Corelite Continua

Interior lighting - suspended linear

Engineering Specification

Revision 1.00
4.23.2021

SECTION 265100 - INTERIOR LIGHTING Luminaire Specification

PART 1 GENERAL

1.01 SECTION INCLUDES

A. Work covered under this section consists of the furnishing of all necessary labor, supervision, materials, equipment, and services to completely execute the interior lighting system as described in this specification and as shown on the drawings.

1.02 RELATED SECTIONS

A. Section 260923 - Occupancy Sensors:] Occupancy sensors used in conjunction with central dimming control system.
B. Section 265113 – Interior Lighting Fixtures, Lamps, and Ballasts:] Fluorescent electronic dimming ballasts.
C. Section 25000 – Integrated Automation] Building integrator shall provide integration of the lighting control system with Building Automation Systems.
D. Section 265200 Emergency Lighting.

1.02 REFERENCES

A. ANSI/NFPA 70, National Electrical Code
B. FCC 47 CFR Part 15, Federal Code Of Regulation (CFR) testing standard for electronic equipment
C. IESNA LM-79, Electrical and TM-30 Photometric Measurements of Solid-State Lighting Products
D. IESNA LM-80, Approved Method for Measuring Lumen Maintenance of LED Light Sources

E. IESNA TM-21-11, Projecting Long Term Lumen Maintenance of LED Light Sources
F. UL1598, Standard for Safety of Luminaires
G. ISTA-1A, Packaging Compression, Vibration and Drop

1.04 COORDINATION REQUIREMENTS

A. Coordination

1. Coordinate the placement of sensors and other user input devices.
2. Coordinate the placement of daylight sensors to achieve optimal daylight dimming.

B. Prewire meeting: conducted on-site or during design meeting with lighting control system manufacturers or designated representative prior to commencing work as part of the manufacturer's standard practice and startup services. Manufacturer to review with the installer:

3. Installation of lighting and connections to lighting control system
4. Lighting control network wiring
5. Network IT requirements
6. Low voltage wiring requirements
7. Sensor coverage requirements
8. Daylight control requirements
9. Installer responsibilities
10. Startup and training schedule and actions

1.05 DRAWINGS

A. The drawings, which constitute a part of these specifications, indicate the general location of the luminaires. Data presented on these drawings is as accurate as preliminary surveys and planning can determine until final equipment selection is made. Accuracy is not guaranteed and field verification of all dimensions, routing, etc., is required.
B. Specifications and drawings are for assistance and guidance, but exact locations, distances and levels will be governed by actual field conditions. Contractor is directed to make field surveys as part of his work prior to submitting system layout drawings.

1.06 QUALITY ASSURANCE

A. Product shall confirm to requirements outlined in NFPA 70.
B. Luminaire manufacturer needs to demonstrate in excess of 30 years of experience in manufacturing indoor luminaires for the North American market and 10 years of

experience in manufacturing LED luminaires and controls for the North American market. Manufacturers that do not have at least 10 years of experience shall not be acceptable.

C. System components listed by an OSHA Nationally Recognized Testing Laboratory specifically for the electronic ballast/driver loads. Provide evidence of compliance upon request. Listed by FCC specifically for the required wireless communication protocols. Provide evidence of compliance upon request.
D. Luminaires shall be fully assembled and individually electrically tested prior to shipment.
E. 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.
F. The sole use of IES LM-80 data to predict luminaire lifetime is not acceptable. You must use in-situ data at 25C ambient and EnergyStar.gov TM-21 calculator to determine the TM-21 life and Lumen Maintenance.
G. Luminaires shall be provided with a 5 year warranty covering, LEDs, drivers and paint finish. Driver warranty must be serviced by fixture manufacturer not outsourced to the driver manufacturer.

1.07 SUBMITTALS

A. Submit product data on luminaires. Product data to include, but not limited to materials, finishes, approvals, photometric performance, and dimensional information.
B. LM79 and TM-30 report for each luminaire from a NVLAP accredited photometric laboratory.

