

PART 1 - GENERAL

1.1 PRICING

- .1 All costs associated with the work required by and associated with this Section shall be included as part of the Contract Price and in the price listed in item #1 of the Bid Form.

1.2 GENERAL INSTRUCTIONS

- .1 Read and conform to:
 - .1 the General Conditions and the Supplementary Conditions of the Contract.
 - .2 Division 1 requirements and documents referred to therein.

1.3 SUMMARY

- .1 Work Included: Provide fiberglass windows and window wall assemblies including but not limited to the following:
 - .1 fixed fiberglass windows.
 - .2 glass and glazing in work of this Section.
- .2 Related Requirements: Specifications throughout the entirety of the Divisions of this Project are directly applicable to this Section, and this Section is directly applicable to them.

1.4 REFERENCES

- .1 Reference Standards: Latest published editions of reference standards listed in this Section in effect as of the closing date and time of the Request for Tenders for the Contract, including any amendments adopted, are applicable unless otherwise indicated herein.

1.5 ADMINISTRATIVE REQUIREMENTS

- .1 Preinstallation Conference: Conduct conference at Project site at which the Contractor shall, among other things:
 - .1 Review and finalize Construction Schedule and verify availability of materials, installer's personnel, equipment, and facilities needed to make progress and avoid delays.
 - .2 Review, discuss, and coordinate the interrelationship of fiberglass windows with other exterior wall components. Include provisions for anchoring, flashing, weeping, sealing perimeters, and protecting finishes.
 - .3 Review and discuss the sequence of work required to construct a watertight and weathertight exterior building envelope.
 - .4 Inspect and discuss the condition of substrate and other preparatory work performed by trades performing the work of other Sections.

1.6 SUBMITTALS

- .1 Product Data: Submit manufacturer's literature and data sheets for each type of material provided under this Section for the Project in accordance with requirements of Division 01. Ensure data sheets provide required information including detailed instructions for installing as

- well as maintaining, preserving and keeping materials in clean and safe conditions. Provide adequate warning of maintenance practices or cleaning agents detrimental to specified materials.
- .2 Material Safety Data Sheets: Submit MSDS for inclusion in operation and maintenance manual without limitations for adhesives, sealants and as other materials designated later by Consultant.
 - .3 Shop Drawings:
 - .1 Submit Shop Drawings of fiberglass windows and window wall assemblies, components and accessories in accordance with Division 01.
 - .2 Indicate head, jamb and sill, profiles of components, (interior and exterior trim), junction between combination units, elevations of unit and description of related components. Indicate relation to adjoining work and location, construction and back-up, joint sealant, location of isolation coating, interior structure and/or details of reinforcements, glazing modules, head and frame details, mullions and details, glazing and glass stop details, thermal break sections and vinyl or neoprene mouldings (in 1/2 size), details of connections, anchorage, interfacing with adjacent work and assembly fixings. Clearly indicate materials used for every component on Shop Drawings.
 - .3 Clearly indicate how thermal expansion and contraction are to be accommodated and to what degree. Show connections to adjacent construction and provision made for structural deflections, contractions, expansion and other normal movement.
 - .4 Submit Shop Drawings bearing the stamp of a Professional Engineer registered in the Province of Ontario and experienced in this type of work. Show where anchors and shims are placed, type of anchors, shim thicknesses, widths, number of fasteners and edge clearances for fasteners.
 - .4 Insulating Glass Manufacturer's Association of Canada (IGMAC) Compliance Audit:
 - .1 Submit in accordance with Division 01.
 - .2 Submit written certification of successful completion of a compliance audit within the last 6 months.
 - .5 Samples: Submit samples in accordance with Division 01. Submit following samples in the sizes indicated:
 - .1 Submit 1 complete full size sample of each window type to the Consultant for approval of general appearance and quality of the work.
 - .2 Submit sample sections of component parts of windows and window wall assemblies including frame, sash, sill, glazing and waterproofing method, surface and finish hardware, and glass finished in specified colours. Samples of extruded shapes shall be 300 mm (12") long; samples of each type of glass shall be 300 mm (12") square.
 - .6 Test Reports:
 - .1 Submit report from an independent testing laboratory completed within the last 3 years, indicating windows and window wall assemblies meet or exceed performance requirements of CAN/CSA-A440-M with respect to air infiltration, wind load resistance, water tightness, condensation resistance, thermal performance, ease of operation, load tests on screens, forced entry resistance and mullion deflection (for combined and composite windows and window wall assemblies).
 - .7 Maintenance Data and Operating Instructions:
 - .1 Submit maintenance instructions in accordance with Division 01.

