



A Division of Metrolinx



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## CONTROLS & STANDARDS

<b>Section 13000</b>	<b>Subject:</b> Guideline Performance Specifications for Prefabricated BRT Shelters	<b>Date:</b> Jan 7, 2015	<b>Page:</b> 1 of 31
----------------------	--	-----------------------------	-------------------------

The Guideline Performance Specifications below are meant to establish a minimum acceptable level of construction, installation, materials and finish quality requirements. Alternate materials and methods are acceptable if they meet or exceed the minimum requirements. All proposals shall be supported by detailed drawings and specifications, clearly showing dimensions, joining details, alloy, temper, finish and thickness of all members and components.

### 1. GENERAL

#### (a) General Guideline Specification Requirements

(i) Sections of Division 1 apply to work of this Section.

(ii) Permits and Allowances

(A) Pay all ESA permit and inspection costs.

(iii) Regulations

(A) Comply with the latest Ontario Building Code, Ontario Electrical Safety Code and all other applicable regulations.

#### (b) Quality Assurance

(i) **Installer Qualification:** Trained and approved by the respective manufacturer and having minimum five years experience in the installation of the work described in this Section and can show evidence of satisfactory completion of projects of similar size, scope and type.

(A) **Roofing Installer:** Member in good standing of the local roofing trade association affiliated with Canadian Roofing Contractors Association.

(ii) If requested, provide letter of certification from manufacturer stating that installers are approved applicators of its products, and are familiar with proper procedures and installation requirements required by the manufacturer.

(iii) **Pre-Installation Meeting:** Prior to commencing work of this Section, arrange for manufacturer's technical representative to visit the site and review preparatory and installation procedures to be followed, conditions under which the work will be done, and inspect the surfaces to receive the work of this Section. Advise the Engineer of the date and time of the meeting.



A Division of Metrolinx



**METROLINX**  
LINKING PEOPLE TO PLACES • ON Y YA

## CONTROLS & STANDARDS

<b>Section 13000</b>	<b>Subject:</b> Guideline Performance Specifications for Prefabricated BRT Shelters	<b>Date:</b> Jan 7, 2015	<b>Page:</b> 2 of 31
----------------------	--	-----------------------------	-------------------------

- (iv) **Manufacturer’s Site Inspection:** Have the manufacturer’s technical representative inspect the Work at suitable intervals during application and at conclusion of the work of this Section, to ensure the Work is correctly installed. When requested, submit manufacturer’s inspection reports and verification that the work of this Section is correctly installed.
- (v) **Maintenance Seminars:** Engage a factory authorized service representative to instruct Engineer’s maintenance personnel regarding proper maintenance procedures.
- (vi) **Source Limitations:** Provide like products from a single manufacturer.
- (vii) **Welding:**
  - (A) **Steel:** To CSA W59 by fabricators certified by the Canadian Welding Bureau to CSA W47.1.
  - (B) **Aluminum:** To CSA W59.2 by fabricators certified by the Canadian Welding Bureau to CSA W47.2.
- (viii) **Accessibility Requirements:** Comply with authorities having jurisdiction and building code requirements.
- (ix) **Glazing:** Perform work in accordance with recommendations of Glazing Association of North America (GANA). Size glass to Code requirements and verify that openings for glazing are correctly sized and within tolerance.
- (x) **Finishing:** Materials, preparation and quality of work in conformance with requirements of the latest edition of the Architectural Painting Specification Manual by the Master Painters Institute, issued by the local MPI Accredited Quality Assurance Association having jurisdiction.
- (c) **Performance Requirements**
  - (i) **Design and Construction:** Installed work capable of withstanding the effects of gravity, dead loads, snow, ice, wind effects, seismic and stresses in accordance with minimum requirements of the building code.
    - (A) Design details and connections, where not shown on Drawings, in accordance with CAN/CSA-S16, CSA S136, and CSA S136.1.
    - (B) Comply with CSA S157/A157.1 for strength design in aluminum work.
  - (ii) **Engineering Design:** Retain a Professional Engineer, licensed in the



A Division of Metrolinx



**METROLINX**  
LINKING PEOPLE TO PLACES • ON Y VA

## CONTROLS & STANDARDS

<b>Section 13000</b>	<b>Subject:</b> Guideline Performance Specifications for Prefabricated BRT Shelters	<b>Date:</b> Jan 7, 2015	<b>Page:</b> 3 of 31
----------------------	--	-----------------------------	-------------------------

Province of Ontario, with experience in work of comparable complexity and scope, to perform the following services as part of the work of this Section:

- (A) Design work as required to resist live, dead, lateral, wind, snow, and seismic loads (location specific)
  - (B) Structural design.
  - (C) Review, stamp, and sign shop drawings.
  - (D) Conduct shop and on-site inspections.
  - (E) Prepare and submit inspection reports.
- (iii) Thermal Movements: Allow for thermal movements resulting from maximum change in ambient and surface temperatures by preventing buckling, opening of joints, overstressing of components, failure of joint sealants, failure of connections, and other detrimental effects. Base engineering calculation on surface temperatures of materials due to both solar heat gain and night time sky heat loss.
- (iv) Wind Loads: Uniform wind load pressures for suction, impact and gusting, with a return period probability required by the governing building code. Snow, Rain and Ice Loads: Capable to support uniform loads required by the governing building code.
- (v) Water Infiltration: Watertight to the interior under design conditions in combination with movements occurring due to imposed loads.
- (vi) Use a safety factor of 2.5:1 minimum for glass design.
- (d) Power and Communication Service
- (i) Provide a complete design, which will include underground ducts and distribution, power service supply and metering (include GO Transit / Metrolinx dedicated meter), grounding systems, lighting systems and controls, telephone and communications systems. Provide a stainless steel enclosure with compartments for both power and communications.
    - (A) CERTIFICATES: Provide copies of all required certificates of approval.
    - (B) At the completion of the installation provide two sets of final "as constructed" drawings, including all installed equipment, devices and conduit.



A Division of Metrolinx



**METROLINX**  
LINKING PEOPLE TO PLACES • ON Y V A

## CONTROLS & STANDARDS

<b>Section 13000</b>	<b>Subject:</b> Guideline Performance Specifications for Prefabricated BRT Shelters	<b>Date:</b> Jan 7, 2015	<b>Page:</b> 4 of 31
----------------------	--	-----------------------------	-------------------------

- (C) Generally, the work includes, in the time frame set out or implied, the provision of a complete, interfaced, reliable, continuous operating electrical system implied, described or required, including but not limited to all labour; equipment; confirmations, co-ordination of equipment; spare parts; fees; service layouts; permits; inspections; investigations; studies; acceptance tests, demonstrations; reports; bonds; notices; declarations; administration; liaison, reviews, meetings, correspondence and travel. Provide training, warranties and insurance.
- (D) The electrical drawings are schematic and indicate major equipment and intended overall arrangement.
- (ii) Electrical service for the shelter is fed from the nearby Power Assemble. Distribution voltage shall be 120/208V, 3 phase, 4 wire or 120/240V, 1 phase, 3 wire system depending on the site conditions. Provide equipment in the shelter with nominal voltage complying with the supplying voltage and phase.
- (A) Terminate power supply and communication wirings in power and communication junction boxes, respectively, complete with tamperproof enclosures and with stainless steel access covers embossed or engraved "ELECTRICAL WIRING" on one access cover and "COMMUNICATION WIRING" on the other access cover for each shelter. Provide barrier between power and communication compartments.
- (B) The power and communication wirings shall include but not be limited to, the following components:
- (I) Power conductors for shelter heaters and controls.
  - (II) Power conductors for shelter heat tracing and controls.
  - (III) Power conductors for shelter lighting and lighting control.
  - (IV) Power conductors for shelter automatic door and operator.
  - (V) Power conductors for GFCI receptacles.
  - (VI) Power conductors for GO signage.
  - (VII) Power conductors for display case
  - (VIII) Communication cable for PA speaker
  - (IX) Communication cable for pay phone/intercom.



