.2 Final Cleaning: upon completion of installation, remove surplus materials, rubbish, tools and equipment barriers in accordance with Variation in the thickness of slabs and walls: Minus - 6 mm; Plus – 12 mm.

END OF SECTION

1 GENERAL

1.01 GENERAL REQUIREMENTS

.1 Comply with requirements of Division 1.

1.02 RELATED SECTIONS

.1 Section 08 80 00: Glazing.

1.03 REFERENCES

.1 Aluminum Association (AA)
  .1 AA DAF 45-03(R200), Designation System For Aluminum Finishes.

.2 American Architectural Manufacturers Association (AAMA).
  .1 AAMA CW-DG-1-96, Aluminum Curtain Wall Design Guide Manual.
  .2 AAMA CW-10-97, Care and Handling of Architectural Aluminum From Shop to Site.
  .3 AAMA 501-05, Methods of Test for Exterior Walls.
  .4 AAMA 503-14, Voluntary Specification for Field Testing of Metal Storefronts, Curtain Wall and Sloped Glazing Systems.
  .5 AAMA 611-14, Voluntary Specifications for Anodized Finishes Architectural Aluminum.

.3 American Society for Testing and Materials International, (ASTM).
  .1 ASTM A36/A36M-08, Specification for Carbon Structural Steel.
  .2 ASTM A123/A123M-09, Specification for Zinc (Hot-Dip Galvanized) Coatings on Iron and Steel Products.
  .3 ASTM B209-07, Specification for Aluminum and Aluminum-Alloy Sheet and Plate.
  .4 ASTM B221-08, Specification for Aluminum-Alloy Extruded Bars, Rods, Wire, Profiles and Tubes.
  .5 ASTM E283-04, Test Method for Determining the Rate of Air Leakage Through Exterior Windows, Curtain Walls, and Doors Under Specified Pressure Differences Across the Specimen.
  .6 ASTM E330-02, Standard Test Method for Structural Performance of Exterior Windows, Doors, Skylights, and Curtain Walls, by Uniform Static Air Pressure Difference.
  .7 ASTM E331-00(2009), Standard Test Method for Water Penetration of Exterior Windows, Skylights, Doors, and Curtain Walls, by Uniform Static Air Pressure Difference.
  .8 ASTM E1105-00(2008), Standard Test Method for Field Determination of Water Penetration of Installed Exterior Windows, Skylights, Doors, and Curtain Walls, by Uniform or Cyclic Static Air Pressure Difference.

.4 Canadian General Standards Board (CGSB).
  .1 CAN/CGSB 1.108, Bituminous Solvent Type Paint.

.5 Canadian Standards Association (CSA International).
  .1 CSA-G40.20/G40.21-04(R2009), General Requirements for Rolled or

Welded Structural Quality Steel/Structural Quality Steels.
.2 CSA-S136-07, North American Specification for the Design of Cold-Formed Steel Structural Members.
.3 CAN3-S157, Strength Design in Aluminum.
.4 CSA W59.2-M1991(R2008), Welded Aluminum Construction.

.6 Environmental Choice Program (ECP).
.1 CCD-045-95(R2005), Sealants and Caulking Compounds.

.7 Society for Protective Coatings (SSPC).
.1 SSPC - Paint 20 Zinc Rich Coating.
.2 SSPC - Paint 25 Alkyd, Zinc Oxide Linseed Oil and Primer for Use Over Hand Cleaned Steel Type 1 and Type 2.

1.04 SUBMITTALS

.1 Submit in accordance with requirements of Section 01 33 00 – Submittal Procedures.

.2 Product data:
.1 Submit manufacturer's instructions, printed product literature and data sheets for curtain wall components, anchorage and fasteners, glass and infill, and internal drainage details. Include product characteristics, performance criteria, dimensions, finish and limitations.

