

## DIVISION 26 - ELECTRICAL

### SECTION 26 51 00 – INTERIOR LIGHTING

#### **PART 1: GENERAL**

##### **1.01 Scope of Standards**

- A. This standard provides general guidance concerning the specific preferences of Texas State University for Interior Lighting.
- B. Texas State University recognizes that project conditions and requirements vary, thus precluding the absolute adherence to the items identified herein in all cases. However, unless there is adequate written justification, it is expected that these guidelines will govern the design and specifications for Texas State University projects.

##### **1.02 General Illuminance Level Requirements for Interior Lighting**

- A. Illuminance levels shall be designated based on careful consideration of the use of each space. The following schedule is a general guide for lighting levels. The schedule is not intended to replace or supplant the information included in the cited references, and is included here for general information only.

<b>AREA OR SPACE</b>	<b>ILLUMINANCE</b>	<b>COMMENTS</b>
Auditoria	0 to 50 fc	Provide full range lighting control via preset dimming
Bathrooms	20 fc	
Classrooms	20 / 50 fc	Provide multi-level lighting via split ballast switching
Computer rooms	20 / 50 fc	Provide multi-level lighting via split ballast switching
Conference rooms	20 / 50 fc	Provide multi-level lighting via split ballast switching
Corridors, stairways	20 fc	
Dining rooms/Lounges	10 fc	
Dormitory rooms	20 fc	
Elevators	10 fc	
Library/reading rooms	20 / 50 fc	
Library/stack areas	30 fc	
Library/stack areas	5 fc <sub>v</sub>	Vertical illuminance at lower shelf
Offices	20 / 50 fc	Provide multi-level lighting via split ballast switching
Public lobbies, atria	20 fc	
Science Labs	30 / 70 fc	Provide multi-level lighting via split ballast switching
Server/technology rms	50 fc	
Support/utility spaces	20 fc	

All illuminance levels shown above are horizontal foot-candles measure at the work plane (30 inches above the floor) unless notes otherwise. See Section 26 50 00, Part 3, and 3.01 Project Deliverables for documentation requirements related to illuminance levels.

### 1.03 Space by Space Requirements for Interior Lighting

#### A. BATHROOMS

1. Bathroom lighting shall be designed for uniform lighting for the comfort of the users and to aid in maintenance and cleaning. Downlights installed above fixture stalls are prohibited.
2. The primary source of light in all bathrooms shall be the FO32T8 lamp or LED lighting.
3. Lighting shall be controlled by a ceiling mounted occupancy sensor(s) suitable for the configuration of the room. At least one emergency fixture shall be provided above the vanity of each bathroom. This fixture shall serve as a night-light to avoid a user entering a completely dark room.

#### B. CLASSROOMS

1. Unless otherwise specifically required by the program, lighting in classrooms shall be standard 2x4 parabolic, three lamp troffers (T8) with split ballast switching or LED lighting.
2. Local switching shall be provided for control at each room entrance and near the marker board (for control by the presenter).
3. Lighting and switching shall be coordinated with audio video equipment. See Audio Video Lighting Requirements for additional requirements.

#### C. AUDITORIA AND RAISED FLOOR CLASSROOMS

1. Lighting applications for auditoria and raise floor classrooms shall be designed to accommodate the varying uses in each space.
2. Illumination levels at teaching areas shall be capable of levels 50 percent brighter than the seating portions of the space. This difference in lighting levels shall be accomplished through a combination of lighting controls and specification/placement of light fixtures.
3. Lighting controls shall be provided as required by the program requirements and in accordance with other sections of these STANDARDS.
4. In all spaces with fixed seating, provide aisle light fixtures to provide illumination in low lighting level settings.
5. See Audio Video Lighting Requirements for additional requirements.

#### D. LOBBIES AND ATRIA

1. Lobbies and atria shall be designed with service access to light fixtures being a primary consideration. Adequate lighting levels must be provided, and fixture maintenance is necessary for the meeting this long-term goal.
2. Multiple lighting levels shall be provided in these spaces through switch control of fixtures so public areas can be used for a variety of functions, including receptions.

3. At locations designated by the University, provide lighting for art or other display.
4. These areas shall be illuminated by LED, Fluorescent (T8), and Compact Fluorescent Lighting.

#### E. TECHNOLOGY ROOMS

1. Technology rooms where only equipment is located shall include surface mounted wrap around style fluorescent fixture with F32T8 lamps.
2. Technology rooms where computers are used shall be meeting the standards for COMPUTER LABORATORIES AND CLASSROOMS shown below.
3. This area shall be illuminated by LED lighting.

#### F. CORRIDORS

1. Lighting in corridors shall be recessed and positioned to provide adequate general lighting.
2. In general, fixtures shall use F32T8 lamps. Where design requirements dictate, fixtures shall be compact fluorescent downlights.
3. At locations designated by the University, provide lighting for art or other display.
4. See Emergency Lighting for additional requirements.
5. These areas shall be illuminated by Led, Fluorescent (T8) and Compact Fluorescent Lighting.