A Division of Metrolinx



**METROLINX**  
LINKING PEOPLE TO PLACES • ON Y VA

## CONTROLS & STANDARDS

<b>Section 13000</b>	<b>Subject:</b> Guideline Performance Specifications for Prefabricated BRT Shelters	<b>Date:</b> Jan 7, 2015	<b>Page:</b> 5 of 31
----------------------	--	-----------------------------	-------------------------

- (X) Power and Communication cables for future ticket vending machine.
- (XI) Power and Communication cables for future vending machine.
- (XII) Provision for emergency blue light and communication.

(e) Submittals

- (i) Shop Drawings: Bearing the signature and seal of the engineer responsible for the engineering design. Include construction details, plans, elevations, sections, details, and attachments to work of other Sections, material descriptions, dimensions of individual components and profiles.
  - (A) When requested, submit design loads, include structural analysis data signed and sealed by the qualified professional engineer responsible for their preparation.
- (ii) Samples: Supply Triplicate 300 mm x 300 mm panel, 300 mm linear, and individual samples fully representing physical properties, and selected finish and colours or arrange for shop inspection of the following:
  - (A) Metal framing and supporting members.
  - (B) Aluminum panels.
  - (C) Light fixtures.
  - (D) Pressure sensitive butyl tape.
  - (E) Corner of door.
  - (F) Door hardware.
  - (G) Bench.
  - (H) Glass and glazing.
  - (I) Ventilation louver.
  - (J) Map display.
  - (K) Skylight (Polycarbonate glazing).
  - (L) Ceiling Panels.
  - (M) Mock up of all key components.
- (iii) Maintenance Data: For inclusion in maintenance manuals. Provide 1 set



A Division of Metrolinx



**METROLINX**  
LINKING PEOPLE TO PLACES • ON Y VA

## CONTROLS & STANDARDS

<b>Section 13000</b>	<b>Subject:</b> Guideline Performance Specifications for Prefabricated BRT Shelters	<b>Date:</b> Jan 7, 2015	<b>Page:</b> 6 of 31
----------------------	--	-----------------------------	-------------------------

of Operation and Maintenance Manuals upon shelter commissioning.

(f) Coordination

- (i) Coordinate installation of anchorages for work of this Section. Furnish setting drawings, templates, and directions for installing anchorages, including sleeves, concrete inserts, anchor bolts, and items with integral anchors, that are to be embedded in concrete. Deliver items to site in time for installation.

(g) Electrical Co-ordination

- (i) Electrical Requirements: Coordinate the electrical and communication requirements with the other trades assembling shelter. Do wiring in strict conformity with requirements of the Ontario Electrical Safety Code and Electrical Sections. Do all electrical work to a minimum requirement of the latest Ontario Electrical Safety Code and Canadian Electrical Safety Code. All work to be done by qualified electrical personnel. All work to be inspected and approved by ESA and local authorities having jurisdiction.

(A) Work by Electrical Sections: Supply and installation of electrical enclosures, breakers, boxes, equipment, power and control of components such as: heating, lighting, receptacles etc.

(B) Work by This Section: Wiring and connection at and from equipment, breakers, junction boxes to equipment, lighting, etc. and controls, safety devices and other items requiring power.

- (ii) Employ licensed electrician to wire and interconnect all operational and safety components for the Work. Terminate wiring required for connection to control circuitry and power at NEMA 4X enclosures. Ground all control wiring. Grounding shall meet the requirements of Ontario Electrical Safety Code.

- (iii) Electrical Components, Devices, and Accessories: CSA Listed and labelled.

## 2. PRODUCTS

(a) Materials - Metals

- (i) Steel

(A) Structural Steel Shapes, Plates: CAN/CSA-G40.20/G40.21-M, Grade 350W.



A Division of Metrolinx



**METROLINX**  
LINKING PEOPLE TO PLACES • ON Y VA

## CONTROLS & STANDARDS

<b>Section 13000</b>	<b>Subject:</b> Guideline Performance Specifications for Prefabricated BRT Shelters	<b>Date:</b> Jan 7, 2015	<b>Page:</b> 7 of 31
----------------------	--	-----------------------------	-------------------------

- (B) Hollow Structural Steel Sections: CAN/CSA-G40.20/G40.21-M, Grade 350W, Class H.
- (C) Galvanized Sheet Steel: ASTM A653/A653M Grade A, Z275 Commercial Quality zinc coating.
- (ii) Stainless Steel
  - (A) Stainless Steel Shapes: ASTM A484/A484M, Type 304.
  - (B) Stainless Steel Sheet and Plate: ASTM A167, Type 304.
- (iii) Aluminum
  - (A) Aluminum Plate and Sheet: ASTM B209M, Alloy 6061-T6, anodizing quality.
  - (B) Aluminum Extrusions: ASTM B221M, Alloy 6063-T6, anodizing quality. For rolled members - Alloy 6063-T4, anodizing quality.
  - (C) Welding Rods, Aluminum: 5356 alloy.
- (b) Materials – Wood
  - (i) Wood Members, Exposed to View: No. 1 clean Maple Select or better, seasoned, straight, square and true on all four sides. Comply with minimum size and tolerances of CSA 0141. Grade-mark all wood materials. Kiln dry wood materials for interior use to a moisture content of 4% to 8%.
  - (ii) Softwood Plywood, Douglas Fir: CSA O121-M, Good One Side (G1S).
- (c) Materials – Unit Skylights
  - (i) Unit Skylight: Barrel vaulted, extruded-polycarbonate sheet with cellular cross section that provides isolated airspaces and coextruded with a UV-protective layer, medium bronze colour, min. 6mm thick Lexan Thermoclear by GE Polymershapes or equivalent with thermally broken prefinished aluminum frame, free of ridge mullions and pre-formed insulated aluminum curb with deck attachment flanges.
  - (ii) Framing: Constructed of extruded Alloy 6063-T6 or 6061-T6 aluminum shapes, continuous gaskets applied above and below the glazing, and integral condensation gutters.
- (d) Materials - Roofing And Sheet Metal
  - (i) Membrane and Membrane Flashing: Single ply roofing membrane, 1.6 mm (0.060”) thick, grey colour, suitable for fully adhered assembly,





A Division of Metrolinx



**METROLINX**  
LINKING PEOPLE TO PLACES • ON Y VA

## CONTROLS & STANDARDS

<b>Section 13000</b>	<b>Subject:</b> Guideline Performance Specifications for Prefabricated BRT Shelters	<b>Date:</b> Jan 7, 2015	<b>Page:</b> 8 of 31
----------------------	--	-----------------------------	-------------------------

largest single sheet possible.

- (ii) Tapered Insulation: CAN/CSA-A247-M, wax impregnated fibreboard, taper cut to provide slopes indicated, on computer controlled machine and sequence packed with detailed installation instruction, minimum 13 mm (1/2”) thick.
  - (iii) Roof Drains: Manufacturer’s standard.
  - (iv) Adhesives, Cements, Bonding Agents, Sealant, Sealer, Primer and Tapes: Manufacturer standard for intended end use.
  - (v) Metal Edging and Membrane Terminations: Manufacturer standard for intended end use.
  - (vi) Flashing and Trim Sheet Metal: Minimum 24 gauge core thickness, zinc coating Z275, ASTM A526M commercial quality sheet, stretcher levelled or temper rolled to stretcher level standard of flatness. Prepainted to Stelcolour 8000 by Stelco Inc., or Dofasco System 8000 by Dofasco Inc. where exposed to view.
- (e) Materials - Aluminum Panels
- (i) Extruded Aluminum Roof Edge, Fascia, Soffit and Ceiling Panels: Prefinished, plate aluminum alloy 3105-H14 or 3003-H14, minimum 18ga nominal thickness, reinforced, corners welded and ground smooth. Prefinish exposed to view aluminum surfaces in high performance fluoropolymer finish. Provide necessary closures, flashings, drips and trims, sealed to stop direct weather penetration.
  - (ii) Ceiling Panels: Interlocking ceiling aluminum soffit 16” 2 Panel- Gentek product with vendor standard “ Dover Gray “ finish or equivalent.
  - (iii) Flashings, Trims and Closures: Prefinish aluminum of core thickness and finish to match panels.
  - (iii) Panel Support Girts, Suspension, Clips and Brackets: Hot dipped galvanized steel, stainless steel, or aluminum of required core thickness to meet design requirements, profile conforming to curvature of panels.
- (f) Materials - Glass and Glazing
- (i) Tempered Safety Glass: CAN/CGSB-12.1 Type 2, Class B, heat treated using the horizontal tong free method, with roll-wave distortion parallel to bottom edge of glass as installed.
  - (ii) Polycarbonate Glazing: Translucent, extruded-polycarbonate sheet with





