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NAVFAC **IGS-16520 (AUGUST 2002)**

Preparing Activity: LANTNAVFACENGCOM **Based on UFGS-16520N**

ITALIAN GUIDE SPECIFICATIONS

Use for ITALIAN projects only

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SECTION 16520

EXTERIOR LIGHTING
08/02

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NOTE: This guide specification is issued by the Atlantic Division, Naval Facilities Engineering Command for regional use in Italy.

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NOTE: This guide specification covers lighting system requirements for exterior installations. This specification is oriented toward high-intensity-discharge (HID), particularly high-pressure sodium (HPS) and low-pressure sodium (LPS) luminaires. HPS and LPS lamps are currently the most efficient of any of the available light sources and are among those having the longest life.

This specification does not cover all possible methods or requirements for exterior lighting; therefore, designer should add special information required to suit a specific project. Industry publications exist to aid the designer in choosing the best lighting system for the project. One such publication is Illuminating Engineering Society (IES) RP-8, "Recommended Practice for Roadway Lighting."

Comments and suggestion on this specification are welcome and should be directed to the technical proponent of the specification. A listing of the technical proponents, including their organization designation and telephone number, is on the Internet.

Use of electronic communication is encouraged.

Brackets are used in the text to indicate designer choices or locations where text must be supplied by the designer.

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NOTE: The following information shall be shown on the drawings or specified in the project specifications:

a. Luminaire schedule and indicate pertinent information; i.e., mounting, lamps, ballasts, and voltage.

1. Type of luminaire;

2. Voltage, wattage, and frequency rating required;

3. Accessories required, such as photocell, time switches, and auxiliary lamps;

4. Location of poles or standards;

5. Referenced sketch; and

6. Extent and location of the work to be accomplished and wiring and equipment necessary for a complete installation.

NOTE: Demolition work that involves disposal of fluorescent and HID lamps and ballasts will require the use of Section 13286, "Handling of Lighting Ballasts and Lamps Containing PCB's and Mercury."

PART 1 GENERAL

1.1 REFERENCES

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

EUROPEAN COMMUNITY QUALITY MARKS (CE)

NOTE: CE (European Community) is a European quality marking system indicating that the equipment or product conforms to EEC (European Economic Community) standards concerning quality of safety and health and conforms with all the Italian technical standards in force. All products (Electrical, Mechanical and Electronic Equipment and similar items) that are marked CE conform to the standards and Laws enforced in Europe. In Italy, the CE marking is a mandatory

requirement and must be shown on all applicable equipment and products attesting to the conformity with the EEC standards.

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CE European Quality Mark

ITALIAN ELECTROTECHNICAL COMMITTEE STANDARDS (CEI)

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NOTE: A CEI Norm is an Italian technical normative for electrical systems recognized by Italian Law, submitted by a private organization "Comitato Electrotecnico Italiano" for the Italian territory, available in the Italian language and only in some cases in English.

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CEI 64-7 (1998) Electrical installations for street lighting and similar applications

CEI 64-8 (1998; V1 2001) Electrical installations of buildings

ITALIAN NATIONAL ASSOCIATION FOR UNIFICATION OF STANDARDS (UNI)

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NOTE: A UNI Norm is a technical normative recognized as Italian Law, submitted by a private organization "Ente Nazionale Italiano di Unificazione" for Italy and is available only in the Italian language. It is the National Standard.

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UNI 9899 (1992) Glass fibre reinforced (GRP) thermosetting resin poles - Requirements and test methods

UNI 10439 (1995) Illumination technology - Lighting requirements of roads for motorized traffic

UNI 10819 (1999) Light and lighting - Outdoor lighting installations - Requirements for the limitation of the upward scattered luminous flux

ITALIAN/EUROPEAN HARMONIZATION STANDARDS (UNI EN)(UNI ENV)(CEI EN) (UNI EN ISO)(UNI ISO)

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NOTE: A UNI EN, UNI ENV, CEI EN, UNI EN ISO or UNI ISO is a European Standard with a coincident Italian National Standard or International Standard. The two standards are identical, with

most (but not all) EN's available in the English language and the UNI available only in the Italian language.

