



# Iowa Department of Transportation

## SPECIAL PROVISIONS FOR DECORATIVE STREET LIGHTING SYSTEM

Greene County  
HDP-4-2(38)--71-37

Effective Date  
11/15/2011

**THE STANDARD SPECIFICATIONS, SERIES 2009, ARE AMENDED BY THE FOLLOWING MODIFICATIONS AND ADDITIONS. THESE ARE SPECIAL PROVISIONS AND THEY SHALL PREVAIL OVER THOSE PUBLISHED IN THE STANDARD SPECIFICATIONS.**

### **090154.01 DESCRIPTION.**

This specification is for the design, fabrication and construction of decorative street lighting system, consisting of footings, poles, luminaires and associated appurtenant items required by the contract documents. Apply Section 2523 to other components of this system.

### **090154.02 MATERIALS.**

#### **A. General.**

1. Products: Subject to compliance with requirements, provide one of the products indicated for each designation in the lighting Schedule or as otherwise indicated on drawings.
2. General: all equipment and materials will be new and free from defects and poor workmanship.
  - a. All electrical parts, wire, switches and other elements of the installations require ample capacity to carry the required current without excessive heating or causing an excessive drop of potential.
  - b. Install a nameplate, indelible marking or brand identifying the type, model, catalog number and manufacturer on each individual item of equipment except as otherwise provided herein.
  - c. The City may request samples of equipment and materials supplied by the Contractor for testing and evaluation.
3. Guarantee. Replace and install free of charge to the city, any material furnished by the contractor that fails in any manner by reason of defective material or workmanship within a period of one year from the date accepted by the city, or the manufacturer's standard warranty, whichever is greater. Warrant performance as advertised and suitability for intended use.

4. Damaged materials. Be responsible to not scratch or damage the paint or galvanized finish on any materials or equipment installed. Touching up minor scratches with two coats of a zinc touched up rich base paint matching the final paint color. The city will not accept major deep scratches on galvanized finishes on poles or other equipment.

## **B. POLES.**

### **1. Description.**

- a. The extruded pole shaft shall be configured utilizing a four-sided dovetail track system.
- b. The exterior of the profile shall be constructed for modular accessory attachments which can be moved or changed after initial installation.
- c. The interior of the pole shall have five independent and separated wiring raceways for initial assembly and post installation wiring flexibility.

### **2. Design.**

The pole shall conform to the requirements of the "Standard Specifications for Structural Supports for Highway Signs, Luminaire and Traffic Signals", 2003 edition by The American Association of State Highway and Transportation Officials for a basic wind speed as specified for supporting luminaire and other accessories as specified by the Contracting Authority.

### **3. Materials.**

- a. Shaft – The shaft shall be constructed of extruded tube of 6061-T6 aluminum in accordance with the requirements of ASTM B221-02. The pole shall be of sufficient nominal thickness to meet the design requirements without use of internal reinforcing sleeve. No longitudinal shaft welds shall be allowed.
- b. Structural Decorative Base – The base shall be a one-piece cast decorative structural base of aluminum alloy 356 per ASTM B26 or B108. The base shall be joined to the shaft by means of a complete circumferential weld. The base shall have a cast aluminum access door fastened to the base with tamper resistant screws. The base shall have provisions for grounding by the use of a lug (with drilled and tapped hole) cast to the inside of the structural base opposite to and accessible through the access door. Contractor shall also use decorative skirt around base to conceal break away couplings, for each pole not installed on bridge.

### **4. Welding.**

Welding shall be done by the inert gas shielded metal arc method with consumable electrode. Aluminum alloy 4043 electrode shall be used. Welding shall be in accordance to the American Welding Society AWS Specification D1.2, Structural Welding Code – Aluminum.

