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1.0 Scope

This specification covers the requirements for polycarbonate vehicle signal and pedestrian signal heads and associated components and accessories.

2.0 References

This specification refers to the following standards, specifications and publications:

Toronto Transportation:

TTS 808.200 Traffic Signal Arms, Bracket, Hangers, Fittings, and Hardware.

Others:

US Federal Specification Color Yellow 595a-33538.

ITE Publication No. ST-017A-1997 - Equipment and Materials Standards of the Institute of Transportation Engineers

3.0 Definitions

The definitions included in ITE Publication No. ST-017A-1997 shall apply to this specification.

4.0 Submission & Design Requirements

For the purposes of design, the signal heads shall be assumed to be supported as shown below.

Head Size and Type	Applicable Mounting Arrangement		
	Rubber Cushion Head Hanger	Two point mounting	Plumizer
300mm/200mm/200mm Highway Head	XX	X	X
300mm – Pedestrian signal head	X	XX	
300mm/300mm/300mm Special Highway head	X	X	XX
300mm/300mm/300mm/300mm Special Highway Head	X	XX	X
300mm/300mm/300mm/300mm/300mm Special Highway Head	X	XX	X

Predominant mounting type shown in **Bold XX**.

5.0 Materials

5.1 General

Signal heads, components and accessories shall conform to ITE Publication No. ST-017A-1997 except as otherwise described herein. All signal heads shall be supplied without lamps.

All vehicle signal heads shall be designed to withstand maximum wind loading as per ITE Publication No. ST-017A-1997.

5.2 Signal Head Housing

The signal head housing shall be one-piece moulded polycarbonate body and left hinged door assembly. The signal head housing shall be one piece of material with sides, top and bottom integrally cast or moulded with ribbing to ensure sufficient strength. The signal head housing shall be constructed with two integrally moulded hinges for door attachment on the left side. The housing shall be constructed with internally moulded latch screw slot for stainless steel captive bolts with wing nuts on the right side or other approved locking mechanism.

The door assembly shall have separate sets of stainless steel screws for LED module and visor attachment. The individual signal housings shall be self-aligning when installed together. The top section of the signal housing shall be provided with serration around a 50 mm opening to allow setting of the signal head in 5° increments over a full 360° of rotation. The top and bottom of the housing shall have an opening to accommodate standard 38 mm I.D. pipe brackets. The signal head shall be moulded, ultraviolet and heat stabilized, flame retardant resin, and, excluding the pedestrian signal head door, shall be yellow conforming to US Federal Specification Color Yellow 595a-33538. Pedestrian signal head door shall be black in colour.

The design of pedestrian signal head housing should allow upside down installation to allow the signal head door to swing from left to right.

5.3 Visors

Each lens shall be provided with a removable polycarbonate visor of the cowl (cap), tunnel, full-circle or louver type as indicated in the contract. The visor for pedestrian signal heads shall be square cowl type with open bottom. The visor shall be moulded polycarbonate with minimum thickness of 2 mm. Each visor shall be securely attached to the door by stainless steel screws. Snap fit visors are not acceptable.

Inside colour of visor is to be flat black, outside is to be yellow to match the head housing.

5.4 Backboards

Flexible “poly” backboards shall be fabricated from high density polyethylene with a minimum thickness of 3 mm and the colour shall be impregnated throughout. All backboards shall be one-piece and shall project a minimum 115 mm width beyond the vehicle signal head housing. The

backboards shall be predrilled to match the mounting holes of the vehicle signal heads. The backboards shall also have built-in adjustments to accommodate plumizer installations. Backboards shall be yellow both sides conforming to US Federal Specification Color Yellow 595a-33538.

5.5 Paint

Paint for inside of visors shall be flat black paint. Pedestrian signal head doors shall be black. Unless otherwise indicated, standard colour No. 595a-33538 (yellow) conforming to US Federal Specification 595a-33538 shall be used for vehicle signal and pedestrian signal head sections, bird plugs, backboards and outside surface of visor. Other than the inside of the visors, all non-metallic materials shall have the colour completely impregnated in the material.

5.6 Reinforcing Plate

Stainless steel reinforcing plate(s) shall be provided as per the manufacturer's recommendation depending on the mounting arrangement specified for the head.

5.7 Bird Plug

Depending on the mounting arrangement specified for the head, removable sealing device(s) (bird plugs) shall be provided as required. Bird plugs may be flush mounting, two piece round disc type design complete with bolt, nut and locking washer. Alternatively bird plugs may be one piece round type complete with self tapping screw. Friction fit bird plugs are not acceptable. Round rubber bird plug washers are to be provided as required.

