SECTION 16510

LUMINAIRES

PART 1 - GENERAL

1.01 SECTION INCLUDES

A. Interior and exterior luminaires and accessories.

B. Exterior luminaires, poles, bollards and accessories.

C. Ballasts.

D. Lamps.

E. Additional wiring methods for luminaires.

1.02 RELATED SECTIONS

A. Section 16010: Basic Electrical Requirements.

1.03 REFERENCES

A. NEMA Standards.

B. NFPA 70 N.E.C. Latest Edition.

C. U.L. Standards.

D. ANSI/NFPA 101 - Life Safety Code.

1.04 PERFORMANCE REQUIREMENTS

A. Conform to requirements of ANSI/NFPA 70 (N.E.C.).

B. Furnish products listed and classified by Underwriters' Laboratories, Inc. (U.L.) as suitable for purpose specified and shown.

1.05 SUBMITTALS

A. Submit shop drawings, Owner 's Manuals, and Operating Instructions in accordance with Section 01300, Submittals.

B. Shop Drawings: Indicate dimensions and components for each luminaire that is not a standard product of the manufacturer.

C. Product Data: Provide dimensions, ratings, performance data and total input watts.

D. Note that substitutions for Type “J” fixtures on the second floor garage will be approved only after review of full sized working samples prior to submission of Shop Drawings and the following:
   1. Include candle power distribution curves.
   2. Include point to point computer modeling on scaled floor plans, showing initial footcandle levels in a 4 to 5 foot grid, at the floor, plus show ceiling exitances (footcandles at ceiling). Use the following surface reflectance: Ceiling=80%, walls=20% and floors=20%. Submittals will not be reviewed without these calculations.

3. Submittals for these lighting fixtures will be returned and mark “Not Approved” without prior review of working samples.

1.06 DELIVERY, STORAGE, AND HANDLING

A. Accept materials on site. Inspect for damage.

B. Protect from moisture, corrosion and entrance of debris by storing above grade. Provide appropriate covering.

1.07 SPARES

A. Provide two of each louver type.

B. Provide two of each plastic lens type.

C. Provide one replacement lamp for each lamp type installed. Maximum of 24 lamps for each type.

D. Provide two of each ballast type.

1.08 PROJECT CONDITIONS

A. Wiring to fixtures as shown on Drawings is diagrammatic only and is intended to show circuit and switching arrangements. Fixtures shall not be used as raceways except as specifically allowed by N.E.C.

B. Where panel designation and circuit numbers are shown with no homerun symbol, wiring to same circuits may share same homerun to panel. See voltage drop and distance restrictions in section 16010.

PART 2 - PRODUCTS

2.01 LUMINAIRES

A. Furnish products as specified in schedule on Drawings.

B. All fixtures shall be approved by Underwriters' Laboratories, Inc., and bear Underwriters' labels.

C. In addition to the manufacturers listed on the Drawings, fixtures with equivalent details and matching characteristics as provided by manufacturers listed below shall be considered for approval after review of Shop Drawings.

D. Manufacturers:

1. Benjamin
2. Columbia
3. Cooper
4. Daybrite
5. Delta
6. Exceline
7. Halo
8. Holophane
9. Hubble
10. ICE
11. Keene
12. Keystone
13. KIM
14. Lightolier
15. Litecontrol
16. Lithonia
17. Moldcast
18. Peerless
19. QL
20. Spaulding
21. USI

E. Ballast: Provide ballast suitable for lamp specified.

F. Lamps: All lamps shall be furnished and installed in each fixture.

2.02 BALLASTS: Rated 120 volts or as noted.

A. Ballast Manufacturers:
   1. Magnetek.
   2. Motorola
   3. Valmont.
   4. Advance.

B. Fluorescent Ballast:
   1. Fully electronic 25,000 Hz instant start, two, three and four lamp type. Quantities to allow switching as indicated on plans. Provide only rapid start lamps which are specifically designed to operate properly on instant start electronic ballasts.
   2. Ballasts for all recessed fixtures shall be of the very low heat (VLH) design.
   3. Total harmonic distortion shall be less than 15%.
   4. Where fixtures run end to end, or are within the standard 11 foot ballast whip distance, then efforts shall be made to utilize as many four lamp ballasts as possible (driving four lamps). In all cases, ballasts shall be installed to drive the exact number of lamps they are designed for, Example - one lamp ballast drives one lamp, two lamp ballast drives two lamps, etc. Installation where this criteria is not followed will not be accepted.
   5. Where fixtures can use 11 foot whips (master and satellite pairs), ballast shall be installed to drive the exact number of lamps indicated and fixture shall be provided with pre-manufactured ballast whips.

C. High Intensity Discharge (HID) Ballast:
   1. High Intensity Discharge Fixtures: All rated for multiple volt operation, connected as indicated in the schedule.
      a. Metal Halide Fixtures: Peak lead auto transformer type with high power factor rating of 90% or better.
      b. High Pressure Sodium Fixtures: Constant wattage auto-transformer, high power factor.

2.03 LAMPS

A. Lamp Manufacturers:
   1. Sylvania/Osram.
   2. Philips.
   3. Venture Lighting International.
   4. General Electric.