#### G. STAIRWAYS

1. Lighting in most STAIRWAYS shall be designed for safety and emergency operation. **Fixtures shall not be located above 9 foot above the floor or landing.** Fixtures shall use F32T8 lamps or LED lighting.
2. For STAIRWAYS considered to be part of a lobby or atria (or other grand stairs), lighting shall be designed to be consistent with these STANDARDS and the architectural design of the space.
3. Fixtures shall not be located above the steps in STAIRWAYS.
4. See Emergency Lighting for additional requirements.

#### H. DORMITORY ROOMS

1. Design of lighting in dormitories (especially the residence floors) shall balance the need for durability (and perhaps vandal resistance) with a desire for a residential look.
2. Dormitory bedrooms and vestibules shall be lighting using vandal resistant fixtures with compact fluorescent lamps and electronic ballasts. When two fixtures are required because of room layout, two fixtures shall be specified which use the same wattage lamp. Varying lighting levels should be accomplished by number of lamps in each fixture.

3. Lighting in bathrooms shall be based on wall mounted fluorescent fixtures with F32T8 lamps. Compact fluorescent fixtures shall be included in shower alcoves or vestibules where required due to room layout.
- I. SUPPORT SPACES (MECHANICAL, ELECTRICAL AND EQUIPMENT ROOMS)
1. Luminaires shall be rigidly attached to structure or equivalent mounting surface. Luminaires suspended by chain or cables are prohibited.
  2. Use F32T8 Lamp Fixtures or LED lighting in mechanical and electrical rooms.
- J. OFFICES
1. Unless otherwise specifically required by the program, lighting in office shall be standard 2x4 parabolic, three lamp troffers (T8) with split ballast switching or LED lighting.
  2. Control shall be provided using an occupancy sensor suitable for split ballast switching, manual on/automatic off and with photocell for daylight sensing. Daylight sensing photocell will hold a portion of lighting off when adequate daylight is present.
- K. CONFERENCE ROOMS
1. If designated by the University, provide preset lighting control system with dimming capabilities.
  2. See Audio Video Lighting Requirements for additional requirements.
  3. These areas shall be illuminated with LED, Fluorescent (T8), or CFL Lighting
- L. COMPUTER LABORATORIES AND CLASSROOMS
1. Computer laboratories and classrooms where the primary task involves working with computers shall be designed with recessed indirect fixtures using three F32T8 lamps. Provide split ballast switching for multiple lighting levels.
  2. Lighting control and Audio Video requirements shall be the same as those for CLASSROOMS.
- M. LIBRARIES
1. CLASSROOMS, LOBBIES and ATRIA, AUDITORIA and other spaces in libraries shall be design to comply with the applicable portions of these STANDARDS.
  2. Lighting in stacks shall be designed to provide adequate illumination at the lower shelf of all stacks.
  3. Lighting controls in LIBRARIES shall be carefully coordinated with the user groups based on hours of operation and patterns of use.
- N. SCIENCE LABS AND SIMILAR SPACES
1. Lighting in SCIENCE LABS AND SIMILAR SPACES shall be similar to classrooms, except all lamps shall be enclosed and illuminance levels shall be increased as required for the tasks.

2. Where required, lighting shall be designed to meet all requirements for handling of chemicals and any other hazardous materials.

O. CRAWL SPACES

1. Provide vapor tight, four-foot fluorescent fixtures at each crawl space. The minimum requirement is one fixture installed inside each entrance to the crawl space.
2. If required by the University or if serviceable equipment is located in the crawl space, provide additional fixtures throughout the crawl space to allow access to the equipment. Locate one fixture at each access panel for serviceable equipment. Provide additional fixture along the walkway to the equipment (maximum 40 foot spacing).
3. Lighting control shall be a toggle switch with pilot light installed in a visible location.

## PART 2: PRODUCTS

### 2.01 Interior Lighting Fixtures, Lamps, Ballasts and LED

- A. All interior lights shall have Electronic Ballasts (T8)
- B. Light fixture selection shall comply with the following:
  1. The preferred light fixture shall be a 24-inch by 48-inch, 18-cell, and 3-inch deep parabolic troffer with low iridescent louver finish designed for lay in ceilings. Fixture shall include two or three lamps, as required by the application.
  2. As an alternate to the preferred troffer fixture noted above, a matching 24" X 24" troffer is acceptable. Fixture shall include one, two or three lamps, as required by the application.
  3. Compact fluorescent downlights are acceptable, but are considered a second choice to fixtures using F32T8 linear fluorescents. This requirement is due to the shorter rated life of the compact fluorescent lamps. **Exception: LED**
  4. Where lensed troffers are used, acrylic lens shall be 0.125 inch thick.
  5. Where used, compact fluorescent downlights shall include one, two or three lamps, as required by the application. Single lamp fixtures shall have vertical lamp orientation.
  6. In spaces with video display terminal use, recessed indirect fixture shall be used with three lamps. Split ballast switching shall be incorporated to provide a variety of lighting levels.
  7. Pendant type fixtures of any type shall require University written approval for each application.
  8. See 26 50 00, PART 2, G. LAMP AND BALLAST GUIDELINES FOR ALL LIGHTING.
  9. T5 Lamps and Ballast are strictly prohibited.

**PART 3: EXECUTION (NOT USED)**

**END OF SECTION 26 51 00**