SECTION 26 5000 - LIGHTING

PART 1 - GENERAL

1.1 DESCRIPTION OF WORK:

A. Furnish and install all luminaires, with all necessary accessories and lamps, as shown, specified, and/or scheduled.

1.2 RELATED SECTIONS:

A. See Section “Electrical General” for requirement for submittals.

B. See Division 1 for allowances and Owner-furnished items to be installed under this Section.

1.3 ABBREVIATIONS:

A. CCT – Correlated Color Temperature

B. CRI – Color Rated Index

C. L.E.D. – Light Emitting Diode

D. L70 – Reported Life of LED lumen maintenance (L, in hrs.) 70% lumen maintenance.

E. PFC – Power Factor Correction.

1.4 SUBMITTALS:

A. Shop drawing submittals for luminaires shall include the following for each luminaire: complete construction details including all dimensions, complete description of materials used, complete electrical data (including operating voltage), photometric test report from an independent testing lab, complete description of finish, and manufacturer catalog cutsheet of lamp to be used.

1.5 WARRANTY

A. Luminaires: 5 year on-site replacement warranty for material, fixture finish, and workmanship. On-site replacement includes transportation, removal, and installation of new products.
   1. Finish warranty to include failure and substantial deterioration such as blistering, cracking, peeling, chalking, or fading.
   2. Material warranty includes:
      a. All drivers.
      b. Replacement when more than 10 percent of LED sources in any lightbar or subassembly(s) are defective or non-starting.

PART 2 - PRODUCTS

2.1 LUMINAIRES:

A. Furnish and install luminaires as shown in luminaire schedule or otherwise indicated on the drawings.

B. Locations of luminaires on electrical drawings are diagrammatic. Verify location of luminaires with architectural drawings prior to installation. Conflicts between electrical and architectural drawings shall be referred to the Architect for resolution.

C. Provide hardware, accessories and other appurtenances required for a complete installation. Verify type of ceiling and wall construction being installed, and provide luminaires properly configured for the type of construction.

D. All products shall be UL listed for the application being installed.

E. Exit signs shall be furnished with 6" high letters with ¾" stroke. Verify color of signage required by local code authorities. Signs shall meet all NFPA, UL and local building code requirements.

F. Pendant stem mounted luminaires shall be furnished with ball aligner swivel, 30 degrees from vertical minimum, with swivel below canopy, with ½" diameter metal tube (stem).

G. Luminaire above-ceiling support wires shall be zinc-coated, soft temper ASTM A641/A641M steel, 12 gage.

H. Luminaires with aircraft cable suspension system shall use stainless steel aircraft cable and adjustable cable gripper with swaged cable stop at ceiling canopy.

2.2 DRIVERS, POWER SUPPLIES, BALLASTS AND TRANSFORMERS:

A. All Drivers, Power Supplies, ballasts and transformers used in luminaires shall be ETL approved and/or UL listed. Transformers for low-voltage lighting systems shall be UL listed for that application.

B. Rated for universal voltage inputs (120V, 277V) or as otherwise indicated on the luminaire schedule.

C. Interior noise level essentially quiet in normal ambient noise level (Class A).

D. Installed internally to luminaire housing unless specifically noted for remote installation.

E. Function without interruptions when operating in room ambient temperature of 80 degree F. and plenum operating temperature of 120 degree F.

F. Where installed in environments with ambient temperature below 32 degree F shall be provided appropriately rated for the ambient environment.

G. Where installed remotely from luminaire, provide with housing listed for installation in environmental air spaces/ceiling plenums and listed for Class 1 wiring methods.

H. All LED Drivers shall be Electronic, Constant-current type, high efficiency with the following PFC:
1. ON/OFF Non-Dimming Driver (PFC>0.95).
2. 0-10v, & Dali Dimming Drivers (PFC>0.90).
3. Lurton 3-wire and Eco-System Dimming Drivers (PFC 0.99).

