

Specification For: Supply of Steel Traffic Signals and Pedestrian Corridor Structures

1. SCOPE

- a) These Specifications cover all operations necessary for and pertaining to the supply of materials, fabrication, hot-dip galvanizing and delivery of steel traffic signal and pedestrian corridor structures.
- b) The Work shall be done in accordance with these Specifications and as shown on the Drawings. The work by the Contractor shall include the furnishing of all superintendence, overhead, labour, materials, equipment, tools, supplies, and all things necessary for and incidental to the satisfactory performance and completion of all Works as hereinafter specified.

2. MATERIALS

2.1. General

- a) All materials used for fabrication of traffic signal and pedestrian corridor structures shall be new, previously unused material.

2.2. Handling and Storage of Materials

- a) The Supplier shall be responsible for the supply, safe storage and handling of all materials in a careful and workmanship-like manner, to the satisfaction of the Engineer.
- b) Significant nicks or scratches caused by improper lifting and handling during fabrication and surface preparation work shall be grounds for repair or rejection at the sole discretion of the Engineer.
- c) Following galvanizing, protective sleeves shall be used on metallic lifting chains or forklift forks coming in contact with the structures. Nicks or scratches in the galvanizing coating will be grounds for repair or rejection at the sole discretion of the Engineer.
- d) After galvanizing, the structures shall be stored on wood blocking and kept free from contact with debris, mud and standing water at all times.
- e) Suitable dunnage, spacers and tie downs shall be used during the transportation and delivery of galvanized components to Manitoba Infrastructure Warehouse Stores in Winnipeg.

2.3. Structural Steel

- a) Structural steel shall be in accordance with CSA G40.21-M-350W unless otherwise noted on the Standard Drawings.
  - b) For purposes of hot-dip galvanizing, the silicon content in the steel shall be controlled as follows:
-

Specification For: Supply of Steel Traffic Signals and Pedestrian Corridor Structures

- i. For monotubular steel shafts and arms, to within 0 to 0.03% or within 0.15 to 0.22%
- ii. For all other components: below 0.30%.

#### 2.4. Hot-Dip Galvanizing

Hot-dip galvanizing shall be in accordance with ASTM A123 – 09 to a net minimum retention of 610 g/m<sup>2</sup>.

#### 2.5. Galvanizing Touch-up and Field-Applied Galvanizing

- a) Only approved products for self-fluxing, low temperature, zinc-based alloy rods in accordance with ASTM A780-09(2015) for “Repair of Damaged and Uncoated Areas of Hot-Dip Galvanized Coatings” shall be used for field-applied galvanizing, to touch-up damaged hot-dip galvanizing on-site and to galvanize field welds. Approved products are:
  - i. Galvalloy as manufactured by Metalloy Products Company, P.O. Box No. 3093, Terminal Annex, Los Angeles, California, available from Welder Supplies Limited, 150 McPhillips Street, Winnipeg.
  - ii. Welco Gal-Viz Galvanizing Alloy, as manufactured by Thermocote Welco, Highway 161, York Road, Kings Mountain, North Carolina, available from Welder Supplies Limited, 150 McPhillips Street, Winnipeg.

#### 2.6. Cold Applied Galvanizing Compound

- a) An Approved cold-applied galvanizing compound is ZINGA, as manufactured by ZINGAMETALL, Ghent, Belgium, available from Pacific Evergreen Industries Ltd. Vancouver, BC, Ph. 604-926-5564, and Centennial Mine & Industrial Supply, Saskatoon, Sask., Ph. 306-975-1944.

#### 2.7. Welding Consumables

- a) The selection, supply, and storage of electrodes for all processes shall be in accordance with CSA W59 (latest edition) and CSA W48 (latest edition). Only controlled hydrogen designation electrodes and low hydrogen wire consumables shall be used for the Shielded Metal-Arc Welding (SMAW) and Flux-Cored Arc Welding (FCAW) processes, respectively.
- b) Electrodes and fluxes shall be strictly stored and maintained as required by CSA W59, section 5.2.

#### 2.8. Connection Bolts

- a) Connection bolts shall be ASTM A325 Type 1 high strength bolts each with one grade DH nut and one hardened washer, all hot-dip galvanized in accordance with ASTM F2329.

Specification For: Supply of Steel Traffic Signals and Pedestrian Corridor Structures

- b) The galvanized nuts shall be over-tapped to the minimum amount required for fastener assembly. The nuts shall be lubricated with a lubricant containing a visible dye. The lubricant shall be clean and dry to the touch.