- .2 Provide a demonstration with window manufacturer for building maintenance staff dealing with operation of windows and window wall assemblies, insert removal, re-glazing, cleaning and general maintenance.

1.7 QUALITY ASSURANCE

- .1 Qualifications:
 - .1 Designers, fabricators and installers of the work of this Section: minimum of 10 years experience in the application of the Products, systems and assemblies specified herein. Installer shall be acceptable to the fiberglass window manufacturer for installation of units required for this Project.
 - .2 Insulating glass unit fabricators: membership and certification in the IGMAC.
 - .1 IGMAC members must participate in the certification program and successfully pass a compliance audit within the last 6 months.
- .2 Structural Design and Inspection: Employ a structural Professional Engineer, that carries a minimum \$2,000,000.00 professional liability insurance and is registered in the Province of Ontario, to:
 - .1 design components for work of this Section requiring structural performance.
 - .2 be responsible for determining sizes, joint spacing to allow thermal movement and loading of components in accordance with applicable codes and regulations.
 - .3 be responsible for production and review of Shop Drawings.
 - .4 inspect work of this Section during fabrication and erection.
 - .5 stamp and sign each Shop Drawing.
 - .6 Provide site administration and inspection of this part of the Work.
- .3 Mock-Ups:
 - .1 Build mock-ups in building envelope wall in locations directed by Consultant:
 - .1 Minimum Size: 450 mm x 450 mm x 450 mm (18" x 18" x 18").
 - .2 Maximum Size: 600 mm x 600 mm x 600 mm (24" x 24" x 24").
 - .3 Include: Glazing and demonstrate airseal and anchorage systems.

1.8 DELIVERY, STORAGE AND HANDLING

- .1 Transport materials to site storage in a manner to prevent in-transit damage. These measures include, but are not limited to, crating, polyethylene wrapping system and similar protective packaging.
- .2 Store in a dry, protected area on site, in original undamaged containers with manufacturer's labels and seals intact.
- .3 Brace frames to maintain squareness and rigidity during shipment and installation.
- .4 Provide glass units with interlayer protection between lites. Keep glass and interleaving dry and store cases in clean, cool, dry areas with temperatures above dewpoint. Circulation of cool, dry air in storage areas is essential. Open cases and inspect units periodically for moisture accumulation. Do not store glass in direct sunlight without an opaque protective covering over same.
- .5 Remove damaged or unsatisfactory materials from the site and replace with new materials to satisfaction of the Consultant at no cost to the Owner.

- .6 Protect the work of this Section from damage. Protect work of other trades adjacent to work of this Section.
- .7 Provide at factory, strippable coatings on exposed surfaces of fiberglass windows and window wall assemblies. This coating and protective wrappings shall remain on the surfaces through the period that the work of other Sections proceeds on the building and shall be removed by those performing the work under this Section upon completion of the building.
- .8 Comply with unpacking procedures as recommended by the framing and glass manufacturers.
- .9 Make Good damaged work caused by failure to Provide adequate protection. Remove unsatisfactory work and replace at no expense to the Owner.

1.9 WARRANTY

- .1 The Contractor warrants the work of this Section for a period of 10 years from Substantial Performance of the Work against defects and/or deficiencies in accordance with the General Conditions of the Contract. Promptly correct any defects or deficiencies which become apparent within this warranty period, to the satisfaction of the Consultant and at no expense to the Owner. Defects include but are not limited to: buckling, opening of seams, bond failure and extensive colour fading.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

- .1 Products of the following manufacturers are acceptable subject to conformance to the requirements of the Drawings, schedules and Specifications:
 - .1 Cascadia Windows;
 - .2 Duxton Windows;
 - .3 Fibertec Windows and Doors Manufacturing;
 - .4 Inline Fibreglass Ltd;
- .2 Substitution Limitations: This Specification is based on "400 Series Windows" by Inline Fibreglass Ltd. Comparable equivalent Products from manufacturers listed herein offering functionally and aesthetically equivalent Products, as judged solely by Consultant, will be considered provided they meet the requirements of this Specification.

