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USACE / NAVFAC / AFCEA / NASA UFGS-26 54 00.00 40 (July 2007)  
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Preparing Activity: NASA Superseding  
UFGS-26 54 00.00 40 (April 2007)

UNIFIED FACILITIES GUIDE SPECIFICATIONS

References are in agreement with UMRL dated March 2008

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### SECTION 26 54 00.00 40

#### CLASSIFIED, SPECIAL PURPOSE, EXTERIOR LIGHTING 07/07

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NOTE: This specification covers the requirements for metal-halide, mercury-vapor, and high-pressure sodium lighting and lamps. Use of mercury vapor lamps should be avoided because of their high energy consumption.

Drawings should show a three-dimensional detail of each fixture with letter designation keyed to the drawings and electrical symbols describing the type, style, class, kind, and size of fixture as follows:

Commercial fixtures, including recessed, surface, and pendant-mounted luminaires for direct, semidirect, direct/indirect, semi-indirect, and indirect lighting distribution

Industrial fixtures, including pendant- and chain-mounted luminaires for direct and semidirect lighting distribution, enclosed and gasketed fixtures, and lowering devices for high-bay lighting fixtures

Industrial HID lighting fixtures include fixtures with domes, deep bowls, symmetrical angles, and medium- and high-bay reflectors for direct and semidirect lighting distribution, as indicated.

Floodlights and street lighting luminaires, including fixtures as specified in Section 26 56 36.00 40 FLOOD LIGHTING and Section 26 56 19.00 40 ROADWAY LIGHTING.

All fixture drawings should indicate the materials and finishes for reflectors, refractors, diffusers, and shielding; fixture-mounting details; the number, size, and description of lamps; and electrical characteristics of branch-circuit or feeder connections. Fixture information should be presented in a fixture schedule.

Edit this guide specification for project specific

requirements by adding, deleting, or revising text.  
For bracketed items, choose applicable items(s) or  
insert appropriate information.

Remove information and requirements not required in  
respective project, whether or not brackets are  
present.

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

Recommended changes to a UFGS should be submitted as  
a Criteria Change Request (CCR).

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## PART 1 GENERAL

### 1.1 REFERENCES

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NOTE: This paragraph is used to list the  
publications cited in the text of the guide  
specification. The publications are referred to in  
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 C78.43	(2004) Standard for Electric Lamps, 400-Watt, M59 Single-Ended Metal Halide Lamps
ANSI C82.9	(1996) Standard for High-Intensity-Discharge and Low-Pressure Sodium Lamps, Ballasts, and Transformers - Definitions

ASTM INTERNATIONAL (ASTM)

ASTM A 123/A 123M	(2002) Standard Specification for Zinc (Hot-Dip Galvanized) Coatings on Iron and Steel Products
ASTM A 368	(1995a; R 2004) Standard Specification for Stainless Steel Wire Strand
ASTM A 467/A 467M	(2001) Standard Specification for Machine Coil and Chain
ASTM A 47/A 47M	(1999; R 2004) Standard Specification for Steel Sheet, Aluminum-Coated, by the Hot-Dip Process
ASTM B 26/B 26M	(2005) Standard Specification for Aluminum-Alloy Sand Castings

NATIONAL ELECTRICAL MANUFACTURERS ASSOCIATION (NEMA)

NEMA C78.388	(1990; R 1994) High Pressure Sodium Lamps-Methods of Measuring Characteristics
NEMA C82.4	(2002) Ballasts for High-Intensity-Discharge and Low-Pressure Sodium Lamps (Multiple-Supply Type)
NEMA C82.5	(1990; R 1995) High-Intensity Discharge and Low-Pressure Sodium Lamps, Reference Ballasts

NATIONAL FIRE PROTECTION ASSOCIATION (NFPA)

NFPA 70	(2007) National Electrical Code - 2008 Edition
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U.S. DEPARTMENT OF ENERGY (DOE)

DOE LT-6	(2000) How to Buy Energy-Efficient Industrial HID Luminaires
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U.S. NATIONAL ARCHIVES AND RECORDS ADMINISTRATION (NARA)

21 CFR 1040	Performance Standards for Light-Emitting Products
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UNDERWRITERS LABORATORIES (UL)

UL 844	(2006; Rev thru Jul 2006) Standard for Electric Lighting Fixtures for Use in Hazardous (Classified) Locations
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1.2 GENERAL REQUIREMENTS

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NOTE: If Section 26 00 00.00 20 BASIC ELECTRICAL MATERIALS AND METHODS is not included in the project specification, applicable requirements therefrom

should be inserted and the following paragraph deleted.