2.9. Non-Metallic Cover Material

- a) The non-metallic access panel covers shall be fabricated using a strong, durable, ultraviolet-stabilized, and tamper-proof extruded plastic material that is not subject to breakage or deformation under temperatures ranging from -50° C to +50° C.
- b) The material for access panel covers shall be a homogenous colour throughout. The final colour of the covers shall be similar to galvanized steel. Painted covers are not acceptable.

2.10. Wind Deflector

- a) The wind deflector material shall be Type 316 stainless steel according to the ASTM specifications shown on the drawings.

2.11. Stainless Steel Hardware

- a) Stainless steel hardware shall be in accordance with ASTM A276 Type 316 stainless steel unless otherwise shown on the Drawings.
- b) Stainless steel threaded rod shall be in accordance with ASTM F593 Type 316 stainless steel unless otherwise shown on the Drawings.

2.12. Miscellaneous Materials

- a) Miscellaneous material incidental to this work shall be as approved by the Engineer.

3. SUBMITTALS

3.1 General

All submittals shall be in PDF format and shall be sent electronically to the Engineer. Submittals required by the Supplier include the following documents:

- a) Shop Drawings.
  - b) Mill Test Certificates including Heat Numbers for all steel materials.
  - c) Material Testing Certificates.
-

Specification For: Supply of Steel Traffic Signals and Pedestrian Corridor Structures

- d) Current Letter of Validation giving evidence that the plant, including those located outside Canada, have recently been fully approved by the Canadian Welding Bureau (CWB) to the requirements of CSA W47.1 Division 2.1 for welding of steel structures.
- e) Current Welding Qualification Certificates for all welding personnel of the Supplier and the sub-Suppliers, including those based outside Canada, indicating that they are qualified to CSA Standard W47.1
- f) All costs resulting from any changes or due to failure to have submissions reviewed by the Engineer shall be borne by the Supplier

3.2 Shop Drawings

- a) The Supplier shall submit shop drawings to the Engineer within fourteen (14) working days from award of contract. All shop drawings shall be sealed, signed, and dated by a Professional Engineer, registered or licensed to practice in the Province of Manitoba.
- b) Shop drawings shall be complete and shall include all information such as material specifications, weld sizes, welding procedures and design criteria etc., as well as bills of material and the location and sizes of venting and drainage holes required for hot-dip galvanizing. Any deviations/changes from the Standard Drawings shall be clearly marked and clouded on the shop drawings. The Supplier shall request all changes or deviations to the Standard Drawings in writing and any verbal discussions will not be accepted. The Engineer will respond to all requests in writing.
- c) The Engineer's review of the shop drawings will not relieve the Supplier of their responsibility for errors and omissions in the Submittals including adequacy of fabrication materials, procedures and methodologies, and design intent or of the responsibility for meeting the requirements of the Contract, unless identified deviations/changes on Submittals have been acknowledged and specifically approved by the Engineer.
- d) No fabrication shall commence until all shop drawings have been reviewed and returned to the Supplier with the Engineer's approval stamp. All costs resulting from any changes or due to failure to have shop drawings so reviewed shall be borne by the Supplier.
- e) Shop drawings shall indicate the total weight and center of gravity of each component for lifting and rigging purposes.

3.3 Mill Test Certificates

- a) The Supplier is advised that copies of mill test certificates showing the chemical and physical properties of all structural steel to be supplied under this Specification must be submitted to the Engineer. The mill test certificates shall be submitted at least fourteen (14) working days prior to commencement of product fabrication for acceptance by the Engineer.
-

Specification For: Supply of Steel Traffic Signals and Pedestrian Corridor Structures

- b) Steel shall not be acceptable unless the mill test certificate states the grade to be in accordance with the grades stated on the Drawings. Lower grade steel shall not be acceptable (despite favourable published mill test yield results). Items fabricated without steel certification will be rejected.
- c) Where mill test certificates for, but not limited to, structural steel, bolts and washer assemblies, and miscellaneous metal, are from a mill outside Canada or the United States of America (USA), the Supplier shall have the information on the mill test certificate tested and verified by a certified independent testing laboratory based in Canada. This laboratory shall be certified by an organization accredited by the Structures Council of Canada to comply with the requirements of ISO/IEC 17025 for the specific tests or type of tests required by the material standard specified on the mill test certificate. The testing information and results of the material listed on the mill test certificates shall be stamped with the name of the Canadian laboratory and appropriate wording stating that the material is in conformance with the specified requirements. The stamp shall include the appropriate material specification number, testing date and signature of an authorized officer of the Canadian laboratory. Testing is subject to the Departments approval. The Supplier shall submit to the Engineer mill certificates for each lot of material and Heat Number for structural steel material to be incorporated into the completed work. The certificates shall show that the material is supplied in accordance with the specifications. The Supplier shall pay all costs for verification and reporting of mill test certificates.