1.08 DELIVERY, STORAGE AND HANDLING

A. Ensure products are delivered as shipped, including pallet assembly and packaging has not been damaged in shipment.
B. Store products in a clean, dry location in manufacturers original packaging.
C. Store products in an environment that meets products ambient and storage temperature per products specification sheets.
D. The contractor is responsible for complete installation of the entire system according to strict factory standards and requirements.
E. Handling: packaging will include clear installation instructions for all components with typical illustrations of installation locations and connections. The installing contractor can easily match each package to the layout on the design floor plans.
F. Deliver luminaires and components carefully to avoid breakage, bending and scoring finishes. Do not install damaged equipment.

G. Store luminaires and accessories in original cartons and in clean dry space; protect from weather and construction traffic.
H. Packaging will be in accordance with ISTA-1A.

PART 2 PRODUCTS

2.01 ACCEPTABLE MANUFACTURERS AND LUMINAIRES

A. Manufacturer and luminaire: Subject to compliance with these specifications, luminaires shall be Cooper Lighting Corelite CTA-XX-LED-X-, (or engineer approved equal).
B. Substitutions:
    1. By using pre-approved substitutions, the contractor accepts responsibility and associated costs for all required modifications to circuitry, devices and wiring. The contractor shall provide complete engineered shop drawings (including power and control wiring) with deviations from the original design, highlighted in an alternate color, to the engineer for review and approval prior to rough-in.

2.02 LED LUMINAIRES

A. General: Except as otherwise indicated, provide LED luminaires, of types and sizes indicated on fixture schedules.
B. Specifications for each luminaire are as follows:

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). Drivers shall have 2.5kVA surge protection.
2. Reported lumen maintenance shall be greater than 84% per TM-21-11 after 60,000 hours of luminaire operation in an ambient environment of 25ºC (77ºF). This data must be TM-21 compliant and derived from the EnergyStar.gov TM-21 Calculator.
3. The rated operating temperature range shall be 25°C.
4. Photometry must be compliant with IESNA LM-79.
5. Each luminaire shall meet all parameters of this specification throughout the minimum operational life.
6. 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.
7. Luminaire shall be constructed such that LED modules may be replaced or repaired without replacement of whole luminaire.

8. Each luminaire shall be listed with Underwriters Laboratory, Inc. under UL1598 for luminaires, or an approved equivalent standard from a nationally recognized testing laboratory.

C. Technical Requirements

1. Electrical

a. Luminaire shall have a minimum efficacy of **115** lumens per watt and shall consume no more than 24 watts per linear foot. The luminaire shall not consume power in the off state.

b. Operation Voltage: The luminaire shall operate from a 60 HZ ±3 HZ AC line over a voltage ranging from 120-277 VAC and 347 VAC. All driver shall not utilize step down transformers to achieve operating voltage. The fluctuations of line voltage shall have no visible effect on the luminous output.

c. Fixture shall be continuously wired through all sections and utilize push-in connectors.

d. Power Factor: The luminaire shall have a power factor of 0.9 or greater.

e. THD: Total harmonic distortion (current and voltage) induced into an AC power line by a luminaire shall not exceed 20 percent.

f. Operational Performance: The driver and LED circuitry shall prevent visible flicker to the unaided eye over the voltage range specified above. Manufacturer shall provide documentation that fixture meets one of the follow criteria:

1. Classified as “reduced flicker operation” per California Title 24, when tested according to the requirements in Joint Appendix JA-10.8
2. Recommended practices 1, 2 or 3 as defined by IEEE standard 1789-2015 LED.9
3. Pst LM ≤ 1.0 and SVM ≤ 0.6 for indoor applications per NEMA 77-2017.10,11

g. RF Interference: LED Drivers must meet Class A emission limits referred in Federal Communications Commission (FCC) Title 47, CFR Part 15, class A regulations concerning the emission of electronic noise.

h. Luminaire shall be Design Lights Consortium Qualified.

i. Luminaire shall allow option for dedicated secondary emergency circuits, integral EM self-testing battery, and integral Automatic Load Control relay (ALCR) / UL924 relay if specified.

