

PART E
SPECIFICATIONS

PART E - SPECIFICATIONS

GENERAL

E1. GENERAL

- E1.1 These Specifications shall apply to the Work of the Contract.
- E1.2 These Specifications are intended to leave the Bidder free to provide his own design for the basic vehicle and equipment, subject to compliance with items specifically identified. The responsibility for providing vehicles with structures and components suitable for urban transit operations that meet all applicable municipal, provincial and federal regulations rests with the Bidder.
- E1.3 The following Drawings are applicable to the Work:

| <u>Drawing No.</u> | <u>Drawing</u> |
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| 24-2004-001 | Bus Paint Scheme |
| 24-2004-002 | Bus Front Tow Eye |
| 24-2004-003 | Radio Wiring Schematic |
| 24-2004-004 | Rear Suspension-Spacer Plate for Hoisting |
| 24-2004-005 | Farebox Stanchion |

E2. GOODS

- E2.1 The Contractor shall supply forty foot (40') low-floor diesel transit buses in accordance with the requirements hereinafter specified. Dimensions and characteristics are given in order to indicate the size and type of buses required. The dimensions are approximate, except where identified as maximums or minimums, and may be varied with the approval of the City.
- E2.2 Buses must be of the accessible "Low Floor" design without steps at the front and rear doors. "Forty Foot" buses require a minimum seating capacity of 38 passengers and a minimum total capacity of 80 passengers. Buses must be equipped with the necessary convertible ambulatory seating to create two wheelchair positions at the front of the bus when required.
- E2.3 The Bidder's bus design must have completed structural durability, strength and distortion testing at the Urban Mass Transit Administration's testing facility in Altoona, Pennsylvania. Consideration will be given to designs that have not yet completed the Altoona testing program at the time of the Award of Contract. However, a Contract will not be awarded without acceptable assurance that the testing of the design to be delivered will be completed with results acceptable to the City. Bidders may include the results of the tests with their tender submissions.
- E2.4 Bus length, excluding bumpers, to be nominal 12.19m (40 feet) for "forty foot" buses.
- E2.5 Outside body width, exclusive of exterior mirrors, rubber fenders and side lights to be nominal 2.59m (8.5 feet).
- E2.6 Maximum overall height, with roof hatches closed, shall not exceed 3.20m (10.5 feet).
- E2.7 Minimum road clearance shall not be less than 0.15m (6 in).
- E2.1 Minimum head room in the centre longitudinal aisle shall not be less than 1.93m (6ft 4in).

| Item Number | Bus Subsystem | Description |
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| 1.0 | Structural Requirements | The bus shall be designed to operate in transit service for at least 12 years or 804,650 kilometres (500,000 miles). It shall be capable of operating at least 64,372 kilometres (40,000 miles) per year including the 12th year. |
| 1.1 | | Throughout the service life of the bus in transit service, the structure shall not fail due to fatigue damage in a manner that can lead directly to passenger injury, driver injury, a crash situation or an interruption to revenue service where the bus must be repaired or replaced at the point of failure. |
| 1.2 | | The bus at GVWR and under static conditions shall not exhibit deformation or deflection that impairs operation of the doors, windows, or other mechanical elements. An example of a static condition is the vehicle at rest with any one wheel or dual set of wheels on a 15cm (6 inch) curb or a 15cm (6 inch) deep hole. |
| 1.3 | | The bus shall withstand impact and inertial loads due to street travel throughout its service life without permanent deformation or damage. |
| 1.4 | | Vehicle must meet all Transport Canada Road Safety Technical Standards and all other applicable standards and regulations from all authorities with jurisdiction. |
| 2.0 | Body and Structure | Body structure shall be cleaned of rust, scale, oil and dirt, primed with epoxy primer, and undercoated with a wax based self sealing undercoating. |
| 2.1 | | Side and end wall structural tubing interiors shall be fogged with undercoating. |
| 2.2 | | Air suspension support beam exteriors and interiors shall be undercoated. All exterior panels exposed from the underside of the vehicle shall be undercoated. |
| 2.3 | | Battery tray and mounting hardware shall resist damage from battery acid for the life of the bus. |
| 2.4 | | Body shell shall be fully insulated on sides, ends and roof. |
| 2.5 | | Vented under pans shall be provided to enclose the engine/transmission compartment area and will be dependant on design and location of equipment housed in the compartment exact configuration and layout will be determined by the City prior to production. |
| 2.6 | | No lifting pads or structure to extend below the front axle with the suspension in the down position |
| 3.0 | Exterior Paint and Decals | Paint scheme according to Drawing 24-2004-001 using PPG Concept Urethane paint in the following colours Classic White |
| 3.1 | | Black decal fleet numbers: <ol style="list-style-type: none"> 1. 15.24cm (6 inch) high required in three locations (1 Street side 1 Curb Side 1 Right Rear Corner) 2. 1 set of 10.16cm (4 inch) decal numbers on the curb side front of the vehicle 3. 2 sets of 5.08cm (2 inch) decal numbers inside the vehicle <p>exact locations to be specified by the City at time of build.</p> |
| 3.2 | | Exterior striping and decals including Winnipeg Transit logos, City of Winnipeg crest to be supplied by the City and installed by the Contractor. Specific locations to be determined by the City prior to production. |
| 4.0 | Windows | Window Manufacturer preferred Storm-Tite Incorporated. Alternatives to be approved by the City. |
| 4.1 | | All window frames shall be black, Side windows shall have solid upper panel with bottom sliders limited to open 15.24cm (6 inch) except the rear windows curb side & street side sliders shall open 8.89cm(3.5 inch) max. |