### 3.4 Material Testing of Steel

- a) When structural steel fabrication takes place in a plant outside Canada or the USA, the Supplier shall take steel coupons from the fabricated components after they are delivered to the Canadian plant as directed by the Engineer. The coupons shall be tested to verify the tensile and chemical properties of the structural steel material used in the fabrication of the structures. Coupons shall be taken prior to hot-dip galvanizing operations. Location where coupons are obtained shall be restored with seal-welded plates or other methods subject to approval by the Engineer. Testing of steel coupons shall be conducted at a Canadian testing laboratory accredited by the Structures Council of Canada to comply with the requirements of ISO/IEC 17025 for the specific tests or type of tests required by the Engineer.
- b) All costs for material testing and reporting as well as restoring the coupon locations shall be borne by the Supplier.

## 4. CONSTRUCTION METHODS

### 4.1. Standard Drawings

Standard Drawings forming part of this Specification include the drawings listed in Table 1.

---

Specification For: Supply of Steel Traffic Signals and Pedestrian Corridor Structures

Table 1: List of Standard Drawings

Drawing No.	Description	Part No.
S1	Light Series – 3.5 m Straight Pole	P-L-S35
S2	Light Series – 5.0 m Straight Pole	P-L-S50
S3	Light Series Cantilever – 6.5 m Vertical Shaft	P-L-C65
S4	Light Series Cantilever: a) 2.5 m Signal Arm b) 5.0 m Signal Arm c) 3.0 m Corridor Arm d) 5.0 m Corridor Arm	A-L-S25 A-L-S50 A-L-C30 A-L-C50
S5	Light Series Davit – 6.4 m Shaft	P-L-D64/25
S6	Light Series Davit Extension Shaft: a) 2.5 m Signal Extension Arm b) 2.5 m Corridor Extension Arm	A-L-DS25 A-L-DC25
S7	Medium Series Double Cantilever – 6.5 m Vertical Shaft	P-M-DC65
S8	Medium Series Cantilever – 6.5 m Vertical Shaft	P-M-C65
S9	Medium Series Cantilever: a) 5.0 m Signal Arm b) 6.0 m Signal Arm c) 7.5 m Signal Arm d) 3.0 m Corridor Arm e) 5.0 m Corridor Arm f) 6.0 m Corridor Arm g) 7.5 m Corridor Arm	A-M-S50 A-M-S60 A-M-S75 A-M-C30 A-M-C50 A-M-C60 A-M-C75
S10	Heavy Series Cantilever – 6.8 m Vertical Shaft	P-H-C68
S11	Heavy Series Cantilever: a) 7.5 m Signal Arm b) 9.0 m Signal Arm c) 10.5 m Signal Arm d) 12.8 m Signal Arm e) 15.0 m Signal Arm	A-H-S75 A-H-S90 A-H-S105 A-H-S128 A-H-S150
S12	Heavy Series Cantilever: a) 7.5 m Advance Warning Signal Arm b) 9.0 m Advance Warning Signal Arm	A-H-AW75 A-H-AW90
S13	Extra Heavy Series Cantilever Vertical Shaft – 6.8 m	P-EH-C68
S14	Extra Heavy Series Cantilever Traffic Signal Arms: a) 17.0 m Signal Arm b) 18.5 m Signal Arm	A-EH-S170 A-EH-S185
S15	Extra Heavy Series Advance Warning Sign Arms: a) 10.5 m Advance Warning Sign Arm b) 15.0 m Advance Warning Sign Arm	A-EH-AW105 A-EH-AW150
S16	Luminaire Davit Extension	E-D38/30
S17	Tenon Extension Shafts a) 5.4 m Extension Shaft b) 6.9 m Extension Shaft c) 8.4 m Extension Shaft	E-S54 E-S69 E-S84

Specification For: Supply of Steel Traffic Signals and Pedestrian Corridor Structures