2.2 DESCRIPTION

- .1 Design and Performance Requirements:
 - .1 Fiberglass window design is established in details on Drawings and performance requirements in Specifications. Design requirements are indicated by dimensions, arrangements, alignment, and profiles of components and assemblies as they relate to sight lines, to one another, and to adjoining construction.
 - .2 Performance characteristics and design criteria specified are subject to verification by one or more methods including preconstruction testing, field testing, and in-service performance. Do not modify intended architectural design effects except with the Consultant's approval.
 - .3 Furnish labor, materials and other services to complete the fabrication of new fiberglass windows, including all materials required for the supply and installation of the units in the manner, direction and performance shown on the design drawings and specified herein.

- .4 Fiberglass window framing to incorporate a drained and vented system with complete air, vapor and moisture seals, allowing water entering the framing to drain to the exterior.
- .5 Fiberglass inswing windows and doors to be glazed with an interior air seal using a continuous silicone heel bead from the IGU to the sash frame.
- .6 Fiberglass inswing windows and doors to incorporate a concealed hinge system with a continuous interior air seal, uninterrupted by any hardware.
- .7 Design fixed windows and window wall assemblies and operating units meeting or exceeding performance requirements of CAN/CSA A440/A440.1 with respect to air infiltration, wind load resistance, water tightness, condensation resistance, thermal performance, ease of operation, load tests on screens, forced entry resistance and mullion deflection as follows:
 - .1 Air Leakage (infiltration and exfiltration):
 - .1 Operable windows and window wall assemblies: maximum air leakage rate: 0.06 L/s-m² (0.01 cfm/ft²)
 - .2 Fixed windows and window wall assemblies: 0.00 cfm/ft² (0.00 L/s.m²).
 - .2 Water Leakage: There shall be no water infiltration at a static air pressure differential as follows when tested in accordance with AAMA 101 and ASTM E331.
 - .1 Water penetration resistance test pressure for all vent types, including: Fixed windows, casement, awning, tilt & turn, hopper, inswing doors, and outswing doors: 15 psf (720 Pa).
 - .3 Structural Performance:
 - .1 Performance Grade (PG) and Class of all windows and doors shall be as required to meet wind load of geographical location of the Work, but not less than the following:
 - .1 For fixed windows, CW-95 or higher
 - .2 For operable window (inswing or outswing), CW-45 or higher
 - .4 Resistance to Forced Entry: F20 per CAN/CSA A440/A440.1 or Grade 10 per according to ASTM F588.
- .8 Thermal Requirements: Thermal Transmittance U-Value shall be certified in accordance with the National Fenestration Rating Council (NFRC).
 - .1 Overall U-values: Not more than 0.15 (Imperial) / 0.85 (Metric)
- .9 Condensation Resistance Test (CRF): When tested in accordance with AAMA Specification 1503 and CAN/CSA-A440, the condensation resistance factor (CFR) shall not be less than: 64 (50.2 I-frame).
- .10 Have work of this Section designed by a Professional Engineer licensed to design structures in the Province of Ontario.
- .11 Comply with requirements of the OBC and regulations of Authorities Having Jurisdiction, which shall be a minimum, except where more stringent requirements are specified herein.
- .12 Design glazing systems and framing to prevent thermal shock and fracture damage to glass. Design glass and glazing to meet CAN/CGSB-12.20. Comply with published recommendations of glass manufacturers and Glass Association of North America (GANA)'s "Glazing Manual" unless more stringent requirements are indicated.