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| 4.2 | | Side destination sign side window and the street side window directly behind the driver shall be non-opening. |
| 4.3 | | Side and, if available, rear window shall be laminated safety glass, grey tone tint, 44% transmittance. |
| 4.4 | | Side windows shall be emergency push-out type with English and French emergency window operating instructions. |
| 4.5 | | Driver's side window shall be horizontal sliding type with rear section to have interior lock, front section to incorporate interior handle non locking , no exterior handle. Driver's side window glass to be Green tint 72% transmittance complete with a solid roller blind. |
| 4.6 | | Windshield shall include upper dark shaded band complete with a driver side solid roller blind. |
| 4.7 | | Destination sign glass to be electrically heated, activated with the defroster control. Glass to be etched to configure to sign shape and dimension |
| 5.0 | Doors | Doors shall have full length glazing 72% Green transmittance on the front door and 44% Grey tone tint on the rear door. |
| 5.1 | | Doors shall be controlled by a five position control valve, front door interlock not required |
| 5.2 | | Front entrance door shall be two-section slide glide type, single stream with wheelchair ramp. Door to be air opened, air closed. 62cm (35 inch) minimum opening. |
| 5.3 | | Rear exit door shall be two-section slide glide type single stream door. Door to be air opened, spring closed. Grease fittings are to be incorporated in the hinges. Driver authorized and passenger controlled with 4-second delay on closing. Rear door shall incorporate an Emergency Release Valve behind the rear door below Mechanism box within easy reach. |
| 5.4 | | Rear exit door shall be operable by passengers using touch control tape. |
| 5.5 | | Rear exit door control system shall include accelerator and brake interlock system. |
| 5.6 | | Rear exit door shall incorporate a sensitive edge with an audible warning device mounted in the front sign compartment and must operate with vehicle moving or stationary |
| 5.7 | | Rear Exit Door Overhead Green Ready light required |
| 5.8 | | A door master switch for the rear door and interlocks shall be installed on the sign compartment above the driver. A soft chime audible alarm shall operate when the switch is in the "OFF" position. |
| 6.0 | Access Doors | Interior engine compartment access panels are required under the rear chesterfield seat (one below the seat cushion, one on the backrest and one on the seat wall riser). Seat wall riser access door to be stainless steel with aluminium trim. |
| 6.1 | | All exterior and interior equipment access doors greater than 30.48cm x 30.48cm (12 inch X 12 inch) shall be equipped with 0.79cm (5/16 inch) square key locks and gas struts and stainless steel hinges. |
| 6.2 | | Fuel filler door shall be located between the exit door and the rear wheels, not obstructed by the exit door when in open position with a 12.7cm X 3.8cm (5 inch X 1½ inch) hand hold with sloped edges that protrudes out 1.9cm (¾ inch) from the bus body. Door must NOT be mounted with Riv-nuts or Well-nuts. |
| 6.3 | | Surge tank water filler access door to have a 5cm X 3.8cm (2 inch X 1½ inch) hand hold with sloped edges that protrudes out 1.9cm (¾ inch) from the bus body. Door must NOT be mounted with Riv-nuts or Well-nuts. |

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| 6.4 | | Radiator door shall incorporate a viewing slot to view sight glass for reservoirs located near the door access. Door must be corrugated perforated aluminium design with holes small enough to act as a Radiator screen eg: New Flyer Part # 233253. |
| 6.5 | | Exterior access door for Defroster to be provided and must be removable type not hinged. |
| 7.0 | Exterior Fittings | Front and rear bumpers shall be black Romeo Rim " Help – S " 3 piece energy absorbing type. |
| 7.1 | | Two horizontal front towing eyes are required as shown on Drawing 24-2004-002. |
| 7.2 | | At least one rear tow eye with a minimum inside diameter of 7.5cm (3 inch) is required. |
| 7.3 | | Polyurethane moulded fenders shall be provided on all wheel wells secured with stainless steel bolts |
| 7.4 | | Full width splash aprons shall be installed at both axles. |
| 7.5 | | Aluminium advertising frames required on the two sides and rear of the bus. Frames to be painted white and mounted flush to the body of the vehicle with stainless steel screws attached to structure members. A centre bar must be provided to allow for fastening the advertisement. Side frames to be 363.1cm. X 78.7cm (139 ½" x 30 ½") National Guard # 080659. Rear frame to be 179.1cm. X 55.9cm (22" x 70 ½") National Guard # 070713 mounted on 0.32cm (1/8 inch) thick nylon spacers. Specific design to be approved by Winnipeg Transit prior to production. |
| 8.0 | Exterior Mirrors | Heated remote 27.9cm. X 25.4cm (11 inch X 10 inch). Exterior curb side B&R mirror Part # A1785NF on mounting bracket # 215-2 with wiring thru arm convex glass required. Mirror to fold flat against the windshield. |
| 8.1 | | Heated non-remote 35.6cm. X 25cm (14 inch X 10 inch). Single Metagal Lucerix Part # 22.693.00-12 exterior drivers side mirror with an integral 10.2cm (4 inch) convex mirror at the bottom. Mirror to be mounted on bracket Part # CZ20.356.04 shall fold flat against the drivers window. |
| 8.2 | | Mirrors shall be mounted on secure structural members or tapping plates. |
| 9.0 | Wheelchair Ramp | Powered wheelchair access ramp 77.47cm (30.5 inch) wide required at front door. Ramp must operate with brake and accelerator interlocks. Ramp control must be located on the dashboard and must activate an audible warning chime, red flashing light on the dashboard and an exterior amber warning light. Ramp floor trim moulding must be non-skid Flame coated surface. |
| 10.0 | Interior Materials | Interior ceiling and window surrounds shall be Antique white 0.25cm (0.098 inch) Arborite or equivalent. Lower interior panels shall be 0.32cm (0.126 inch) Arborite, Charcoal Grey colour. |
| 10.1 | | Plywood sub floor shall be 1.91cm (¾ inch) marine grade with sealed waterproof edges. Underside exposed area to be undercoated. |
| 10.2 | | Flooring shall be Tarabus Sirius NT 6727 Anthracite Transport Flooring 0.225cm (0.088 inch) coved up sidewalls 10.0cm (3.94 inch) using 2.0cm (0.79 inch) radius cove former. All seams to be welded. Yellow nosing on reinforced aluminium plates required on steps. Interior step nosing to be yellow, interior step risers to be Anthracite colour. Yellow stripe welded into the floor across the centre aisle required at the front of the front wheelhousing. Yellow nosing to be provided at Front and Rear door openings. Upper deck wall to floor trim to be aluminium, rear seat riser to be cover with flooring material. Front wheel well covers to be covered with 6801 Graphite colour flooring material. Material to be installed in accordance with the manufactures requirements. |
| 10.3 | | Stainless Steel scuff guards to be supplied on front wheel housings mounted with stainless steel screws. |

