

4-23-2015

265100 - Interior Lighting

Sandra Hickey
sandra.hickey@unh.edu

Follow this and additional works at: http://scholars.unh.edu/pdch_5_26

Recommended Citation

Hickey, Sandra, "265100 - Interior Lighting" (2015). *Division 26 – Electrical*. 22.
http://scholars.unh.edu/pdch_5_26/22

This Article is brought to you for free and open access by the Chapter 5 – Technical Construction and Renovation Standards at University of New Hampshire Scholars' Repository. It has been accepted for inclusion in Division 26 – Electrical by an authorized administrator of University of New Hampshire Scholars' Repository. For more information, please contact nicole.hentz@unh.edu.

265100 - Interior Lighting

SECTION 26 5100 - INTERIOR LIGHTING

PART 1 – GENERAL

1.1 Summary

A. Related Requirements Specified Elsewhere:

1. Chapter 5, Division 26, Section 260100.
2. See Chapter 5, Division 01, Section 017700.1.1.B.1.i Closeout Procedures - Project Record Documents for equipment list requirements for all equipment provided in this section.

B. Normal Lighting: A building's normal lighting system necessary to provide lighting for the intended occupation and use of the facility under normal operating conditions. Lighting levels are to be designed in accordance with the values recommended by the latest edition of the Illuminating Engineering Handbook.

C. Night Lighting: Lighting meant to remain on at all times to assure minimum illumination for security and other purposes. This lighting is generally along building circulation routes and may, for example, consist of a single, low wattage down light at each end of a corridor. This maximizes potential lighting energy and long range maintenance savings by allowing all other lighting to be turned off during unoccupied periods. Night lighting is NOT the same as emergency lighting or standby lighting. Powerlink lighting panels (Circuit control) and WattStopper OC sensor switches should be used in such a way to shut all/selected lighting circuits off after operating hours by the powerlink panel, but yet allow the OC sensors to override the panel and provide lighting as needed where the sensors are located. Lighting in stairs will be exempt, and shall remain ON 24/7. GTD (Generator Transfer Device) may be used as well.

D. Lighting design for new or renovated spaces shall meet the current New Hampshire Energy Code, and IECC 2006 or the latest edition.

E. Choice of fixtures should be made with the following considerations:

1. Energy efficiency and sound rating.
2. Quality of lighting.
3. Ease of installation and installation flexibility.
4. Ease of maintenance.
5. Suitability for the specific application.
6. Replacement parts availability.
7. Consideration of potential abuse.

F. Where partitions will result in uneven or substandard lighting (based upon Illuminating Engineering Society Recommended Lighting Levels), fixtures shall be relocated and/or additional fixtures shall be installed. The use of energy efficient fluorescent adjustable task lighting is encouraged in partitioned work stations.

G. Fixtures:

1. Interior Direct Luminaries:

- a. 2 x 4 recessed troffers with, High Performance Low Wattage (HP) T-8's, or T-5's lamps shall be the standard for suspended ceiling and surface-mount applications. T-5 HO lamps shall be used in high bay applications only (too bright for low ceilings).
- b. 2 x 2 recessed troffers or surface-mount fixtures with T-5 lamps shall be utilized in limited areas for specific applications. T-5 HO lamps shall be used in high bay applications only (too bright for low ceilings).
- c. Parabolic lenses and/or direct/indirect fixtures either basket type or volumetric illumination shall be used in areas in which VDT's dominate the activity. Where parabolic fixtures are selected cell number and size shall be selected for the specific application.
- d. Lenses shall meet IES standard RP-1-04 glare control recommendations, for maximum allowable candlepower for VDT intensive and VDT normal use area.
- e. Appropriate lenses shall be selected for each application in accordance with IES RP-1-04. Glare shall be a consideration in determining the quality of the light, and shall meet recommended IES standards for glare control for each space depending upon the use.
- f. Fixtures shall be tandem-wired whenever possible to minimize energy consumption.

