

GENERAL:

The scope of this document is to provide requirements for interior lighting.

DESIGN GUIDELINES:

1. Illumination design shall comply with the latest editions of the Illuminating Engineering Society (IES) Lighting Handbook and ASHRAE 90.1.
2. Lighting Calculation shall be submitted at Design Development. These calculations shall show iso-photo (contours) diagrams of each space, average foot candle levels and min/max ratios. These calculations shall be submitted concurrent with the ASHRAE 90.1 compliance submittal.
3. Accessibility of light fixtures for changing lamps and ballast shall be considered when selecting and placing fixtures.
 - 3.1. Fixtures shall not be placed over stairs. In stairwells, lights shall be located on landings.
 - 3.2. All fixtures shall be installed or mounted within 11'-0" AFF.
 - 3.3. In Auditoriums, lighting shall be designed to minimize the use of scaffolding to change lamps and ballast.
 - 3.4. In no case shall the changing of a lamp or ballast require the fixtures to be removed or require the demolition of the ceiling.
 - 3.5. Provide a 6'-0" electrical whip on all cove lighting so that it may be lifted out of the cove for maintenance.
 - 3.6. For Fixtures in Atriums along walkways, the fixture shall be placed a minimum of 4'-0" from the atrium opened wall and shall be positioned such that the fixture can be maintained with the ladder facing the atrium. See drawing 265100.1.
4. Use the same type of lamps to the greatest extent possible throughout the facility. This reduces the storage of mass quantities of different types of lamps and eases the maintenance of the lighting system.
5. Use energy efficient lamp technology. T-8, 31-watt, lamps (4 ft. in length) are the standard lamps to be used on a project. Compact fluorescents shall use four pin lamps in lieu of 2 pin. All lamps shall be low mercury type.
6. The minimum color rendering index (CRI) for fluorescent lamps shall be 80.
7. All ballast for fluorescent fixtures shall be electronic, high frequency type with plug in type disconnect, and end of life sensor. Ballast shall be Class 'P', and CSA certified and shall comply with FCC and NEMA limits governing electromagnetic and radio frequency interference and shall not interfere with operation of other electrical equipment. Ballast shall meet the following requirements:
 - 7.1. Power Factor = 0.95 (minimum)
 - 7.2. Average Lamp Crest Factor = 1.7 (maximum)

- 7.3. Total Harmonic Distortion (THD) = 10% (maximum)
- 7.4. Sound Rating = Class A
- 8. Lighting Control
 - 8.1. Provide local switching for all lighting. Offices, corridors, equipment rooms, etc. will be provided with separate switches except for night lights.
 - 8.2. Open Office spaces shall have the lighting switched in office groups. Light control shall provide for a two hour override for lighting in these areas afterhours.
 - 8.3. One switch to provide minimal lighting is required at the back of lecture halls and auditoriums close to a door.
 - 8.4. Occupancy Sensors with dual contacts (Watt Stopper Dual Technology type) shall be used for lighting control in most building spaces. Wall light switches are still required in all locations where occupancy sensors are used.
 - 8.5. Timers shall be used for lighting control in mechanical, electrical, telecommunication, etc. rooms.
- 9. All damp/wet locations (animal rooms, greenhouses, mechanical rooms, etc.) shall be provided with lighting fixtures rated for wet locations.
- 10. Step lighting along egress path is required in all sloped or stepped auditoriums and lecture halls.
- 11. All exit lights shall be LED type.
- 12. Emergency lighting needs to meet minimum required by code, but should not be excessive.
- 13. Specialty lighting for specific occupancies is acceptable if approved by the Project Manager.