.3 Shop drawings:
.1 Submit shop drawings stamped and signed by professional engineer registered or licensed in Province of Nova Scotia.
.2 Indicate system dimensions, profiles of components, materials, details to scale, including head, jamb and sill conditions, elevations, opening vents and hardware, framed opening requirements and tolerances. Show adjacent construction and anchorage details, anticipated deflection under load; internal weep drainage network; expansion and contraction joint location and details, and field welding required.

Test Reports: Submit substantiating engineering data, test results of previous tests by independent laboratory which purport to meet performance criteria, and supportive data.

1.05 QUALITY ASSURANCE

.1 Regulatory Requirements: conform to applicable code for acoustic attenuation, sound transmission requirements.

1.06 DELIVERY, STORAGE AND HANDLING

.1 Deliver, store, handle and protect materials in accordance with Section 01 61 00 - Common Product Requirements.

.2 Delivery and Acceptance Requirements: deliver materials to site in original factory packaging, labelled with manufacturer's name and address.

.3 Storage and Handling:

.1 Handle work of this section in accordance with AAMA CW-10.
.2 Store materials off ground, indoors in dry location and in accordance with manufacturer's recommendations in clear, dry well-ventilated area.
.3 Store and protect aluminum doors and frames from nicks, scratches and blemishes.
.4 Protect prefinished aluminum surfaces with wrapping. Do not use adhesive papers or sprayed coatings which bond when exposed to sunlight or weather
.5 Replace defective or damaged materials with new.

1.07 AMBIENT CONDITIONS

.1 Install sealants when ambient temperature is above 5 degrees C. minimum.

.2 Maintain this minimum temperature during and for 48 hours minimum after installation of sealants.

1.08 WASTE MANAGEMENT AND DISPOSAL

.1 Separate and recycle waste materials in accordance with Section 01 74 21 – Construction Waste Management and Disposal.

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

.3 Collect and separate for disposal paper, plastic, polystyrene, corrugated cardboard and packaging material in appropriate on-site bins for recycling in accordance with Waste Management Plan.

.4 Divert unused metal from landfill to metal recycling facility as approved by Departmental Representative.

.5 Dispose of unused sealant and adhesive material at official hazardous material collections site approved by Departmental Representative.

.6 Fold up metal banding, flatten and place in designated area for recycling.

1.09 WARRANTY

.1 At no extra cost to contract remedy any defects in work of this Section due to faults in materials and/or workmanship for a period of five (5) years from date of Substantial Performance.

2 PRODUCTS

2.01 SYSTEM DESCRIPTION

.1 Description:
.1 Vertical glazed aluminum curtain wall system includes tubular aluminum sections with self-supporting framing, shop fabricated, factory prefinished, single pane glass, column covers; related flashings, anchorage and attachment devices.

.2 Assembled system to permit re-glazing of individual glass (and infill panel) units from exterior without requiring removal of structural mullion sections.

.2 Performance Requirements:

.1 Design and size components to withstand dead and live loads caused by pressure and suction of wind, snow and hail for sloped glazing, acting normal to plane of system as calculated in accordance with National Building Code 2015 to a design pressure of 1.10kPa (23psf) as measured in accordance with ASTM E330.

.2 Design and size components to withstand seismic loads and sway displacement as calculated in accordance with National Building Code 2015.

.3 Limit mullion deflection to L/175; with full recovery of glazing materials.

.4 Size glass units and glass dimensions to limits established in CAN/CGSB-12.20.

.5 Provide system to accommodate, without damage to components or deterioration of seals:

.1 Movement within system.

.2 Movement between system and perimeter framing components.

.3 Dynamic loading and release of loads.

.4 Deflection of structural support framing.

.5 Shortening of building concrete structural columns.

.6 Creep of concrete structural members.

.7 A mid-span slab edge deflection of 19 mm.

.6 Water leakage: none, when measured in accordance with ASTM E331.

.7 System to provide for expansion and contraction within system components caused by a cycling temperature range of 95 degrees C over a 12 hour period without causing detrimental effect to system components.

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

.9 Ensure no vibration harmonics, wind whistles, noises caused by thermal movement, thermal movement transmitted to other building elements, loosening, weakening, or fracturing of attachments or components of system occur.