Drawing No.	Description	Part No.
S18	Stub Extension Shafts	
	a) 1.5 m Stub Extension Shaft	E-STUB15
	b) 3.0 m Stub Extension Shaft	E-STUB30
	c) 4.5 m Stub Extension Shaft	E-STUB45
	d) 6.1 m Stub Extension Shaft	E-STUB61
S19	Hydro Luminaire Adaptor	HLA
S20	Shaft Access Details:	
	a) Access Panel and Non-Metallic Access Panel Cover	AP1
	b) Handhole	H1
S21	Wind Deflector Assembly	WD1
S22	Rotating Base Assembly	

#### 4.2. General Requirements

- a) The details shown on the Standard Drawings shall not be changed unless approved in writing by the Engineer.
- b) Care shall be taken to ensure that flange connections remain interchangeable.
- c) All extension arms shall be fabricated in one piece without any flanges, except where the arm is attached to the vertical member.
- d) Holes in the base plates shall be sized as shown on the Drawings, and provisions made for field erection must be accurate within plus or minus 13 mm between supports, without affecting final installation and load capacity.
- e) Sufficient reinforced handholes and wiring holes shall be provided for lighting of the signs as shown on the Drawings. All wiring holes shall have threaded couplings. All coupling holes shall be capped with a ballistic nylon plug before shipping.
- f) Adequate venting and drainage holes shall be provided in enclosed sections for hot-dip galvanizing. The galvanizing facilities shall be consulted regarding the size and location of these holes. Holes shall be provided by drilling, not burning.
- g) Prior to fabrication, the dimensional limitations on the size and shape imposed by the galvanizing facilities shall be determined for hot-dip galvanizing all individual components of the traffic signal and pedestrian corridor structures.

Specification For: Supply of Steel Traffic Signals and Pedestrian Corridor Structures

#### 4.3. Fabrication

- a) All fabrication shall be carried out in accordance with this Specification and the approved Shop Drawings, as well as AASHTO LRFD Specifications for Structural Supports for Highway Signs, Luminaires and Traffic Signals – 2015 Edition, plus all subsequent revisions.
- b) Each tubular component shall be fabricated in one piece, except where joints are indicated on the Standard Drawings.
- c) Access panel, handhole and tenon cap details shall be in accordance with the Standard Drawings.
- d) The punching of identification marks on the members will not be allowed, except for the structure identification number.
- e) Any damage to members during fabrication shall be brought to the attention of the Engineer in order that the Engineer may approve remedial measures.
- f) All portions of the work shall be neatly finished. Shearing, cutting, clipping and machining shall be done neatly and accurately. Finished members shall be true to line, free from twists, bends, sharp corners, and edges.
- g) Cut edges shall be true and smooth and free from excessive burrs or ragged breaks. Re-entrant cuts shall be avoided wherever possible. If used, they shall be filleted by drilling prior to cutting.
- h) All holes shall be free of burrs and rough edges.

#### 4.4. Welding

- a) Welding shall be in accordance with CSA W59, "Welded Steel Construction" (latest edition).
  - b) The proposed welding procedures and welding consumable certificates shall be submitted to the Engineer as indicated in Section 3, Submittals.
  - c) All seams shall be continuously welded and free from any slag and splatter. Longitudinal seam welds shall be a minimum of 70% by submerged arc welding (SAW) methods. Welds within 800 mm of baseplates and within 200 mm of flanges and end openings shall be 100% full penetration. The full penetration welds shall be provided by gouging from the inside and outside of the member. All circumferential groove welds shall be 100% penetration, and where circumferential welds are used at a butt joint, an internal backup strip shall be provided.
  - d) Longitudinal seam welds in davit arms and extensions shall be located at the bottom of the horizontal members. Only one (1) longitudinal seam is permitted in each member.
-



Specification For: Supply of Steel Traffic Signals and Pedestrian Corridor Structures

- e) Welds joining monotubular column or arm elements to base or flange plates shall be unequal leg welds, with the long leg of the fillet weld along the column or arm. The termination of the longer weld leg shall contact the shaft's surface at approximately a 30° angle.
- f) All welds shall be ground smooth and flush with the adjacent surface prior to hot-dip galvanizing.