A Division of Metrolinx



**METROLINX**  
LINKING PEOPLE TO PLACES • ON Y VA

## CONTROLS & STANDARDS

<b>Section 13000</b>	<b>Subject:</b> Guideline Performance Specifications for Prefabricated BRT Shelters	<b>Date:</b> Jan 7, 2015	<b>Page:</b> 9 of 31
----------------------	--	-----------------------------	-------------------------

cellular cross section that provides isolated airspaces and coextruded with a UV-protective layer, medium bronze colour, Lexan Thermoclear by GE Polymershapes or equivalent.

- (iii) Glazing Gaskets: Neoprene, EPDM, thermoplastic or other approved material, of sufficient thickness to be 25% compressed when installed. Gaskets shall have a 13.8 MPa (2000 psi) tensile strength, Durometer A hardness of 50, plus/minus 5, resistance to permanent set 30% maximum, minimum elongation at break of 300% and resistance to ozone showing no cracks.
- (iv) Glazing Tape: Pre-shimmed, extruded, ribbon shaped, non-drying, non-skinning, non-oxidizing polyisobutylene tape with continuous synthetic rubber spacer rod, sufficiently wide and thick as to completely cover bite area of glazing unit when unit is pushed into place.
- (v) Shims, Spacers and Setting Blocks: 45, 50 and 90 Durometer A hardness plus/minus 5 respectively, neoprene rubber. Resistance to sunlight, weathering, oxidation and permanent deformation under load shall be prime essentials of shims, spacers and setting blocks.

(g) Materials – Door Hardware

- (i) Retain services of an Architectural Hardware Consultant (AHC) for preparation of hardware shop drawings, keying, consultation with the Engineer and for on-site inspections.
- (ii) Inspect installed hardware by the manufacturer's representative who shall certify in writing to the Owner, that hardware has been supplied and installed in accordance with the specifications and reviewed shop drawings, and are functioning properly.
- (iii) Include in the work of this Section assistance and supervision when requested, to ensure correct installation.
- (iv) Safeguard keys out of unauthorized hands. Hand deliver keys to Owner at Substantial Performance.
- (v) Door Hardware

All doors shall have keyed cylinder locks on exterior side only. Interior side to be blank cover dummy cylinders (no thumb latches).

Supply to each leaf one maximum security deadlock with lateral bolt swing.

There are only external cylinders on these deadlocks.



A Division of Metrolinx



**METROLINX**  
LINKING PEOPLE TO PLACES • ON Y Y A

## CONTROLS & STANDARDS

<b>Section 13000</b>	<b>Subject:</b> Guideline Performance Specifications for Prefabricated BRT Shelters	<b>Date:</b> Jan 7, 2015	<b>Page:</b> 10 of 31
----------------------	---	-----------------------------	--------------------------

Lock type AR MS18500A – 24.6mm BS. Cylinder type – Corbin 525A x Russwin 6D4 or 6D2 Keyway x 29mm – C26D

Keying shall be as follows:

- (a) All Stainless Steel cylinders subject to Line Grand Master Key.
- (b) All Stainless Steel cylinders subject to Station Master Key; and;
- (c) Shelter doors - keyed alike.

All keys and cylinders shall be full visual key code stamped on key bow and cylinder face with two service keys for each enclosure. DO NOT SUPPLY ANY COPIES OF GMK.

Provide S.S blank cover plates for cylinders and turn cylinders over to Owner.

All door hardware shall comply with Barrier Free Design Standard CAN/CSA-B651-M90, Article 4.2.6., Door Hardware.

Hinges: all exterior doors shall be provided with top to bottom continuous hinge. Continuous hinges must be made of 14 gauge, Type 304 stainless steel and be full mortise application. Hinge type Markar FM300 or approved equal.

Door closer: Top line product, heavy duty, single armed, overhead concealed, 180 degree opening, maximum required force for pushing or pulling to be 38N, delay closing feature to meet Barrier Free Design Standard requirements.

- (a) Equipped with a push bar on the push side only. It shall be Alumicor type #221 or equivalent, clear anodised for the full width of the door. The shop drawings shall show the push bar, type, size, connections, etc.
- (b) Equipped with a door pull on the pull side of the door. It shall be Alumicor type #220 or equivalent, clear anodised, 300 mm high pull. The shop drawings shall show the door pull, type, size, connection details, etc.

Locking devices for all shelter doors: supply to each leaf one maximum security deadlock with lateral bolt swing. There are external cylinders on these deadlocks. Supply blank cover on interior. Lock type AR MS18500A - 24.6 mm BS. Cylinder type - Corbin 525A x Russwin 6D4 or 6D2 Keyway x 29 mm - C26D. Turn over to Owner and provide blank cover plates. Cylinders to be keyed alike.



A Division of Metrolinx



**METROLINX**  
LINKING PEOPLE TO PLACES • ON Y VA

## CONTROLS & STANDARDS

<b>Section 13000</b>	<b>Subject:</b> Guideline Performance Specifications for Prefabricated BRT Shelters	<b>Date:</b> Jan 7, 2015	<b>Page:</b> 11 of 31
----------------------	--	-----------------------------	--------------------------

Door controls: all doors to be fitted with overhead concealed channel type door stay and holder. Size as required. Type: Rixson 1-400 Series or approved equal.

Weatherseal: Provide weatherseal to head and jambs of all exterior doors. Door seal to be aluminum with sponge neoprene min. 6 mm thick, width to suit frame stop. Type: Canada threshold W14. Door sweeps shall be brush type: W24S.

Kick plate: provide stainless steel kickplate on the push side of each door. The kick plate shall be 1.63 mm thick, 150 mm high for the full width of the door.

Door hold-open and stop: provide Stainless Steel approved positive locking hold-open device mounted at safety bar and door as shown on drawing. Provide approved door stop, mounted with door hold-open device.

(vi) Automatic Door Operator:

ANSI 156.19, surface mount, full housing, power open and spring close, complete with CSA labelled electro mechanical motor, operating temperature between -34 deg C and 71 deg C, maximum un-assisted opening force of 38 N.

(a) Activation Push Buttons: Exterior mounted on guard rail and Interior mounted on support column; 100x45 mm stainless steel plate, complete with international barrier free logo and standard warning label. Tamper resistant security fasteners.

(b) Key Switch: Single pole double throw switch to accept mortise cylinder, to de-activate the operator in hold-open or close position. Mount switch on 3 mm thick aluminum narrow gang plate.

(h) Materials - Electrical

(i) General: Bearing CSA or Electrical Safety Authority inspection approval.

(ii) Grounding: Provide a grounding system to the authorities (ESA and Metrolinx's) approval. Grounding shall meet the requirements of Ontario Electrical Safety Code.

(iii) Wiring: TW90, RW90, TWU90, TECK90, RWU90, AC90 (X-LINK), sized for 75 deg C

(A) Conductors: Copper with 1000 volt insulation, unless noted otherwise. Heater wiring shall be as a minimum temperature rated as per the manufactures recommendation and terminated with



A Division of Metrolinx



**METROLINX**  
LINKING PEOPLE TO PLACES • ON Y VA

## CONTROLS & STANDARDS

<b>Section 13000</b>	<b>Subject:</b> Guideline Performance Specifications for Prefabricated BRT Shelters	<b>Date:</b> Jan 7, 2015	<b>Page:</b> 12 of 31
----------------------	--	-----------------------------	--------------------------

appropriate connectors and tape.