- .13 Design glazing and spanning window frame members, including any required reinforcing, in accordance with AAMA/WDMA/CSA 101/I.S.2/A440-11. There shall be no deflection in excess of L/175 of the span of any framing member.
- .14 Design fiberglass work as shown on the Drawings to Provide free and noiseless movement of all components of assembly without buckling of any component and/or transmitting of stresses to any members.
- .15 Design fiberglass window system to accommodate and interface with work of other Sections as applicable.
- .16 Locate sealants, gaskets, air/vapour seals, thermal separations, drainage slots and holes as shown or specified in this Section as required to obtain design requirements. Ensure components and assemblies exterior to the air barrier drain to the building exterior.
- .17 Design, assemble and secure work in a manner that will keep any stresses on sealants within the sealant manufacturer's recommended working range within factors of safety specified in AAMA/WDMA/CSA 101/I.S.2/A440-11.
- .18 Accurately shape members at intersecting joints to obtain hairline joints, just wide enough to permit thermal expansion and contraction.
- .19 Conceal securement devices unless otherwise indicated in the Contract Documents.
- .20 Design attachments which will permit replacement of individual units during construction or in subsequent usage of building without dismantling or disturbance to adjoining components or units. In addition, accomplish such replacement without use of extra fasteners, splices, covers and like that alter original design features.
- .21 Provide accessories, closures, and trims required and necessary to complete the work.
- .22 Design window system on NRC recommended rain screen principles with pressure equalized and draining provisions. Maintain integrity of continuous air barrier/vapour retarder system with adjacent surrounding air barrier/vapour retarder.
- .23 Design and detail controlled drainage path to actively discharge water, which may enter into or form within aluminum work, to exterior; prevent accumulation or storage of water within aluminum work. Prevent water from entering interior when tested in accordance with ASTM E331.
- .24 Fire Performance: Where required by building type, classification, occupancy, height or building size, Provide a cladding system tested in accordance with CAN/ULC-S134 by an independent testing organization, and approved for use in non-combustible construction.
- .25 Refer to Section 01 83 16 for additional performance and testing requirements pertaining to the work of this Section.

2.3 MATERIALS

- .1 Basic Material: All frames and sash profiles shall be made from Pultruded Fiberglass, having a minimum thickness of 2.3mm (0.090") with minimum glass content of 60%. Non-structural accessory members are permitted to be in aluminum and are identified as such on Drawings.
 - .1 Frames and Sashes: Pultruded fiberglass complying with AAMA/WDMA/CSA 101/I.S.2/A440 and with exposed exterior fiberglass surfaces finished with manufacturer's standard enamel coating complying with AAMA 613 or AAMA 623.
 - .2 Exterior Colour: As selected by Consultant from manufacturer's full range.
 - .3 Interior Finish: As selected by Consultant from manufacturer's full range.

- .2 Aluminum Components: ASTM B209M, size accurately formed as shown on Drawings, extruded aluminum alloy AA-6063-T5 for all aluminum except surfaces receiving anodizing which shall be AA-6061-T6. Surfaces shall be free from defects impairing appearance, strength and durability.
- .3 Screws, Bolts and Fasteners: Exposed stainless steel, ASTM A167, Series Type 304 or Type 300 or hardened aluminum.
- .4 Miscellaneous and Sub-Frame Steel: CSA G40.21, Grade 300W, hot dipped galvanized after fabrication to CAN/CSA-G164-M, with additional zinc chromate coating to CAN/CGSB-1.132-M after fabrication. Steel reinforcements and anchors shall conform to Section 05 50 00 requirements.
- .5 Shims: Alcan Utility sheet when not in contact with cementitious substances; stainless steel when in contact with cementitious substances or galvanized steel. Thicknesses as required per CSA A440.
- .6 Window Hardware: Manufacturer's standard hardware fabricated from aluminum, stainless steel, or other corrosion-resistant material compatible with aluminum; designed to smoothly operate, tightly close, and securely lock aluminum windows and window wall assemblies and sized to accommodate sash or ventilator weight and dimensions. Cadmium-plated hardware shall not be permitted. Do not use aluminum in frictional contact with other metals. Where exposed, Provide nonmagnetic stainless steel.
- .7 Compression-Type Weather Stripping: Provide compressible weather stripping designed for permanently resilient sealing and completely concealed when fiberglass window is closed. Weather-Stripping Material: Elastomeric cellular preformed gaskets complying with ASTM C509. Weather-Stripping Material: Dense elastomeric gaskets complying with ASTM C864.
- .8 Sealant: Multi-component conforming to CAN/CGSB-19.24-M, Type 2, Class "B" for sealant to be incorporated between fiberglass framing and adjacent structures. Colours later selected by Consultant from standard colour selection. Furnish non-hardening, non-shrinking, non-migrating non-skimming, non-sagging, non-bleeding poly-isobutylene or partially vulcanized rubber base sealant for use in concealed-sealing of thin joints in metal work.
- .9 Screen for Operating Units:
 - .1 Design windows and window wall assemblies and hardware to accommodate screens in tight fitting, removable arrangement with minimum of exposed fasteners and latches.
 - .2 glass fibre fabric mesh woven into 14 x 18 mesh screen cloth, CAN/CGSB-79.1-M.
 - .3 Frame: extruded aluminum with baked enamel finish.
- .10 Insulation within frame assemblies: Foamed-in-place type (INS-9) as specified in Section 07 21 00 in locations indicated on the Drawings.
- .11 Glazing Materials:
 - .1 Design glass and glazing to meet CAN/CGSB-12.20-M, including appendices and design requirements listed herein as applicable. Glass thicknesses given in this Section are minimum. Ensure glass bears manufacturer's labels indicating quality. Leave labels in place until final cleaning.
 - .2 Factory-Sealed Insulated Glass Units: Factory-assembled units consisting of sealed lites of glass separated by a dehydrated interspace, qualified according to ASTM E2190, IGCC or equivalent to CAN/CGSB-12.8, and complying with other requirements specified in this Section.
 - .1 Sealing System: Dual seal, with polyisobutylene and silicone primary and secondary.