I. LED Drivers shall have on-board transient voltage surge suppression protective device.

J. LED Drivers shall be dimmable (10-100% standard) using 0-10V control unless otherwise indicated in luminaire schedule. Contractor shall verify compatibility between drivers, power supplies and transformers and lighting control devices.

2.3 LED LIGHTING

A. Provide luminaires complete with power supplies (drivers) and light sources.

B. Luminaire drive current value must be identical to that provided by test data for luminaire in question.

C. Luminaires must be tested to IES LM-79 and IES LM-80 standards, with the results provided as required in the Submittals paragraph of this specification.

D. LED package shall be designed around the lumen maintenance of 87% at 60,000 hours. and achieve L70 at 100,000 hrs.

E. Department of Energy 'Lighting Facts' label for each luminaire.

F. Listed with the DesignLights Consortium 'Qualified Products List' when falling into category of "General Application" luminaires, i.e. Interior Directional, Display Case, Troffer, Linear Ambient, or Low/High Bay.

G. Luminaires shall incorporate a high-efficiency LED light engine with LED chips by one of the following manufacturers:
1. Nichia
2. Philips/Lumileds
3. CREE

H. LED’s shall be binned for consistent color performance, with CCT tolerances within a 3-step MacAdam ellipse and CRI of 80 (minimum).

2.4 EMERGENCY LIGHTING:

A. Provide luminaires and exit signs with self-contained battery power supplies as indicated. All equipment shall conform to UL924-Emergency Lighting and Power Equipment.

B. Battery shall be sealed, maintenance-free lead-acid type (indoors) or nickel-cadmium (outdoors or unconditioned spaces) with 10-year nominal life. Unit shall incorporate a fully-automatic solid state charger and automatic transformer relay to transformer to backup battery power supply upon failure of normal power.

C. All emergency lighting equipment shall be equipped with means to test operation and an LED indicating battery status.

2.5 POLES AND STANDARDS:

A. Poles should conform to AASHTO LTS-3 standards for structural design. Poles shall be designed to withstand prevailing wind conditions with a gust factor of 1.3.

B. Pole manufacturer shall coordinate with luminaire manufacturer to ensure adequate strength to support the fixtures specified. Pole shall be furnished with all appropriate mounting hardware, fasteners and supports for installation of the luminaire(s).

C. All pole hardware and fasteners shall be stainless steel or other corrosion-resistant materials if stainless steel is not compatible with structural material.

D. Pole manufacturer shall provide a plywood or steel anchor-bolt template to assist installer in preparing pole foundation. Template shall indicate luminaire orientation to ensure proper light distribution.

E. Provide power-installed screw foundation where indicated. Screw foundation shall be fabricated with hot-dip galvanized structural steel (ASTM A36/A36M) of sufficient strength to support pole and luminaire. Mounting plate and bolts shall be coordinated to match pole.

F. All poles shall be provided with a wiring handhole per National Electrical Code requirements.

G. All poles shall be provided with grounding lug bonded to metal components of the pole. The lug shall be accessible through the handhole.

H. All poles shall be furnished with anchor bolt/base plate covers. Cover shall match pole match pole material and finish.

I. Steel poles shall be pre-finished inside and out, either hot-dip galvanized or prime-coat enamel to prevent corrosion.

PART 3 - EXECUTION

3.1 INSTALLATION

A. Install in accordance with NECA standard 1.

B. Support luminaires from structure of the building, independent from the ceiling membrane or finish material. Luminaire shall be set level, plumb, and square with ceilings and walls.

C. Recessed luminaires in suspended grid ceilings shall be secured to the ceiling grid in a minimum of four locations, spaced near corners of the housing. Provide devices for securing the luminaire to the ceiling grid to comply with the National Electrical Code (e.g. "earthquake clips").
   1. Luminaires heavier than 20 pounds shall have supplemental support wires directly attached to the housing at each corner and anchored to the structure above the ceiling.

D. Recessed luminaires in fire-rated ceiling assemblies shall be installed in accordance with the UL listing of the assembly.

