Design Standard

Interior Lighting

The lighting and day lighting systems of a building represent one of the most important aspects of building aesthetics. The performance of these systems has a direct effect on the functionality and energy efficiency of the illuminated spaces.

Detailed specifications follow.

PART 1 - GENERAL

1.01 Design all lighting systems in accordance with applicable codes and standards.


1.03 Illuminate all spaces in accordance with the User's requirements and within the footcandle limits specified in the latest edition of the Illuminating Engineering Society of North America (IESNA) Lighting Handbook.

1.04 Design lighting systems to limit glare, minimize uniformity ratios, and provide CRIIs appropriate to the functionality of the space. Refer to the IESNA Lighting Handbook for guidance.

1.05 Do not exceed a lumen depreciation of 5.0% in the calculation of design foot candles.

1.06 Design lighting systems to minimize the maintenance required.

1.07 Do not specify incandescent lighting.

1.08 The specification of custom-designed luminaires is discouraged because of the special maintenance required.

1.09 Select a combination of direct/indirect energy-efficient fluorescent or LED luminaires to light general interior spaces. Specify luminaires to be either recessed type or pendant mounted.

1.10 Specify T8 linear, low-mercury fluorescent lamps with efficacies above 95 lumens/watt and a color temperature of either 3500K or 4100K for use throughout the building. Confirm the type with Utilities & Energy Services, if applicable. (28w T8)
1.11 Specify T5 linear, low-mercury fluorescent lamps with efficacies above 90 lumens/watt and a color temperature of either 3500K or 4100K for use throughout the building. Confirm the type with Utilities & Energy Services, if applicable.

1.12 All lamps shall have a color-rendering index (CRI) greater than or equal to 80. Minimum rated lamp life must be 20,000 hours.

1.13 All compact fluorescents lamps (CFL) must have a minimum efficacy of 60 lumens/watt and maximum lumen depreciation of 15%. Minimum rated lamp life must be 10,000 hours. Lamp color and CRI must be consistent with linear fluorescent lamps. No CFLs below 13W shall be used.

1.14 All ceramic metal halide lamps used in interior finished spaces shall have a color rendering index (CRI) greater than 75.

1.15 All ballasts shall be UL-rated and CMB-certified, rapid-start electronic type with the following characteristics:

A. Sound ratings: “A” for 430mA lamps, “B” for 800mA lamps, and “C” for 1500mA lamps.

B. Operate at less than 10% total harmonic distortion (THD).

1.16 Instant-start ballasts shall not be used. Electronic program start ballasts are acceptable.

1.17 Where dimming is required, use fluorescent fixtures and electronic ballasts that are capable for dimming to 10% (minimum) of full light output. LEDs may also be used.

**PART 2 - CLASSROOM AREAS**

2.01 Widely varying illumination levels are necessary for various project types. Fluorescent fixtures shall be wired so that separate switches control banks of lights in rows (width wise) running from front to back of room.

2.02 The front row of lights can be turned off when the overhead or video project is used.

2.03 The next row of lights can be turned off during slide/filmstrip viewing, leaving the last switch to turn off last row of lights for opaque projection and 16mm projection. Thus, ambient light levels can be maintained as high as possible for visual comfort and note taking without compromising the quality of the project image. Directionality and resultant glare on screens, TV monitors must be considered.

2.04 Lighting controls must be easily accessed by presenter and should be positioned at both the front and rear of room.
PART 3 - SWITCHING

3.01 Provide multiple switching of interior lighting as required for flexibility and economy of operation.

3.02 Any exterior lights and site lighting will be controlled by the energy management system with a hand off auto switch override or by photocell.

PART 4 – OCCUPANCY SENSORS

4.01 Occupancy sensors are to be ceiling mounted dual technology occupancy or vacancy switches. Sensor Switch CM PDT9 with relay or Sensor Switch CM10 with relay or equivalent are acceptable. Sensors are to be set for 5 minutes with a 10 minute lamp maximizer setting.

4.02 Sensors must be tied into the VAV’s TEC to control room conditioning.

4.03 Room temperature is to be programmed for day occupied (70F heating and 75F cooling), day unoccupied (65F heating and 80F cooling), and night unoccupied (60F heating and 85F cooling).

4.04 VAV CFM shall go to 0 CFM during unoccupied periods.

4.05 AHUs shall shut down when all associated VAVs are in unoccupied mode (0 CFM).

4.06 Lab ACH to be programmed to 8 ACH during occupied and 4 ACH during unoccupied.