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Section 26 00 00.00 20 BASIC ELECTRICAL MATERIALS AND METHODS applies to work specified in this section.

Material, Equipment, and Fixture Lists shall be submitted for HID lighting fixtures including manufacturer's style or catalog numbers, specification and drawing reference numbers, warranty information, and fabrication site information.

### 1.3 SUBMITTALS

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NOTE: Review Submittal Description (SD) definitions in Section 01 33 00 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 01 33 00 SUBMITTAL PROCEDURES:

#### SD-01 Preconstruction Submittals

Material, Equipment, and Fixture Lists shall be submitted for HID lighting fixtures in accordance with paragraph entitled, "General

Requirements," of this section.

#### SD-02 Shop Drawings

Installation Drawings shall be submitted for the high intensity lighting fixtures in accordance with the paragraph entitled, "Installation," of this section.

#### SD-03 Product Data

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

Commercial Lighting Fixtures  
Industrial Lighting Fixtures  
Lamp Ballasts  
Lamps  
Lowering Devices  
Lighting-Distribution Systems

#### SD-06 Test Reports

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

#### SD-07 Certificates

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NOTE: Specifier should list those requirements  
desired to satisfy the specific job requirements.  
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Certificates shall be submitted showing compliance with the following requirements:

Efficiencies

## PART 2 PRODUCTS

### 2.1 PRODUCT STANDARDS

Fixtures in hazardous areas shall conform to UL 844.

Lighting fixtures shall be furnished completely assembled with wiring and mounting devices and ready for installation at the locations indicated. Recessed fixtures in suspended ceilings shall be designed and equipped for installation in the type of ceiling in which the fixture is to be installed. Fixtures shall be designed to be supported independent of the ceiling. Fixtures shall be equipped with the lamps indicated.

#### 2.1.1 Efficiencies

Lighting fixtures shall have efficiencies in accordance with the recommended levels specified in DOE LT-6.

### 2.2 COMMERCIAL LIGHTING FIXTURES

Commercial HID lighting fixtures shall be of the types and designs

indicated, completely assembled, wired, and ready for connection to the building lighting-distribution system.

### 2.3 INDUSTRIAL LIGHTING FIXTURES

Fixture assembly shall include a [detachable] [nondetachable] reflector, gaskets, porcelain lampholder, and cast-aluminum flange and capnut, with a threaded pipe fitting suitable for stem mounting. Reflector shall be seamless [aluminum] [porcelain-enameled steel] with beaded bottom edge completely covered by the finish. Porcelain lampholder shall be attached to the flange with mounting screws. Reflector shall be rigidly supported between the threaded lower flange and threaded capnut with gaskets to protect the reflector finish. A threaded, molded, porcelain-lampholder cover shall provide access to the lampholder wiring terminals. Lampholder screw shells shall be designed for the [medium]-[mogul]-base lamp indicated.

### 2.4 LAMP BALLASTS

#### 2.4.1 Multiple-Circuit Ballasts

Multiple-circuit ballast shall include a two-winding core-and-coil assembly with a saturated-iron regulating element and capacitors impregnated with an insulating material in accordance with NEMA C82.4, NEMA C82.5, and ANSI C82.9.

Ballast 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 not less than [95] [\_\_\_\_\_] percent.

Ballasts shall be voltage rated for operation on [120] [277] [480]-volt, single-phase, 60-hertz lighting-distribution systems, as indicated.

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.

[Solid state ballasts shall be used when indicated.]

#### 2.4.2 Series Circuit Transformers

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

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

### 2.5 LAMPS

[Lamps shall be certified to be automatically self-extinguishing and in conformance with 21 CFR 1040, Section 30, when HID lamps are used in a populated area.]

[HID lamps shall be low-pressure sodium, conforming to ANSI C82.9.]