2. Indirect Luminaries

- a. Shall be considered for areas which contain VDT's or audio-visual equipment and have unobstructed reflective ceilings of appropriate height, and other appropriate areas.
- b. Fixtures shall utilize Low Wattage HP T-8s, T-5 and T-5HO lamps.
- c. Fixtures shall be tandem-wired whenever possible to minimize energy consumption. 3 and 4 lamp fixtures shall be tandem wired to inboard and outboard for lamp configuration. 2 Lamp fixtures shall be tandem wired to allow for each row within the fixture to be switched independently.

3. High Abuse Luminaries

- a. High abuse luminaries shall be used in areas which are susceptible to acts of vandalism.
- b. High abuse luminary lenses shall have a lifetime warranty.

4. Special Application

- a. Including pendant-mount fixtures, accent light, wall sconces and fiber-optic systems shall use high-efficiency fixtures, and shall receive approval in writing from FD&C.
- b. Heating Tunnel Fixtures.

5. Light fixtures in a suspended ceiling shall be supported from the building structure. Independent fixture support is required for life safety purposes in the event of ceiling grid failure.
6. Exit Signs: Edge lit or cast aluminum, green lettering, LED type, wall mounted exit signs shall be used whenever practical. See Chapter 5, Division 26, Section 263323 for exit signs and emergency egress lighting.

H. Lamps:

1. Fluorescent:

- a. Straight fluorescent T-5's and T-5 HO's shall be acceptable for new construction and new fixtures.
- b. Straight fluorescent (HP) T-8's, T-5's and T-5HO's, shall be 3500K with a CRI greater than 85.
- c. Straight fluorescent (HP) T-8's T-5's and T-5HO's shall be of low mercury content less than 5 mg of mercury per four foot lamp.
- d. Medium bipin U-bent fluorescent lamps are not acceptable for use in new construction.
- e. All Lamps shall be low mercury, and shall pass the EPA's Toxicity Characteristic Leaching Procedure (TCLP).

2. Compact Fluorescent:

- a. Electronically ballasted, 4 pin, 3500K.
- b. Screw-in compact fluorescents, 3500K.
- c. PL triple four-pin fluorescent lamps other than 26W, 32W and 42W are to be utilized only in specific circumstances and with prior approval from FD&C.
- d. PL long fluorescent lamps, 18 to 50 watts are not acceptable for use in new construction.
- e. All CFL lamps shall be low mercury and shall pass the EPA's Toxicity Characteristic Leaching Procedure (TCLP).

3. Incandescent, halogen, and MH lamps are NOT acceptable, however they are to be used only with written permission from University Facilities Design and Construction (FD&C).

I. Ballasts:

1. Fluorescent Electronic Ballasts:

- a. Straight Fluorescent Lamps, normal HP T-8's, T-5's and T-5 Hos:
 - 1) Electronic ballasts shall be Program Start and provide for parallel wiring of lamps. Rapid Start Ballasts shall be used with permission in writing by FD & C and only in those applications where program start ballasts cannot be utilized.
 - 2) Ballast shall be program start normal HP T-8, T-5 and T05 HO.
 - 3) Total harmonic shall be 10% or less.

- 4) Power factor shall be 95% and greater.
 - 5) Ballast shall have a sound rating of A.
 - 6) Ballasts shall be free of PCB's.
 - 7) Warranty shall be for a period of five years.
2. Dimming Ballast Straight and Compact Fluorescent:
 - a. Shall dim from 100% to 5% of full lamp output for HP T-8's, T-5's, and 100% to 5% for linear fluorescent and compact fluorescent.
 - b. Power factor shall be greater than 95%.
 - c. Total harmonic distortion less than 10%.
 - d. Sound rating A.
 - a. Light level output shall be continuous, smooth and flicker-free over the entire dimming range.
 - b. Warranty shall be for a period of five years.
 3. HID Ballasts Pulse Start only Potted Core for interior applications,
 - a. Linear Reactor: 277 Volt only
 - b. Constant Wattage Auto transformation (CWA)
 - c. Warranty two years or greater.
 4. Electronic Ballasts-Cold Application to -20F:
 - a. Electronic Ballast: Rated for Cold Applications.
 - b. Warranty shall be for a period of five years.
- J. Switches:
1. Individual wall-mounted switches shall be installed to control only the lighting within individual spaces. Pull chain fixtures shall not be installed.
 2. Switches shall be installed so that light fixtures along windows are controlled by a separate switch; Multi-level day-lighting control shall be provided whenever economically justified.
- K. Occupancy Sensors:
1. Occupancy sensors shall be wired to the line side of the lighting circuit.
 2. Classrooms and conference room spaces shall utilize Dual-Technology occupancy sensor(s).
 3. Bathrooms, Stairwells, Corridors and Open Office Spaces shall utilize ultrasonic occupancy sensor(s). Ultrasonic sensors shall not be used when ceiling heights exceed 12-14'.
 4. Ultrasonic Sensors shall be mounted at least 6-8' away from any air supply registers.
 5. Perimeter Offices and Laboratories Shall Utilize Passive Infrared occupancy sensor(s).
 6. Special areas shall utilize technology per manufacturer's recommendation.
 7. All occupancy sensors shall have an internal additional isolated relay with Normally Open, Normally Closed, and Common Outputs for use with HVAC Control, Data Logging and other control options.

