





the text by basic designation only and listed in this paragraph by organization, designation, date, and title.

Use the Reference Wizard's Check Reference feature when you add a RID outside of the Section's Reference Article to automatically place the reference in the Reference Article. Also use the Reference Wizard's Check Reference feature to update the issue dates.

References not used in the text will automatically be deleted from this section of the project specification when you choose to reconcile references in the publish print process.

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The publications listed below form a part of this specification to the extent referenced. The publications are referred to within the text by the basic designation only.

AMERICAN NATIONAL STANDARDS INSTITUTE (ANSI)

ANSI C136.3	(1995) Roadway Lighting Equipment - Luminaire Attachments
ANSI C78.387	(1995; R 2000) Electric Lamps - Metal-Halide Lamps - Methods of Measuring Characteristics
ANSI C78.388	(1990; R 1994) Electric Lamps - High Pressure Sodium Lamps
ANSI C78.41	(2001) Electric Lamps - Low Pressure Sodium Lamps
ANSI C82.5	(1990; R 1995) Reference Ballasts - High-Intensity-Discharge and Low Pressure Sodium Lamps

ILLUMINATING ENGINEERING SOCIETY OF NORTH AMERICA (IESNA)

IESNA HB-9	(2000) IES Lighting Handbook
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NATIONAL ELECTRICAL MANUFACTURERS ASSOCIATION (NEMA)

NEMA C82.9	(1996; C82.9b) High-Intensity-Discharge and Low-Pressure Sodium Lamps, Ballasts, and Transformers - Definitions
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NATIONAL FIRE PROTECTION ASSOCIATION (NFPA)

NFPA 70	(2005) National Electrical Code 2005 Edition
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UNDERWRITERS LABORATORIES (UL)

UL 1571	(1992) UL Standard for Safety Incandescent Lighting Fixtures
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U.S. NATIONAL ARCHIVES AND RECORDS ADMINISTRATION (NARA)

21 CFR 1040

(1995) Performance Standards for  
Light-Emitting Products

1.2 GENERAL REQUIREMENTS

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NOTE: If Section 16003S GENERAL ELECTRICAL  
PROVISIONS is not included in the project  
specification, applicable requirements therefrom  
should be inserted and the following paragraph  
deleted.  
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Section 16003S GENERAL ELECTRICAL PROVISIONS applies to work specified in  
this section.

Certificates shall be submitted showing compliance with the following  
requirements:

Lighting-distribution curves for each type of fixture shall be in  
accordance with the Illuminating Engineering Society.

Certification that Floodlighting Fixtures conform to structural,  
electrical, and photometric requirements.

Equipment and Performance Data shall be submitted for floodlighting systems  
consisting of life, test, system functional flows, safety features,  
mechanical automated details, automatic interlocks, and such features as  
electrical system protective device ratings.

1.3 SUBMITTALS

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NOTE: Review Submittal Description (SD) definitions  
in Section 01330 SUBMITTAL PROCEDURES and edit the  
following list to reflect only the submittals  
required for the project. Submittals should be kept  
to the minimum required for adequate quality control.

A "G" following a submittal item indicates that the  
submittal requires Government approval. Some  
submittals are already marked with a "G". Only  
delete an existing "G" if the submittal item is not  
complex and can be reviewed through the Contractor's  
Quality Control system. Only add a "G" if the  
submittal is sufficiently important or complex in  
context of the project.

For submittals requiring Government approval on Army  
projects, a code of up to three characters within  
the submittal tags may be used following the "G"  
designation to indicate the approving authority.  
Codes for Army projects using the Resident  
Management System (RMS) are: "AE" for  
Architect-Engineer; "DO" for District Office  
(Engineering Division or other organization in the

District Office); "AO" for Area Office; "RO" for Resident Office; and "PO" for Project Office. Codes following the "G" typically are not used for Navy, Air Force, and NASA projects.

Choose the first bracketed item for Navy, Air Force and NASA projects, or choose the second bracketed item for Army projects.

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Government approval is required for submittals with a "G" designation; submittals not having a "G" designation are [for Contractor Quality Control approval.] [for information only. When used, a designation following the "G" designation identifies the office that will review the submittal for the Government.] Submit the following in accordance with Section 01330 SUBMITTAL PROCEDURES:

#### SD-03 Product Data

Equipment and Performance Data shall be submitted for floodlighting systems in accordance with paragraph entitled, "General Requirements," of this section.