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| 10.4 | | Stainless Steel graffiti guards on the upper rear side of the rear wheel housings if accessible by passengers. Guards to be sealed on the upper edge |
| 10.5 | | Interior passenger information decals to be supplied by the City and installed by the contractor. Specific locations and numbers to be determined by the City prior to production. |
| 11.0 | Seats | Transverse seating required where possible. Seat structures shall be cantilevered with powder coated finish where possible. Components and fasteners at floor level must be stainless steel. Rear bench shall be 1-3-1 hinged configuration. The City must approve the seating lay out prior to production. |
| 11.1 | | Seating shall be Otaco model 6468 with fibreglass shells Grey 980 with VR50 seat and back inserts behind the rear door. Back panels shall be stainless steel and grab rails shall be energy absorbing thermoplastic. Inserts to be Holdsworth A944L with weep holes in underside of cushion. Seat and back inserts from the front to the rear of the exit door shall be padded with 1.11cm (0.44 inch) Safeguard foam. Finisher panels on arm rests to be anti-graffiti stainless steel. |
| 12.0 | Wheelchair Positions | Two wheelchair positions are required at the front of the bus. Flip up seats to accommodate wheelchairs must only lock in the up position and must stay in the down position without rattles when not in use as a wheelchair position. Street side position aisle facing seat complete with grab rail on underside and stop request button. Curb side location to be Rear facing with flush mount stop request button on underside of aisle facing seat. Rear facing vertical stanchion locations must be approx 4.44cm (1¾ inch) from the wheel house base and 35.56cm (14 inch) from the top of the wheel house to the back side of the Protection cushion. Curb side location to incorporate Winnipeg curved design wheel chair restraint stanchion at the wheel chair location. |
| 12.1 | | Wheelchair securements at street side shall be Otaco calliper design wheelchair lock with unlock lever mounted in the vertical position, two (2) red retractable belts, one (1) black retractable lap belt, instruction sign to be French and English. |
| 13.0 | Driver's Seat | Driver's seat shall be USSC - Q 90 seat Black fabric inserts and vinyl boxing with Rail Bumper |
| 14.0 | Stanchions | Stanchions and grab rails shall be either 3.18cm (1¼ inch) diameter stainless steel tubing with 180 grit finish, 3.18cm (1¼ inch) diameter yellow powder coated tubing or 3.18cm (1¼ inch) diameter black powder coated tubing as required. All fittings and fasteners to be stainless steel at floor level. |
| 14.1 | | Stanchions and grab rails shall be black from the rear of the front wheelhousing to the front of the bus, except the door grab rails and assist bar at the curb side wheel house. |
| 14.2 | | Two ceiling mounted overhead stainless steel grab rails running the length of the bus are required. Handhold loops required at wheelchair positions. Minimum 3 – Curb Side 4 – Street Side Locations to be determined at time of Production. |

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| 14.3 | | <p>Vertical stanchions to be located as follows:</p> <ol style="list-style-type: none"> 1. Entrance & exit door grab rails to be Yellow 2. Stanchions from floor to ceiling & floor to upper grab rail to be Yellow 3. Stanchion at Exit door to be Yellow 4. All Stanchions rear of the front wheelhouse Stainless Steel 5. Stanchion and railing in Drivers area to be Black. 6. All Fittings forward of the Front wheel house to be Black 7. Curved vertical stanchion from grab rail to floor at curb side wheelchair position to be Yellow 8. Luggage Rack – Black 9. Vertical Stanchion at Curb side forward of Front wheel house to be Yellow |
| 14.4 | | Yellow clad grab rail with black padding shall be mounted at entrance and must support the fare box with 90 degree bend at the fare box stanchion mount. Design to be approved by the City prior to production. (Drawing 24-2004-005) |
| 14.5 | | 106.68cm (42 inch) high stanchion mounted on the floor and supported by the fare box stanchion is required for mounting Transfer cutter and coffee cup holder. Transfer cutter supplied and installed by City, Coffee Cup holder to be supplied and installed by contractor. Type and location to be approved by the City prior to production. |
| 14.6 | | Numbers, locations and designs of grab rails and stanchions required for the safe movement of passengers shall be approved by the City prior to production. |
| 15.0 | Interior Modesty Panels | Bankers Grey Modesty panels approximately 86.36cm (34 inch) high shall be provided at the rear of the exit door aisle and modesty panels are required on both sides of interior steps. Modesty Panels in driver's area to be Black |
| 15.1 | | Driver's Storage Locker to be provided behind operators compartment, must be large enough to hold winter coat and regular size duffle bag. Installation size, and location to be approved by the City prior to build. |
| 16.0 | Signs | <p>Luminator Horizon LED 24 volt destination sign system required as follows:</p> <ol style="list-style-type: none"> 1. 16X112 front sign; 2. 7X90 side sign; 3. 7X23 rear sign; 4. ODK mounted above driver adjacent to destination sign door 5. Programming via PCMCIA flashcard located on the ODK with a MTU port mounted inside the front Destination Sign Compartment |
| 17.0 | Interior Mirrors | 30.48cm (12 inch) Convex mirror required at rear inner corner of exit door stanchion and 15.24cm (6 inch) Flat round mirror required at curb side of the front route sign panel |
| 17.1 | | Interior rear view mirror non convex with Black colour surface backing, approximately 13.97cm. X 21.59cm. (6 inch x 9 inch) required on header panel. Mirror is not to interfere with the dash fans specified in 18.11. The location is to be approved by the City of Winnipeg prior to production. |

