

INTERIOR LIGHTING

GENERAL INFORMATION

- 1.1 The CU Interior Lighting Program is prescriptive based on these criteria – lighting quality, quality of fixture, energy efficiency, maintainability, warranty and cost.
- 1.2 CU partners with Signify to support a robust program of LED fixture types. Use the Lighting LookBook for pre-approved fixtures and the space types for which they are approved. Pre-approved fixtures have been evaluated for color rendering (CRI [~90], TM30 [R9>90]), glare control, distribution and cost.
- 1.3 Identify any and all rebate opportunities and work with the University to apply for them in a timely and thorough manner.

DESIGN REQUIREMENTS

2.1 Interior Lighting

-  a. Required footcandle levels – perform photometric studies to confirm appropriate lighting for the activity.

ROOM TYPE	LIGHT LEVEL (FOOT CANDLES)	LTG POWER DENSITY (W / SF)
Cafeteria - Eating	20-30 FC	0.4
Classroom - General	30-50 FC	0.71
Conference Room	30-50 FC	0.97
Corridor - General	5-10 FC	0.41
Corridor - Hospital	5-10 FC	0.71
Dormitory - Living Quarters	20-30 FC	0.5
Exhibit Space (Museum)	30-50 FC	0.31
Gymnasium - Exercise / Workout	20-30 FC	0.76
Gymnasium - Sports / Games	30-50 FC	0.85
Kitchen / Food Prep	30-75 FC	1.09
Laboratory (Classroom)	50-75 FC	1.11
Laboratory (Research)	75-120 FC	1.33
Library - Stacks	20-50 FC	1.18
Library - Reading / Studying	30-50 FC	0.96

Loading Dock	10-30 FC	0.88
Lobby - Office/General	20-30 FC	0.84
Locker Room	10-30 FC	0.52
Lounge / Breakroom	10-30 FC	0.59
Mechanical / Electrical Room	20-50 FC	0.43
Office - Open	30-50 FC	0.61
Office - Private / Closed	30-50 FC	0.74
Parking - Interior	5-10 FC	0.15
Restroom / Toilet	10-30 FC	0.63
Retail Sales	20-50 FC	1.05
Stairway	5-10 FC	0.49
Storage Room - General	5-20 FC	0.38
Workshop	30-75 FC	1.26



b. Sustainability

Exceed the code-mandated lighting power density (watts / SF) by 10%. Use COMCheck for demonstrating performance regardless of historic exemption or filing status. Review COMCheck results with the PM prior to filing with regulatory agencies.

- c. Use direct / indirect fixtures wherever ceiling heights are adequate.
- d. The standard color temperature is 3500K. Any requests to modify this standard will be based on function and will be reviewed by DAC on a case-by-case basis.
- e. Non-standard light fixtures, such as a decorative fixture in a confined space such as a lobby, may be considered if they are submitted for review to DAC during the schematic design phase of the project, and represent a small percentage of the overall light fixture schedule. Lamps, boards and drivers must be of a type that is commonly stocked in the maintenance department, easy to replace or re-lamp and readily available from local suppliers.
- f. Ganged fixtures and/or remote drivers will be accompanied by a floor plan diagram indicating the ganging layout and the location of the remote drivers. Remote drivers must be in an accessible location.
- g. Submit a Lighting Schedule for proposed fixtures at the Design Development phase of the project for review by CPM DAC and Cx.
- h. Any fixtures specified with A19 or E26 bases will utilize an LED bulb.

2.2 Emergency Lighting

- a. Determine power sources for emergency lighting as follows:
 - 1. Emergency generator – utilize generator capacity when available. Perform capacity analysis for any project requiring new or replacement emergency lighting.

2. Inverter – provide logical grouping of emergency lighting on an inverter placed in a secure closet in an accessible location. For partial floor or partial building renovations, provide additional capacity as directed by CUFO.
 3. Fixture mounted battery ballasts – utilize only when options 1 and 2 are not feasible.
 4. Individual wall-mounted battery pack fixtures – utilize only when options 1, 2 and 3 are not feasible. Exception: Use battery packs in addition to the above methods in emergency generator and ATS rooms (3hr capacity).
- b. In the schematic phase of each project, provide a narrative report detailing the proposed concept for emergency lighting.
 - c. Present the security and emergency egress lighting plan to Cx at the Design Development phase.

2.3 Exit Lights

- a. Provide self-contained, AC battery-illuminated exit light units with universal mounting and downlight component. New York City approved.
 1. Lamps: LED type rated for 25 years life.
 2. Graphics: The word "EXIT" shall be spelled in ¾ inch stroke red letters only.
 3. Directional Arrows: Chevron type design to indicate egress path.
 4. Battery: Sealed, maintenance-free, nickel-cadmium type, with 10-year nominal life.
 5. Charger: Integral, fully automatic, solid-state type, with sealed transfer relay.
 6. Finish: Matte black for exposed parts.
- b. Operation: Sign shall be illuminated by AC powered lamps under normal conditions. Relay shall turn emergency lamps on automatically when supply circuit voltage drops to 80 percent of nominal or below. Lamps shall operate for 90 minutes minimum. Lamps shall automatically disconnect from battery when voltage approaches deep-discharge value. When normal voltage is restored, AC powered lamps shall relight and DC lamps shall switch off. Battery shall automatically recharge within 16 hours and maintain on trickle charge.

2.4 Emergency Battery Packs

- a. (Only when other sources are not available.) Self-contained, surfaces wall mounted, with two lamp heads and provisions for a third lamp head on top of unit, and having the following features:
 1. Minimum 20-gage steel housing.
 2. Front-mounted LED indicator lights and push-to-test switch, with concealed terminals for remote lamp heads.
 3. Top-mounted integral lamp heads with 180-deg, 2-way, and locking swivel joints for aiming. 18-watt minimum lamp output, bi-pin halogen type.
 4. Battery: Sealed, maintenance-free, nickel-cadmium type, with 10-year normal life.
 5. Charger: Fully automatic, solid-state type, with sealed transfer relay and fused output circuits.

6. Operation: Relay shall turn lamps on automatically when supply circuit voltage drops to 80 percent of nominal or below. Lamps shall operate for duration of 90 minutes minimum. Lamps shall automatically disconnect from battery when voltage approaches deep-discharge value. When normal voltage is restored battery shall automatically recharge within 16 hours and maintain on trickle charge.
- b. Integral emergency battery-inverter units shall be utilized where appropriate. Consideration of reduced light output during operation must be accounted for.



2.5 Outdoor Lighting

- a. Select outdoor lighting which does not exceed the backlight, uplight, and glare ratings based on lighting zone, mounting location, and distance from the lighting boundary outlined in LEED Light Pollution Reduction Credit. LEED ratings are based on specific light sources installed in the luminaire as well as lighting zone, as defined in IES TM-15-11 Addendum A.
- b. Outdoor lighting design must also meet Columbia University Public Safety Requirements

CONSTRUCTION REQUIREMENTS

3.1 Attic Stock required for any non-Signify fixtures:

- a. Spare Lenses: 1 percent of spare glassware, lenses, or diffusers, but in no case less than one for each type classification of lighting fixture.
- b. Spare Lamps: 10 percent, but not less than 2 lamps in each case, of each type and size lamp used in each type fixture.
- c. Spare drivers: One for each type unit installed.
- d. Spare Batteries: One for each type battery installed.

END OF SECTION