E. Recessed luminaires (non lay-in or hard ceiling types) shall be supported by ¾" steel ceiling channel, or factory-supplied hanger bars one on each side of the luminaire, anchored to ceiling structure. Recessed

luminaires heavier than 20 pounds shall have supplemental support anchored to the structure above the ceiling. Do not use conduit to support luminaire.

F. Provide recessed luminaires with appropriate frames, hardware and trim for the ceiling installed.

G. Install luminaires free and clear of structural and mechanical interferences above the ceiling. If location indicated on the drawing conflicts with other elements, notify the Architect for directions for remedial action.

H. Attach surface and pendant mounted luminaires to 3/16" fixture stud in outlet box. Pendant luminaires shall have supplemental support rods or wire anchored to the structure above the ceiling.

I. Luminaires surface mounted to grid-type ceilings shall be mounted with Caddy IDS type clips anchored to structure above.

J. Wall mounted luminaires shall be anchored to wall structure. Luminaire shall fully conceal the outlet box. Luminaires installed on gypsum wall board partitions shall be anchored to backing plates or blocking spanning wall framing members; do not install luminaires solely with support from gypsum wall board anchors.

K. Recessed luminaires in insulated ceilings shall be installed so that insulation is no less than 3 inches away from the fixture enclosure unless the luminaire is listed for direct contact with insulation (IC rated).

L. Provide equipment, labor and materials, as needed for final aiming of adjustable luminaires. Aiming shall take place immediately before final occupancy by the Owner.

M. Reflectors, trim cones, and other visible trim of luminaires shall not be installed until completion of ceiling work, and shall be clean and free of dust, fingerprints, scratches, dents etc. upon substantial completion.

N. Remote Mounting of Drivers, Ballasts or Transformers: Distance between the remote device and fixture shall not exceed that recommended by manufacturer. Verify, with manufacturers, maximum distance between device and luminaire and minimum wiring conductor size required for proper operation.

3.2 EXTERIOR LIGHTING INSTALLATION

A. All poles and bollard-style luminaires shall be installed plumb to the earth, with the bottom of the base flush to the foundation, surrounding paving or finished grade, unless indicated otherwise.

B. Exterior pole-mounted luminaire with anchor base type poles shall be installed on a reinforced concrete foundation designed to support fixture weight and withstand prevailing wind conditions.
1. Verify soil conditions at each pole location to ensure adequacy of soil to support pole. Advise Architect if soil conditions are not adequate.
2. Provide and set anchor bolts according to anchor-bolt templates furnished by pole manufacturer. Mount pole with leveling nuts, and tighten top nuts to torque level recommended by pole manufacturer.
3. Conduit raceway shall be pre-set in the foundation and terminate inside the pole.
4. Grout void between pole base and foundation. Use nonshrink concrete grout firmly packed to fill space. Arrange to drain condensation and water from interior of pole with a drain hole.
5. Install anchor bolt base plate and wiring handhole covers.

C. Exterior pole-mounted luminaires with direct-embedment type poles shall be installed in carefully compacted earth per pole manufacturer's recommendations.

3.3 WIRING AND GROUNDING

A. Wiring to luminaires shall be installed with approved raceway or cable to a junction box. Do not wire luminaire to luminaire unless noted otherwise, or if using manufactured wiring systems.

B. Individual flexible connections under 6 feet in length may consist of 2#14 and 1#14 (ground) in 3/8" flexible metallic conduit (for circuits 20A or less). Bond ground wire and conduit at each end.

C. Provide molded plastic luminaire disconnecting means that opens and separates all grounded and ungrounded conductors.

D. Provide a copper-clad steel grounding rod at each lighting pole. Bond to pole at wiring access handhole.

E. All pole-mounted luminaires shall have in-line fuse and wiring disconnect installed at the hand hole of the pole. Provide sufficient slack in conductors to allow servicing outside of pole.

END OF SECTION