5.8 Hardware

All hinges, latching mechanisms, screws, retainer clips and washers shall be stainless steel. Screws used for visor attachment, backboard attachment, LED module retainer clips and bird plugs shall have Robertson type screw heads.

6.0 Production

6.1 General

Sectional signal heads shall be supplied as indicated in the contract. Where multiple sections are indicated, lenses shall be arranged in the following order commencing from the top to the bottom:

1. Red
 2. Amber
 3. Green
 4. Straight Through Green Arrow
 5. Left Turn Green Arrow
 6. Right Turn Green Arrow
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Where any of the foregoing indications are not required, the order of arrangement shall be maintained by omitting those sections which are not required.

Pedestrian signal heads shall consist of two 300 mm sections suitable for 300 mm round LED modules. Standard square cowl visors shall be provided.

Each section shall be comprised of a signal head housing and visor of the type indicated in the contract. The individual signal housings shall be securely attached together to prevent separation.

6.2 Assembly

All components shall be factory assembled using mechanical devices conforming to the strength requirements of ITE Publication No. ST-017A-1997.

6.3 Marking

Each signal head shall have identification marking showing the manufacturer's name and trade mark, and the date of manufacture.

7.0 Quality Assurance

7.1 Warranty

All equipment, excluding backboards, covered by this specification is to be guaranteed by the Supplier to be free of material or workmanship defects for a period of one (1) year from the date of installation by Toronto Transportation. All backboards covered by this specification are to be guaranteed by the Supplier to be free of material or workmanship defects for a period of two (2) year from the date of installation by Toronto Transportation. Any equipment which is proven to be defective in material or workmanship will be replaced or repaired by the Supplier at no cost to Toronto Transportation. Warranty is for the equipment only and specifically excludes labour or sub-contracting charges.

8.0 Toronto Transportation Purchase Of Material

8.1 Submissions – Pre-approval

All vehicle signal and pedestrian signal heads and accessories are to be pre-approved by the City of Toronto. The Supplier, at no cost to the City of Toronto, shall submit two samples of each type of assembled component to Toronto Transportation for review. Samples may be subjected to destructive testing. Such testing shall be done by Toronto Transportation personnel or their agents as may be required to determine conformance with the design requirements of this specification. This testing and evaluation period shall not exceed 30 calendar days from the date of receipt of the samples.

Samples submitted for review will be approved by Toronto Transportation if found to be acceptable, or will be marked with corrections if not found to be acceptable. The Supplier shall resubmit corrected samples within 14 calendar days. One sample of the final approved assembly will be retained by the City of Toronto.

If the Supplier has previously submitted samples and received “approval” from Toronto Transportation, only reference to the original submission is required.

8.2 Technical Information to be Supplied to the Bidder

The following technical information shall be supplied to the bidder:

1. Type of head
2. Type of visors
3. Mounting arrangement
4. Components and accessories (if required).

8.3 Technical Information to be Provided in Quotations/Contracts

Only pre-approved products may be submitted.

8.4 Inspection

All material and workmanship is subject to an inspection by Toronto Transportation or its representative upon delivery to Toronto Transportation. When requested, the Supplier shall notify Toronto Transportation of the date that the fabrication of the equipment will commence.

Toronto Transportation’s representative or agent shall have access to the place of manufacture, while work is being performed, for the purpose of inspecting and examining plant records and certificates, material used, process of manufacturing and to make any tests considered necessary to ensure compliance with this specification.

8.5 Packaging and Shipment

All materials shall be shipped suitably packaged to avoid damage and to ensure that all parts are delivered as an entity.

Vehicle signal and pedestrian signal heads shall be shipped without visors attached. Vehicle signal heads are to be shipped with reinforcing plates installed. Bird plugs and bird plug washers may be packaged separately in cardboard cartons. Visors and backboards are to be packaged separately. Backboard screws may be packaged separately.

All packaging is to be marked to clearly indicate contents. Packaging containing plumizer mounted vehicle signal heads are to be clearly marked.

Delivery shall take place during normal business hours (0800 to 1600 hours, Monday to Friday). Monthly and special order deliveries shall take place as specified.

8.6 Measurement of Payment

Measurement will be made for each item as specified in the contract.

8.7 Basis of Payment

Payment at the quotation/contract price shall be full compensation for all labour, equipment and materials required to do the work including manufacture, testing, packaging, and shipment and delivery at the time and the place shown on the purchasing document.