- (B) Provide fish wire in all conduits.
- (C) All wire underground to be direct buried rated. No splices are allowed below grade.
- (iv) Conduits: Exposed conduits not permitted.
  - (A) Unburied Conduit: Rigid galvanized or rigid PVC as permitted by code unless stated otherwise.
  - (B) Direct Buried Conduit: Rigid PVC conduit with ground, as permitted by code.
  - (C) Concrete Encased Conduit: Rigid PVC conduit with ground, as permitted by code.
  - (D) Rigid hot dipped, galvanized Epoxy or PVC coated.
  - (E) Expansion Couplings: Purpose built, for conduits cross construction and expansion joints.
  - (F) Lighting And Power Circuit Conduits: Minimum 21 mm diameter inside shelter unless otherwise stated. Between handholes 53 mm.
  - (G) Buried Conduit Or Conduit Embedded In Concrete: Minimum 25 mm diameter.
- (v) Conduit, Cable or Equipment Supports: Concealed, corrosion resistant metal or preserved wood. Where cutting of support materials is required, treat cut ends to maintain suitable protection from deterioration.
- (vi) Lighting Fixtures and Lamps LED: Easily maintained, gasketed water and vandal resistant. Support outlet and junction boxes independently of conduits running to them. Fixtures controlled by photocell and H-O-A select switch in a lockable box.
  - (A) H-O-A Select Switch: Complete with auxiliary contact and mounted on the Service supply cabinet to control all shelter and local area lighting.
  - (B) Photocell: Rated for operation at 120V, 1200 W capacity, -40°C to +40°C operating temperature range, SPST normally closed contact. Lockable PVC or Fibreglass box with replaceable hinges and clasps which house the control enclosure, suitable for mounting on 19 mm conduit nipple.



A Division of Metrolinx



**METROLINX**  
LINKING PEOPLE TO PLACES • ON Y VA

## CONTROLS & STANDARDS

<b>Section 13000</b>	<b>Subject:</b> Guideline Performance Specifications for Prefabricated BRT Shelters	<b>Date:</b> Jan 7, 2015	<b>Page:</b> 13 of 31
----------------------	--	-----------------------------	--------------------------

- (C) Lighting Contactors: Electrically held complete with enclosure and control transformer.

Provide complete lighting fixtures and lamps, as designated in the fixture schedule. Support light fixtures independently of ceiling suspension systems. Support outlet and junction boxes independently of conduits running to them.

Use No. 4 Tenso Pattern Coil chain galvanized plated, with a rated strength of 180 lbs. (800 N) as manufactured by Dominion Chain Co. or equivalent. Use No. 6 'S' type hook with a rated strength of 180 lbs. (800 N).

- (D) All lighting contactors to be Square D No. 8903 series or approved equal, electrically held, complete with enclosure and control transformer. Switch shall have contacts to suit. Provide photocell and Hand-off-auto switch to suit installation. Provide a programmable controller timer as made by Siemens, Square D or approved equal, complete with an variable Day light

- (vii) Outlet Boxes, Pull Boxes, Junction Boxes, Terminal Boxes: CSA approved, listed, labelled and comply with OESC requirements NEMA 4X, complete with suitable securing lugs, conduit connectors, knockouts, escutcheons, covers and any other required accessory. All boxes and fitting to maximum finish of conduit system used.

- (A) Duplex Power Receptacles: 120V GFCI with aluminum face plate gasketed and rated for outside applications.

- (B) Surface Mounted Boxes: FS type, solid construction.

- (C) Boxes With Both Power and Communication Outlets: Barrired.

- (D) Boxes for Submergence: Bearing submersible rating with all fittings designed and installed to prevent the entry of water.

- (viii) Accessories: Fittings, drains, plugs, cover plates, bushings, clips, rods and accessories as required and appropriate.

- (ix) Electric Radiant Heater (as required by tender documents): CSA approved and shall bear CSA or Electrical Safety Authority certified organization accredited by Standard Council of Canada.

Each unit shall be safety guard fitted, waterproof, shortwave infrared type, suitable for outdoor use, industrial and commercial applications. Safety



A Division of Metrolinx



**METROLINX**  
LINKING PEOPLE TO PLACES • ON Y Y A

## CONTROLS & STANDARDS

<b>Section 13000</b>	<b>Subject:</b> Guideline Performance Specifications for Prefabricated BRT Shelters	<b>Date:</b> Jan 7, 2015	<b>Page:</b> 14 of 31
----------------------	--	-----------------------------	--------------------------

guard, anodized aluminum reflector and built-in adjustable directional system components shall be factory assembled. All components shall be corrosion resistant.

Heating element(s) shall be:

- (A) tubular quartz with tungsten coil and shall be glare reducing,
- (B) thermal shock resistant for outdoor use, and
- (C) able to withstand vibrations typically encountered on rail platforms (averaging 3.4 mm/s). Thermal shock and Vibration testing shall be conducted by an independent qualified third party.

System power to include the following features:

- (A) Heaters shall be suitable for operation with 120V/208V/240V AC, single phase, and 60 Hz electrical service. Recommended power is 3000W per heater at 208V service.
- (B) Shelter power distribution conductors shall terminate in a NEMA 4X lockable enclosure, complete with backboard. All terminations shall end on a terminal block inside enclosure. All power sources shall have local breaker disconnects.
- (C) Ground fault interrupt breakers are required for each heater circuit.
- (D) Power conductors to be underground rated.
- (E) Wiring shall meet radiant heater temperature specification.
- (F) All exposed conduit, junction boxes and fittings shall be rigid galvanized steel PVC or epoxy coated.
- (G) Liquid-tight conduit and Armored (AC) cables are acceptable only if they are mounted inside existing structural members. Use weatherproof fittings.

System controls to include following features:

- (A) Each radiant heater shall be independently turned on by its own remote momentary push button (button colour green, recessed type, heavy duty, Allan-Bradley, Siemens or approved equal).
- (B) Thermostat: remote bulb type.

**SPEC NOTE:** Use percentage input timer for metal sheath infrared heaters only.

- (C) Each shelter heater shall be controlled by a PLC or an adjustable timer that allows 10 minutes of heating at a time if the ambient temperature is below 10°C. The controls are to be designed in such a way as to prevent operation should the push button be jammed in



# CONTROLS & STANDARDS

<b>Section 13000</b>	<b>Subject:</b> Guideline Performance Specifications for Prefabricated BRT Shelters	<b>Date:</b> Jan 7, 2015	<b>Page:</b> 15 of 31
----------------------	--	-----------------------------	--------------------------

the position. No 347 V in shelters.

- (D) Heater shall be suspended by chains or threaded rods. Heaters shall be installed at a minimum height of 2440mm (8') from the underside of the heater to finished floor. The radiation angle should be between 60 and 75 degrees.  
Approved manufacturers: Chromalox, Ouellet, Caloritech and Solaira Heaters or approved equivalent.
- (E) Each heater shall be provided with its own controls complete with a local momentary push to start. If more than one radiant heater is used in a shelter, each heater to be independently controlled by its own push button.
- (F) Ground fault interrupt breakers are required for each heater circuit.
- (G) Heater controls shall be in 120V or less.
- (x) Heat Tracing Cable and Termination Components: ULC Listed as Deicing and Snow-melting Equipment and CSA Certified as Designation 1B, 2B.

SPEC NOTE: Most heating cables are not 347V rated.

- (A) Heating Cable: Two nickel-coated-copper bus wires embedded in parallel in a self-regulating polymer core, covered by a crosslinked dielectric jacket and protected by a tinned-copper braid and outer jacket, operating on 208, 240volts without the use of transformers, complete with suitable thermostats, variable power output in response to temperature all along its length, allowing the heating cable to be crossed over itself without overheating, cut to length in the field, and to have no heater-to-cold-lead connections buried in the pavement.
- (B) Circuit Protection: Ground fault interrupt breaker or receptacle circuit protection are required for all circuits.
- (xi) P.A. Speaker: Refer to Metrolinx DRM for hardwire and accessory requirements.