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UNI EN 40-3-1	(2001) Lighting columns - Part 3-1: Design and verification - Specification for characteristic loads
UNI EN 40-5	(2001) Lighting columns - Part 5: Specification for steel lighting columns
UNI EN 40-6	(2001) Lighting columns - Part 6: Specification for aluminium lighting columns
UNI EN 10025	(1995) Hot rolled products of non-alloy structural steels - Technical delivery conditions
CEI EN 60192	(2002) Low pressure sodium vapour lamps
CEI EN 60529	(1997; A1 2000) Degrees of protection provided by enclosures (IP Code)
CEI EN 60598-2-3	(1996; A1 1998, A2 2001) Luminaires - Part 2: Particular requirements - Section three: Luminaires for road and street lighting
CEI EN 60662	(2001) High-pressure sodium vapour lamp
CEI EN 60922	(1998) Auxiliaries for Lamps - Ballasts for Discharge Lamps (Excluding Tubular Fluorescent Lamps) - General and Safety Requirements
CEI EN 60923	(1997) Auxiliaries for lamps - Ballasts for discharge lamps (excluding tubular fluorescent lamps) - Performance requirements
CEI EN 60947-4-1	(2002) Low-voltage switchgear and controlgear - Part 4: Contactors and motor-starters - Section 1 - Electromechanical contactors and motor-starters
CEI EN 61095	(1998) Electromechanical contactors for household and similar purposes
CEI EN 61167	(1998; Thru A3 1999) Metal halide lamps
CEI EN 61347-2-9	(2001) Lamp controlgear - Part 2-9:

Particular requirements for ballasts for discharge lamps (excluding fluorescent lamps)

1.2 RELATED REQUIREMENTS

Section 16050, "Basic Electrical Materials and Methods," applies to this section, with the additions and modifications specified herein.

1.3 DEFINITIONS

1.3.1 Average Life

Time after which 50 percent will have failed and 50 percent will have survived under normal conditions.

1.3.2 Groundline Section

That portion between 305 mm above and 610 mm below the groundline.

1.4 SUBMITTALS

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NOTE: Where a "G" in submittal tags follows a submittal item, it indicates Government approval for that item. Add or delete "G" in submittal tags following any added or existing submittal items deemed sufficiently critical, complex, or aesthetically significant to merit approval by the Government. Submittal items not designated with a "G" will be approved by the QC organization.

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Submit the following in accordance with Section 01330, "Submittal Procedures."

SD-02 Shop Drawings

Luminaire drawings; G

Poles; G

SD-03 Product Data

Luminaires; G

Lamps; G

Ballasts; G

Lighting contactor; G

Time switch; G

Photocell switch; G

Aluminum poles; G

Steel poles; G

Fiberglass poles; G

Brackets

[Auxiliary instant-on quartz system; G]

[SD-04 Samples

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NOTE: Samples involve additional shipping cost. Use only for special fixtures or for an item for which a large quantity is required on a project. If samples are not essential to the specific application, delete them.
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Luminaires; G

Submit one sample of each luminaire type[, complete with lamp and ballast].[Submit one sample for each item other than luminaires.] Sample will be returned to the Contractor for installation in the project work.

] SD-06 Test Reports

[Test Data for luminaires; G]

[Tests for fiberglass poles; G]

Operating test

Submit operating test results as stated in paragraph entitled "Field Quality Control."

1.5 QUALITY ASSURANCE

1.5.1 Drawing Requirements

1.5.1.1 Luminaire Drawings

Include dimensions, effective projected area (EPA), accessories, and installation and construction details. Photometric data, including zonal lumen data, average and minimum ratio, aiming diagram, and[computerized] candlepower distribution data shall accompany shop drawings.

1.5.1.2 Poles

Include dimensions, wind load determined in accordance with UNI EN 10025

and UNI EN 40-3-1, pole deflection, pole class, and other applicable information.

[1.5.2 Test Data for Luminaires

a. Distribution data according to UNI classification type as defined in UNI 10439 and UNI 10819.

b. Computerized horizontal illumination levels in lux at ground level, taken every [3050][6100][_____] mm. Include average maintained lux level and maximum and minimum ratio.

