

PART E

SPECIFICATIONS

TECHNICAL SPECIFICATION FOR TRAFFIC AND PEDESTRIAN HEADS

1. GENERAL

- 1.1 This Specification shall apply to the Work.
- 1.2 The intent of this specification is to establish minimum acceptable electrical, mechanical, design and performance requirements, which Traffic and Pedestrian Signal Heads complete with LED indications, shall meet to ensure satisfactory and reliable operation. It is not intended to impose restrictions upon design or materials, which conform to the latest ITE Technical Standard. All ITE standards per the most current ITE Specification at time of contract shall still apply. Where there is a variation between this specification and the latest ITE Standard, the provisions of this specification shall still apply.

2. MATERIAL

- 2.1 All Traffic Signal and Pedestrian Heads shall be die-cast aluminum in construction.
- a) The visors shall be aluminum;
 - b) The metallic component of traffic signal head section connecting brackets, visor mounting fasteners, backboard mounting fasteners, hinge pins, reflector pins, door securing bolts and wing-nut hardware shall be stainless steel;
 - c) Pins used for the door hinge shall be of roll spring type, unless they are user replaceable;
 - d) Stainless steel screws shall be provided for backboard attachment. Note: the screw holes on the traffic signal heads shall be of sufficient depth to accept the screws and hold the backboard firmly in place. Screw head size must be large enough such that the backboard withstands wind gust velocities up to and including 80 mph; and
 - e) Backboards shall be aluminum, Grade 5052-H321;
- 2.2 All Traffic Signal and Pedestrian Signal module indications shall be LED (Light Emitting Diode) type unless otherwise specified in the contract document.

3. DESIGN STANDARDS

- 3.1 Backboards:
- a) The thickness of the backboards shall be 0.05 inch +0.02, - 0.00 inch;
 - b) If the backboard mounting screws secure to the hinge or door locking bolt shoulders, the shoulders must not break when the backboard screws are inserted and tightened;
 - c) J^u hook mounting of backboards is not acceptable, and heads that use this mounting system will be rejected;
 - d) all vehicle signal heads, whether eight (8) or twelve (12) inch in diameter, when equipped with a backboard must fit a City of Winnipeg specified ten (10) foot high straight shaft pole, as described below, without deforming the backboard;

Note: City of Winnipeg 10 Foot High Straight Shaft Poles:

- i) 10 foot high straight poles shall consist of a straight shaft which tapers uniformly from the base plate to the nipple plate. **Overall height** of the

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pole from top surface of the nipple plate to the bottom of the base plate shall be **10 feet, + 1 inch**.

- ii) the exterior dimensions of the 10 foot pole shaft walls measured "across the flats" shall be as follows:
 - a) exterior dimensions "across the flats" at **top** of the shaft (at nipple plate) shall be **4 3/4 inches +0, -1/8 inch**; and
 - b) *exterior dimensions "across the flats" at **bottom** of the shaft (at base plate) shall be **7 inches +0, - 1/8 inch**.*
- iii) at the top of each 10 foot straight shaft pole shall be a nipple plate made of 1/2-inch steel plate. Centered within that plate shall be a 1-1/2 inch IPS non-tapered threaded nipple extending through and projecting 1-1/2 inch (+ 1/8, -0) above the nipple plate. The nipple shall be fastened to the plate with a circumferential weld on the **interior** side of the nipple plate. The nipple shall be aligned within 1 degree of the vertical centreline of the pole. The threads shall be continuous and uninterrupted from the top of the nipple to within a distance of 1/16-inch or less, from the top surface of the nipple plate. The nipple plate shall be level and smooth such that a traffic signal head will sit —flat and true“ on the plate.
- iv) The nipple plate shall be octagonal in shape to match the internal — across flats“ dimension of the 10 foot pole shaft and shall be inserted partially into and welded circumferentially to the top of the pole shaft.
- e) Backboards designed for plumbizer mounted signal heads shall be continuously adjustable so as to fit any plumbizer bracket ranging from one (1) inch —thick to two (2) inches —thick (thickness being defined as the separation distance required between the two (2) head sections to accommodate the plumbizer.

3.2 Pedestrian Heads:

- a) Pedestrian signal heads shall be twelve (12) inch square, and must meet the current edition of the ITE specification.

3.3 Pedestrian Lenses:

- a) All pedestrian indications shall be LED;
- b) LED pedestrian indications shall meet the current edition of the ITE specification for the lenses they are replacing;
- c) LED pedestrian indications shall be BIMODAL LED with lunar white walking man figure and Portland orange upraised hand, both outlined only. The filled in hand figure will not be accepted as being compliant to this specification;
- d) Pedestrian signal lenses, when asked for, must meet the current edition of the ITE specification.

3.4 Signal Heads:

- a) Vehicle traffic signal heads shall be a **maximum** of fourteen (14) inches square, and must meet the current edition of the ITE specification.

3.5 Signal Lenses:

- a) All vehicular indications shall be LED;

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- b) LED vehicular indications shall meet the current edition of the ITE specification for the lenses they are replacing;
 - c) Vehicular signal lenses, when asked for, must meet the current edition of the ITE specification for Red, Amber, Amber Arrow (left & right), Green, Green Arrow and transit priority vertical lunar white bar;
- 3.6 Visor Design:
- a) All visors shall be of cut-away design; and
 - b) Tunnel visors for both signal and pedestrian heads will be by special order and covered by a separate specification and are not part of this Contract.