2.02 MATERIALS

.1 Extruded aluminum: ASTM B221.

.2 Sheet aluminum: ASTM B209.

.3 Sheet steel: CSA-S136M and ASTM A653/A653M; galvanized.

.4 Steel sections: CSA-G40.20/G40.21M and ASTM A36/A36M; shaped to suit mullion sections.

.5 Anchors: 3-way adjustable hot-dip galvanized cast iron.

.6 Fasteners: stainless, finish to match curtain wall.

.7 Isolation coating: alkali resistant bituminous paint to CAN/CGSB 1.108, Type 1, without thinner.

.8 Glazing: See Section 08 80 00 – Glazing and schedules for types and locations.

2.03 COMPONENTS

.1 Mullion profile:
- .1 Vertical / horizontal members: 63.5 x 101 mm nominal dimensions (overall with 19 mm cap).
- .2 Thermally broken with interior tubular section insulated from exterior pressure plate.
- .3 Matching stops and pressure plate of sufficient size and strength to provide adequate bite on glass and infill panels.
- .4 Face caps: 19mm
- .5 Drainage holes, deflector plates and internal flashings to accommodate internal weep drainage system.
- .6 Reinforced mullion: internal reinforcement of shaped steel structural section as required for maximum design deflection.
- .7 Provide manufacturer's engineered approval for application.
- .8 Acceptable product: Kawneer 1600 (2), Alumicor Series 2500, or approved equal.

2.04 FABRICATION

.1 Fabricate system components with minimum clearances and shim spacing around perimeter of assembly, yet enabling installation and dynamic movement of perimeter seal.

.2 Fabricate 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 Brace frames to maintain squareness and rigidity during shipment and installation.

.4 Size units to allow for structural deflection of surrounding construction.

.5 Design work so that it will not be distorted, nor fasteners overstressed, from expansion and contraction of metal.

.6 Make provisions to drain to exterior any moisture entering or forming inside systems while preventing passage of air, dirt or insects to the interior.

.7 Accurately fit and secure joints and corners. Make joints flush, hairline, and weatherproof. Deburr and make smooth all sharp edges and corners.

.8 Prepare components to receive anchor devices. Install anchors.

.9 Arrange fasteners and attachments to ensure concealment from view.

.10 Prepare system components to receive exterior doors and hardware.

.11 Reinforce interior horizontal head rail to receive automatic door operators, drapery track brackets and attachments.

.12 Reinforce framing members for external imposed loads.

.13 Visible manufacturer's identification labels not permitted.

2.05 FINISHES

.1 Finish exposed surfaces of aluminum windows and aluminum components In accordance with Aluminum Association Designation System for Aluminum Finishes.
  .1 Clear anodized finish: designation AA-M10C22A41, Architectural Class 1, with a minimum coating thickness of 0.7 mils.

.2 Formed components such as sills, closures, trim shall be formed prior to finishing.

.3 Shop and touch-up primer for steel components: SSPC 25 Paint red oxide.

.4 Touch-up primer for galvanized steel surfaces: SSPC 20 Paint zinc rich.

.5 Concealed steel items: primed with iron oxide paint.

.6 Apply one coat of bituminous paint to concealed aluminum and steel surfaces in contact with cementitious or dissimilar materials.

2.06 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.

2.07 SOURCE QUALITY CONTROL

.1 Perform work in accordance with AAMA GSM and AAMA CW-I-9. Maintain one copy on site.

.2 Design structural support framing components to CAN3 S157 under direct supervision of a professional structural engineer experienced in design of this Work of the type described in this Section and registered or licensed to practice in the Province of New Brunswick.

.3 Perform welding Work in accordance with CSA W59.2.

3 EXECUTION

3.01 EXAMINATION

.1 Verification of Conditions: verify conditions of substrates previously installed under other Section are acceptable for curtain wall installation in accordance with manufacturer's written instructions.