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| 18.0 | Heating and Ventilation | <p>Thermo king heating system shall be sized to maintain 10°C and frost-free windows at outside temperatures of -40°C and 20 km/hr (12 mph) wind. Heating system shall incorporate a rear mount main heater unit and minimum of two floor mount auxiliary heaters.</p> <p>The system shall incorporate a Webasto thermal 300 – 80000 Btu auxiliary heater</p> <ol style="list-style-type: none"> 1. The Webasto system shall incorporate a guarded override switch that will allow the heater to operate when the cover is closed and not function when the switch is open, no dash light indicator is required 2. The Webasto system shall as follows on every engine start up: <ol style="list-style-type: none"> a. The vehicle must reach a 3.2 km/hr (2 mph) road speed, and a 10 minute timer will time out and the Webasto unit will then cycle ON b. The Webasto system shall function when heat mode has been selected and/or coolant temp has not been achieved. 3. Webasto unit operation shall incorporate a manual function test and shall function as follows: <ol style="list-style-type: none"> a. Door master switch to be in OFF position b. Auxiliary override switch to be in override position c. Heat mode selected d. Engine running and alternator charging e. Street side chime switch has been activated for a period of 5 seconds |
| 18.1 | | <p>Heating system shall include a thermostatically controlled EG&G Rotron brushless booster pump with a micro switch on the water valve for the defroster heater that turns the booster pump on and off. Booster Pump to be located at the Webasto Heater Unit. (City to approve installation) Water control valves to control passenger compartment heater cores. Thermostat shall be mounted in return air side of main air handling unit.</p> |
| 18.2 | | Supply air shall be filtered. |
| 18.3 | | Heating systems shall provide a minimum of 20% outside air. |
| 18.4 | | <p>Passenger compartment heating system shall be controlled with a three position switch as follows:</p> <ol style="list-style-type: none"> 1. HEATING/ ON – Main Heater fans to operate on Low Speed when heating system is calling for heat, Auxiliary Floor Heaters to operate on high speed. When not calling for heat, Main heater motors will run on Low Speed, Auxiliary heaters will shut down, booster pump and water control valve controlled by the thermostat 2. OFF - fans, booster pump and water control valve shut OFF 3. VENTILATION – Main Heater fans on high speed, booster pump and water valves shut OFF |
| 18.5 | | Passenger compartment fans to operate only if alternator is charging. |
| 18.6 | | <p>Auxiliary Driver Area Heaters Required :</p> <ol style="list-style-type: none"> 1. Separate fan/heater core system supplied by the booster pump required for driver compartment heating and windshield defrosting 2. Electrically controlled Water control valves required to shut off water supply to Driver compartment heaters, to be located at the rear of the vehicle, unit to be separated with manual ball valves. |
| 18.7 | | <p>Driver compartment heating system controls as follows:</p> <ol style="list-style-type: none"> 1. Fan controlled by rotary multi-speed switch on switch panel; 2. Manual damper system to modulate between driver heat and windshield defrosting. 3. Defroster heater to go to high speed operation regardless of manual speed setting when heating system is calling for heat and when the front door is opened. |