#### 4.5. Surface Preparation and Cleaning

- a) Surface preparation and cleaning of materials prior to hot-dip galvanizing shall be in accordance with ASTM A153 and SSPC Specification SP:6 "Commercial Blast Cleaning", unless otherwise specified herein. The Supplier shall ensure that the exterior of all individual components of the structures are blast cleaned prior to pickling to achieve the minimum zinc coating mass of 610 g/m<sup>2</sup>. All welding and provision of holes is to be completed prior to surface preparation and cleaning, except where shown on the Drawings.
- b) The sandblasting and cleaning of all components shall be done in the shop.
- c) After sandblasting, the inside and outside of the structure shall be cleaned free of all sand and sandblasting debris by means of blowing with compressed air and/or vacuuming to the satisfaction of the Engineer.
- d) After the fabricated components have been sandblasted and cleaned, an inspection agency appointed by the Department will carry out a visual inspection of the components in the shop before they are shipped to the galvanizing plant.
- e) Following sandblasting, the structures shall be galvanized as soon as practical. If significant surface rusting should develop on the structures before they are galvanized, they shall be re-sandblasted as directed by the Engineer.

#### 4.6. Hot-Dip Galvanizing

##### 4.6.1. General

- a) The hot-dip galvanizing plant shall be a Regular Member of the American Galvanizers Association, Inc.
  - b) Hot-dip galvanizing shall be in accordance with ASTM A123 (latest edition) to a net minimum retention of 610 g/m<sup>2</sup>. The Supplier shall safeguard against embrittlement of the fabricated steel in accordance with ASTM A143 – 07 "Standard Practice for Safeguarding Against Embrittlement of Hot-Dip Galvanized Structural Steel Products and Procedure for Detecting Embrittlement".
  - c) All outside surfaces and interior surfaces of all individual components of the traffic signal and pedestrian corridor structures shall be hot-dip galvanized in accordance with the requirements of this Specification.
-

Specification For: Supply of Steel Traffic Signals and Pedestrian Corridor Structures

- d) The galvanizing coating on outside surfaces of the structures shall be generally smooth and free of blisters, lumpiness and runs. In particular, the outside surfaces of the bottom 2.5 m of the vertical support members shall have a smooth finish equal to the finish on hot-dipped galvanized handrails.
- e) The aesthetic appearance of the structure after hot-dip galvanizing will be a criterion in the acceptance or rejection of the galvanized coating. The galvanized coating on the entire structure shall have a uniform "silver" colour and luster. Galvanizing with parts of the structure having dull grey coating or streaks or mottled appearance will not be acceptable. If the galvanizing is rejected for aesthetic reasons, the Supplier shall rectify the appearance by applying spray-on molten zinc metallizing with 85/15 zinc/aluminum alloy. The metallizing shall be carried out in the shop before the structure is installed.
- f) To prevent problems with aesthetic appearance of structures after hot-dip galvanizing, the Supplier shall be responsible for ensuring that the silicon content in the steel used for fabricating the structures is controlled as specified herein.
- g) Defects in the galvanizing coating shall be repaired in accordance with Section 5.5.2 of this Specification. The Engineer shall be consulted before repairs are made. Other defects and contaminants in the galvanizing coating, such as heavy dross protrusions, flux inclusions and ash inclusions shall be grounds for rejection of the galvanizing coating system.
- h) The Supplier shall verify the thickness of galvanized coatings as directed by the Engineer and have these readings available for review.
- i) All threaded attachments and couplings shall be re-threaded after the sign structures have been hot-dip galvanized.
- j) All external galvanizing vent and drain holes shall be filled with either aluminum or plastic tapered plugs.
- k) After hot-dip galvanizing, the structure shall be stored (at the Galvanizing Plant and at the Supplier's Yard) on timber blocking with all the flanges and base plates completely supported above the ground.

4.6.2. Repair of Damaged Galvanizing

- a) Any areas of damaged galvanizing on the Structures shall receive field-applied touch-up galvanizing. Repair materials and procedure shall be supplied and performed in accordance with ASTM A780 – 09 "Standard Practice for Repair of Damaged and Uncoated Areas of Hot-Dip Galvanized Coatings".
-

Specification For: Supply of Steel Traffic Signals and Pedestrian Corridor Structures

- b) Surfaces to receive touch-up galvanizing shall be cleaned using a wire brush, a light grinding action, or mild blasting to remove loose, scale, rust, paint, grease, dirt, or other contaminants.
- c) For self-fluxing, low temperature, zinc-based alloy rods, preheat the surface to 315°C and wire brush the surface during preheating. Rub the cleaned preheated area with the repair stick to deposit an evenly distributed layer of zinc alloy. Spread the alloy with a wire brush, spatula, or similar tool. Field-applied galvanizing shall be blended into existing galvanizing of surrounding surfaces and shall be buffed and polished if required to match the surrounding surfaces. Care shall be taken to not overheat surfaces beyond 400°C and to not apply direct flame to the alloy rods.
- d) For cold applied galvanizing compound, the approved product shall be applied by either a brush or roller. The compound shall be applied in three (3) coats, with each coat having a dry film thickness of 60 µm (2.4 mils). Each coat shall be left to dry for a minimum of one (1) hour before the application of the next coat.
- e) All costs associated with galvanizing touch up and repair shall be borne by the Contractor. No additional payment will be made.
- f) No repair shall be made until agreed to by the Department.