(i) Materials – Paints And Finishes

- (i) Manufacturers and Products: Listed under the Approved Product List (APL) section of the MPI Painting Manual.





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## CONTROLS & STANDARDS

<b>Section 13000</b>	<b>Subject:</b> Guideline Performance Specifications for Prefabricated BRT Shelters	<b>Date:</b> Jan 7, 2015	<b>Page:</b> 16 of 31
----------------------	--	-----------------------------	--------------------------

- (ii) Use lead and mercury free products with low VOC content.
- (iii) Use only materials having a minimum MPI Environmentally Friendly E3 rating based on VOC (EPA Method 24) content levels.
- (iv) The Engineer will select colors from a manufacturer's full range of colors.
- (j) Installation - Materials And Accessories
  - (i) Fasteners: Bolts, nuts, washers, rivets, lock washers, anchor bolts, machine screws and machine bolts.
    - (A) For Joining Steel Components: Hot dipped galvanized to CSA G164.
    - (B) For Joining Stainless Steel Components: Type 304 stainless steel.
    - (C) For Joining Aluminum Components: Type 304 stainless steel.
    - (D) For Joining Dissimilar Metal Components: Type 304 stainless steel.
  - (ii) Primer Paint: CISC/CPMA 2-75.
  - (iii) Galvanized Primer Paint: Organic zinc rich primer. For galvanized fabrications where touchup is to remain unpainted in finished work: Inorganic zinc rich primer, Galvafruid by W.R. Meadows of Canada Ltd.
  - (iv) Grout: Non-shrink, non-metallic, flowable, 24h, 15 MPa, pull-out strength 7.9 MPa.
  - (v) Drilled Anchors: Mega by ITW Construction Products or HAS/RE-500 by Hilti Inc. heavy-duty anchors, sizes to suit.
  - (vi) Sealant: Non-yellowing, non-bleeding, non-migrating, capable of supporting its own weight, one component silicone base, intended for specific end use, colour to match colour of substrates.
    - (A) Horizontal Joints: Self levelling.
    - (B) Vertical and Overhead Joints: Non-sag.
  - (vii) Isolation Coating: Acid and alkali resistant.
  - (viii) Self-Adhering Decals: Pressure-sensitive, non-facing, with clear, colourless, non-yellowing adhesive, in design provided by Owner.
  - (ix) Above Door Ventilation Louver: 50% free area, flush mount, prefinished aluminum louver and retention framing, bird screen.



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## CONTROLS & STANDARDS

<b>Section 13000</b>	<b>Subject:</b> Guideline Performance Specifications for Prefabricated BRT Shelters	<b>Date:</b> Jan 7, 2015	<b>Page:</b> 17 of 31
----------------------	--	-----------------------------	--------------------------

- (k) Fabrication – Structural Framing
- (i) Integrated set of mutually dependent components that form a completely assembled shelter, ready for site installation. Include structural framing, roof and wall panels, and accessories.
  - (ii) Structural Framework: Fabricated from tubing, channel, angle, I beam or tee extrusions. Connect framework with mechanical fasteners or welding.
- (l) Fabrication - Entrances
- (i) Preparation for Hardware: Drill and cut to template for hardware. Reinforce frames and door stiles to receive hardware in accordance with manufacturer's recommendations.
  - (ii) Arrange fasteners and attachments to conceal from view.
  - (iii) Accurately fit and secure joints and corners. Make joints hairline in appearance.
  - (iv) Prepare components with internal reinforcement for door hardware.
  - (v) Door Frame
    - (A) Fabricate and assemble units with joints only at intersection of aluminum members with uniform hairline joints; rigidly secure, and sealed in accordance with manufacturer's recommendations.
  - (vi) Doors
    - (A) Corner Construction: Mechanical clip fastening, sigma deep penetration plug welds and 30 mm long fillet welds inside and outside of all four corners
    - (B) Glazing Stops: Manufacturer's standard snap-in glazing stops with EPDM glazing gaskets. Factory glaze doors with clear tempered glass.
- (m) Fabrication - Metal Flashing And Trims
- (i) Fabricate metal flashings, coping, rain water leaders and other sheet metal work to details shown. Form pieces in 2400 mm (8') maximum lengths. Make allowance for expansion at joints.
  - (ii) Hem exposed edges on underside 13 mm (1/2"). Miter and seal corners with sealant.
  - (iii) Form sections square, true and accurate to size, free from distortion and other defects detrimental to appearance or performance.



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## CONTROLS & STANDARDS

<b>Section 13000</b>	<b>Subject:</b> Guideline Performance Specifications for Prefabricated BRT Shelters	<b>Date:</b> Jan 7, 2015	<b>Page:</b> 18 of 31
----------------------	--	-----------------------------	--------------------------

(iv) Apply isolation coating to metal surfaces to be embedded in concrete or mortar.

(n) Fabrication - Benches

(i) Seats: Form continuous slats for benches #1 clean Maple select or better, D4S, straight and free of splits and with eased edges. Each piece to be clean cut each end, true and square, all pieces the same length +/-2 mm for each specific bench in equal lengths for each bench.

(ii) Arm Rests: 38 mm diameter aluminum pipes at 587 mm centres. Securely connect work to resist minimum 1.3 kN force vertically or horizontally.

(iii) Benches shall be inspected by Engineer on the premises prior to shipping.

(o) Fabrication - Sign Boxes

(i) Fabricate illuminated sign boxes of pre-finished extruded aluminum and display case.

(A) Design, construct and reinforce sign boxes and display case to provide strong, rigid, self-supporting, weathertight and light-tight housing to accommodate sign faces and electrical components. Use one piece casing lengths.

(ii) Provide access for installation, maintenance, and re-lamping, through hinged access panel having concealed latches to prevent unauthorized access.

(iii) Provide conceal mounting hardware for installation. Exposed materials to match sign boxes and casing.

(iv) Sign Face: Fabricate sign faces of min. 4.5mm (3/16") thick Solar grade UV protected translucent white. Polycarbonate sheet suitable for intended use in sign fabrication, colours as indicated. Apply self-adhering vinyl film graphics.

(A) Support sign face along top, leaving sides and bottom floating to permit unrestricted thermal movement.

(v) Sign displays shall be LED illuminated.

(p) Welding



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## CONTROLS & STANDARDS

<b>Section 13000</b>	<b>Subject:</b> Guideline Performance Specifications for Prefabricated BRT Shelters	<b>Date:</b> Jan 7, 2015	<b>Page:</b> 19 of 31
----------------------	--	-----------------------------	--------------------------

- (i) Execute welding to avoid damage or distortion to work. Execute welding in accordance with following standards:
  - (A) CSA W48: For welding materials. If rods are used, only coated rods are allowed.
  - (B) CSA W59 Series: For design of connections and workmanship.
  - (C) CAN/CSA W117.2: For safety.
- (ii) Thoroughly clean welded joints and expose metals for a sufficient distance to perform welding operations.
- (iii) Test welds for conformance and remove work not meeting specified standards and replace to Engineer's acceptance.
- (iv) Continuous weld all joints for the full length of each joint. Finish exposed welds smooth and flush, file or grind as required.
- (q) Hot Dip Galvanizing
  - (i) Hot dip galvanize, after fabrication, steel metal fabrication items. Straighten shapes and assemblies true to line and plane after galvanizing. Repair damaged galvanized surfaces with brush or spray-applied anti-corrosion coating containing 92-95% zinc, in accordance with manufacturer's printed directions.
    - (A) Members exposed to elements when in final location.
    - (B) Members embedded on exterior side of exterior walls.
    - (C) Members imbedded in concrete.
    - (D) Members specified in this Section or indicated on Drawings.
  - (ii) Hot-dip galvanize members in accordance with CAN/CSA G164 and requirements of the following ASTM standards, with minimum coating weights or thicknesses as follows:
    - (A) Rolled, Pressed and Forged Steel Shapes, Plates, Bars and Strips: ASTM A123/A123M; average weight of zinc coating of actual surface
      - (I) 4.8 mm and less member thickness: 600 g/sq.m.
      - (II) 6 mm and heavier members: 640 g/sq.m.
    - (B) Iron and Steel Hardware: ASTM A153/A153M; minimum weight of zinc coating, in gram per square meter of surface for the various



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**METROLINX**  
LINKING PEOPLE TO PLACES • ON Y VA

## CONTROLS & STANDARDS

<b>Section 13000</b>	<b>Subject:</b> Guideline Performance Specifications for Prefabricated BRT Shelters	<b>Date:</b> Jan 7, 2015	<b>Page:</b> 20 of 31
----------------------	--	-----------------------------	--------------------------

classes of materials used in the Work.