][1.5.3 Tests for Fiberglass Poles

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NOTE: Whenever fiberglass poles are required for a project, include the following test.
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a. Light resistance tests: Perform according to UNI 9899.

b. Flexural strength and deflection test: Test loading shall be as a cantilever beam with pole butt as fixed end and a force simulating wind load at the free end.

]1.6 DELIVERY, STORAGE, AND HANDLING

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NOTE: Select the applicable paragraph(s) from the following.
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[1.6.1 Fiberglass Poles

Do not store poles on ground. Support poles so they are at least 305 mm above ground level and growing vegetation. Do not remove factory-applied pole wrappings until just before installing pole.

][1.6.2 [Aluminum][Steel] Poles

Do not store poles on ground. Support poles so they are at least 305 mm above ground level and growing vegetation. Do not remove factory-applied pole wrappings until just before installing pole.

]PART 2 PRODUCTS

2.1 SOURCE MANUFACTURERS

2.1.1 High Pressure Sodium Lamps

The following manufacturers provide that generally comply with these specifications:

OSRAM

Via Savona, 105
20144 Milano (MI)
Tel: 02-42491
Fax: 02-4249458
Telex: 353526 OSRAMM I
http: http://www.osram.it
E-mail: marcom@osram.it

PHILIPS
Via G. Casati, 23
20052 Monza (MI)
Tel: 039/203.1
Fax: 039/203.6118
Fax Marketing Communication: 039/203.6119

2.1.2 Low Pressure Sodium Lamps

The following manufacturers provide that generally comply with these specifications:

OSRAM
Via Savona, 105
20144 Milano (MI)
Tel: 02-42491
Fax: 02-4249458
Telex: 353526 OSRAMM I
http: http://www.osram.it
E-mail: marcom@osram.it

PHILIPS
Via G. Casati, 23
20052 Monza (MI)
Tel: 039/203.1
Fax: 039/203.6118
Fax Marketing Communication: 039/203.6119

2.1.3 Metal-Halide Lamps

The following manufacturers provide that generally comply with these specifications:

OSRAM
Via Savona, 105
20144 Milano (MI)
Tel: 02-42491
Fax: 02-4249458
Telex: 353526 OSRAMM I
http: http://www.osram.it
E-mail: marcom@osram.it

PHILIPS
Via G. Casati, 23
20052 Monza (MI)
Tel: 039/203.1

Fax: 039/203.6118
Fax Marketing Communication: 039/203.6119

2.1.4 Ballasts for HID Luminaires

The following manufacturers provide that generally comply with these specifications:

OSRAM
Via Savona, 105
20144 Milano (MI)
Tel: 02-42491
Fax: 02-4249458
Telex: 353526 OSRAMM I
http: http://www.osram.it
E-mail: marcom@osram.it

PHILIPS
Via G. Casati, 23
20052 Monza (MI)
Tel: 039/203.1
Fax: 039/203.6118
Fax Marketing Communication: 039/203.6119

2.1.5 Lighting Contactor

The following manufacturers provide that generally comply with these specifications:

BTicino
Via Messina, 38
20154 Milano
Call Center BTicino 199.145.145
Web Site: www.bticino.it
E-mail: info.ind@bticino.it

Schneider Electric
20041 Agrate (MI)
Tel: 039/6558111
Fax: 039/6056900
Telex: 301535 MAGGAL I
WEB Site: www.schneider.it

ABB S.p.A.
20010, Vittuone (MI)
Viale dell'Industria, 18
Tel: 029034.1
Fax: 029034.7609
www.abb.it

2.1.6 Time Switch

The following manufacturers provide that generally comply with these specifications:

BTicino
Via Messina, 38
20154 Milano
Call Center BTicino 199.145.145
Web Site: www.bticino.it
E-mail: info.ind@bticino.it

Schneider Electric
20041 Agrate (MI)
Tel: 039/6558111
Fax: 039/6056900
Telex: 301535 MAGGAL I
WEB Site: www.schneider.it

ABB S.p.A.
20010, Vittuone (MI)
Viale dell'Industria, 18
Tel: 029034.1
Fax: 029034.7609
www.abb.it

2.1.7 Photocell Switch

The following manufacturers provide that generally comply with these specifications:

BTicino
Via Messina, 38
20154 Milano
Call Center BTicino 199.145.145
Web Site: www.bticino.it
E-mail: info.ind@bticino.it

Schneider Electric
20041 Agrate (MI)
Tel: 039/6558111
Fax: 039/6056900
Telex: 301535 MAGGAL I
WEB Site: www.schneider.it

2.1.8 Aluminum Poles & Supports

The following manufacturers provide that generally comply with these specifications:

TECNOPALI/ELETTROSISTE
Via s. Martino 90
00015 Monterotondo (RM)
Tel: 06/906836
Fax: 06/9061647

Bega
Zumtobel Staff Illuminazione SRL

Via Pirelli 26
I - 20124 Milano
Tel: (390) 2 - 66 74 51
Fax: (390) 2 - 66 74 57 77
infomilano@zumtobelstaff.co.at
www.bega.com

DISANO Illuminazione S.p.A.
20089, Rozzano (MI)
viale Lombardia, 129
Tel: 02824771
www.disano.it

2.1.9 Steel Poles & Supports

The following manufacturers provide that generally comply with these specifications:

CAPOCCIONI
Viale dell'Industria, 7
Località Poggino (Zona Industriale) - Viterbo
Tel: 0761/250046
Fax: 0761/271678
E-mail: info@capoccioni.it

SIDERPALI
Via Monti di Pietralata, 79
00157 Roma
Tel: 06/41730110 (r.a.)
Fax: 06/41731060

2.1.10 Fiberglass Poles & Supports

The following manufacturers provide that generally comply with these specifications:

MARECO LUCE
Via S. Croce, 121
47032 Bertinord (FO)
Tel: 0543-449090
Fax: 0543-449051

NTET S.r.L.
S.P. 14 Zona Industriale
95040 Piano Tavola (CT)
Tel: 39-095-7563511
Fax: 39-095-7563544
www.ntet.it

2.2 PRODUCT COORDINATION

Products and materials not considered to be lighting equipment or lighting fixture accessories are specified in Section 16303, "Underground Electrical Work"[, Section 16301, "Overhead Transmission and Distribution,"][and][

Section 16402, "Interior Distribution System"].[Lighting fixtures and accessories mounted on exterior surfaces of buildings are specified in Section 16510, "Interior Lighting."]

2.3 LUMINAIRES

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NOTE: Luminaire, ballast, and lamp design and technology have advanced rapidly in recent years; ensure a luminaire is currently available before specifying. Light distribution and brightness characteristics can be helpful for comparison, selection, and special applications of exterior luminaires. Computer programs for lighting design are available from many sources including IES and luminaire manufacturers.

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NOTE: As an exception to what may normally be specified, lenses and refractors of acrylic or polycarbonate plastic should be specified if secondary damage by the breakage of a refractor cannot be tolerated. Some plastic refractors are subject to yellowing and in general are not as desirable as glass refractors. Of the plastics, acrylic plastic refractors offer the most desirable properties. If vandalism is a serious problem, polycarbonate plastic refractors are less susceptible to breakage but are susceptible to yellowing after a relatively short period of time. Other types of plastic refractors are available and should be investigated for special applications. Do not use metal-halide lamps without a tempered glass diffuser.

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CEI EN 60598-2-3. Provide luminaires as indicated. Provide luminaires complete with lamps of number, type, and wattage indicated. Details, shapes, and dimensions are indicative of the general type desired, but are not intended to restrict selection to luminaires of a particular manufacturer. Luminaires of similar designs[, light distribution and brightness characteristics,] and of equal finish and quality will be acceptable as approved.

2.3.1 Lamps

2.3.1.1 High-Pressure Sodium (HPS) Lamps

CEI EN 60662. Wattage as indicated.

[2.3.1.2 Standby HPS Lamps

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NOTE: Dual arc tube HPS lamps may, under certain conditions, be used as auxiliary stand-by lighting when momentary power interruptions are anticipated.

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CEI EN 60662. Wattage as indicated. Standby HPS lamps shall have two arc tubes and hot restart instant lumen output shall be 8 percent of total light output, minimum.