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| 18.8 | | Ram air vent required at driver's foot level. Manually operated vent cover shall open to 45°C minimum. |
| 18.9 | | Upper powered air vent 100% fresh air for driver compartment area. All working controls shall be easily accessible for Maintenance purposes. Adjustable louvered vents on the underside of the driver ceiling header area with rotary controls |
| 18.10 | | Two (2) roof hatches with escape mechanism and with French and English instructions required. Hatches must be capable of being positioned with leading side up, trailing side up or all four sides up. |
| 18.11 | | Three dash fans with separate switch controls required. Fans shall be two speed. Two fans to be dash mounted for defrosting, one fan used for driver cooling to be mounted above the centre of the windshield and not in sight line of interior rear view or exterior mirrors |
| 18.12 | | Separate Front Entrance Area Heater controlled in the same manner as Item 18.6 |
| 19.0 | Exterior Lighting | Sealed beam headlights with left side floor-mounted dimmer required. Headlights to be easily replaceable while in service. |
| 19.1 | | Rear lights shall be LED 10.16cm (4 inch) Factory sealed, rubber shock mounted lights with #67000 pigtails. |
| 19.2 | | Rear lights on both corners from top down shall be as follows:(Stop lights to function on with brakes, retarder, park brake & interlock) <ol style="list-style-type: none"> 1. RED combination stop/tail light 2. AMBER turn signal 3. RED combination stop/tail light 4. CLEAR backup light |
| 19.3 | | Front turn signals shall be LED factory sealed, rubber shock mounted lights with #67000 pigtails. Turn Signals to incorporate audible sound when flashing (click/click) |
| 19.4 | | Amber armour type side directional light LED required above all four wheel housings. |
| 19.5 | | Four way hazard warning system shall operate lights at front and rear corners only. Audible automotive type soft chime required for four-way hazard system. |
| 19.6 | | One factory sealed, rubber shock mount amber light adjacent to front door required on exterior for lift and kneeling warning. |
| 19.7 | | All clearance lights to be LED Slim Line flush mount |
| 19.8 | | Turn signal switches and P.A. switch shall be mounted on a tapered box operated by driver's left foot. P.A. switch between and elevated above turn signal switches. |
| 19.9 | | Pre-road Lamp Test – shall be activated by depressing both Turn Signal Switches at the same time, must be able to be activated with or without bus running |
| 20.0 | Interior Lighting | Interior lighting shall be Transmatic L20 |
| 20.1 | | Tubes forward of the rear door shall be fitted with blue sheaths. |
| 20.2 | | Interior lighting control shall be independent of the master switch and to be as follows: <ol style="list-style-type: none"> 1. NORMAL - all lights on; 2. OFF - all lights off. |
| 20.3 | | Overhead lights are required in entrance and exit door aisles 2 per location . Lights to operate when doors are open, 2 additional standee lights to be provided on either side of passenger standee line. |
| 20.4 | | Factory sealed, rubber shock mount clear lights required at interior step wells. |

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| 20.5 | | Overhead dome lamp above the driver's head on a separate switch required. |
| 20.6 | | Wiring for a fare box light required adjacent to the instrument panel at fare box mount stanchion. Circuit must be controlled with a separate switch. Wiring exposed from the dash shall be not less than 30cm (12 inch) in length. Installation to be approved by the City prior to production. |
| 21.0 | Engine Compartment Lighting | Five (5) Trucklight 73-7828 lights required in engine compartment controlled by a switch in the engine compartment. |
| 22.0 | Driver's Compartment | Driver's draft shield on Driver's Platform shall be full width with door and magnetic latch. Installation to be approved by the City prior to production. |
| 22.1 | | Floor to ceiling modesty panel required behind driver's seat. Modesty panel to include two (2) 9.53cm (3¾ inch) wide leaflet slots and one (1) 17.15cm (6¾ inch) wide leaflet slot. Leaflet slot design to be approved by the City prior to production. |
| 22.2 | | An aluminium radio lock box measuring minimum 50.8cm X 48.26cm X 20.96cm (20 inch X 19 inch X 8 inch) is required on the driver side front wheel housing. |
| 22.3 | | Speedometer must not include an odometer and must read in KPH |
| 22.4 | | Warning lights and buzzers required as follows: <ol style="list-style-type: none"> 1. Alternator Discharge - RED Light; 2. Exit Door Unlocked - RED Light; 3. Stop Light Action - RED Light; 4. Low Air Pressure - RED Light and Buzzer; 5. Low Coolant – AMBER ; 6. Emergency Brake - RED Light; 7. Headlight High Beam - BLUE Light; 8. Directional Signals - GREEN Light; 9. Kneeling Activated - AMBER Light (on right side of dash); 10. Ramp Deployed - AMBER Light (on right side of dash); 11. Stop Requested - RED (2.54cm. diameter minimum); 12. Wheelchair Stop Requested - AMBER Light. 13. All warning lights and buzzers pertinent to the engine and transmission will be supplied. |
| 22.5 | | Ramp and kneeling controls shall be located on right side of dash instrument panel. |
| 22.6 | | Four position master run switch required with operating positions as follows: <ol style="list-style-type: none"> 1. Stop Engine; 2. Day Run; 3. Night Run; 4. Night Park. |
| 22.7 | | Stop Engine override switch required if provided for in engine control system. |
| 22.8 | | Steering column mounted switches are not allowed. |
| 22.9 | | Buses equipped with interior slide-up electrical side consoles require gas prop assists and lock screws. |
| 23.0 | Power Train | Minimum 250 HP. Engine Road speed governed at 90 km/hr (55.9 mph). City to approve Engine selection. |
| 23.1 | | Buses equipped with electronic engine management systems must be programmed with engine shut down in the event of low oil pressure and high engine temperature and have a Stop Engine Override switch to be incorporated in the operator area. |