(r) Aluminum Finishes

- (i) Pre-finish exposed to view aluminum surfaces. Ensure aluminum finish is free from blemishes or scratches and uniform in colour and sheen. Pre-treat aluminum and apply primer and finish coats in accordance with manufacturer's instructions.
- (ii) Clear Anodic Finish: AA-M12C22A41, as fabricated non-specular mechanical finish, medium matte etched chemical finish, architectural class I clear anodic coating of minimum 0.018 mm thick complying with AAMA 611.
- (iii) Colour Anodic Finish: AA-M12C22A42/A44, as fabricated non-specular mechanical finish, medium matte etched chemical finish, architectural class I, integrally coloured or electrolytically deposited color coating of minimum 0.018 mm thick complying with AAMA 611. Color as selected by Engineer from full range of industry colours and colour densities.
- (iv) Baked Enamel, Two Coat: AAMA 2603, high performance fluoropolymer, thermocured system consisting of specially formulated inhibitive primer and fluoropolymer color topcoat containing not less than 70% polyvinylidene fluoride resin by weight.
- (v) Baked Enamel, Three Coat: AAMA 2603, high performance fluoropolymer, thermocured system consisting of specially formulated inhibitive primer, fluoropolymer color coat, and fluoropolymer clear top coat, colour and top coats containing not less than 70% polyvinylidene fluoride resin by weight.
- (vi) Powder Coat Finish: Components to receive a baked on painted finish “Duramar XL” by PPG or equivalent over full multi-stage chlorine free pretreatment process. Powder coating to be applied with a minimum 12 gun automatic electrostatic spray gun. Finish shall be in exterior quality powder coating applied in accordance with AAMA 2603-02, selection to be available in standard RAL colors, thickness 2+mils, gloss +/- 5 degrees per technical data

(s) Stainless-Steel Finishes

- (i) Polish Finish: Apply finish after fabrication. Remove tool and die marks and stretch lines or blend into finish. When polishing is completed, passivate and rinse surfaces. Remove embedded foreign matter and leave surfaces chemically clean.



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**METROLINX**  
LINKING PEOPLE TO PLACES • ON Y VA

## CONTROLS & STANDARDS

<b>Section 13000</b>	<b>Subject:</b> Guideline Performance Specifications for Prefabricated BRT Shelters	<b>Date:</b> Jan 7, 2015	<b>Page:</b> 21 of 31
----------------------	--	-----------------------------	--------------------------

- (A) Nondirectional Polish: AISI No. 8 mirror like reflective finish.
- (B) Directional Polish: AISI No. 4 bright satin finish. Grind and polish surfaces to produce uniform, directionally textured, polished finish, free of cross scratches. Run grain with long dimension of each piece.
- (ii) Bright, Cold-Rolled, Unpolished Finish: No. 2B finish.
- (t) Shop Finishing
  - (i) Prepare surfaces and shop finish work in accordance with paint manufacturer and MPI Premium Grade requirements for intended substrates.
    - (A) Do work by skilled trades persons, to manufacturer's directions. Apply paint only when dust-free conditions prevail. Results shall be even, uniform in sheen, colour and texture; free from brush or roller marks, or other defects.
  - (ii) Finishing Systems:
    - (A) Finish surfaces in accordance with MPI Painting Manual requirements.
    - (B) Steel Components: EXT 5.1L, pigmented polyurethane finish over inorganic zinc primer and high build epoxy.
  - (iii) Sand, clean, dry, etch, neutralize and test surfaces under adequate illumination, ventilation and temperature requirements.
  - (iv) Seal component joints and crevices with paintable sealants prior to finishing.
  - (v) Reduce materials only when indicated by paint manufacturer. Reduce only with approved thinner.
  - (vi) Tint each coat of finish progressively darker to enable confirmation of number of coats.
  - (vii) Work specified is intended to cover surfaces satisfactorily when applied at proper consistency and in accordance with manufacturer's recommendations. If the Contractor is of the opinion that the specified materials will not provide uniform coverage, report in writing to the Engineer, before commencing the work. If surfaces finished are not covered satisfactorily to the Engineer' opinion, apply additional coats at



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**METROLINX**  
LINKING PEOPLE TO PLACES • ON Y Y A

## CONTROLS & STANDARDS

<b>Section 13000</b>	<b>Subject:</b> Guideline Performance Specifications for Prefabricated BRT Shelters	<b>Date:</b> Jan 7, 2015	<b>Page:</b> 22 of 31
----------------------	---	-----------------------------	--------------------------

no additional cost.

### 3. EXECUTION

#### (a) Installation - General

- (i) Set work plumb, aligned, level and true to plane with full bearing on supports, to manufacturer's instructions.
- (ii) Fasten shelter to cast-in anchor bolts or to concrete bases with epoxy anchors.
- (iii) Connect electrical power service to power distribution system in accordance with the project electrical requirements.
- (iv) All electrical material shall be specification grade, where applicable, new and carry CSA approval or special ESA inspection approval.
- (v) Similar devices and items shall be from one manufacturer throughout the project
- (vi) Modifications to existing equipment shall be made using manufacturers approved parts and installation methods.
- (vii) Securely display units, entrance guardrails, benches and ventilation louvers.

#### (b) Installation – Unit Skylights

- (i) Install work level, plumb, square, accurately aligned, correctly located, and without warp or rack.
- (ii) Do not force units into place, nor superimpose on them loads for which they were not designed.
- (iii) Anchor work securely in place to supports to resist all loads. Use attachment methods permitting adjustment for construction tolerances, irregularities, alignment, and expansion and contraction.
- (iv) Provide for thermal movement to take place between units and adjacent construction.
- (v) Isolate with protective barrier contact areas between aluminum and dissimilar metals.
- (vi) Install skylights including flashing, fasteners, hardware, sealants, gaskets,





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## CONTROLS & STANDARDS

<b>Section 13000</b>	<b>Subject:</b> Guideline Performance Specifications for Prefabricated BRT Shelters	<b>Date:</b> Jan 7, 2015	<b>Page:</b> 23 of 31
----------------------	--	-----------------------------	--------------------------

and glazing materials required for a complete, weatherproof installation.

(A) Seal joints to provide a weathertight assembly, and in accordance with sealant manufacturer's specifications.