][2.3.1.3 Low-Pressure Sodium (LPS) Lamps

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NOTE: Use low-pressure sodium where color rendition is not a factor, but high lamp efficiency is.

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CEI EN 60192. Provide lamp wattage as indicated.

][2.3.1.4 Metal-Halide Lamps

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NOTE: Do not use Metal-Halide lamps for roadway, parking or area lighting. Metal-Halide lamps should only be used for areas where high color rendition is required.

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CEI EN 61167. Provide lamp wattage as indicated. Provide luminaires with tempered glass lens.

]2.3.2 HID Ballasts

CEI EN 60922, CEI EN 60923, and CEI EN 61347-2-9 and shall be constant wattage autotransformer (CWA) or regulator, high power-factor type. Provide single-lamp ballasts which shall have a minimum starting temperature of minus 30 degrees C. Ballasts shall be:

a. Designed to operate on voltage system to which they are connected.

b. Constructed so that open circuit operation will not reduce the average life.

High Pressure Sodium (HPS) ballasts shall have a solid-state igniter/starter with an average life in the pulsing mode of 3500 hours at the intended ambient temperature. Igniter case temperature shall not exceed 90 degrees C.

2.4 LIGHTING CONTACTOR

CEI EN 60947-4-1 and CEI EN 61095. Lighting contactors shall be approved and listed by a recognized European safety organization and shall have a "mark of quality" from such an organization. Provide lighting contactors with operational features, electrical ratings, and number of poles as indicated on the drawings. Provide [electrically][mechanically] held

contactor.[The lighting contactor and photocell switch shall be an integrally designed assembly.][Mount the lighting contactor as an integral part of the associated panelboard's assembly.] [Provide separately mounted lighting contactor and mount in an IP 55 [___] enclosure conforming to CEI EN 60529 and approved for the environment in which the contactor is installed.] [Provide contactor with [Hand-Off-Automatic] [On-Off] selector switch.] Provide a separately mounted selector switch in an enclosure suitable for the environment if switch is not provided integral to the contactor.

2.5 TIME SWITCH

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NOTE: Provide operational requirements and electrical ratings for time switches on the drawings. Customary European practice is to design time switches as accessory modules to panelboards and to mount the switches adjacent to the circuit's associated circuit breaker.

Photocells and time switches should not always be used together. Use the following information as a guide.

1. Lights on/lights off by photocell: Street lighting and certain parking lots. Any facility or street that requires lighting after dark.

2. Lights on by photocell; lights off by time switch: Most administration facilities, commissaries, hobby shops, or clubs. Any facility that does not stay open all night.

3. Lights on/lights off by time switch: Service stations, snack bars, barracks, or officer's quarters. Facilities that will be open to the public, or have personnel that must report before daylight and after dark, but not continually through the night.

Other considerations: Time switches with skip-a-day feature may be useful for facilities with a 5-day work week. (Program time switch to skip Saturday and Sunday.) For facilities that do not stay open all night, it may be desirable to have lighting at night for security. Consult area engineering field division for local station policy and exceptions to these suggestions.

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Time switches shall be approved and listed by a recognized European safety organization and shall have a "mark of quality" from such an organization. Provide electronic type time switches with operational features and electrical ratings as indicated on the drawings. Provide time switches

with an electrical power reserve feature (running reserve feature) so that the timer continues to maintain accurate time for a minimum of 7 hours after normal electrical power has been lost. Provide time switch with a manual on-off bypass switch. [Mount the time switch as an integral part of the associated panelboard's assembly.] [Provide a separately mounted time switch and mount in an IP 55 [____] enclosure conforming to CEI EN 60529 and approved for the environmental in which the switch is installed.] [Astronomic type time switches shall be arranged to turn "ON" at sunset and turn "OFF" at predetermined time between 8:30 p.m. and 2:30 a.m. or sunrise, automatically changing in the settings each day in accordance with seasonal changes of sunset and sunrise.]

2.6 PHOTOCELL SWITCH

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NOTE: Provide operational requirements and electrical ratings for photocell switches on the drawings. Customary European practice is to provide photocell switches (referred to as "light sensitive switches") as an accessory component of the panelboard manufacturer. Silicon diode type photocells are solid state devices and have limited sources. Therefore, cadmium-sulfide type cells cannot be deleted from specification.