Manufacturer's catalog data shall be submitted for the following items:

- Floodlighting Fixtures
- Floodlighting Luminaires
- High-Intensity-Discharge (HID) Luminaires
- Quartz-Iodine Luminaires
- Substation-Yard Lighting Luminaires
- Lighting Standards
- Series Circuit Transformers
- Lamp Ballasts

#### SD-02 Shop Drawings

Installation Drawings shall be submitted for the Floodlighting Systems in accordance with the paragraph entitled "Installation," of this section.

#### SD-06 Test Reports

Test reports shall be submitted for Operational Tests on incandescent lighting fixtures in accordance with the paragraph entitled, "Field Testing," of this section.

#### SD-07 Certificates

Certificates shall be submitted in accordance with paragraph entitled, "General Requirements," of this section.

Floodlighting Fixtures

## PART 2 PRODUCTS

### 2.1 PRODUCT STANDARDS

Floodlighting fixtures shall conform to IESNA HB-9.

Floodlighting fixtures shall be furnished complete with wiring and mounting devices ready for installation at the locations. Fixtures shall be equipped with the proper lamps.

## 2.2 FLOODLIGHTING LUMINAIRES

Floodlighting luminaires shall be enclosed and gasketed vaportight fixtures in accordance with IESNA HB-9.

## 2.3 HIGH-INTENSITY-DISCHARGE (HID) LUMINAIRES

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**NOTE: The following paragraph shall be used when  
low- or high-pressure sodium or metal halide lamps  
are used.**

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HID luminaires with base-down vertical-lamp burning positions shall include a housing with glass lens and cover, reflector, lampholder, ballast compartment, terminal block, fuses, fuseholders, and fixture mounting devices in a completely sealed optical system.

Housing shall be cast aluminum with hinged cast-aluminum cover, heat-resistant clear plain glass lens not less than 5 millimeter 3/16-inch thick, gasket, and cover clamps. Housing shall provide a weatherproof seal against moisture and foreign material. Housing shall include an integral cast-aluminum ballast compartment with built-in ballast and terminal block.

Reflector shall be detachable, formed anodized sheet aluminum with diffuse or specular finish designed for a rectangular wide-beam spread.

Fixture mounting devices shall include a galvanized-steel trunnion adaptable to pole, wall, pipe, or crossarm mounting as indicated and required, with fixture positioning devices that will permit horizontal and vertical adjustment over a 180-degree range.

Fixture shall have lamp focusing adjustments, fixture aiming and leveling devices, fuses, and fuseholders accessible from the outside of the fixture. Lamps shall be replaceable from the top or front.

Electrical connections shall be made with Type AFS cord.

## 2.4 QUARTZ-IODINE LUMINAIRES, SPECIAL PURPOSE

Quartz-iodine lamp luminaires, Class HD, with horizontal lamp-burning position shall include a housing with glass lens and cover, reflector, lampholders, fuses, fuseholders, lamp, and fixture mounting devices in a completely sealed optical system for pole-top mounting. Wiring shall be concealed in floodlighting luminaires.

Housing shall be cast aluminum with hinged cast-aluminum cover, heat-resistant plain glass lens, gasket, and cover clamps. Housing shall seal against moisture and foreign material.

Reflectors shall be formed anodized sheet aluminum in a [parabolic] [elliptical] shape with diffuse or specular finish for a rectangular beam spread with narrow, medium, or wide light distribution. Beam spread shall be not less than 10 percent of the maximum illuminance candlepower.

Fixture shall have lamp focusing, positioning, and leveling adjustments that will permit horizontal and vertical adjustment over a 180-degree range, fixture leveling and aiming devices, and fuses with fuseholders accessible from the outside of the fixture. Lamps shall be replaceable from the front and rear.

Fixture shall be designed to accommodate the appropriate lamp.

## 2.5 SUBSTATION-YARD LIGHTING LUMINAIRES

[Substation-yard lighting luminaires shall be enclosed and gasketed vaportight fixtures especially designed for substations to illuminate overhead vertical and horizontal surfaces of the substation structure.

Luminaires shall include cast-aluminum fittings with pole-top slip fitters and supports for lampholder and reflector assemblies. Lampholder shall be porcelain with mogul base and shall support the lamp in a vertical base-down burning position. Slip fitter shall secure the fixture to the pole with corrosion-resistant steel setscrews. Collar of the reflector assembly shall engage threads in the cast-aluminum fitting with corrosion-resistant steel setscrews that will prevent rotation of the luminaire after beam adjustment.