(c) Installation – Roofing and Sheet Metal

- (i) Mechanically fasten sheathing to roof structure. Stagger end joints.
- (ii) Fasten tapered insulation to form positive drainage to drain.
- (iii) Position roofing sheets to accommodate contours of the roof structure and shingle splices to avoid bucking water.
- (iv) Unroll and position sheets without stretching. Allow the membrane to relax for approximately 1/2 hour before bonding. Fold the sheet back onto itself so half the underside of the membrane is exposed.
- (v) Exercise care to position membrane sheets. Locate field splices away from low spots and out of drain sumps. Shingle splices to prevent bucking of water.
- (vi) Apply bonding adhesive full coverage to both the underside of the membrane and the substrate.
- (vii) Roll the coated membrane into the coated substrate while avoiding wrinkles. Brush down the bonded half of the membrane sheet with a soft bristle push broom to achieve maximum contact.
- (viii) Fold back the unbonded half of the membrane sheet and repeat the bonding procedure.
- (ix) Install adjoining membrane sheets in the same manner, overlapping edges approximately 100 mm (4"). Do not apply bonding adhesive to the splice area.
- (x) Membrane Splicing: Apply to roofing manufacturer standard.
- (xi) Daily Seal: When the completion of work is not achieved by the end of the work day, provide a daily seal to temporarily close the membrane to prevent water infiltration, using manufacturer's sealers or other acceptable membrane seal in accordance with the manufacturer's requirements.
- (xii) Continue the roof membrane as wall flashing where practicable. Follow manufacturer's typical flashing procedures for all wall, curb, and penetration flashing including metal edging/coping and roof drain applications.
- (xiii) Roof Drains and Drain Flashing: Set roof drains to a water-tight



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**METROLINX**  
LINKING PEOPLE TO PLACES • ON Y VA

## CONTROLS & STANDARDS

<b>Section 13000</b>	<b>Subject:</b> Guideline Performance Specifications for Prefabricated BRT Shelters	<b>Date:</b> Jan 7, 2015	<b>Page:</b> 24 of 31
----------------------	--	-----------------------------	--------------------------

installation. Carry flashing down into sump to edge of drain fitting. Embed flashing flange in full bed adhesive or pourable sealer. Extend flashing 200 mm (8") beyond drains onto roof membrane.

(xiv) Install sheet metal work in accordance with CRCA specifications, using concealed fastenings except where approved before installation.

(A) Counterflash membrane flashings at intersections of roof with vertical surfaces and curbs. Flash joints using S-lock forming tight fit over hook strips.

(B) Lock end joints and caulk with sealant.

(d) Installation – Aluminum Panels

(i) Install work plumb, level with intersecting parts joined together to provide tight, accurately fitted joints with adjoining surfaces in true planes. Attach components in manner not restricting thermal movement.

(ii) Fasten panels cladding to supports with concealed fasteners where possible and at spacings to suit loading requirements. Sealed side and lap joints.

(iii) Align panels end-to-end to provide accurate fit with corresponding sections parallel and straight. Locate joints directly over supports.

(iv) Cut and flash openings. Provide necessary closures, flashings, drips and trims, sealed to stop direct weather penetration.

(v) Seal junctions with adjoining work with sealant. Apply and cure sealant in accordance with manufacturer's instructions.

(e) Installation - Signage

(i) Erect and secure signs plumb and level using Stainless Steel fasteners.

(f) Installation – Glass And Glazing

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

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

(iii) Without limitations, cracked or scratched glass, shrinking, cracking, staining, hardening, sagging of glazing materials; loosening or rattling of



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**METROLINX**  
LINKING PEOPLE TO PLACES • ON Y VA

## CONTROLS & STANDARDS

<b>Section 13000</b>	<b>Subject:</b> Guideline Performance Specifications for Prefabricated BRT Shelters	<b>Date:</b> Jan 7, 2015	<b>Page:</b> 25 of 31
----------------------	--	-----------------------------	--------------------------

glass; leaking of glazed joints will be rejected.

- (iv) Use setting blocks and spacers as required to properly support glass, centred in place in the glazing space independent of the materials and to uniformly distribute its load, with uniform bite and face and edge clearance, free from twist, warp or other distortion likely to develop stress.
  - (A) Use a minimum of 2 setting blocks, located at the quarter points.
  - (B) Locate spacers at jamb edges of glass, uniformly spaced at 600 mm o.c. maximum, and 300 mm maximum from top and bottom.
- (v) Assess coloured glass units for colour uniformity and arrange to avoid abrupt variation in appearance.
- (vi) Leave labels on glass until it has been set and inspected and approved. Leave glass whole and without cracks, scratches or other defects and with setting in perfect condition at completion, to the approval of the Engineer.
- (vii) Remove rejected, broken or damaged glass due to defective materials or improper setting and replace with perfect materials. Units producing distorted vision will be rejected and replaced at the reasonable discretion of the Engineer.
- (viii) Seal glass-to-glass joints with sealant.
- (ix) Apply decals to all wall glazing panels, and doors free of wrinkles, air bubbles and other defects.
- (g) Installation - Electrical
  - (i) Install, program, set-up and adjust all equipment as indicated and/or required and complete all commissioning.
  - (ii) In locations where there are no existing services, design and install all necessary underground duct banks to and from a new metering / distribution / communication stainless steel cabinet. The power / communication cabinet shall have a minimum of least two compartments one for power and its distribution / control and one for the communication equipment including telephone. A complete grounding system shall be provided. The cabinet compartments will be individually lockable and suitable for the applications.
  - (iii) Service equipment and other relevant systems to be rated for 100% loading. select breaker and or fuse types to ensure optimum selective co-ordination.



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LINKING PEOPLE TO PLACES • ON Y VA

## CONTROLS & STANDARDS

<b>Section 13000</b>	<b>Subject:</b> Guideline Performance Specifications for Prefabricated BRT Shelters	<b>Date:</b> Jan 7, 2015	<b>Page:</b> 26 of 31
----------------------	--	-----------------------------	--------------------------

- (iv) Provide all grounding to the authorities' approval.
- (v) Wiring shall be TW90, RW90, TWU90, TECK90, RWU90, AC90 (X-LINK), sized for 75 deg C.  
  
All conductors, unless specifically noted otherwise, shall be stranded copper with 1000 Volt insulation. The minimum size of conductor allowed is # 12 AWG.
- (vi) Unburied conduit shall be rigid galvanized epoxy coated steel or rigid pvc as permitted by code unless stated otherwise.
- (vii) Direct buried conduit shall be rigid PVC conduit with ground, as permitted by code. Concrete encased conduit may be PVC DB2 conduit with ground, as permitted by code. Seal Tight conduit shall be used to connect motors and other vibrating equipment, minimize runs.
- (viii) Minimum conduit size for lighting and power circuits shall be 21 mm (3/4") unless otherwise stated. All buried conduit or conduit embedded in concrete shall be minimum 50 mm diameter. Conduits to be concealed, where possible. Supply and install expansion couplings where conduits cross construction joints.
- (ix) No underground splices are permitted.
- (x) Maximum armoured cable (AC) length of 3 m (10ft) is acceptable in the ceiling space, use EMT conduit otherwise. Minimum lengths of armoured cable may be used in furred ceilings, hollow partitions and hollow walls. Rigid galvanized steel or rigid PVC conduit only in masonry walls unless otherwise approved. No armoured cable may lay on or clip to ceiling tiles or terminate in panels.
- (xi) Provide all pull boxes, junction boxes, terminal boxes, fittings, drains, plugs, cover plates, bushings, clips, rods and accessories as required and appropriate. No EMT conduit connectors to be c/w steel set screw. Rigid galvanized epoxy coated steel shall be used. Where the potential for box submergence exists, the box is to have a submersible rating with all fittings designed and installed to prevent the entry of water.
- (xii) Supports for conduit, cable or equipment shall be corrosion resistant and where cutting of support materials is required, the cut ends to be treated to maintain suitable protection from deterioration.
- (xiii) Door Entry Wiring: Provide concealed in complete metal conduit raceway system.



