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Attachment X

Specifications

This specification document is part of a set of documents used for ARRA relighting projects. It is an attachment to the Statement of Work which is an attachment to the Commercial Item for Construction Contract. This document is used as applicable to the specific project scope.

Edit this document based on the blue guidance text.

BI-LEVEL LIGHTING FOR STAIRWELLS AND CORRIDORS

PART 1 - GENERAL

1.1 Where there is an apparent contradiction between this specification and the Interior Lighting Specification, a reasonable interpretation accommodating both documents will be considered the correct interpretation. Where such a reasonable interpretation cannot be reached then the Interior Lighting Specification takes precedence.

1.2 REFERENCES

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

A. American Society of Heating, Refrigerating, and Air-Conditioning Engineers (ASHRAE)

1. Std. 90.1-2007 – ANSI/ASHRAE/IESNA Standard 90.1 Energy Standard for Buildings Except Low-Rise Residential Buildings

B. American National Standard Institute (ANSI)

1. ANSI C82.11 – For Lamp Ballasts, High Frequency Fluorescent Lamp Ballasts – Supplements

C. Institute of Electrical and Electronics Engineers (IEEE)

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1. ANSI/IEEE C2 – National Electrical Safety Code
- D. National Fire Protection Association (NFPA)
1. NFPA 70 – National Electrical Code
- E. National Electrical Manufacturers Association (NEMA)
1. LSD23-2002 – Recommend Practice – Lamp Seasoning for Fluorescent Dimming Systems
 2. WD 7-2000 – Occupancy Motion Sensors
- F. Underwriter’s Laboratory (UL)
1. UL 1598 – Luminaires
 2. UL 935 – Standard for Fluorescent-Lamp Ballasts

1.3 SUBMITTALS

- A. Product Data: For each type of lighting fixture, arranged in order of fixture designation. Include data on features, accessories, finishes, and the following:
1. Physical description of lighting fixture including dimensions.
 2. Ballast [including: ballast type (e.g., instant-start or programmed rapid-start), Ballast Factor, Ballast Efficacy Factor, catalog code, Input Watts for ballast when operating the applicable number of light sources].
 3. Luminaire (also known as fixture) efficiency.
 4. Table of zonal lumen output in 10° vertical increments showing both the lumen value and the percentage of total output per 10° increment.
 5. Initial lumen output of light source and temperature at which the lumens are rated
 6. Mean (also known as design) lumens output of light source and percentage of rated life in which mean/design lumen value is derived.
 7. Correlated Color Temperature (CCT) of light source.
 8. Color Rendering Index (CRI) of light source.
 9. Mean Lumens Per Watt of Lamp + Ballast (mean lumens / ballast input watts).
 10. Luminaire Efficacy of luminaire (Initial lumens x ballast factor x luminaire efficiency / ballast input watts).
 11. Photometric data and adjustment factors based on laboratory tests, complying with IESNA Lighting Measurements Testing & Calculation Guides, of each lighting fixture type. The adjustment factors shall be for lamps, ballasts, and accessories identical to those indicated for the lighting fixture as supplied in this Project.

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- a. Testing Agency Certified Data: For indicated fixtures, photometric data shall be certified by a qualified independent testing agency. Photometric data for remaining fixtures shall be certified by manufacturer.
 - b. Manufacturer Certified Data: Photometric data shall be certified by a manufacturer's laboratory with a current accreditation under the National Voluntary Laboratory Accreditation Program for Energy Efficient Lighting Products.
- B. Shop Drawings: Include plans, elevations, sections, details, and attachments to other work- mechanical or otherwise.
1. Detail equipment assemblies and indicate dimensions, weights, loads, required clearances, method of field assembly, components, and location and size of each field connection.
 2. Wiring Diagrams: For power, signal, and control wiring.
- C. Installation instructions.
- D. Qualification Data: For qualified agencies providing photometric data for lighting fixtures.
- E. Product Certificates: For each type of ballast for bi-level and dimmer-controlled fixtures, from manufacturer.
- F. Field quality-control reports.
- G. Operation and Maintenance Data: For lighting equipment and fixtures to include operation, and maintenance manuals.
1. Provide a list of all lamp types in each fixture on the Project; use ANSI and manufacturers' codes.
- H. Warranty: Sample of special warranty.
- I. Provide ultrasonic sensor field of view and adjustability.
- 1.4 QUALITY ASSURANCE
- A. Luminaires of same type and style shall be from a single manufacturer.
 - B. Lamps shall be from a single manufacturer and batch.
 - C. Luminaire Photometric Data Testing Laboratory Qualifications: Provided by manufacturers' laboratories that are accredited under the National Volunteer Laboratory Accreditation Program for Energy Efficient Lighting Products.