2. **Photometric Requirements**

a. Optical Assemblies:

1. Direct LEDs shall not be visible from below fixture. Lens shall be encapsulated by end cap to prevent light leak at end of fixture.
2. Indirect LEDs shall be provided with an over optic element that is serviceable/replaceable.

b. Light Color/Quality: The luminaire shall have a correlated color temperature (CCT) tolerance of (3) MacAdam ellipses. The color rendition index (CRI) shall be a nominal 80 with an option for 90+.

c. Luminaire shall provide a customizable uplight lumen output with a minimum of 250lms/ft in 250 lumen increments.

d. Luminaire shall provide a customizable downlight lumen output with a minimum of 200lms/ft in 250 lumen increments.

e. Luminaire shall be capable of adjusting up and down lighting distributions.

2. Thermal Management

a. 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.

b. The LED manufacturer's maximum thermal pad temperature for the expected life shall not be exceeded.

c. Thermal management shall be passive by design. The use of fans or other mechanical devices shall not be allowed.

3. Physical and Mechanical Requirements

a. Fixture shall be constructed of a single-piece extruded aluminum housing.

b. Fixture segments shall be able to be constructed up to 12' to minimize suspension points.

c. Suspension hardware shall be aircraft cable which is capable of field adjustment along the length of the fixture.

d. The maximum weight of the luminaire shall be 5 lbs/ft.

e. The housing shall meet the requirements for NEMA/UL dry/damp location and be UL listed.

f. Luminaire to include standard 1% 0-10V dimming driver and options for DALI 2.0.

g. Luminaire shall be constructed such that driver may be replaced or repaired without the replacement of the whole fixture.

4. Materials

a. Fixture shall be constructed extruded aluminum housing.

b. End caps shall be die cast, mechanically attached to fixture without exposed fasteners, and allow for thermal expansion of lens to eliminate light leak.

c. Lens shall be acrylic and able to be produced in a single piece up to 100' in length without the need for seems, welds or any type of joint. High resistance to yellowing and other changes due to aging, exposure to heat, and UV radiation.

5. Connected Sensors and Controls

a. Product: WaveLinx Integrated Sensor [WAA][WAB].
b. Luminaire shall include an integrated sensor providing Luminaire Level Lighting Controls.
c. Luminaire sensor shall control ON/OFF/DIM of the luminaire via wireless control.
d. Luminaire Integrated Sensor shall provide occupancy, daylighting and wireless control of the luminaire.

1. Sensing mechanism:

- [Infrared]: Utilize multiple segmented lens, with internal grooves to eliminate dust and residue build-up.
- [Daylight]: Utilize integrated daylight sensor to provide closed loop daylight dimming control. Each WaveLinx Integrated Sensor provides an individual daylight dimming zone to provide highly

accurate daylight levels at the work surface throughout the entire space.

- [Location]: Utilize additional internal Bluetooth radio capable of offering Real Time Location Services (RTLS) – IoT Software Upgrade Required.

2. Power failure memory:
   - Controls incorporate non-volatile memory. Settings and parameters saved in protected memory shall not be lost should power be interrupted and subsequently restored.