[HID lamps shall be high-pressure sodium conforming to NEMA C78.388.]

[HID lamps shall be metal halide conforming to ANSI C78.43] [ANSI C78.43].]

## 2.6 LOWERING DEVICES FOR HIGH-BAY LIGHTING FIXTURES

[Lowering devices for high-bay lighting fixtures shall consist of a hand-operated mechanism that will connect, disconnect, raise, and lower the lighting fixture and permit the servicing and maintenance of fixtures and equipment at floor level. Lowering device shall include hangers, pulleys, beam clamps or suspension fittings, operating cable, hand chain, and cable and chain fittings as indicated and specified.

Hanger shall consist of a two-piece latching spring-loaded mechanism with an upper and lower separable contact assembly and stem and guide assembly, with cast-aluminum protective housings. Contacts shall be two-pole for single 2-wire circuits and four-pole for 3- and 4-wire circuits rated 15 amperes at 600 volts and 30 amperes at 250 volts ac.

Upper contact assembly shall include an integrally mounted corner pulley with threaded hub for electrical-circuit connections and top flange with lugs or ears for mounting to an overhead truss or supporting structural member with bead clamps or suspension fittings.

Lower contact assembly shall include fixture adapters and swivel end fittings for anchoring operating cable in the stem of the hanger. Fixture adapters shall be hot-dip galvanized malleable iron.

Pulleys shall be open face with cast-aluminum-alloy housings and deep-grooved pulley wheels closely shrouded to prevent lines from becoming wedged between wheel and housing. Pulleys shall be straight through for top mounted and bottom mounted operating cables and corner type as required. Top mounted pulleys shall be hinged, with mounting lugs. Bottom mounted pulleys shall be fixed, with mounting lugs. All pulleys shall be bolted to the supporting structure. Horizontal runs of operating cable shall be supported with pulleys located not more than [11] [ ] meter [35] [ ]-feet apart.

Terminal fittings shall include an enclosed lock box with hub tapped for [20] [ ] millimeter [3/4] [ ] inch conduit, flared conduit end fitting, pulley wheel, locking hooks, and hinged cover with provisions for padlocking.

Lock box and cover shall be [cast-aluminum alloy] [ ], and the flared conduit end fitting shall be [hot-dip galvanized malleable iron] [ ].

Lock box shall be wall-mounted not less than [1100] [ ] millimeter and not more than [1400] [ ] millimeter [42] [ ] inches and not more than [54] [ ] inches above the floor at the operating level. Pulley shall permit horizontal pull operation of the lowering device at the operating level.

Operating cable shall be [3] [ ] millimeter [1/8] [ ] inch diameter, [7 by 19] [ ] stranded corrosion-resistant steel aircraft-grade cable with link, cable loops, and serving sleeves. Cable shall be preformed with detachable fittings designed for connection to the terminal fittings. Operating cable shall conform to ASTM A 368.

Hand chains shall be separate detachable hand lines to provide means for disconnecting, lowering, raising, and reconnecting fixtures after servicing and maintenance work has been completed. Length of the hand chain shall be equal to the mounting height of the fixture and shall be equipped with a snap hook for connection to the terminal end of the operating cable. Hand chains shall be size [4] [\_\_\_\_], hot-dip galvanized steel, conforming to [ASTM A 467/A 467M](#), Class MS machine, straight link, steel chain.

Cast-aluminum-alloy housings shall conform to [ASTM B 26/B 26M](#).

Malleable-iron fittings shall conform to [ASTM A 47/A 47M](#). Hot-dip galvanized coatings shall conform to [ASTM A 123/A 123M](#).]

### PART 3 EXECUTION

#### 3.1 INSTALLATION

Installation shall be performed in accordance with [NFPA 70](#).

HID fixtures shall be installed at each outlet indicated, 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 of the reflector and in the proper burning position.

High-bay fixtures shall be so installed that they clear obstructions such as crane rails, piping, and bracing that could impede operation of lowering devices.

[Installation Drawings](#) shall be submitted for the high intensity lighting fixtures. Drawings shall indicate overall physical features, dimensions, ratings, service requirements, and weights of equipment.

#### 3.2 FIELD TESTING

HID lighting fixtures and their accessories, including lowering devices, 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 --