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- D. Luminaire Photometric Data Testing Laboratory Qualifications: Provided by an independent agency, with the experience and capability to conduct the testing indicated, that is an NRTL as defined by OSHA in 29 CFR 1910, complying with the IESNA Lighting Measurements Testing & Calculation Guides.
- E. Electrical Components, Devices, and Accessories: Listed and labeled as defined in NFPA 70, by a qualified testing agency, and marked for intended location and application.
- F. Comply with NFPA 70.

1.5 WARRANTY

- A. Special Warranties: Manufacturer's standard form in which manufacturer agrees to repair or replace components that fail in materials or workmanship within specified warranty period.
 - 1. Lamps: 24 months from date of Substantial Completion.
 - 2. Ballasts: 60 months from date of Substantial Completion.
 - 3. Fixtures: 36 months from date of Substantial Completion.
 - 4. Ultrasonic sensors: 60 months from date of Substantial Completion..

PART 2 - PRODUCTS

2.1 GENERAL REQUIREMENTS FOR LIGHTING FIXTURES AND COMPONENTS

- A. Fluorescent Fixtures: Comply with UL 1598.
- B. Capable of operating at input voltage of 120 V and 277 V.
- C. Metal Parts: Free of burrs and sharp corners and edges.
- D. Finishes: Baked-on enamel or powder coated unless indicated otherwise. Color to be selected by GSA at the time of submittal approval.
- E. Sheet Metal Components: Steel unless otherwise indicated. Form and support to prevent warping and sagging.
- F. Lamp holders: Low profile, medium Bi-Pin fluorescent of high-strength and quickwire pressure terminals with recessed wire wells to insulate against shorting; chemical-resistant thermoplastic body and equipped with a captive nut.
- G. Doors, Frames, and Other Internal Access: Smooth operating, free of light leakage under operating conditions, and designed to permit relamping without

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use of tools. Designed to prevent doors, frames, lenses, diffusers, and other components from falling accidentally during relamping and when secured in operating position.

H. Diffusers:

1. Acrylic Lighting Diffusers: 100 percent virgin acrylic plastic. High resistance to yellowing and other changes due to aging, exposure to heat, and UV radiation.

- a. Lens Thickness: At least [0.125 inch (3.175 mm)] <Insert dimension> minimum unless otherwise indicated.
- b. UV stabilized.

I. Factory-Applied Labels: Comply with UL 1598. Include recommended lamps and ballasts. Labels shall be located where they will be readily visible to service personnel, but not seen from normal viewing angles when lamps are in place. Label must be placed where it will not be damaged by heat.

1. Label shall include the following lamp and ballast characteristics:

- a. "USE ONLY" and include specific lamp type.
- b. Lamp diameter code (T-5, T-8, etc.), tube configuration (twin, quad, triple, etc.), base type, and nominal wattage for fluorescent and compact fluorescent luminaires.
- c. Start type for fluorescent luminaires.
- d. CCT and CRI for all luminaires.

2.2 RECESSED FLUORESCENT FIXTURE

A. Luminaires in stairwells and similar low-occupancy spaces shall be bi-level fluorescent luminaires controlled by a fixture-body integrated ultra-sonic motion sensor.

1. The luminaire must operate at a low standby light level during vacancy and instantly switch to full light output upon occupancy.
2. The luminaire must allow for manual selection of the low mode level, 5%, 10%, 20%, or 30% of normal output.