- .1 Basis-of-Design (Silicone Secondary Seal): DOWSIL 982 or DOWSIL 3363 by The Dow Chemical Company as suitable for use or Equivalent.
 - .2 Colour: Black.
- .2 Ensure low 'E' coating is edge-deleted over depth of primary and secondary edge seal at units where glass edges are visible.
- .3 Edge spacer core to be straight and evenly set into glass units with maximum variation in line of spacer core of +/- 2 mm (0.08 inch) and ensure primary seal does not extend past inside edge of spacer core by more than 1.5 mm (1/16 inch).
- .4 All units to have IGMA certification.
- .5 Spacer: Plastic-covered stainless steel in colour selected by Consultant.
 - .1 Basis-of-Design: "CHROMATECH ULTRA" by Roll-Tech A/S; <http://www.rolltech.dk> or Equivalent.
- .6 Low Emissivity Glass Coating (Low 'E'): Provide triple silver sputtered vacuum deposited Low 'E' coating to surfaces of sealed insulating glass unit to meet criteria specified herein. Uniformly apply Low 'E' coating to glass.
- .7 Ensure low 'E' coating is edge-deleted over depth of primary and secondary edge seal at units where glass edges are visible.
 - .1 Basis-of-Design: "SunGuard® SN 68" or Equivalent meeting aesthetic and performance criteria by one of the following:
 - .1 Vitro Architectural Glass (formerly PPG)
 - .2 AGC Glass Industries
 - .3 Cardinal Glass Industries
 - .4 Viracon
- .3 Safety / Security Window Film (FILM-S) - at all exterior glazing units: Optically clear microlayered polyester film, with abrasion-resistant acrylic coating over one surface and a pressure sensitive adhesive on the other. Apply to surface no. 2 of double glazed units.
 - .1 Colour: Clear.
 - .2 Thickness: Minimum 0.2 mm (8 mils)
 - .3 Impact Resistance:
 - .1 complying with testing requirements in ANSI Z97.1, Class A and 16 CFR 1201 for Category II.
 - .2 Complying with testing requirements in ASTM E1996 for "Large-Missile Test" when tested at +/- 3.6 kPA (75 psf) according to ASTM E1886; with film applied to 6.0 mm (1/4 inch) thick tempered glass.
 - .4 Accessories: Provide manufacturer's recommended weatherable, UV-resistant, structural sealant attachment system "3M Impact Protection Film Attachment System" by 3M Canada or Equivalent.
 - .5 Basis-of-Design: "3M Scotchshield Ultra S800 Safety and Security Window Film" by 3M Canada or equivalent.
- .4 Vision Glass - Type VG1: Low-E-coated, clear double insulating glass.
 - .1 Overall Unit Thickness: 25 mm (1 inch)
 - .2 Outdoor Lite: 6 mm thick clear tempered glass.
 - .3 Glazing cavity: 90% Argon; 10% Air

- .4 Indoor Lite: 6 mm thick clear tempered glass.
- .5 Low-E Coating: triple-silver as specified in this Section, sputtered on surfaces no. 2
- .6 Bird-friendly frit: Provide ceramic frit applied by acid etching on surface no. 1 of glazing.
 - .1 Pattern: Provide 6 mm (1/4 inch) diameter dots at 100 mm (4 inches) on center spacing, applied to glass units, with 100% coverage of glass unit.
 - .2 Basis-of-Design: Walker Glass or approved Equivalent.
- .7 Performance Requirements:
 - .1 Winter U-Value: 0.25 Maximum
 - .2 SHGC: 0.37 Maximum
 - .3 Visible Light Transmittance (VLT): Not less than 60%.