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Photocell switches shall be approved and listed by a recognized European safety organization and shall have a "mark of quality" from such an organization. Provide hermetically sealed cadmium-sulfide or silicon diode type cell rated for the voltage system to which it is connected. Switch shall turn on at or below 30 lux and off at 20 to 50 lux. A time delay shall prevent accidental switching from transient light sources. [The photocell switch and lighting contactor shall be an integrally designed assembly.] [Provide a directional lens in front of the cell to prevent fixed light sources from creating a turnoff condition.]

2.7 POLES

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NOTE: This specification does not cover decorative poles or high-mast lighting systems. Poles, luminaire mounting assemblies, and lowering mechanisms for high-mast lighting are specially fabricated and should be individually designed to suit a specific project. Pole specifications for high-mast system should, as a minimum, include wind loading and ultimate strength meeting the loading requirements of UNI EN 10025 and UNI EN 40-3-1.

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Provide poles designed for wind loading of [161][_____] km/hr determined in accordance with UNI EN 10025 and UNI EN 40-3-1 while supporting luminaires having effective projected areas indicated. Poles shall be [embedded][anchor]-base type designed for use with [underground][overhead]

supply conductors.[Poles shall have oval-shaped handhole having a minimum clear opening of 65 by 130 mm. Handhole cover shall be secured by stainless steel captive screws.][Metal poles shall have an internal grounding connection accessible from the handhole near the bottom of each pole.] Scratched, stained, chipped, or dented poles shall not be installed.

2.7.1 Aluminum Poles

Provide aluminum poles manufactured of corrosion resistant aluminum alloys conforming to UNI EN 40-6. Poles shall be seamless extruded or spun seamless type. Provide a pole grounding connection designed to prevent electrolysis when used with copper ground wire. Tops of shafts shall be fitted with a round or tapered cover. Base shall be anchor bolt mounted, made of cast aluminum alloy and shall be machined to receive the lower end of shaft. Joint between shaft and base shall be welded. Base cover shall be cast aluminum allow. Hardware, except anchor bolts, shall be either anodized aluminum alloy or stainless steel. [Aluminum poles and brackets for [walkway] [_____] lighting shall have a [uniform satin] [dark anodic bronze] [_____] finish to match fixtures and shall not be painted.] Manufacturer's standard provision shall be made for protecting the finish during shipment and installation. Minimum protection shall consist of spirally wrapping each pole shaft with protective paper secured with tape, and shipping small parts in boxes.

2.7.2 Steel Poles

UNI EN 10025 and UNI EN 40-5. Provide steel poles having minimum 3 mm steel with minimum yield/strength of 331 MPa and [hot-dipped galvanized] [iron-oxide primed] factory finish. Provide a pole grounding connection designed to prevent electrolysis when used with copper ground wire. Pole shall be [direct set] [anchor bolt mounted] type. Poles shall have tapered tubular members, either round in cross section or polygonal. [Pole shafts shall be one piece. Poles shall be welded construction with no bolts, rivets, or other means of fastening except as specifically approved.] Pole markings shall be approximately 900 to 1270 mm above grade and shall include manufacturer, year of manufacture, top and bottom diameters, length, and loading tree. [Base covers for steel poles shall be structural quality hot-rolled carbon steel plate having a minimum yield of 248 Mpa.]

2.7.3 Fiberglass Poles

UNI 9899. Designed specifically for supporting luminaires and having factory-formed cable entrance and handhole. Resin color shall be [dark bronze][as indicated][_____], and pigment shall provide uniform coloration throughout entire wall thickness. Finish surface shall be pigmented polyurethane having a minimum dry film thickness of 0.038 mm. Polyurethane may be omitted if the surface layer of the pole is inherently ultraviolet inhibited. Minimum fiberglass content shall be 65 percent with resin and pigment comprising the other 35 percent material content.