e. Products tested in identical manner, complaint to NEMA WD 7 -2011 Occupancy Motion Sensors Standards.
f. Sensor shall have time delays from 10 to 20 minutes.
g. Sensor shall provide unique daylight calibration considering light level at the sensors, work surface and integrated luminaire light output.
h. All sensors shall provide an LED as a visual means of indication to verify that motion is being detected during both testing and normal operation.
   - Green LED indication when sensor is in out-of-the-box operation mode
   - White LED indication when sensor has been connected to the WaveLinx lighting control system
i. Test mode - fifteen second time delay.
j. Walk-through mode.
k. Sensors are RoHS compliant.
l. Sensor shall provide out-of-the-box functionality of occupancy detection, directly controlling integrated fixture.
   - Occupied default light level is 75%
   - Unoccupied default light level is OFF
   - Occupancy default time out is 20 minutes
m. Sensors shall monitor changes in occupancy, changes in ambient light levels and communicate digital control commands to light fixtures according to a control strategy.
n. Sensor shall wirelessly transmit occupancy status and light level to the wireless lighting control system which allows the data to be stored in a central location on premises and displayed via the wireless Mobile Application and software.
o. Calculated energy consumption data available through Trellix.
p. Sensors shall be fully adaptive with the ability to have the sensitivity and timing to be remotely adjusted to ensure optimal lighting control for any use of the space.
q. Sensors have remotely adjustable settings for dimming levels, occupied/unoccupied light levels, occupancy/vacancy sensing, and sensitivity to changes in motion and changes in ambient light levels.

r. Sensors may remotely adjust light output to reduced levels and remain at that reduced level for an adjustable period before turning off when a space is vacant.
s. Default programming is stored in each sensor in addition to the Wireless Area Controller. Sensors operate independently of from Wireless Area Controller, so there cannot be single point failure. Systems must operate so there is no single point of failure

6. Modular wiring system

To reduce installation time and labor, fixture must allow for a modular wiring system that solves the challenges of branch circuit wiring in. Modular wiring system components shall meet all requirements:

a. UL listed under standard 183 and approved in Article 604 of the NEC
b. Meets the NEC and UL listing requirements for combining power/lighting circuits and class 2 or class 3 signal/control circuits in the same cable
c. True dead front design prevents accidental contact with live components
d. Allow for integral 0-10V or DALI control circuit along with power in a single circuit jacketed cable
e. All connectors shall be positive self-grounding locking clips that fit into any 1/2" knockout on a fixture
f. Allow for external fixture access for safe and easy servicing
g. Galvanized steel housing exterior with robust integral key and latch design
h. Accommodate voltages include 120V, 277V, 347V, 208V and 480V circuits
i. Copper conductors are THHN insulated wire rated 90°C
j. Fixtures specified with factory installed modular wiring components shall arrive at the job site completely assembled and ready to be snapped together to form a branch circuit system. No bending, cutting or assembly of modular hardware in the field permitted
k. Fixtures specified for field installation with modular wiring system components shall be UL listed for field installation and meet all requirements a. – i. above

PART 3 EXECUTION

3.01 INSTALLATION

A. Installation and configuration shall conform to the requirements of the NFPA 70 (National Electrical Code), and applicable local codes.

B. Installation shall conform to manufactures recommended instructions.
C. Install the work of this Section in accordance with manufacturer's printed instructions unless otherwise indicated.
D. Provide written or computer-generated documentation on the commissioning of the system including:
    1. Sensor parameters, time delays, sensitivities and daylighting setpoints.
    2. Sequence of operation, (e.g. manual ON, Auto OFF. Etc.).
    3. Load parameters (e.g. blink warning, etc.).

3.02 PRODUCT SUPPORT AND SERVICE

A. Factory telephone support shall be available at no cost to the owner. Factory assistance shall consist of solving programming or application questions concerning the control equipment.

3.03 FACTORY COMMISSIONING (OPTIONAL)

A. Upon completion of the installation, the system shall be commissioned by the manufacturer's factory authorized representative who will verify a complete fully functional system.
B. The electrical contractor shall provide both the manufacturer and the electrical engineer with twenty-one (21) working days written notice of the system startup and adjustment date.
C. Upon completion of the system commissioning the factory-authorized technician shall provide the proper training to the owner's personnel on the adjustment and maintenance of the system.

3.04 FIELD QUALITY CONTROL

A. Test for Emergency Lighting: Interrupt power supply to demonstrate proper operation. Verify transfer from normal power to battery and retransfer to normal.

B. Prepare a written report of tests, inspections, observations, and verifications indicating and interpreting results. If adjustments are made to lighting system, retest to demonstrate compliance with standards.

END OF SECTION 265100