2.4 AUXILIARY MATERIALS

- .1 Preformed Silicone-Sealant Extrusion (at glazing transitions): Manufacturer's standard system consisting of cured low-modulus silicone extrusion, sized to fit opening widths, with a single-component, neutral-curing, Class 100/50 (low-modulus) silicone sealant for bonding extrusions to substrates. Acceptable Products:
 - .1 "Silicone Transition System (STS)" by Dow Corning Corp
 - .2 "Proglaze ETA" by Tremco Canada
 - .3 or Equivalent to the above.
- .2 Sprayed Polyurethane Foam Sealant (INS-7): Foamed-in-place, polyurethane foam sealant; flame-spread index of 25 or less according to ASTM E162; with primer and substrate cleaner recommended by foam-sealant manufacturer.
 - .1 Acceptable Products:
 - .1 "Zerodraft Air Sealant Foam and Insulating Sealant" by Zerodraft (Division of Canam Building Envelope Specialists Inc.), www.zerodraft.com
 - .2 "Handi-Foam®" by Fomo Products, Inc.; www.fomo.com
 - .3 "GREAT STUFF PRO™ Series" Foam Sealant by Dow Chemical.
 - .4 or Equivalent to the above.
- .3 Flashing and Tapes: Self-adhesive types, conforming to AAMA 711 and sized as required to provide flashing, window seal and drainage.
 - .1 Acceptable Products:
 - .1 Rough Opening Flashing and Window Seal: "Wigluv 100/150/230 Tape" by SIGA or Equivalent.

2.5 FABRICATION

- .1 Fiberglass frame and sash corners shall be connected with molded reinforced polymer shear blocks and mechanically secured. All joints shall be factory sealed and neatly fitted together.
- .2 Provide integral window components such as glazing perimeter airseal, frame perimeter air seal, metal clip anchors, sills and closures.
- .3 Fabricate in accordance with CSA A440 requirements and the manufacturer's written instructions.

- .4 Fabricate units square and true to detail with maximum tolerance of ± 1.5 mm (1/16") for units with diagonal measurement of 1800 mm (6'-0") or less than 3.00 mm (1/8") for units with diagonal measurement over 1800 mm (6'-0"), free from defects impairing appearance, strength and durability. Overall assembled profiles shall be as detailed on the Drawings.
- .5 Make provision at sealed horizontal members to lead moisture accumulation to exterior.
- .6 Anchorages must be attached to warm side of fiberglass window assembly.

2.6 FINISHES

- .1 Fiberglass: Manufacturer's standard electrostatically applied finish. Colour to be selected by Consultant at a later date from manufacturer's standard range.

PART 3 - EXECUTION

3.1 EXAMINATION

- .1 Site Verification of Conditions: Verify actual site dimensions and location of adjacent materials prior to commencing work. Verify fiberglass window openings by field measurements before fabrication. Notify the Consultant in writing of any conditions which would be detrimental to the installation. Commencement of work implies acceptance of previously completed work.

3.2 INSTALLATION

- .1 Set window framing in its correct location, level, square and plumb and at proper elevations, with the nominal face of the framing aligned in a single vertical plane. Prior to flashing installation:
 - .1 Substrate must be smooth, dry and free of debris, including frost, grease, dirt and sharp edges.
 - .2 Ensure mechanical fasteners are installed flush to substrate surface.
 - .3 Ensure masonry joints are struck flush.
 - .4 Ensure voids over 25 mm (1") are filled and tooled flush, using compatible sealant or spray foam.
 - .5 Use manufacturer's recommended primer where necessary to promote adhesion to surfaces.
 - .6 Ensure door and window rough openings are slightly sloped to the exterior to ensure proper drainage.
 - .7 Install materials with not less than 25 mm (1 inch) overlap to building's primary air barrier membrane.
- .2 Fasten and anchor framing in place in accordance with CSA A440.6. Install in accordance with reviewed Shop Drawings. Maintain continuity of air barrier and vapour barrier membranes by installing flashings and tapes as indicated on Drawings:
- .3 Erection Tolerances:
 - .1 Limit variations from plumb, level or dimensioned angle to the following:
 - .1 3 mm (1/8") maximum deviation in storey height, or in 3 m (10') vertical run, or in 6 m (20') horizontal run.
 - .2 6 mm (1/4") maximum deviation in 12 m (40') in any direction.

