



SECTION 26 51 00 - LIGHTING FIXTURES

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

- A. The general provisions of the Contract, including the Conditions of the Contract (General, Supplementary, and other Conditions) as appropriate, apply to the Work specified in this Section.
- B. Refer to other Electrical specifications, as well as the Specifications for the other various trades and materials and be thoroughly familiar with all provisions regarding electrical work.

1.2 GENERAL

- A. The Contractor shall furnish and install lighting fixtures and accessories as shown on the drawings and/or described herein.
- B. Unless otherwise specified, lighting fixtures shall be permanently installed and connected to the wiring system.
- C. The Contractor shall support each new fixture independently, from the building structure. Ceiling framing members shall not be used to support fixtures except in specific areas where ceiling supports for this purpose have been specified elsewhere in these specifications.
- D. Catalog numbers scheduled on the drawings or descriptions of lighting fixtures contained herein may indicate fixture compatibility with certain types of ceiling construction. The Contractor shall determine exact type of ceilings actually to be furnished in each area and shall obtain fixtures to suit, deviating from specified catalog numbers or descriptions only where necessary, and only to the extent necessary to insure fixture-ceiling compatibility. The Contractor shall notify the Architect/Engineer in writing where such changes are to be made. Contractor shall clean all lighting fixtures of dirt and debris upon completion of project prior to requesting substantial completion inspection.
- E. Unless noted otherwise on the drawings, lamps installed in each fixture shall be of the type specifically recommended by the manufacturer of the fixture for use in the fixture. Fixtures shall not be wired with or have any parts constructed using asbestos materials.
- F. All requests for prior approval shall contain the following:
 - 1. Photometric data for each fixture being submitted.
 - 2. For all exterior lighting, point by point foot candle levels shall be submitted. (Exception: Wall packs, ground mounted flood lights, landscape lighting).
 - 3. Listing of all deviations of fixtures proposed as compared to fixtures specified.
 - 4. For interior lighting point by point foot-candle levels shall be submitted for typical interior spaces (offices, classrooms, corridors) and for spaces with indirect and/or specialty lighting.

PART 2 - PRODUCTS

2.1 LED FIXTURES

- A. Manufacturers of LED luminaires shall demonstrate a suitable testing program incorporating high heat, high humidity and thermal shock test regimens to ensure system reliability and to substantiate lifetime claims.

- B. The use of IESNA LM-80 data to predict luminaire lifetime is not acceptable.
- C. At time of manufacture, electrical and light technical properties shall be recorded for each luminaire. At a minimum, this should include lumen output, CCT, and CRJ. Each luminaire shall utilize a unique serial numbering scheme. Technical properties must be made available for a minimum of 5 years after the date of manufacture.
- D. Luminaires shall be provided with a full, non-pro-rated, non-limited, 5-year warranty covering LEDs, drivers, paint and mechanical components.
 - 1. Each luminaire shall consist of an assembly that utilizes LEDs as the light source. In addition, a complete luminaire shall consist of a housing, LED array and electronic driver (power supply).
 - 2. The rated operating temperature range shall be 30°C to +40°C.
 - 3. Each luminaire is capable of operating above 100°F° (37°C), but not expected to comply with photometric requirements at elevated temperatures.
 - 4. Photometry must be compliant with IESNA LF-79 and shall be conducted at 25°C ambient temperature.
 - 5. The individual LEDs shall be constructed such that a catastrophic loss or the failure of one LED will not result in the loss of the entire luminaire.
 - 6. Luminaire shall be constructed such that LED modules may be replaced or repaired without replacement of whole luminaire.
 - 7. Each luminaire shall be listed with Underwriters Laboratory, Inc. under UL 1598 for luminaires, or an equivalent standard from a nationally recognized testing laboratory.
 - 8. Power Consumption: Maximum power consumption allowed for the luminaire shall be determined by application. The luminaire shall not consume power in the off state.
 - 9. Operation Voltage: The luminaire shall operate from a 60 HZ \pm 3HZ AC line over a voltage ranging from 108 VAC to 305 VAC. The fluctuation of line voltage shall have no visible effect on the luminous output.
 - 10. Power Factor: The luminaire shall have a power factor of 0.90 or greater.
 - 11. THD: Total harmonic distortion (current and voltage) induced into an AC power line by a luminaire shall not exceed 20 percent.
 - 12. Surge Suppression: The luminaire onboard circuitry shall include fused surge protection devices (SPD) to withstand high repetition noise transients as a result of utility line switching, nearby lightning strikes, and other interference. The SPD shall protect the luminaire from damage and failure for common mode transient peak voltages up to 10 kV (minimum) and transient peak currents up to 5 kA (minimum) SPD shall conform to UL 1449 depending on the components used in the design. SPD performance shall be tested per the procedures in ANSI/IEEE C62.41-1992 (or current edition for category C (standard)). The SPD shall fail in such a way as the luminaire will no longer operate. The SPD shall be field replaceable.
 - 13. Each luminaire shall have integral UL Listed Class II power supplies. Class I power supplies will not be acceptable.
 - 14. Operational Performance: The LED circuitry shall prevent visible flicker to the unaided eye over the voltage range specified above.
 - 15. RF Interference: LED drivers must meet Class A emission limits referred in Federal Communications Commission (FCC) Title 47, Subpart B, Section 15 regulations concerning the emission of electronic noise.
 - 16. Drivers shall have a Class A sound rating.
 - 17. Illuminance: The illuminance shall not decrease by more than 30% over the expected operating life. The measurements shall be calibrated to standard photopic calibrations.

18. Light Color Quality: The luminaire shall have a correlated color temperature (CCT) range of 3800K to 4200K. The color rendition index (CRI) shall be 80 or greater. Binning of LEDS shall conform to ANSI/G.NEMA SSL 3-2010.
19. Backlight –Uplight-Glare: the luminaire shall not allow more than 10 percent of the rated lumens to project above 80 degrees from vertical. The luminaire shall not allow more than 2.5 percent of the rated lumens to project above 90 degrees from vertical. Backlight and Glare ratings as per fixture schedule and calculated per IESNA TM-15.
20. The thermal management (of the heat generated by the LEDs) shall be of sufficient capacity to assure proper operation of the luminaire over the expected useful life.
21. The LED manufacturer's maximum thermal pad temperature for the expected life shall not be exceeded.
22. Thermal management shall be passive by design. The use of fans or other mechanical devices shall not be allowed.
23. The luminaire shall have a minimum heat sink surface such that LED manufacturer's maximum junction temperature is not exceeded at maximum rated ambient temperature.
24. The heat sink shall be aluminum.
25. The luminaires shall be dimmable from 100 percent output to 0 percent output.
26. Driver shall be integral to the fixture and field replaceable.

END OF SECTION 26 51 00