.1 Visually review substrate in presence of Departmental Representative.
.2 Verify dimensions, tolerances, and method of attachment with other work.
.3 Verify wall openings and adjoining air barrier and vapour retarder materials are ready to receive work of this Section.
.4 Inform Departmental Representative of unacceptable conditions immediately upon discovery.
.5 Proceed with installation only after unacceptable conditions have been remedied.

3.02 INSTALLATION

.1 Install curtain wall and sloped glazing system in accordance with manufacturer's instructions.

.2 Attach to structure to permit sufficient adjustment to accommodate construction tolerances and other irregularities.

.3 Provide alignment attachments and shims to permanently fasten system to building structure. Clean weld surfaces; apply protective primer to field welds and adjacent surfaces.

.4 Align assembly plumb and level, free of warp or twist. Maintain assembly dimensional tolerances and align with adjacent work.

.5 Provide thermal isolation where components penetrate or disrupt building insulation.

.6 Install sill flashings and formed aluminum sills where indicated.

.7 Install eave edge flashings at sloped glazing system.

.8 Coordinate installation of fire stop insulation at each floor slab edge and intersection with vertical construction where indicated.

.9 Co-ordinate attachment and seal of perimeter air barrier and vapour retarder materials.

.10 Fill voids in shim spaces and voids between perimeter of assembly framing and surrounding building elements with non-expanding type foamed-in-place insulation to maintain continuity of thermal barrier.

.11 Install fire-stopping in areas as indicated.

.12 Install operating sash in accordance with manufacturer's recommendations, to glazing method required to achieve performance criteria.

.13 Install glass and infill panels in accordance with Section 08 80 50 - Glazing, to exterior wet/dry method of glazing. Place sealant on the up-slope side of the pressure plate cover caps; finish the surface with a slope to encourage drainage over the cap. Cover caps to conceal screws and provide continuous sightline.

.14 Install perimeter sealant to method required to achieve performance criteria, backing materials, and installation criteria in accordance with

industry standards.

3.03 SEALANTS

.1 Seal joints between windows 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 Clean and prime contact surfaces in accordance with manufacturers recommendations prior to installation of sealant.

.3 Provide caulking between framing members and adjoining work and where required to render work of this Section weather tight.

.4 Effectively seal window units to adjacent building elements.

.5 Fill voids between framing and surrounding building elements with foamed-in-place insulation.

.6 Match colour of sealant to colour of window frame.

3.04 SITE TOLERANCES

.1 Maximum variation from plumb: 1.5 mm/m non-cumulative or 12 mm/30 m, whichever is less.

.2 Maximum misalignment of two adjoining members abutting in plane: 0.8 mm.

.3 Maximum sealant space between curtain wall and adjacent construction: 13 mm.

3.05 FIELD QUALITY CONTROL

.1 Inspection will monitor quality of installation and glazing.

.2 Test to ASTM E1105, and AAMA 501.

.3 Evaluate installed system by thermo-photographic scan.

3.06 CLEANING

.1 Remove protective material from prefinished aluminum surfaces.

.2 Wash down surfaces with a solution of mild detergent in warm water, applied with soft, clean wiping cloths. Take care to remove dirt from corners. Wipe surfaces clean.

.3 Remove excess sealant by moderate use of mineral spirits or other solvent acceptable to sealant manufacturer.

3.07 CLEANING

.1 Protect finished Work from damage.

END OF SECTION

1 GENERAL

1.01 GENERAL REQUIREMENTS

.1 Comply with requirements of Division 1.

1.02 RELATED SECTIONS

.1 Section 08 11 16 Aluminum Doors and Frames.

.2 Section 08 44 13: Aluminum curtain wall

1.03 REFERENCES

.1 ANSI/ASTM E330/E330M-14, Test Method for Structural Performance of Exterior Windows, Curtain Walls and Doors by Uniform Static Air Pressure Difference.

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

.3 CAN/CGSB-12.3 Flat, Float Glass.

.4 CAN/CGSB-12.4 Heat Absorbing Glass.