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| 23.2 | | Transmission shall be Allison B400R and operate in Economy Mode with shift enable off the brake pedal. Retarder activation method to be Brake applied 1/3 activated by 1 Psi Brake light switch remaining 2/3 working off the 4 Psi Brake light pressure switch |
| 23.3 | | Transmission shall be removable separately from the engine. |
| 23.4 | | Engine and transmission assembly shall be removable as a single unit. Contractor to supply Engine Removal Dolly. |
| 23.5 | | Fluid lines shall be Aeroquip FC300. |
| 23.6 | | Electric Starter required. |
| 23.7 | | Engine compartment shall include a control panel with the following: <ol style="list-style-type: none"> 1. Front start/rear start selector; 2. Engine start button; 3. Mechanical engine oil pressure gauge; 4. Water temperature gauge (resettable peak temperature); 5. Engine compartment light switch; 6. Morse Throttle Control; |
| 23.8 | | Fast idle with selector in the driver's compartment required. Fast idle to be interlocked with accelerator and brakes to prevent gear selection or movement while fast idle selected. |
| 23.9 | | Exhaust system shall be all stainless steel components and shall exit straight up at left rear corner of bus, exhaust pipe to extend 15.24cm (6 inch) above the roof line. |
| 23.10 | | Front and Rear Axle to be MAN with a Rear Axle ratio of approx 4.63Rear axle suspension beam to incorporate spacers at hoist lift locations to accommodate hoisting adapters if fittings, devices or fasteners extend below the underside of the suspension beam (See Drawing 24-2004-004) |
| 24.0 | Brakes and Air System | Brake System shall incorporate WABCO ABS system with no Traction Control Parking Brake actuator to be Pull to Apply. Brake and Accelerator Pedals must be mounted on a 45-degree angle. Brake valve shall be Bendix Westinghouse E10. |
| 24.1 | | Haldex Automatic slack adjusters required. |
| 24.2 | | Haldex Dry EST blow through air dryer with heating element in exhaust valve area and Haldex Consep drain valve required. Components must be mounted forward of the rear axle and on the curb side of the bus. |
| 25.0 | Wiper System | Two (2) dry arm self parking windshield wipers mounted at the bottom of the windshield with intermittent control required. |
| 25.1 | | Minimum 19 litre (5 galUS: 4.2 galIMP) capacity windshield washer system with external spring loaded filler cap required. |
| 26.0 | Steering System | Sheppard power steering box required. |
| 26.1 | | Steering wheel shall be a VIP – 20 inch, 2 spoke padded wheel with a Douglas C231 Tilt/telescopic steering column. |
| 27.0 | Suspension System | Air suspension required – all levelling valve links must incorporate rubber bushing mount ends |
| 27.1 | | Full front kneeling function required. Kneeling must operate brake and accelerator interlocks. Control must be on right hand side of dash instrument panel, must include warning chime, flashing red light on dashboard and exterior amber warning light. |
| 28.0 | Fuel Tank | Fuel tank capacity must allow operating range of 700 km (435 mile) and 22 hours of operation. |
| 28.1 | | Fuel system must be sized to accept 180 litres (47.5 galUS: 40 galIMP) per minute fill rate with dry-break filler. |
| 28..2 | | Stainless steel fuel tank designed to last the life of the vehicle required. |
| 28.3 | | Fuel tank vent shall be equipped with audible signal. |

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| 29.0 | Cooling System | Radiator requires copper tubes, brass tanks. |
| 29.1 | | Air operated shutters controlled by thermostat required on radiator. |
| 29.2 | | Stainless steel surge tank mounted above the radiator required. Surge tank to be 18.9 litre (5 galUS: 4.16 gallMP) stainless steel and include sight glass, filler neck with quick release hinged safety cap and manual pressure relief valve Part # 680364 MCI, all accessible from outside the bus through the surge tank door. Low coolant light sensor in addition to standard engine sensor. |
| 29.3 | | Automotive-type pressure cap to regulate cooling system pressure required. |
| 29.4 | | Cooling system initial charge shall be water and Nalcool 2000. If buses are stored at sub-freezing temperatures prior to delivery, initial charge shall be water, antifreeze and Nalcool 3000. Cooling system requires Nalcool water filter with spin-on cartridge. |
| 29.5 | | Silicone rubber hoses required. |
| 30.0 | Wheels | Contractor shall mount tires Goodyear 305/70x22.5 Metro Miler supplied by the City of Winnipeg. Valve stems to be high temperature MEX-1298EV and stem extensions 21-534 Myers Tire Supply to be installed on the inner wheels. |
| 30.1 | | All wheel/tire assemblies must be dynamically balanced. Spare rims & Tires are not required. |
| 30.2 | | Veeder-Root hubodometer on driver's side rear axle required must read in Km's. |
| 30.3 | | All rims to be steel 22.5 x 8.25 Powder Coated to the colour specified by City of Winnipeg |
| 31.0 | Electrical | Alternator must be Delco Model DN50. |
| 31.1 | | Voltage regulator must be mounted in sealed compartment accessible without hoisting the bus. |
| 31.2 | | Two (2) 8D 1400 batteries, with handles, drop terminals, 0.95cm (3/8 inch) USS negative stud and 1.27cm (1/2 inch) USS positive stud required. |
| 31.4 | | Batteries must be installed in vented compartments, protected from dirt and water entry. Batteries installed in engine compartments must be protected by easily removable covers. |
| 31.5 | | Battery Boost Jump start connector to be provided. This Jump start connector must be located in an accessible compartment on the curb side near the rear of the vehicle. This system must be capable of powering up the vehicle electrical systems to allow the vehicle to be started with vehicle batteries isolated. This Jump Start connector must incorporate Plug # 3008066 Goodall on the vehicle. This system shall incorporate a frame mounted ground stud. The Goodall Plug shall be configured with 12 volt on top position and 24 volt on the bottom position. Installation to be approved by the City prior to build. System voltages to be 24 volt Primary and 12 volt secondary |
| 31.6 | | Wiring and wiring harnesses must be installed above floor level and must not contact the floor. |
| 31.7 | | Manual resettable circuit breakers are required on all circuits where allowed by legislation. Water resistant switches are required. Retarder, Auxiliary Heater & Door Master switches are to be mounted on the exterior of the Destination Sign compartment above the operator. |
| 31.8 | | Wiring must be high heat resistant stranded SXL copper core with cross linked polyethylene insulation. All wiring must be minimum 18 gauge SAE J1127 double insulated and hot stamped numbered and colour coded. Wiring in engine compartment must be insulated from heat with a treated covering. All engine and transmission harness wiring to be GXL |