2.8 BRACKETS AND SUPPORTS

CEI EN 60598-2-3, UNI EN 40-3-1, and UNI EN 10025, as applicable. Pole brackets shall be not less than 31.75 mm [galvanized steel pipe][aluminum]

secured to pole. Slip-fitter or pipe-threaded brackets may be used, but brackets shall be coordinated to luminaires provided, and brackets for use with one type of luminaire shall be identical. Brackets for pole-mounted street lights shall correctly position luminaire no lower than mounting height indicated. Mount brackets not less than 7320 mm above street. Special mountings or brackets shall be as indicated and shall be of metal which will not promote galvanic reaction with luminaire head.

2.9 POLE FOUNDATIONS

Anchor bolts shall be steel rod having a minimum yield strength of 344.5 MPa ; the top 305 mm of the rod shall be galvanized. Concrete shall be as specified in Section 03300, "Cast-In-Place Concrete."

[2.10 AUXILIARY INSTANT-ON QUARTZ SYSTEM

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NOTE: Specify auxiliary quartz system or standby HPS lamps for luminaires where the extinguishing of HID lamps caused by momentary power interruptions is unacceptable for safety or security reasons.
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CE listed, automatically switched instant-on [150][250]-watt [quartz][_____] lamp. Quartz lamp shall come on when the luminaire is initially energized and immediately after a momentary power outage, and remain on until HID lamp reaches approximately 60 percent light output. Wiring for quartz lamp shall be internal to ballast and independent of incoming line voltage to the ballast.[Provide instant-on quartz system for each HPS fixture.][Provide instant-on quartz system as indicated.]

]PART 3 EXECUTION

3.1 INSTALLATION OF POLES

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NOTE: Suggested luminaire mounting height ranges for HID lamps:

70 to 150 Watt Lamps: 4575 to 6100
250 Watt: 6100 to 7625 mm
400 Watt Lamps: 7625 to 18300 mm
1000 to 2000 Watt Lamps: 18300 to 30500 mm
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CEI 64-7 and CEI 64-8, and to the requirements specified herein.

[3.1.1 Fiberglass

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NOTE: Poles longer than 12.2 m and poles set in swampy or rocky soil will require different settings or foundations than those set in average bearing soils. Consult pole manufacturer and structural

engineer for proper setting or foundation requirements.

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Install according to pole manufacturer's instructions.

][3.1.2 [Aluminum][Steel]

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NOTE: Poles longer than 12.2 m and poles set in swampy or rocky soil will require different settings or foundations than those set in average bearing soils. Consult pole manufacturer and structural engineer for proper setting or foundation requirements.

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Provide pole foundations with galvanized steel anchor bolts, threaded at the top end and bent 1.57 rad at the bottom end. Provide galvanized nuts, washers, and ornamental covers for anchor bolts. Concrete for anchor bases, polyvinyl chloride (PVC) conduit ells, and ground rods shall be as specified in Section 16303, "Underground Electrical Work". Thoroughly compact backfill with compacting arranged to prevent pressure between conductor, jacket, or sheath and the end of conduit ell. Adjust poles as necessary to provide a permanent vertical position with the bracket arm in proper position for luminaire location.[After installation, paint exposed surfaces of steel poles with two finish coats of [exterior oil paint of a color as indicated][aluminum paint].]

]3.1.3 Pole Setting

[Depth shall be as indicated.][Poles in straight runs shall be in a straight line. Dig holes large enough to permit the proper use of tampers to the full depth of the hole. Place backfill in the hole in 150 mm maximum layers and thoroughly tamp. Place surplus earth around the pole in a conical shape and pack tightly to drain water away.]

3.1.4 Photocell Switch Aiming

Aim switch according to manufacturer's recommendations.[Mount switch on or beside each luminaire when switch is provided in cast weatherproof aluminum housing with swivel arm.][Set adjustable window slide for [_____] lux photocell turn-on.]

3.2 GROUNDING

Ground noncurrent-carrying parts of equipment including[metal poles,] luminaires, mounting arms, brackets, and metallic enclosures as specified in Section 16303, "Underground Electrical Work". Where copper grounding conductor is connected to a metal other than copper, provide specially treated or lined connectors suitable for this purpose.

3.3 FIELD QUALITY CONTROL

Upon completion of installation, conduct an operating test to show that the equipment operates in accordance with the requirements of this section.

-- End of Section --