#### 4.7. Non-Metallic Cover

- a) The non-metallic cover shall be fabricated in accordance with the details on the Standard Drawings.
  - b) A sample cover shall be submitted, at the Supplier's cost, to the Engineer for approval prior to producing the covers for the contract.
  - c) The cover shall be fabricated of material with a minimum thickness of 3 mm (1/8 in). Flat covers will be rejected.
  - d) The access panel cover shall have a smooth and continuous circumferential perimeter flange. When mounted, the flange shall overlap the outside edge of the access panel ring sufficiently to prevent driven snow or rain entry into the access panel. The flange shall be located no greater than 6 mm from the outside edge of the access panel ring.
  - e) The cover shall bear down onto the access panel ring and lay flush against the entire perimeter of the access panel ring when the cover is attached.
  - f) The cover shall have a smooth and continuous internally extruded ring. The ring shall be located approximately 5 mm from the inside of the clear opening of the pole's access panel steel ring. The width and depth of the internal ring extrusion shall be sufficient as to provide rigidity to the cover, to channel rogue moisture away from the terminal strip, and
-

Specification For: Supply of Steel Traffic Signals and Pedestrian Corridor Structures

not interfere with the mounting of the access cover. The maximum size of the extruded ring shall be 16 mm wide x 10 mm deep.

- g) Any additional extrusions into the pole access opening shall be limited to 10 mm except at the mounting bolts. Extrusions exterior to the plane of the access panel's opening shall be limited to 19 mm and shall be functional.
- h) The two recessed counter-sunk holes in the cover for the mounting bolts shall be reinforced on the backside with minimum 6 mm of material during the extrusion process to withstand proper bolt-tightening. The holes shall be centered over the upper and lower bracket mounting holes as detailed on the Standard Drawings.
- i) All edges on the exposed front face of the cover shall be rounded and smooth.
- j) The fabrication and delivery of non-metallic access panel covers will be considered incidental to the supply of steel poles for the structures in the Contract, and no separate payment will be made.

#### 4.8. Wind Deflector

- a) The wind deflector shall be fabricated in accordance with the details on the Standard Drawings.
- b) The fabrication and delivery of wind deflectors will be considered incidental to the supply of steel arms for the structures in the Contract, and no separate payment will be made.

#### 5. IDENTIFICATION

- a) Each structure will be provided with a "raised component name" welded to the component, as indicated on the Drawings. Each character of the component name shall be approximately 25 mm wide by 40 mm tall, with a 10 mm space provided between each character. The weld profile shall be a smooth half round bead approximately 2 mm tall by 3 mm wide.
  - b) For horizontal (arm type) components, locate the start of the welded identification, approximately 150 mm from the inside face of the flange plate, on the underside of the arm.
  - c) For vertical (shaft and stub type) components, locate the bottom of the welded identification, approximately 500 mm from the top face of the flange plate, on the access panel side of the shaft.
  - d) Horizontal (arm type) components shall be marked with a raised "T" welded to the top face of the arm approximately 250 mm away from the flange plate. The raised weld shall conform to the requirements of the "raised component name" described above.
-

Specification For: Supply of Steel Traffic Signals and Pedestrian Corridor Structures

- e) For the non-metallic access panel cover, a label identifying the manufacturer and year of manufacture shall be permanently formed or etched into the inside face of the cover with a minimum 10 mm character height. The format is as follows: "XX – YR" where "XX" shall be the abbreviation or logo of the Contractor's firm, followed by "dash", followed by the last two (2) digits of the year of manufacture

## 6. QUALITY CONTROL

### 6.1 General

- a) All workmanship and all materials furnished and supplied under this Specification are subject to close and systematic inspection and testing by the Department, including all operations from the selection and production of materials, through to final acceptance of the work. The Supplier shall be wholly responsible for the control of all operations incidental thereto notwithstanding any inspection approval that may have been previously given. The Department reserves the right to reject any materials or works that are not in accordance with the requirements of this Specification.
- b) The Supplier shall be responsible for making a thorough inspection of materials to be supplied under this Contract. All material shall be free of surface imperfections and other defects.
- c) The Supplier shall hire and pay for their own independent CSA Quality Control weld inspection program. This is mandatory requirement of the Contract and does not replace the Department's Inspection in Section 6.2.