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| 31.9 | | All wiring harnesses must terminate at electrical panels housed in moisture and dust sealed compartments. All terminals in electrical panels must be numbered. Circuits between terminals must be hard wired, or if required, connectors must be approved by the City prior to production. Plasticized diagrams identifying all components in a compartment, their locations and circuits controlled by relays must be fastened to the inside of all electrical compartment doors. |
| 31.10 | | Twelve (12) spare circuits are required between the main electrical control panel and the engine compartment and between all other electrical panels. |
| 32.0 | Multiplexed Wiring System | Buses with multiplexed wiring systems must utilize Allen Bradley model 502 PLC hardware with 10 slot racks and EEPROM memory back up. |
| 32.1 | | <p>The Contractor must supply 4 - notebook computers per bus build to be used for diagnostic and programming functions. The computers must be equipped with the latest version of the Windows operating system, colour screens, integral pointing devices, CD Rom Drives, floppy drive, the largest capacity hard drive available for the computer and twice the minimum RAM memory required to run all applicable software.</p> <p>The computers shall be equipped with the latest versions of all software required for diagnostics and programming of the Engine, Transmission, PLC, ABS, Electronic Signs, and all other Electronic equipment included in the vehicle. All software must be installed and functional.</p> <p>The computers shall include all peripheral communication hardware, such as PIC's, links and adapters used in downloading and programming of the equipment. Data Link connectors shall be provided 10 connectors per bus build to function with computer equipment and all applicable software provided. Cigarette type plug-in to be provided at Lap Top diagnostic plug locations for Lap Top operation.</p> <p>The City of Winnipeg shall have final approval of the hardware and software to be supplied. Computers supplied under contract must be available for testing of all functions and data link connections during pre-delivery inspections.</p> |
| 33.0 | P.A. System | P.A. system shall be Mobilpage amplifier P470CE (12V negative ground), Mobilpage microphone #MAC 565 on an Atlas Sound gooseneck assembly #AD11 with 68.58cm (27 inch) overall length mounted in the left front corner of the driver's compartment. |
| 33.1 | | Minimum of six (6) 15cm (6 inch) Ceiling mounted speakers required. |
| 33.2 | | P.A. system shall be controlled by a floor mounted starter type switch located between the left and right turn signal switches and raised away from the same plan as the Turn Signal Switches. |
| 33.3 | | Wiring from amplifier plug to microphone must be as shown in Drawing 24-2004-003 |
| 33.4 | | Portable P.A. jack must be installed behind the driver's seat operated with separate switch on driver's console. |
| 34.0 | Passenger Stop Signal | Pull cord passenger stop signal yellow in colour required on both sides of bus, with verticals at all window mullions in Low Floor Section of the bus. Push button passenger stop signals required at wheelchair positions as per Item 12. Push buttons required at the rear exit door stanchion, one at each front wheel house stanchion, and one at each of the upper deck vertical stanchion closest to the steps. Stop signal chime from wheelchair positions must sound twice. Stop signal chime from other locations must sound once. Chime unit to be mounted above driver's window area. |

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| 34.1 | | Transign "STOP REQUESTED" sign system required (English only – Upper Case Letters). Dashboard mounted 2.54cm (1 inch) STOP REQUESTED red indicator light required. |
| 35.0 | Antenna and Provisions for Radio | Excaliber SRL321A low profile UHF antenna with a "P" connector required on the roof centred above the driver's seat. Antenna frequency range to be 413 to 418 Hz. Radio antenna mount provision shall be a minimum 30.48cm X 30.48cm (12 inch x 12 inch) ground plate |
| 35.1 | | The antenna coaxial lead-in and fish wire must run inside a protective plastic conduit from the roof antenna to the radio lock box. The excess coaxial cable and fish wire must be coiled inside the radio lock box. |
| 35.2 | | Co-axial lead-in shall be RG58 co-axial cable with AMP-PL259 and 831AP connectors on antenna end and PL259 connector on radio end. Minimum 10 inch coaxial cable coiled up at the antenna end |
| 35.3 | | Radio Power Supply wiring shall be One (1) #6 red and one (1) # 6 black SXL type, wires must be continuous without splices or connectors between battery box and the radio lock box. These wires must be protected on both ends to prevent accidental shorting. |
| 35.4 | | Radio must be provided with a filtered 12V- 25 amp direct battery power supply through a 24 to 12 Volt - Sure Power Ind Power Converter # 52142. Radio power supply circuit must remain energized for 30 minutes after the vehicle has been shut off. Two additional (2) spare wires shall be supplied from the power source to the radio box. |
| 35.5 | 0158 | <p>The Contractor must supply and install a radio wiring harness. The harnesses must be manufactured by Vansco Electronics Ltd., Winnipeg, Manitoba. The harness is number CBP 804, drawing number XD 01 issue 6. All harnesses must be supplied to the City, minimum of 30 working days prior to start date of production for testing and verification of plug pin configuration.</p> <p>The harness will run from the radio lock box to the front of the driver's side console with a branch running up a protected wire run behind the driver's window to a location above the driver's window. Harness installation details to be approved by the City prior to production.</p> |