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LINKING PEOPLE TO PLACES • ON Y VA

## CONTROLS & STANDARDS

<b>Section 13000</b>	<b>Subject:</b> Guideline Performance Specifications for Prefabricated BRT Shelters	<b>Date:</b> Jan 7, 2015	<b>Page:</b> 27 of 31
----------------------	--	-----------------------------	--------------------------

- (xiv) Conduits: Conceal conduits, support conduits from the shelter structure. Nails or tie wires are not acceptable.
  - (A) Maximum armoured cable (AC) length of 3 m is acceptable in the ceiling space, use rigid galvanized epoxy coated conduit otherwise.
- (xv) Seal tight conduits used to connect motors and other vibrating equipment, minimize runs.
- (xvi) Electric Radiant Heater: Securely mount heaters at locations indicated. Remote push-button control shall be Allen Bradley, Siemens, Square D 9001 or approved equal.
- (xvii) Heat Tracing: Make heating cable power connection and end seal terminations in junction box. Provide a system Scupper heat trace, snow sensor, controller, contactor(s) equipment and accessories required and/or indicated Equipment shall be by Britech or reviewed equivalent by 3M/Thermon or Pyrotanax. Verify all cable lengths before ordering equipment. Follow manufacturer's installation recommendations.
- (xviii) Disconnects, motor starters and meter sockets shall be by Schneider Electric, Cutler-Hammer, Allen Bradley Canada Ltd., or reviewed equivalent.
- (xix) All equipment shall operate without noise or vibrations exceeding manufacturer's criteria.
- (xx) Automatic swing door operators shall be "Power Swing", Self contained, surface mounted system, all as manufactured by Besam Inc. and supplied and installed by Enex Door West of Guelph, Ontario, (519)824-5331, or approved equal.
- (xxi) Operator Housing: The operator shall be completely contained in an 150mm x 150mm extruded aluminum housing. The housing shall extend across the entire door opening. Where located on a leaf of a double door, it shall extend over both doors. All aluminum sections shall be of 6006-t6 alloy and shall have a minimum wall thickness of 0.156". All exposed surfaces shall be finished to match existing door frames. The operator housing shall provide a seal against dust, dirt and moisture. Operator housing shall extend the full width of the door frames.
  - Finish: clear anodized.



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**METROLINX**  
LINKING PEOPLE TO PLACES • ON Y VA

## CONTROLS & STANDARDS

<b>Section 13000</b>	<b>Subject:</b> Guideline Performance Specifications for Prefabricated BRT Shelters	<b>Date:</b> Jan 7, 2015	<b>Page:</b> 28 of 31
----------------------	--	-----------------------------	--------------------------

- Electric motor: electric motor shall be minimum 1/8 horsepower, 120V and shall be equipped standard with a built in thermal overload protection and shall not exceed 5 Amps.
- Operator assembly: Operator shall be non-handed and the power transmission shall be servo unit type with one moving part. Helical/mesh or chain driven systems will not be accepted.
- Electric control: a self-contained, 100% solid state integrated circuit shall control the operation and switching of the swing door power operator. The electronic control shall provide low voltage power supply for all means of operation. No external or auxiliary low voltage source shall be allowed. The control shall include time delay (adjustable between 1 to 60 seconds) for normal cycle. plug-in relays, resistors, contacts, etc., will not be accepted. Actuator buttons to be compact 110mm diameter recessed mount, stainless steel, 4r-3 As Manufactured by WIKK.
- **OPERATION**  
**POWER OPEN:** The automatic door operator shall be powered by a force transmitted by the electric motor to the servo unit and shall be connected by way of an adjustable arm linkage to the door. A constant opening pressure shall be maintained at all times. Both opening speed and back check must be individually adjustable. External/manual stops will not be accepted. The automatic door system shall function as a manual door closer in the event of a power failure, and allow for manual operation at all times, requiring no more than 5-7 pounds force on opening manually.
- **SPRING CLOSE:** The automatic door operator shall be spring closed action. The spring shall be non-handed and designed to counter-act wind and stack conditions, and return the door to its fully closed position. Both closing speed and latching shall be individually adjustable, without the need to change resistors or any other components.
- The automatic door system shall be self-contained, requiring no remote pumps or compressors. Pneumatic tubing will not be accepted.
- Operator must be adjusted with sufficient back check to prevent wind from damaging the door.
- Push and go feature will not be accepted.
- Manual reset buttons will not be accepted.
- Operator must be electro-hydraulic technology to ensure longer life with lower maintenance.
- Provide hardware of type and finish in accordance with, and equal



A Division of Metrolinx



**METROLINX**  
LINKING PEOPLE TO PLACES • ON Y VA

## CONTROLS & STANDARDS

<b>Section 13000</b>	<b>Subject:</b> Guideline Performance Specifications for Prefabricated BRT Shelters	<b>Date:</b> Jan 7, 2015	<b>Page:</b> 29 of 31
----------------------	--	-----------------------------	--------------------------

in all respects to the samples of hardware and finishes approved by the consultant.

- Metal finishes shall be free from defects, clean and unstained, and of uniform colour and finish for each type of finish required.
- Fastenings  
Supply screws, bolts, expansion shields and other fastening devices required for satisfactory installation and operation of hardware. Exposed fastening devices to match finish of hardware, use fasteners compatible with material through which they pass

(xxii) Train the owner's personnel as required to operate and maintain all equipment. correct installed work as directed by the engineer or authorized inspector

(xxiii) Equipment Mounting Heights: Mounting height of equipment is from finished floor to centreline of equipment unless indicated otherwise. Verify unspecified heights, dimensioned locations and ensure indicated heights in accordance with current barrier free access requirements before installation.

(h) Installation - Sealants

- (i) Clean joints and spaces which are to be sealed. Ensure joints are dry and free of dust, loose mortar, oil, grease, oxidation, coatings, form release agents, sealers and other foreign material.
- (ii) Clean porous surfaces, and metal surfaces, except pre-coated metals, of rust, mill scale and foreign materials by wire brushing, grinding or sanding.
- (iii) Clean glass surfaces with cellulose sponges or clean rags soaked with ethyl alcohol, ketone solvent, xylol or toluol and wipe dry with clean cloth.
- (iv) Clean pre-coated metals with solutions or compounds which will not injure finish and which are compatible with joint primer and sealant.
- (v) Install joint backing material to achieve correct and uniform joint profile.
- (vi) On horizontal traffic surfaces, support joint filler against vertical movement which might result from traffic loads, including foot traffic.
- (vii) Where surfaces adjacent to joints are likely to become coated with sealant during application, mask surfaces prior to priming and sealing.





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## CONTROLS & STANDARDS

<b>Section 13000</b>	<b>Subject:</b> Guideline Performance Specifications for Prefabricated BRT Shelters	<b>Date:</b> Jan 7, 2015	<b>Page:</b> 30 of 31
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- (viii) Do not exceed shelf life and pot life of materials, and installation times, as stated by manufacturers.
- (ix) Use materials as received from manufacturer, without additions, deletions and adulterations of materials.
- (x) Seal joints in surfaces to be painted before surfaces are painted. Where surfaces to be sealed are prime painted in shop before sealing check to make sure prime paint is compatible with primer and sealant. If they are incompatible, inform Consultant and change primer and sealant to compatible types approved by Consultant.
- (xi) Prime joints as required by sealant manufacturer. Prime sides of joints for type of surface being sealed prior to application of joint backing, bond breaker or sealant.
- (xii) Apply sealant using hand operated guns or pressure equipment fitted with suitable nozzle size and equipment approved by sealant manufacturer. Apply in accordance with manufacturer's directions and recommendations.
- (xiii) Force sealant into joint and against sides of joints to obtain uniform adhesion. Use sufficient pressure to completely fill all voids in joint regardless of variation in joint widths and to proper joint depth as prepared. Ensure full firm contact with interfaces of joint. Superficial pointing with skin bead shall not be acceptable.
- (xiv) Finish face of compound to form smooth, uniform beads. At recesses in angular surfaces, finish compound with flat face, flush with face of materials at each side. At recesses in flush surfaces, finish compound with concave face flush with face of materials at each side.
- (xv) Compound may be tooled, provided that such tooling does not damage seal or tear compound. Avoid pulling of sealant from sides.
- (xvi) Tool surfaces as soon as possible after sealant application or before any skin formation has occurred, particularly when using silicone sealants.
- (xvii) Joint surfaces shall be straight, neatly finished, free from ridges, wrinkles, sags, dirt, stains, air pockets and embedded foreign matter or other defacement and be uniform in colour, free from marbling and/or colour streaking due to improper mixing or use of out of shelf life products.



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## CONTROLS & STANDARDS

<b>Section 13000</b>	<b>Subject:</b> Guideline Performance Specifications for Prefabricated BRT Shelters	<b>Date:</b> Jan 7, 2015	<b>Page:</b> 31 of 31
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- (i) Adjusting And Cleaning
  - (i) After completing installation, inspect exposed finishes and repair damaged finishes.

**END OF SECTION**

Obsolete