### 6.2 Inspection by Department

#### 6.2.1 General

- a) The Department will appoint an inspection agency to carry out inspections and testing of work in this Specification. The inspection agency shall report to the Department based on plant inspections of welds, material, fabrication procedures, quality control, mill test certificates, etc. The inspections will include the following:
  - (i) Inspection of all material and proposed fabrication procedures prior to the start of manufacturing.
  - (ii) Inspection of all fabricated components prior to surface preparation.
  - (iii) Inspection of all fabricated components prior to hot-dip galvanizing.
  - (iv) A final inspection following hot-dip galvanizing, prior to shipment from the manufacturer's plant.
- b) The inspection agency shall carry out the following welding inspections and testing:

Specification For: Supply of Steel Traffic Signals and Pedestrian Corridor Structures

- (i) Circumferential Welded Splices: 100% of circumferential welds used to join pole sections together shall be inspected. Inspection shall be performed by Radiography or Ultrasonic Testing, or by destructive tests acceptable to the Engineer.
  - (ii) Longitudinal Seam Welds: 100% of full penetration welds and a random 25% of partial penetration welds of longitudinal seams shall be inspected. Full penetration weld inspections shall be performed by Radiography or Ultrasonic Testing. In addition, partial penetration welds may be inspected by Magnetic Particle. Both types of weld may be tested by destructive methods acceptable to the Engineer.
  - (iii) Base Connection and Flange Plate Connection Welds: A random 25% of all base connection and flange plate connection welds shall be inspected. Full penetration weld inspection may be performed by Radiography or Ultrasonic Testing. Fillet welds may be inspected by Magnetic Particle. Both types of weld may be tested by destructive methods acceptable to the Engineer.
- c) Welds that are found by any of the inspection methods to be inadequate and unsatisfactory shall be repaired in accordance with CSA W59 and then re-tested. The cost of the repairs and the cost of the re-test shall be paid for by the Supplier.
  - d) No repair shall be made until agreed to by the Engineer in writing.
  - e) The Supplier shall fabricate the components (pieces) in batches such that one inspection can be carried out at each stage (fabrication, surface preparation, galvanizing) for each batch. Batches shall consist of a minimum of 10 components. Where practical, batches should include all the items of a particular Part No. A batch shall not be separated or recombined with other batches such that there are less than 10 items in the resulting batch. The inspection agency reserves the right to refuse inspection of components in the event that the minimum batch requirements are not met.
  - f) The Supplier shall only carry out the next step in the fabrication process (e.g. fabrication, surface preparation, galvanizing) only after the completed previous step has been duly inspected.

### 6.3 Unacceptable Work

- a) Any welding work found to be unacceptable shall be corrected in accordance with CSA W59. No repair shall be made until agreed to by the Engineer in writing.

## 7. DELIVERY

- a) The Supplier shall deliver all structures F.O.B. Manitoba Infrastructure Warehouse Stores, 1550 Dublin Avenue, Winnipeg, Manitoba, R3E 0L4.
-

Specification For: Supply of Steel Traffic Signals and Pedestrian Corridor Structures

- b) All structures will be inspected by the Director of Traffic Engineering or his representative upon receipt, before acceptance by this Department.
- c) The Director of Traffic Engineering or his representative shall be informed 48-hours in advance of the anticipated delivery date.
- d) A Bill of Lading shall be prepared by the Supplier clearly identifying all components being delivered. A PDF copy of the Bill of Lading shall be forwarded to the Engineer when the load leaves the plant.
- e) All fasteners and miscellaneous hardware as well as access panel covers and wind deflectors shall be bundled separately for each structure type. Each bundle shall be clearly marked indicating to which items the fasteners and miscellaneous hardware correspond.

8. GUARANTEE

The Supplier shall guarantee all material against defects in quality or workmanship for a period of one year (1) after final acceptance by the Department.

