****
USACE / NAVFAC / AFCESA / NASA

Preparing Activity: NASA

NASA-16535S (December 2005)

MasterFormat™ 2004 - 26 52 00.00 40

Superseding

NASA-16535 (April 2005)

UNIFIED FACILITIES GUIDE SPECIFICATIONS

References are NOT in agreement with UMRL
References will be in agreement at next scheduled update of UMRL
****

SECTION TABLE OF CONTENTS

DIVISION 16 - ELECTRICAL

SECTION 16535S

EMERGENCY LIGHTING

12/05

-- End of Section Table of Contents --

****
USACE / NAVFAC / AFCESA / NASA | **NASA-16535S (December 2005)**

Preparing Activity: NASA | **MasterFormat™ 2004 - 26 52 00.00 40**
Superseding
NASA-16535 (April 2005)

UNIFIED FACILITIES GUIDE SPECIFICATIONS

References are NOT in agreement with UMRL
References will be in agreement at next scheduled update of UMRL
****

SECTION 16535S

EMERGENCY LIGHTING
12/05

****
NOTE: Delete, revise, or add to the text in this section to cover project requirements. Notes are for designer information and will not appear in the final project specification.

This section covers battery-operated incandescent emergency lighting units and lamps. Special systems requirements such as lamp-in fluorescent fixtures, battery or central systems are covered in this section.

Design should provide number and location of units to provide a minimum of 10 lux 1 foot-candle in compliance with OSHA; otherwise modify mounting and field-testing requirements.

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.

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

Use of electronic communication is encouraged.
****

PART 1 GENERAL

1.1 REFERENCES

****
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.

****

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.

NATIONAL FIRE PROTECTION ASSOCIATION (NFPA)

NFPA 101	(2003) Life Safety Code
NFPA 70	(2005) National Electrical Code 2005 Edition

UNDERWRITERS LABORATORIES (UL)

UL 924	(1995; 8th Ed; Rev thru July 2001) UL Standard for Safety Emergency Lighting and Power Equipment

1.2 GENERAL REQUIREMENTS

****

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.

****

Section 16003S GENERAL ELECTRICAL PROVISIONS applies to work specified in this section.

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

1.3 SUBMITTALS

****

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.

****

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-01 Preconstruction Submittals

Material, Equipment, and Fixture Lists shall be submitted in accordance with paragraph entitled, "General Requirements," of this section.

SD-02 Shop Drawings

Installation drawings shall be submitted for the Central Emergency Lighting Systems indicating location of installed fixture.

SD-03 Product Data

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

Emergency Lighting Egress Units
Emergency Fluorescent Lighting
Central Emergency Lighting Systems
Accessories

SD-06 Test Reports

Test reports shall be submitted showing results of System Operational Tests for emergency lighting systems.

SD-07 Certificates

Certificates shall be submitted for the following showing conformance with the referenced standards contained in this section.

Emergency Lighting Egress Units
Emergency Fluorescent Lighting
Central Emergency Lighting Systems
Accessories

PART 2 PRODUCTS

2.1 PRODUCT STANDARDS

Emergency lighting units shall conform to UL 924 and NFPA 101.

Emergency lighting units shall be furnished completely assembled with wiring and mounting devices and ready for installation at the locations indicated. Fixtures shall be equipped with lamps.

2.2 EMERGENCY LIGHTING EGRESS UNITS

Emergency lighting units shall be complete self-contained units with batteries, battery charger, one or more local or remote lamp heads with lamps, under-voltage relay, indicator lights, on/off switch, and test switch, in accordance with UL 924 for Type I (emergency light set), Class I (rechargeable storage-battery-powered unit), Style D (nonrefillable nickel-cadmium battery), as indicated.

Batteries shall be rated not less than [6-12] [_____] volts.

Battery charger shall include a dry-type full-wave rectifier with two charging rates, one to automatically maintain the battery in a fully charged state under normal conditions and the other to automatically recharge the battery to a fully charged state within [12] [_____] hours after continuous discharge of [1-1/2] [_____] hours through the connected lamploads.

Batteries shall have capacity and rating to supply the lamp load with maintained [87.5] [_____]-percent power, minimum, for [1.5] [_____] hours, or the battery-lamp combination shall maintain [60] [_____]-percent, minimum, illumination. Batteries shall be maintenance-free [lead acid] [nickel-cadmium] type. Minimum normal life shall be [10] [_____] years.

Unit enclosure shall be fabricated from sheet steel not less than [1.3] [_____] millimeter [18] [_____] gage. Cover shall provide access to the battery and battery-charger compartments and shall have a full-length piano hinge and a latching device. Component parts within the enclosure shall be protected from dust, moisture, and oxidizing fumes from the battery. Interior and exterior surfaces of enclosure shall be coated with a corrosion-resistant gray baked-enamel finish.