### **5. Anchorage.**

Four steel anchor bolts shall be supplied with each lighting pole. The bolt size and length shall be in accordance to the AASHTO Specification for the loads imposed by the poles. The anchor bolt material shall meet the requirements of AASHTO M314-90 Grade 55. Bolts shall be hot dipped galvanized per ASTM A153 at the threaded end for at least 10 inches. For each bolt a heavy hex nut per ASTM A563 grade DH or 2H and washer shall be supplied. The nut and washer shall be fully galvanized per ASTM A153 or ASTM B695.

### **6. Miscellaneous Hardware.**

All nuts, bolts and washers used in the assembly of the pole shall be AISI type 300 series stainless steel per ASTM A193 Class 1 Grade B8 except for anchorage hardware.

### **7. Pole.**

Decorative extruded aluminum pole with four self-contained track for mounting luminaire, banners, etc. 17 inch base, 22 feet height, 5.25 inch diameter fluted, 0.25 inch thick wall, round base, 3 inch by 3 inch tenon, anchor bolts, galvanized steel, black powder coat paint finish.

**C. Luminaires.**

1. Comply with IESNA RP-8 for parameters of lateral light distribution patterns indicated for luminaries.
2. Metal Parts: Free from burrs, sharp corners and edges.
3. Housings: Rigidly formed, weather- and light-tight enclosures that will not warp, sag or deform in use.
4. Lenses and Refractors: Materials as indicated. Use heat- and aging-resistant, resilient gaskets to seal and cushion lens and refractor in luminaire doors.
5. Optical System: The optical assembly shall consist of a precisely molded thermal resistant borosilicate glass reflector and refractor. The upper portion of this system shall incorporate a series of reflecting prisms that redirect over 50% of the upward light into the controlling refractor while allowing a soft upright component to define the traditional acorn shape. The lower portion shall utilize precisely molded refracting prisms to control the distribution of light to maximize utilization and uniformity. The very top of this assembly shall consist of a removable prismatic glass cover with decorative finial for tool-less entry into the lamp chamber.
6. Luminaire Housing: The luminaire housing shall consist of cast aluminum and provide an enclosure for the plug-in electrical module. The nickel plated lamp grip socket and three station incoming line terminal block shall be prewired to a five conductor receptacle for ease in connection of the electrical module. The slipfilter shall accept a 3 inch by 2 7/8 inch to 3 1/8 inch outside diameter tenon.
7. Luminaire Housing/Door: Cast of aluminum, the housing/door shall be removable without the use of tools and be retained by a nonconductive lanyard, attached to the door and to the housing. For units with a N.E.M.A twist lock photocell receptacle, the door shall contain an acrylic "window" to allow light to reach the cell.
8. Electrical Module: The ballast components shall be mounted on a steel plate that is removable without the use of tools. A matching five conductor plug shall connect to the receptacle in the luminaire housing to complete the wiring. Where a starting aid is required, it shall be provided with a separate plug-in connector and be replaceable without the use of tools. For photoelectric operation, the electrical module shall be provided with an N.E.M.A twist lock photocell receptacle.
9. Luminaire: Pulse-start metal halide, module base, multi-volt wired 240V only. UL Listed, black powder coat finish, asymmetric with cutoff optics, with gold standard spike finial.
10. Finish: The luminaire shall be finished with polyester black powder paint applied after a seven stage pretreatment process to ensure maximum durability.
11. UL: The luminaire shall be UL listed as suitable for wet locations at a maximum of 104°F ambient temperature.
12. High-Intensity-Discharge Ballast: Comply with ANSI C82.4. Constant wattage auto-transformer for 100W to 150W lamps, regulating high-power-factor type for other lamps unless otherwise indicated.
  - a. Single-Lamp Ballasts: Minimum starting temperature of minus 40°F.
  - b. Open-circuit operation will not reduce average life.
  - c. Noise: Uniformly quiet operation, with a noise rating of B or better.

13. Lamps: Comply with the standard of the ANSI C78 series that is applicable to each type of lamp. Provide luminaire with indicated lamps of designated type, characteristics and wattage. Where a lamp is not indicated for a luminaire, provide a lamp with Metal-Halide Color Temperature and Minimum Color-Rendering Index: 3600K and 70CRI.