.5 CAN/CGSB-12.8 Insulating Glass Units.

.6 CAN/CGSB-12.10 Glass, Light and Heat Reflecting.

.7 Flat Glass Manufacturer's Association (FGMA) Glazing Manual.

.8 CCD-045, Sealants and Caulking – Environmental Choice Program (ECP).

1.04 PERFORMANCE REQUIREMENTS

.1 Provide continuity of building enclosure vapour and air barrier using glass and glazing materials as follows:
.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 acting normal to plane of glass to a design pressure of as measured in accordance with ANSI/ASTM E330.

.3 Limit glass deflection to 1/200 flexural limit of glass with full recovery of glazing materials.

1.05 SUBMITTALS

.1 Product Data: Submit manufacturer's printed product literature, specifications and data sheet 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 35 29 – Health and Safety Requirements. Indicate VOC's for glazing materials during application and curing.

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

.4 Samples: Submit samples in accordance with Section 01 33 00 – Submittal Procedures. Submit 300 mm x 300 mm size samples of insulating glazing units.

.5 Manufacturer's Instructions: Submit manufacturer's installation instructions.

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

1.06 QUALITY ASSURANCE

.1 Perform work in accordance with IGMAC and Laminators Safety Glass Association - Standards Manual for glazing installation methods.

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

.3 Tempered glass identification must be sandblasted into glass and shall be visible after installation.

1.07 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.

1.08 WASTE MANAGEMENT AND DISPOSAL

.1 Separate and recycle waste materials in accordance with Section 01 74 21 - Construction Waste Management and Disposal.

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

.3 Collect and separate for disposal paper, plastic, polystyrene, corrugated cardboard and packaging material in appropriate on site bins for recycling in accordance with Waste Management Plan.

.4 Divert unused caulking and sealant materials from landfill through disposal at special wastes depot.

1.09 WARRANTY

.1 At no cost to Departmental Representative, replace factory sealed

insulating window units should cracking of glass or any other breakdown or failure of glass unit occur or should obstruction of vision develop due to dust or film forming on inner glass surfaces within a period of five (5) years from date of Substantial Performance.

2 PRODUCTS

2.01 MATERIALS: FLAT GLASS

.1 Safety Glass, tempered (Wind screen): to CAN/CGSB-12.1, tempered glass, type 2, Class B, 9.5 mm thick.

2.02 MATERIALS: SEALED INSULATING GLASS

.1 Insulating glass units (IG) – Type 1: aluminum exterior doors: factory sealed units to CAN/CGSB-12.8, double unit, nominal 25 mm overall thickness.
- .1 Glass: to CAN/CGSB-12.1; 12.4; 12.10 and 12.13 – see insulating glass units descriptions.
- .2 Glass thickness: 6 mm inner light, 6 mm outer light.
- .3 Inter-cavity space thickness: 13 mm with black, low conductivity spacer.
- .4 Glass coating: low "E" on third surface (exterior surface of inner light).
- .5 Inert gas fill: Argon.
- .6 Insulating glass units:
  - .1 IG: Outer light – to CAN/CGSB-12.4, tempered, clear, 6 mm thick. Inner light - to CAN/CGSB-12.10, low-E coating on clear tempered glass, third surface, 6 mm thick.
    - .1 Light transmittance - visible: 70%.
    - .2 Shading co-efficient: 0.45.
    - .3 Solar heat gain coefficient: 0.45.
    - .4 U-Value (Imperial): winter 0.29 (night-time), summer 0.27 (daytime).
    - .5 U-Value (metric): 1.6

2.03 GLAZING AND SEALING COMPOUNDS

.1 Sealant: as specified in Section 07 92 00 – Joint Sealing.

.2 Heel bead: as specified in Section 07 92 00 – Joint Sealing.

.3 Cap bead compound: as specified in Section 07 92 00 – Joint Sealing.

