

# EXPECTED IMPLEMENTATION JANUARY 2020

## 992 HIGHWAY LIGHTING MATERIALS (REV 5-1-19) (FA 8-1-19) (1-20)

SUBARTICLE 992-1.2 is deleted and the following substituted:

**992-1.2 Luminaires, Driver, etc.:** All luminaires shall be one of the products listed in the Department's Approved Product List (APL). Manufacturers seeking evaluation of their product shall submit an application and sample luminaire in accordance with Section 6.

The light source for luminaires shall be either light emitting diodes (LED), magnetic induction or plasma induction.

The luminaire housing shall be constructed of precision cast aluminum with a corrosive resistant polyester powder coat finish. The standard color shall be gray. The housing shall have an electrical terminal block to attach the luminaire cable and a hinged door which provides direct access to internal parts. Hinged doors are not required for high mast luminaires and underdeck luminaires. All hardware on the exterior of the housing shall be stainless steel. The refractor and lens shall consist of glass or an optical grade polymer. The manufacturer shall place a permanent tag in the luminaire housing imprinted with: the manufacturer name, luminaire voltage, lamp wattage, and provide a blank area for the Contractor to inscribe the installation date.

Luminaires shall meet the following requirements: UL 1598 listed and labeled for installation in wet locations by an OSHA recognized "Nationally Recognized Testing Laboratory" (NRTL), be capable of maintaining 94.1% intensity at 10,000 hours with an ambient temperature of 25°C (IES LM-80) and have IESNA light distribution curves (IES LM-79) by an EPA recognized laboratory.

The driver shall be rated for 100,000 hours and have a power factor greater than or equal to 90% at full load with a total harmonic distortion less than or equal to 20% at full load. The fixture shall accommodate a circuit voltage of 480V.

Luminaires shall be provided with a minimum 10kV/10kA internal surge suppression module meeting UL 1449/ANSI C62.41.2 Category C.

The manufacturer shall submit a five year non-prorated full warranty on all components of the luminaire to the Department. The warranty shall begin on the project acceptance date and include all components of luminaire.

ARTICLE 992-2 is expanded by the following:

### **992-2 Conventional Lighting.**

**992-2.1 Poles:** Poles for conventional lighting shall be aluminum unless otherwise shown in the Plans.

**992-2.1.1 Aluminum Poles:** Aluminum poles shall be round, one piece, continuous-tapered high-strength aluminum, and of an approved alloy meeting the requirements of the Standard Plans. The poles shall be of such length as to provide the approximate luminaire mounting height shown in the Plans. Poles installed on bridges, walls and median concrete barriers shall be equipped with internal vibration damping devices.

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**992-2.1.2 Concrete Poles:** Concrete poles may be used only when specified in the Plans. When specified, concrete poles shall meet the requirements of Section 641 and Standard Plans, Index 641-010 for a Type P-III pole.

**992-2.2 Bases:** Aluminum poles shall be installed on transformer bases with the exception of lights installed on bridge pilasters or on top of median concrete barriers. Transformer base poles shall have a grounding lug in the transformer base. The base shall be arranged for anchoring to a transformer base with four 1 inch anchor bolts (minimum size).

**992-2.3 Bracket Arms:** Bracket arms shall be aluminum, truss-type construction, consisting of upper and lower members with vertical struts, and shall have the luminaire end formed to accommodate a 2 inch pipe slipfitter. The bracket arms shall meet the design requirements of 992-1.1. Bracket arms shall be attached to aluminum poles, with machine bolts and pole adapters, unless approved otherwise.

**992-2.4 Luminaires:** Provide luminaires in accordance with the following requirements.

**992-2.4.1 Luminaires for Conventional Lighting:** Luminaires shall meet the following additional requirements.

- a. A maximum correlated color temperature (CCT) of 4000°K meeting ANSI C78.377A (3985°K, plus or minus 275°K).
- b. The optical portion of the housing shall be sealed to provide an IP 66 rating.

The luminaire mounting assembly shall be a slipfitter type designed to accommodate a nominal 2 inch pipe size (2-3/8 inch O.D.) arm or a pole top mounting assembly designed to accommodate a 2-3/8 inch pole top tenon.

For APL qualification, the manufacturer must have a fixture with an IESNA light distribution curve (IES LM-79) by an EPA recognized laboratory, meeting a minimum pole spacing of 240 feet using the AGi32 lighting optimization tool with the following settings:

Setting	Requirement
Roadway Standard	IES RP-8-2000
R-Table	R3 (Q0=0.07)
Roadway Layout	Two Rows Opposite, With Median, 2R OPP w/M
Roadway Width	40 feet
Median Width	22 feet
Number of Lanes in Direction of Travel	3
Driver's Side of Roadway	Right
Calculation Area	Bottom
Mounting Height	As per manufacturer's recommendation
Setback	12 feet
Tilt	0°
Optimization Criteria	Avg. Illuminance = 1.5 fc Avg./Min. Ratio = 4 Max./Min. Ratio = 10

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Setting	Requirement
	Lv Max./L Avg. Ratio= 0.3
Arm Length	Pole top fixtures – as provided by the IES file Arm mounted fixtures – 12 feet

## 992-2.4.2 Luminaires for Wildlife-Sensitive Conventional Lighting:

Luminaires must meet the following additional requirements:

- a. The light source for the luminaires must be true red, orange, or amber light-emitting diodes (LEDs) with no more than 1.75% of the spectral power distribution below 560 nm. Submit testing report.
- b. The optics must have an IP 66 rating. Submit testing report.
- c. The luminaire mounting assembly must be a slipfitter type designed to accommodate a nominal 2 inch pipe size (2-3/8 inch O.D.) arm or a pole top mounting assembly designed to accommodate a 2-3/8 inch pole top tenon.
- d. Luminaires must have a IESNA light distribution curve (IES LM-79) designated by an EPA-recognized laboratory. Submit testing report.
- e. Luminaires must meet a minimum pole spacing of 50 feet using the AGi32 lighting optimization tool in accordance with the settings shown in 992-2.4. Submit IES file.

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