9. METHOD MEASUREMENT

- a) The Supply of Steel Traffic Signal and Pedestrian Corridor Structures will be measured on a unit basis for each type of component. The number of units to be paid for shall be the total number of parts of each component supplied in accordance with this Specification and accepted by the Engineer.

10. BASIS OF PAYMENT

- a) The Supply of Steel Traffic Signal and Pedestrian Corridor Structures will be paid for at the Contract Unit Price per Part No. for the "Items of Work" listed below, measured as specified herein, which price shall be payment in full for supplying all materials and performing all operations herein described, and all other terms incidental to the Work included in this Specification.
-

Specification For: Supply of Steel Traffic Signals and Pedestrian Corridor Structures

Items of Work:

Supply of Steel Traffic Signal and Pedestrian Corridor Structures:

Item No.	Description	Part No.
1.	Light Series – 3.5 m Straight Pole	P-L-S35
2.	Light Series – 5.0 m Straight Pole	P-L-S50
3.	Light Series Cantilever – 6.5 m Vertical Shaft	P-L-C65
4.	Light Series Cantilever – 2.5 m Signal arm	A-L-S25
5.	Light Series Cantilever – 5.0 m Signal arm	A-L-S50
6.	Light Series Cantilever – 3.0 m Corridor Arm	A-L-C30
7.	Light Series Cantilever – 5.0 m Corridor Arm	A-L-C50
8.	Light Series Davit – 6.4 m Shaft	P-L-D64/25
9.	Light Series Davit – 2.5 m Signal Extension Arm	A-L-DS25
10.	Light Series Davit – 2.5 m Corridor Extension Arm	A-L-DC25
11.	Medium Series Double Cantilever – 6.5 m Vertical Shaft	P-M-DC65
12.	Medium Series Cantilever – 6.5 m Vertical Shaft	P-M-C65
13.	Medium Series Cantilever – 5.0 m Signal Arm	A-M-S50
14.	Medium Series Cantilever – 6.0 m Signal Arm	A-M-S60
15.	Medium Series Cantilever – 7.5 m Signal Arm	A-M-S75
16.	Medium Series Cantilever – 3.0 m Corridor Arm	A-M-C30
17.	Medium Series Cantilever – 5.0 m Corridor Arm	A-M-C50
18.	Medium Series Cantilever – 6.0 m Corridor Arm	A-M-C60
19.	Medium Series Cantilever – 7.5 m Corridor Arm	A-M-C75
20.	Heavy Series Cantilever – 6.8 m Vertical Shaft	P-H-C68
21.	Heavy Series Cantilever – 7.5 m Signal Arm	A-H-S75
22.	Heavy Series Cantilever – 9.0 m Signal Arm	A-H-S90
23.	Heavy Series Cantilever – 10.5 m Signal Arm	A-H-S105
24.	Heavy Series Cantilever – 12.8 m Signal Arm	A-H-S128
25.	Heavy Series Cantilever – 15.0 m Signal Arm	A-H-S150
26.	Heavy Series Cantilever – 7.5 m Advance Warning Sign Arm	A-H-AW75
27.	Heavy Series Cantilever – 9.0 m Advance Warning Sign Arm	A-H-AW90



Specification For: Supply of Steel Traffic Signals and Pedestrian Corridor Structures

Item No.	Description	Part No.
28.	Extra Heavy Series Cantilever – 6.8 m Vertical Shaft	P-EH-C68
29.	Extra Heavy Series Cantilever – 17.0 m Signal Arm	A-EH-S170
30.	Extra Heavy Series Cantilever – 18.5 m Signal Arm	A-EH-S185
31.	Extra Heavy Series Cantilever – 10.5 m Advance Warning Sign Arm	A-EH-AW105
32.	Extra Heavy Series Cantilever – 15.0 m Advance Warning Sign Arm	A-EH-AW150
33.	Luminaire Davit Extension	E-D38/30
34.	5.4 m Tenon Extension Shaft	E-S54
35.	6.9 m Tenon Extension Shaft	E-S69
36.	8.4 m Tenon Extension Shaft	E-S84
37.	1.5 m Stub Extension Shaft	E-STUB15
38.	3.0 m Stub Extension Shaft	E-STUB30
39.	4.5 m Stub Extension Shaft	E-STUB45
40.	6.1 m Stub Extension Shaft	E-STUB61
41.	Hydro Luminaire Adaptor	HLA

“Original Signed By”

Approved: \_\_\_\_\_

Glenn Cuthbertson, P. Eng.  
 Director, Traffic Engineering Branch