Reflector assembly shall include a reflector with cast-aluminum threaded collar, refractor, and top access cover. Reflector and refractor shall be sealed at the joint with a clamping band formed from sheet aluminum or corrosion-resistant steel. Refractor and access cover shall be sealed with a heat-resistant weatherproof gasket and secured with spring-loaded corrosion-resistant steel latches.

Reflector and access cover shall be formed from anodized sheet aluminum. Reflecting surfaces shall have a specular finish. Refractor shall be molded prismatic heat-resistant borosilicate glass designed to provide not less than 60 percent of the total lamp lumens in the upward direction. Maximum illuminance candlepower of the lighting-distribution curve shall be adjustable plus or minus 5 degrees.

Wiring shall be concealed in lighting standards and luminaires.]

## 2.6 LIGHTING STANDARDS

[Lighting requirements shall be in accordance with Section 16524S ROADWAY LIGHTING.]

Lighting standards, including poles, anchor base, transformer base, brackets, and accessories, shall conform to ANSI C136.3. Lighting standards shall be designed to withstand vertical and horizontal loading on the entire structure and supported equipment without damage or permanent deformation to any component of the lighting standard. Standards shall be set in a concrete base. Installations provided with photocell devices shall operate at 320 lux on and 650 lux off 30 foot-candles (fc) on and 60 fc off.

Lamp ballasts shall maintain correct lamp operation over a voltage-input range of plus or minus 13 percent of rated voltage. Capacitors shall provide a power-factor lamp load of not less than 95 percent.

Ballasts shall be voltage rated for operation on [120] [277]-volt, single-phase, 60-hertz lighting-distribution systems.

Ballasts shall be designed for a minimum lamp starting temperature of minus 29 degrees C 20 degrees F and a maximum ambient temperature of 40 degrees C 105 degrees F.

## 2.7 SERIES CIRCUIT TRANSFORMERS

Series type transformers shall include a two-winding core-and-coil assembly designed for connection to constant-current supply circuits in accordance with ANSI C82.5 and NEMA C82.9.

Primary winding of the transformer shall be designed for connection to [6.6] [20]-ampere constant-current street-lighting circuits. Transformer shall provide the proper starting voltage and operating current for the appropriate lamp.

Transformers shall be designed for a maximum ambient temperature of 40 degrees C 105 degrees F.

## 2.8 LAMPS

### 2.8.1 HID Lamps

High Intensity Discharge (HID) lamps shall be automatically self-extinguishing and shall conform to 21 CFR 1040, Section 30, when used in a populated area.

### 2.8.2 Low-Pressure Sodium

Low-Pressure Sodium (LPS) lamps shall be in accordance with ANSI C78.41.

### 2.8.3 High-Pressure Sodium

High-Pressure Sodium (HPS) lamps shall be in accordance with ANSI C78.388.

### 2.8.4 Metal Halide

Metal Halide lamps shall be in accordance with ANSI C78.387.

### 2.8.5 Incandescent Lamps

Incandescent Lamps shall be in accordance with UL 1571.

General-purpose incandescent lamps up to 300 watts shall have medium screw bases.

Lamps with wattage ratings above 300 watts shall have mogul screw bases.

Special-purpose PAR and R lamps shall have wall reflector. R lamps shall have clear soft-blown-glass bulbs with silver-deposited inner-bulb wall reflector.

Lamps shall be designed for operation on 120-volt, 60-hertz circuits.

## PART 3 EXECUTION

### 3.1 INSTALLATION

Floodlighting fixtures shall be installed in accordance with NFPA 70, and



lamps of the proper type, voltage, and wattage shall be installed in each fixture.

New lamps shall be installed immediately prior to completion of the project. Lamps shall be installed with the light center at the focal point in the reflector and in the proper burning position. Fixtures shall be aimed at night to provide optimum light coverage.

Installation Drawings shall be submitted for Floodlighting Systems. Drawings shall indicate overall physical features, dimensions, ratings, service requirements, and weights of equipment.

### 3.2 FIELD TESTING

Floodlighting fixtures installation shall be demonstrated to operate satisfactorily in the presence of the Contracting Officer.

Operational Tests shall be performed in accordance with referenced standards in this section.

-- End of Section --