Lampheads shall be mounted on the top or wall mounted, of the unit enclosure except where otherwise indicated and shall be fully adjustable in the horizontal and vertical planes. The lamphead mounting assembly shall be steel construction with [nickel] [chromium] plating. Exterior housing of the lamp shall be formed from [nickel] [cadmium]-plated sheet steel.

Lamps shall be the sealed-beam type [PAR-36] [halogen], rated not less than [12] [_____] watts at the specified dc voltage.

An amber "ready-for-use on alternating current" indicating light, a red "recharging on alternating current" indicating light, and a momentary-contact pushbutton test switch shall be mounted on the cover of the unit enclosure. The amber indicating light shall indicate, when illuminated, that the unit is electrically connected to the normal ac supply source and that the battery is fully charged. The red indicating light shall indicate, when illuminated, that the battery is being recharged. The momentary-contact pushbutton test switch shall transfer unit from normal supply to battery supply and shall test operation of equipment under simulated ac source power failure.

The under-voltage relay shall be the self-clearing type and shall automatically connect the lampload to the battery supply upon failure of the alternating current supply. An on-off toggle switch shall be mounted inside the unit enclosure to disconnect the battery from the lampload when the unit is taken out of service for maintenance purposes. The relay shall energize when the ac supply falls to [70] [_____] percent of normal voltage.

Emergency lighting units shall be provided with [angle iron] [_____] mounting shelves and with a protective screen designed by the equipment manufacturer for this purpose. The mounting shelf and screen shall be coated with a corrosion-resistant finish in accordance with manufacturer's standard practice.

Emergency lighting units shall be suitable for operation on the ac supply circuit to which they are to be electrically connected.

2.3 EMERGENCY FLUORESCENT LIGHTING

Each unit shall have an automatic power failure device, test switch, pilot light, and fully automatic high/low trickle charger in a self-contained solid-state, temperature-compensated power-pack. The battery shall be [sealed-wet] [gelled-electrolyte] type with capacity as required to supply power to provide a minimum of [6500] [_____] lumens per square meter [600] [_____] lumens using a [40] [_____]-watt rapid start lamp. The battery shall be sealed and maintenance-free for a period of not less than [10] [_____] years under normal operating conditions.

2.4 CENTRAL EMERGENCY LIGHTING SYSTEMS

A central power system shall provide emergency power at [277] [120] volts, 60 hertz, for a minimum period of [90] [_____] minutes. The system shall be designed to handle surges during loss and recovery of the voltage. The system shall deliver its full rated output to designated lamp load. The power source shall be [batteries] [backup ac source].

2.4.1 Operation

Upon loss of normal supply voltage, the system shall automatically disengage itself from the normal input line, switching to a self-contained inverter with built-in protection when the output is shorted or overloaded. When normal line voltage resumes, the emergency system shall automatically switch back to normal operation. The transfer switch for this function shall be sized to handle [125] [_____] percent of full load. Battery systems shall include self-contained inverters with overload protection.

2.4.2 Charger

The battery charger shall be completely automatic, maintaining the batteries in a fully charged condition, and shall recharge the batteries to full capacity within [24] [_____]-hours after full discharge in accordance with UL 924.

2.4.3 Batteries

The batteries shall be sealed [lead-acid] [nickel-cadmium] type and shall be maintenance-free for a period of not less than [10] [_____] years under normal operating conditions.

2.4.4 Accessories

Visual indicators shall be provided to indicate normal power, inverter power, and battery charger operation. Low-voltage test switch to simulate power failure by interrupting the input line, voltage meter, electrolyte level detector to automatically disable the charging circuit in the event of a fault, and low voltage cutoff to prevent extreme battery power dissipation shall be provided.

2.4.5 Enclosure

A free-standing cabinet shall be provided with floor stand and shall be constructed of [2.7] [_____] millimeter [12] [_____]-gage sheet steel with baked-on enamel finish and locking type latch.

PART 3 EXECUTION

3.1 INSTALLATION

Emergency lighting unit shall be permanently fixed in place and shall have wiring to each unit installed in accordance with NFPA 70. The branch circuit feeding the unit equipment shall be the same panel bus or branch circuit as that serving the normal lighting in the area and shall be connected ahead of area switches. Emergency lighting fixtures that are remotely connected to the emergency lighting unit shall have circuit wiring kept independent of all other wiring and equipment and shall not enter the same conduit, cable, box, or cabinet with other wiring unless the fixture is supplied from two sources.

Mounting heights of emergency lighting units and remote lamps shall be a minimum of [2100] [_____] millimeter [7] [_____]-feet above the finished floor.

3.2 FIELD TESTING

Emergency lighting units shall be demonstrated to operate satisfactorily in the presence of the Contracting Officer.

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

-- End of Section --