2.04 ACESSORIES

.1 Setting blocks: Neoprene, 80 - 90 Shore A durometer hardness to ASTM D2240, minimum 100 mm x width of glazing rabbet space minus 1.5 mm x height to suit glazing method, glass light weight and area.

.2 Spacer shims: Neoprene, 50-60 points 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: Preformed butyl compound with integral resilient tube spacing

device, 10 - 15 Shore A durometer hardness to ASTM D 2240; coiled on release paper; sized to suit; black colour.

.4 Glazing splines: resilient PVC, extruded shape to suit glazing channel retaining slot, colour to match adjacent material.

.5 Lock-strip gaskets: to ASTM C542.

.6 Primer - sealers and cleaners: to glass manufacturer's standard.

3 EXECUTION

3.01 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.

3.02 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.

3.03 PREPARATION

.1 Clean and prime surfaces scheduled to receive sealant in accordance with sealant manufacturers recommendations. Use solvents and cleaning agents recommended by manufacturer of sealing materials.

.2 Clean contact surfaces with solvent and wipe dry.

.3 Seal porous glazing channels or recesses with substrate compatible primer or sealer.

3.04 GLASS INSTALLATION GENERAL

.1 Provide clearance at perimeter edge of glass on all four sides, minimum equal to glass thickness.
- .1 Accurately cut glass to fit openings, allowing for expansion in accord with glass manufacturer's recommendations.
- .2 Provide sealer space between face of glass and glazing stops of minimum 3 mm.

.2 Set glass on setting blocks, spaced as recommended by glass manufacturer. Provide at least one setting block at quarter points from each corner.

.3 Centre glass in glazing rabbet to maintain specified clearances at perimeter on all four sides. Maintain centered position of glass in rabbet and provide the required sealer thickness on both sides of glass.

.4 On interior hollow metal screens, locate glass and glazing stops on "secure" side of frame (i.e. to interior of room side).

.5 Carefully remove glazing stops and reinstall after glazing.

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

.1 Perform work in accordance with FGMA Glazing Manual, IGMAC and Laminators Safety Glass Association - Standards Manual for glazing installation methods.

.2 Cut glazing tape to length and set against permanent stops, 3 mm below sight line. Seal corners by butting tape and dabbing with sealant.

.3 Apply heel bead of 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 Install removable stops with spacer strips inserted between glazing and applied stops 6 mm below sight line. Place glazing tape on glazing light or unit with tape 3 mm below sight line.

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

.8 Apply cap head of sealant along void between stop and glazing, to uniform.

3.06 INSTALLATION: INTERIOR - DRY METHOD (TAPE AND TAPE)

.1 Perform work in accordance with FGMA Glazing Manual, IGMAC and Laminators Safety Glass Association - Standards Manual for glazing installation methods.

.2 Cut glazing tape to length and set against permanent stops, projecting 1.6 mm above sight line.

.3 Place setting blocks at 1/4 points, with edge block maximum 150 mm from corners.

.4 Rest glazing on setting blocks and push against tape for full contact at perimeter of light or unit.

.5 Place glazing tape on free perimeter of glazing in same manner described.

.6 Install removable stop without displacement of tape. Exert pressure on tape for full continuous contact.

.7 Knife trim protruding tape.

3.07 CLEANING

.1 Perform cleaning after installation to remove construction and accumulated

environmental dirt.

.2 Remove dust, dirt, sealant, plaster, paint spatter, and other harmful and deleterious matter from glass promptly and completely, before they establish tight adhesion.

.3 Remove glazing materials promptly from finish surfaces as the work progresses. Remove traces of primer and caulking.

.4 Remove labels after work is complete.

.5 Clean glass and mirrors using approved non-abrasive cleaner in accordance with manufacturer's instructions. Avoid using abrasives, steel wool razor blades, solvents alkaline or other harsh cleaning agents.

.6 Replace chipped, broken, scratched or otherwise damaged glass.

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

3.08 PROTECTION OF FINISHED WORK

.1 After installation, mark light with an "X" by using removable plastic tape or paste.

END OF SECTION