4. AASHTO STANDARDS

- 4.1 All traffic signal and pedestrian signal heads shall be designed in accordance with the latest revisions of the requirements of the AASHTO standard specifications for structural supports for highway signs, luminaries and traffic signals.

5. WIND LOAD

- 5.1 All traffic signal and pedestrian signal heads shall be designed to withstand gust wind velocities up to and including 100 miles per hr, equivalent to a wind pressure $P = 25.6 C_d C_h$ for a single point (top or bottom) head mounting.
- 5.2 All backboard mounting shall be designed to withstand gust wind velocities up to and including 80 miles per hr.

6. PAINTING

- 6.1 All burrs and sharp edges must be made smooth on traffic signal and pedestrian signal heads and backboards before painting.
- 6.2 The traffic signal and pedestrian heads and backboards shall be degreased with a suitable solvent or steam cleaning process before painting.
- 6.3 The traffic signal and pedestrian heads and backboards aluminum shall be etched, if required, by the product recommended by the paint manufacturer.
- 6.4 The traffic signal and pedestrian heads and backboards shall be undercoat painted, with an appropriate undercoat paint, if required by the topcoat paint manufacturer.
- 6.5 The traffic signal heads shall be topcoat painted with an Epoxy polyester powder coat paint, in U.S.A. Standard colour Federal YELLOW number 595A-13538 or 13415, or BLACK as required. The pedestrian heads shall be topcoat painted BLACK as described in clause 6.4.
- 6.6 The backboards shall be topcoat painted with an Epoxy polyester powder coat paint, in U.S.A. Standard colour Federal YELLOW number 13415, or BLACK as required.
- 6.7 All parts referenced in the ITE specification that must be FLAT BLACK must conform to the ITE requirements.

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7. ASSEMBLY

- 7.1 All heads shall be assembled, excluding backboard, in the configuration specified in the order.
- 7.2 Visors may be packaged separately from the head assembly if desired.
- 7.3 All sections shall be wired and ready for use.
- 7.4 The traffic signal heads shall have the wiring splitters mounted in the LED RED Section in an electrically secure manner.
- 7.5 The pedestrian heads shall have the wiring splitters mounted in an electrically secure manner.

8. LED

- 8.1 All traffic signal and pedestrian signal indications shall be LED (Light Emitting Diode) type unless otherwise specified in the contract document. LED signal indications shall meet the most current ITE LED signal (or otherwise Interim) specification.
- 8.2 All shall meet the ITE specification for the color of lens they are replacing.
- 8.3 All pedestrian heads **shall have** a dual (BiModal) LED Portland orange hand and lunar white walking man, outlined only, in place of the standard Reflector/Lens/bulb assembly. The pedestrian indication shall meet the ITE specification for dual Portland orange hand and lunar white walking man LED displays. The dual indication pedestrian heads shall be provided in a single section only.
- 8.4 LED units shall properly fit within all ITE conforming traffic signal and pedestrian signal heads for eight (8) inch or twelve (12) inch signal sections as per design.
 - a) All light emitting diodes units shall conform to the current ITE specification for LED signals for Lumen Output and Chromaticity;
 - b) Units shall have a diode string failure rate of no more that —1 for 4", that is, for any individual diode failure no more that four (4) diodes may be out unless the ITE specification for LED signals specifies a lower amount;
 - c) Design of symbols shall conform to ITE standards for circular (Red/Amber/Green), Hand (outline only as to the Manual of Uniform Traffic Control Devices, Canadian Standard), Walking Man (outline only as to the MUTCD Canadian Standard), Arrows, bus priority, and the City of Winnipeg U-turn arrow;
 - d) All arrow LED units shall have two rows of LED's for each segment making up the arrow configuration, and conform to the Manual of Uniform Traffic Control Devices Canadian Standard with respect to configuration and dimensions for arrow indications;
 - e) Units shall operate from 90 to 135 volts RMS 60 Hz. alternating and from minus 40 to plus 165 degrees Fahrenheit and from zero to one hundred percent humidity;
 - f) Units shall have a sharp voltage turn-off characteristic, decaying to less that 15 volts A.C. RMS within 200 milliseconds of removal of power, over the full 90 to

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135 VAC specified operating voltage range, so as to not to cause false triggering of a signal Conflict Monitor device due to extended turn-off voltage decay;

- g) Units shall not show any visible light when in the OFF condition when attached to a Model 200 switch pack as used in the 170 type controller 33X control cabinet, (Evaluation of this requirement shall be undertaken in total darkness);
 - h) Each UNIT shall be identified with manufacture's name, wattage, voltage range, date of manufacture and —serial number, if used"; and
 - i) All circuit boards, including the LED mounting circuit board shall be conformal coated.
- 8.5 The Manufacture shall warrant that all the LED units be guaranteed against failure of any component, and maintaining of ITE Lumen Output and Chromaticity, for five (5) years from date of acceptance by the City of Winnipeg.

9. PACKAGING

- 9.1 Each assembled traffic signal head shall be packaged separately, in a manner suitable to protect the unit and paint from damage.
- 9.2 Each assembled pedestrian head shall be packaged separately, in a manner suitable to protect the unit and paint from damage.
- 9.3 Each package shall have the configuration of the Head clearly indicated.
- 9.4 Visors, if packaged separately, shall be protected from damaging each other in packaging and have the size, colour type and amount in package clearly indicated on the package.
- 9.5 Backboards shall be packaged in suitable quantities for handling manually and, if required by the paint manufacturer, separated with suitable packing material.