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| 35.6 | | <p>The Contractor must supply and install wiring harnesses for an Automatic Passenger Counting system.</p> <p>The wiring harness and equipment installation shall be as follows:</p> <ol style="list-style-type: none"> 1. One 4 wire and one 2 wire shielded /stranded 22 gauge wire harness to run from the Exit door to the APC computer mount provision. Wire must be ECI Electrocom FT-4 LL61365DR or approved equal. 2. One 4 wire and 2 wire shielded / stranded 22 gauge wire harness from the Entrance door compartment to the APC computer mount provision. Wire must be ECI Electrocom FT- 4LL61365DR or approved equal. 3. One 4 wire shielded / stranded 22 gauge wire harness from the Side Sign to the APC computer mount provision. Wire must be ECI Electrocom FT – 4LL61365DR or approved equal. 4. One – 16 gauge wire from the dash speedometer to the APC computer mount provision 5. One – 16 gauge wire from the ramp control signal source to the APC computer mount provision 6. One 2 wire 14 gauge harness terminating at the APC computer mount provision – one wire to be 12 volt ignition source and one wire to be 12 volt battery source 7. One – 15.24cm X 22.86cm (6 inch X 9 inch) Metal mount plate located in an enclosure to allow for APC computer mounting 8. One - 10.16cm X 10.16cm (4 inch X 4 inch) Metal ground mounting plate to allow for GPS Antenna mount, must be mounted to structural frame away from steel frame members 9. Extra 60.96cm (24 inches) of wiring on all harnesses at termination points to allow for equipment installation 10. All mounting locations to be approved by the City prior to production |
| 36.0 | Manuals | <p>The following manuals and diagrams must be supplied prior to delivery:</p> <ol style="list-style-type: none"> 1. Ten (10) maintenance manuals; 2. Eleven (11) spare parts listings; 3. Three (3) spare parts cost listings; 4. One (1) part cross reference listing showing Contractor part number, OEM manufacturer of part, OEM part number; 5. One (1) complete set of OEM vendor manuals for major components; (Heating & Ventilating, Axles, Engine & Transmission, Steering, Compressor, Electronic Signs, etc.) 6. Twelve (12) operator's manuals 7. One (1) set "as built" wiring installation diagrams including harness and junction box locations approximately 55.88cm X 81.28cm (22 inch X 32 inch) 8. One (1) set "as built" under frame and body assembly drawings approximately 55.88cm X 81.28cm (22 inch X 32 inch) 9. 3 sets of Plasticized Wiring Diagrams 10. If Available all Manuals to be supplied on CD disc format |
| 36.1 | Documentation | <p>Contractor must supply on the date of delivery a New Vehicle Information Statement and a Certificate of Sale of New Motor Vehicle for registration purposes.</p> |

E3. DELIVERY

E3.1 All vehicles must be delivered, F.O.B., freight prepaid, to the following address:

Winnipeg Transit Fort Rouge Transit Base
421 Osborne St.
Winnipeg, Manitoba
R3L 2A2
Contact: Don DeVisser 986-5801

E3.2 Deliveries will be accepted between 07:00 and 14:00, Monday to Friday excluding statutory holidays.

E3.3 Each bus must be delivered with all documentation necessary for licensing in the Province of Manitoba.

E4. TRAINING

E4.1 The Contractor shall provide 80 man-days of training courses for the City's staff per annual bus order. The training shall be performed in the City of Winnipeg. The training course requirement shall be determined by the City and shall include but shall not be limited to theoretical and practical subjects such as engine and transmission fault diagnosis and engine and transmission rebuilding.

E5. INSPECTIONS AND PERFORMANCE TESTS:

E5.1 Further to GC.5.03 of the General Conditions, City of Winnipeg inspectors will perform three types of inspections during the Contract:

- (a) City of Winnipeg inspectors will perform production inspections to verify that Specification and manufacturing quality requirements are met throughout the manufacturing process on every bus;
- (b) City of Winnipeg inspectors will perform pre-delivery inspections on every bus at the Contractor's manufacturing facility prior to its release for delivery;
- (c) City of Winnipeg inspectors will perform post-delivery inspections at 421 Osborne St. Winnipeg, MB. on every bus.

E5.2 City of Winnipeg inspectors must have unrestricted access to inspect the materials and processes used on its vehicles at the Contractor's manufacturing facility at all stages of production.

Bidders with facilities located outside the City of Winnipeg must include in their bids, all costs for two inspectors to spend a minimum 5 full days per week that buses are in production at their manufacturing facility on a weekly basis. Costs must include air and/or vehicle transportation between Winnipeg and the manufacturing facility. Costs must include lodging and be approved by the City, and additional vehicle transportation between the hotel and the manufacturing facility, (vehicle type supplied will be determined by the time of year and weather conditions) and shall include all applicable insurances. Costs of per diem rate per day per person as set by the City of Winnipeg for meals and other costs. Out of Province medical insurance must be provided in the form of a sub-contractor supply such as Blue Cross Extended Travel Insurance for the time period that the Inspectors are out of Province.

E5.3 Pre-delivery inspections will be performed by City of Winnipeg inspectors. The Contractor must allow a minimum of two hours per inspection, must provide a hoist to raise the bus, indoor facilities in inclement weather, and temporary licensing for a road test. Any defects or deficiencies in the Work noted during this inspection shall be remedied by the Contractor at the earliest possible instance and the Inspector shall be notified when the Work is ready for re-inspection.

The pre-delivery inspectors will observe a brake system test by the Contractor on each completed vehicle prior to delivery. The brake system must stop the bus at a minimum deceleration rate equivalent to 6.1 m (20 feet) from a speed of 32 km/hr (20 mph) on dry pavement and conform to the Transport Canada Technical Standard No. 121 requirements.

- E5.4 Post-delivery inspections will be performed at the point of delivery at City of Winnipeg facilities. The buses must have been operated within the drivetrain manufacturer's recommendations during delivery, must be clean inside and out, must have full fuel tanks and must be free of damage incurred during transport. Any defects or deficiencies in the Work noted during this inspection shall be remedied by the Contractor at the earliest possible instance and the Inspector shall be notified when the Work is ready for re-inspection.

The post-delivery inspection shall be considered complete when all defects or deficiencies have been remedied by the Contractor and the Contract Administrator certifies that the bus meets the requirements of the Contract Documents.