**D. Luminaire Support Components.**

1. Wind-Load Strength of Total Support Assembly: Adequate to carry support assembly plus luminaire at indicated heights above grade without failure, permanent deflection or whipping in steady winds of 100 mph with a gust factor of 1.3. Support assembly includes pole or other support structures, brackets, arms, appurtenances, base, anchorage and foundation.
2. Strength Analysis: For each pole type and luminaire combination, multiply the actual equivalent projected area or luminaire and brackets by a factor of 1.1 to obtain the equivalent projected area to be used in pole selection strength analysis.
3. Finish: Match finish of pole/support structure for arm, bracket and tenon mount materials.
4. Mountings, Fasteners and Appurtenances: Corrosion-resistant items compatible with support components.
  - a. Materials: Will not cause galvanic action at contact points.
  - b. Mountings: Correctly position luminaire to provide indicated light distribution.
  - c. Anchor Bolts, Nuts and Washer: Hot-dip galvanized after fabrication unless stainless-steel items are indicated.
  - d. Anchor-Bolt Template: Plywood or steel
5. Pole/Support Structure Bases: Anchor type with hold-down or anchor bolts, leveling nuts and bolt covers.
6. Aluminum Poles: Fabricated from seamless, extruded structural tube complying with ASTM B429, 6063-T6 alloy with access handhole in pole wall.
7. Grounding Provisions for Metal Pole/Support Structure: Welded 1/2 inch threaded lug, accessible through handhole and listed for copper conductor connection.
8. Pole-Top Tenons: Fabricated to support luminaire and brackets indicated and securely fastened to pole top.

**E. Finishes.**

1. Comply with NAAMM's "Metal Finishes Manual for Architectural and Metal Products" for recommendations for applying and designating finishes.
2. Provide pole finishes and colors as indicated on the drawings or in the specifications.

**090154.03 CONSTRUCTION.**

**A. Concrete Pole Foundations.**

1. Comply with details for reinforcement and for anchor bolts, nuts and washers. Verify anchor-bolt templates by comparing with actual pole bases furnished.
2. Finish for Parts Exposed to View: Trowel and rub smooth.

**B. Breakaway.**

1. Furnish and install breakaway couplings of the size and type specified in the contract documents for each light pole not mounted on a roadway bridge. Use the same type and manufacturer for all bases for a project. Install a commercially available product. Comply with the details of bases shown in the contract documents.
2. Ensure each breakaway coupling has a nonmetallic spacer impervious to galvanic action.

**C. Poles.**

1. Use web fabric slings (not chain or cable) to raise and set poles.
2. Mount pole to foundation with leveling nuts and tighten top nuts to torque level recommended by pole manufacturer.
3. Secure poles level, plumb and square.
4. Grout void between pole base and foundation. Use non-shrinking or expanding concrete grout firmly packed in entire void space.

**D. Electrical Duct:**

Conduit shall be provided and installed per Section 2523 as follows:

1. Conduit in barrier rail is part of the barrier rail bid item.
2. Conduit in Bridge is part of the Bridge bid item.
3. Conduit outside of the bridge and barrier rail is included in the street lighting bid item.

**E. Connections:**

1. Tighten electrical connectors and terminals according to manufacturer's published torque-tightening values. If manufacturer's torque values are not indicated, use those specified in UL 486A and UL 486B.
2. Ground metal poles/support structures according to Article 2523.03, M, of the Standard Specifications.

**090154.04 METHOD OF MEASUREMENT.**

Measurement for the all items of work involved in street lighting, satisfactorily completed, will be lump sum. Measurement includes all associated work.

**090154.05 BASIS OF PAYMENT.**

- A. Payment for all items involved in constructing highway lighting will be the lump sum contract price, and shall include all of the items necessary for construction of the lighting shown on the P sheets.
- B. Payment includes full compensation for all required supervision, labor, products, tools, equipment, plant, transportation, services and incidentals, erection, application or installation of the lighting system and Contractor's overhead and profit.