- .2 Limit variations from location (theoretical calculated positions in plan or elevation based on established floor lines and column lines), including variations from plumb and level, to following:
 - .1 9 mm (3/8") total maximum deviation for member at any location.
 - .2 3 mm (1/8") maximum change in deviation for member for 3 m (10') run, any direction.
- .3 Limit offsets in end-to-end and edge-to-edge alignment of adjoining and consecutive members, which form planes, continuous runs and profiles to 1.5 mm (1/16") maximum offset in flush alignment, including those which are to be 13 mm (1/2") or less out-of-flush, and including those which are separated 50 mm (2") or less by a reveal or protrusion in plane or wall.
- .4 Glazing:
 - .1 Use glazing and bedding compounds of type compatible with secondary sealant in insulating glass unit.
 - .2 Surfaces receiving glazing materials shall be thoroughly wiped with low-VOC cleaning substances recommended by the manufacturer.
 - .3 Install windows using "inside-glazing" methods with exterior butyl tape and integral spacer. Provide heal bead at bottom of interior edge of sealed units and up the lower 75 mm (3") of each vertical to Provide a vented glazing cavity. Provide punched louvres or holes through exterior glazing flange for venting and drainage. Snap-in glazing stop to be complete with elastomeric roll-in wedge to hold glass tight and separate glass from fiberglass frame.
- .5 Caulking: At interior and exterior joints between fiberglass framing and adjacent work of other Sections:
 - .1 Install backer rod over compressible filler material or perimeter blocking to Provide sealant joints of proper form, thickness to width ratios, and to Provide bond break at back side of sealant. Where backer rod cannot be used or is not shown Provide bond breaker tape to back side of sealant joint substrate.
 - .2 Clean substrate surfaces to which sealant is to bond and apply sealant primers as recommended by the sealant manufacturer.
 - .3 Caulk joints continuously to produce weatherproof and visually acceptable joint installation.

3.3 FIELD QUALITY CONTROL

- .1 Site Tests and Inspections:
 - .1 Fiberglass window systems will be subject to tests to confirm performance criteria specified herein and in Sections 01 45 00 and Section 01 83 16. The Owner will engage a qualified independent testing and inspecting agency to perform field tests and inspections and prepare test reports.
 - .2 Before concealing fiberglass window work obtain required inspections from an independent testing and inspection agency. As a minimum, the following tests will be required:
 - .1 Water Leakage Tests: ASTM E1105 at a minimum cyclic static-air-pressure differential as specified in Section 01 83 16, and shall not evidence water penetration.
 - .2 Air Leakage Tests: ASTM E783 the rate specified in Section 01 83 16.
 - .3 In event that the fiberglass window system does not pass tests performed by the inspection and testing company, take remedial action, approved by the Consultant, as necessary to

correct deficiencies observed as a result of tests. Perform retesting at own expense until tests indicate satisfactory results.

3.4 CLEANING

- .1 Maintain window framing in a clean condition throughout construction period, so it will be without deterioration or damage at the 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.
- .2 Immediately before Substantial Performance of the Work, clean windows and window wall assemblies thoroughly, inside and out. Demonstrate proper cleaning methods to the Owner during this final cleaning. Prepare a "Cleaning and Maintenance Manual" listing types of cleaning compounds, cleaning methods, sealants and glazing materials of the work of this Section and submit 2 copies to the Owner.

3.5 PROTECTION

- .1 Protect window surfaces from contact with contaminating substances resulting from construction operations. In addition, monitor window surfaces adjacent to and below exterior adjacent surfaces during construction for presence of dirt, scum, alkaline deposits, stains, or other contaminants. If contaminating substances do contact window surfaces, remove contaminants immediately according to manufacturer's written recommendations.
- .2 Remove protective covering and coating from fiberglass surfaces, inside and out, and clean surfaces, remove labels, stripes and protective devices and polish glass surfaces, immediately prior to final acceptance of the Work by Consultant.

END OF SECTION