B. Fluorescent Lamps: T8 & T5HO, as scheduled. 3500K, minimum 80 CRI.

C. Incandescent Lamps: Rated 130 volt.

D. High Intensity Discharge Lamps: Supplied as indicated.

E. Provide lamp types specified for luminaire.

PART 3 - EXECUTION

3.01 INSTALLATION

A. Fixtures: Complete with 660 watt sockets, wiring, ballasts, stems, hangers, fittings, end plates, pendant feeds, aircraft cable, etc.

B. Install in accordance with manufacturer's instructions.

C. Suspended Luminaires.
   1. Pendants:
      a. In Utility areas: 1/2" rigid conduit stems, painted to match fixture, with swivel mounts.
      b. In Finished areas: Provide aircraft cable suspension. Feed end shall have canopy with feed grommet and white coiled cord wrapped around cable. Stretch coil making 1" gaps.
      c. Provide pendant length required to suspend luminaire at indicated height. Cut or lengthened to give mounting heights as indicated and required.
      d. Where fixtures are specifically indicated to be chain mounted, provide wire hook chain set & jack chains cut to length as required to suspend luminaire at indicated height. Use MC cable supported by cable ties from fixture to junction box mounted in structure above each fixture.
      e. Except as specifically noted, fixtures shall be supported from structural steel. Provide unistrut channels or equal to span between top cord of joists. Supports shall be suitable for fixture weight and seismic forces.
      f. Pendant suspension details shall be submitted for approval prior to installation.

D. Provide 12 gauge safety hanger wire supports for all fixtures recessed in ceiling grids of suspended acoustical ceilings. Hangers shall be independent of ceiling framing suspension system and shall extend from fixture housing to structure above. Lighting fixtures weighing less than 56 pounds shall have two hangers, at diagonal corners of fixture (2 locations). Lighting fixtures weighing more than 56 pounds shall have four hangers, one at each corner of fixture (4 locations). Wires shall have no tension (slack) to prevent ceiling distortion. In addition, attach to ceiling framing “T”s as required by code.

E. Fixtures with one (1) piece 8' channel shall be supported within two feet (2') of each end and fixtures with 4' channel shall be supported within one foot (1') of each end. Fixtures indicated in continuous rows shall have ends bolted together and shall be provided with 4' long lens constructed so the joint between two (2) sections of an 8' fixture appear the same as two (2) 4' fixtures butted together.

F. Fixtures in sloping ceilings shall have angle face plate for proper orientation of fixture.

G. Locate recessed ceiling luminaires as indicated on reflected ceiling plan. Fixtures shall have frame and trim details to match the ceiling suspension system furnished. Coordinate details with Acoustical Treatment Section and installation with the Ceiling Installer to assure fixtures are centered on tiles or on joints as required.

H. Install surface mounted luminaires plumb and adjust to align with building lines and with each other. Install spacers where required to allow proper installation of rabbeted (Tegular) ceiling tiles. Secure to prohibit movement.

I. Install clips to secure recessed luminaires in place. Install recessed luminaires to permit removal from below.

J. Install recessed luminaires using accessories and fire stopping materials to meet regulatory requirements for fire rating.

K. Install wall mounted luminaires at height as indicated.

L. Install accessories furnished with each luminaire.

M. Additional Wiring Methods For Luminaires:
   1. Refer to Section 16010 - Basic Electrical Requirements: Performance Requirements.
   2. Refer to Section 16123 - Wire and Cable: Wiring Methods.
   3. Recessed and surface incandescent fixtures: Wiring rated minimum 300° F in metallic conduit where required for Underwriters' approval.

4. Fluorescent Fixtures: Wiring within housings and between fixtures and junction boxes above ceilings shall be Type THHN insulated conductors rated for use at temperatures not lower than 90° C.
5. Wiring From Recessed Fixtures To Junction Boxes: As described in Section 16010 - Basic Electrical Requirements: Performance Requirements.
6. Wiring to Exterior Pole Mounted Luminaires and Bollards: Per Section 16111 - Conduit: Conduit Requirements for underground installations and Section 16123 - Wire and Cable: Wiring Methods for underground installations and as shown on the Drawings.

N. Bond products and metal accessories to branch circuit equipment grounding conductor.

O. Install specified lamps in each luminaire.

3.02 INTERFACE WITH OTHER PRODUCTS

A. Locate fixtures to avoid interference with mechanical and structural features.

3.03 FIELD QUALITY CONTROL

A. All fixtures and equipment shall be in first-class condition at time of delivery of building to Owners with all scratches, mars, etc., refinished to factory standards.

B. Operate each luminaire after installation and connection. Inspect for proper connection and operation.

3.04 ADJUSTING/CLEANING/RELAMPING

A. Aim and adjust luminaires after dark as directed.

B. Relamp luminaires whose lamps have failed at Substantial Completion and six (6) months thereafter.

C. Clean electrical parts to remove conductive and deleterious materials.

D. Remove dirt and debris from enclosure.

E. Clean photometric control surfaces using procedures as recommended by manufacturer.

F. Clean finishes and touch up damage.

3.05 SCHEDULE

A. Shown on Drawings.

END OF SECTION