B. Housing and ends are die-formed, 20 gauge steel with riveted socket supports.

C. The luminaire must have multiple knock-out locations to accommodate a variety of mounting configurations.

D. Fixture is assembled at the factory.

E. The luminaire must use a prismatic lens to fully enclose the lamps.

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- F. The lens must have a linear refractive pattern to ensure even horizontal illumination.
- G. The internal reflector must have a minimum of 87% reflectivity.

2.3 BALLASTS FOR LINEAR FLUORESCENT LAMPS

A. General Requirements for Electronic Ballasts:

1. Must be NEMA Premium.
2. Comply with UL 935 and with ANSI C82.11.
3. Type: Programmed rapid start.
4. Designed for type and quantity of lamps served.
5. Designed for wiring as both Class 1 and Class 2 circuit.
6. Minimum starting temperature: 10 deg C.
7. Sound Rating: Class A.
8. Total Harmonic Distortion Rating: Less than 10 percent.
9. Transient Voltage Protection: IEEE C62.41.1 and IEEE C62.41.2, Category A or better.
10. Operating Frequency: 42 kHz or higher.
11. Lamp Current Crest Factor: 1.7 or less.
12. BF for T5 systems: 1.0 or higher.
13. Power Factor: 0.95 or higher.
14. Parallel Lamp Circuits: Multiple lamp ballasts shall comply with ANSI C82.11 and shall be connected to maintain full light output on surviving lamps if one or more lamps fail.

B. Electronic Programmed-Start Ballasts for T5 or T8 Lamps: Comply with ANSI C82.11 and the following:

1. Lamp end-of-life detection and shutdown circuit for T5 diameter lamps.
2. Automatic lamp starting after lamp replacement.

C. Single Ballasts for Multiple Lighting Fixtures: Factory wired with ballast arrangements and bundled extension wiring to suit final installation conditions without modification or rewiring in the field.

D. Comply with 47 CFR 18, Ch. 1, Subpart C, for limitations on electromagnetic and radio-frequency interference for consumer equipment.

E. Ballasts for Bi-Level Controlled Lighting Fixtures: Electronic type.

1. Bilevel means that the fixture operates in two states: high-level and low-level operation. Although the ballast may be adjustable at the fixture for the different possible low-level output, the ballast still toggles between high and low-level operations.

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2. Operating Modes: Ballast circuit and leads provide for remote control of the light output of the associated lamp between high- and low-level.
 - a. High-Level Operation: 100 percent of rated lamp lumens.
 - b. Low-Level Operation: 30 percent; 20 percent; 10 percent; or 5 percent of rated lamp lumens. (Field adjustable without disassembling the fixture.)
3. Ballast shall provide equal current to each lamp in each operating mode.
4. Compatibility: Certified by manufacturer for use with specific bi-level control system and lamp type indicated.

2.4 FLUORESCENT LAMPS

- A. Fluorescent Lamps shall meet the following requirements:
 1. Light sources in this application shall be one of the following:
 - a. 32 W (nominal) 48- inch T8 (F32T8).
 - b. 28 W (nominal) 48-inch (nominal) T5 (F28T5).
 - c. 54W (nominal) 48-inch (nominal) T5HO (F54T5HO) lamps.
 2. All lamps shall have the following characteristics:
 - a. Low-mercury meeting Toxicity Characteristic Leaching Procedure (TCLP) standards
 - b. Produce at least 2,900 lumens (initial) when measured on a reference ballast.
 - c. Correlated color temperature (CCT) between: 3,000 and 4,100 K.
 - d. Color Rendering Index (CRI): equal to or greater than 80.
 - e. Lamp Lumen Depreciation (LLD) shall be 92% or greater at 20,000 hours

2.5 OCCUPANCY SENSOR CONTROLS

- A. Occupancy/vacancy sensors shall comply with NEMA Standard WD 7-2000 which provides for testing requirements on the issues of performance sensitivity.
- B. Ultrasonic Type: Integral to the luminaire. Detect occupancy by sensing a change in pattern of reflected ultrasonic energy in area of coverage. Provide a field adjustable time delay once activated in minute time increment per GSA. Must be compatible with a DALI lighting control system and NEMA 243.
- C. Sensor must incorporate a failsafe feature such that lamps fail “on” in the event of sensor failure.

END OF SECTION