8. Storage Closets, Equipment Rooms, Janitors Closets, Tel/Com, Electrical, and Mechanical Rooms shall utilize Digital Time Switch(s). Time switch shall be adjustable from 5 minutes to 12 Hour time period. Time switch shall utilize optional flash-warn and audible alert prior to timing out. Mechanical Room Time Switches shall be set for 8 hours for initial installations.
 9. Bathrooms in residence halls shall have one fixture that remains ON.
 10. All sensors shall have readily accessible, user adjustable settings for time-delay and sensitivity.
 11. Sensors shall be installed in quantity and located properly per manufacturer's recommendation to provide appropriate room coverage.
 12. Unless Specified otherwise, the contractor shall set all time-delay settings to 10 (Ten Minutes).
 13. Unless Specified otherwise, the contractor shall set all sensors to VACANCY mode, requiring manual activation to the "on" position.
 14. Powerpacks shall utilize Zero-Crossing Circuitry to protect from the effects of inrush current and increase product longevity.
 15. Occupancy Sensor layouts will be reviewed and approved by the manufacturer to ensure appropriate technology, location and number of sensors for each project.
 16. Warranty shall be for a period of five years.
- L. Daylight Harvesting Controls:
1. When installing open-loop daylight harvesting control systems, upon completion of the installation, the system shall be commissioned by a manufacturer's authorized technician who will verify all adjustments and photocell placement to ensure a trouble-free operation of day lighting control system.
 2. All photocells and daylight harvesting control products shall be installed in quantity and located properly per manufacturer's recommendations, and reviewed in advance by the manufacture prior to installation.
- M. Automatic Lighting Control Systems: When used in specific applications, shall comply with the following:
1. Microprocessor-based lighting control systems shall be compatible with the Andover Controls Building Automation System. A separate microprocessor-based control system for local lighting is not acceptable. Electrical engineers shall coordinate lighting controls with the DDC (Direct Digital Control) system specified by mechanical engineers for HVAC equipment within the occupied space.
 2. Building Automation system control panels shall contain an LED pilot light and integral self-reporting, hand-off-auto override switch for each lighting output control point within the occupied space.

PART 2 – PRODUCTS

- 2.1 All below lighting fixtures and ballasts datasheets shall be submitted to the client for approval:
 - A. Fixtures, Acceptable Manufacturers:

Cooper
Kenall
Hubbell (Columbia and Prescolite)
Lithonia
Genlyte
Or UNH Facilities-approved equal.
Application)

SPI
Advent
Lite Control
Bega
Visa
Canlet (Heating Tunnel

- B. Fluorescent Straight & Compact Lamps, Acceptable Manufacturers: Low Mercury
GE
Osram/Sylvania
Philips
Or UNH Facilities-approved equal.
- C. Metal Halide Pulse Start Lamps, Acceptable Manufacturers:
GE
Osram/Sylvania
Philips
Venture
Or UNH Facilities-approved equal.
- D. Fluorescent Electronic Ballasts, Acceptable Manufacturers: Program Start for all linear fluorescent with lamps wired in parallel, Electronic Non-Dimming:
Advance
GE
Warranty shall be for a period of five years or UNH Facilities-approved equal.
- E. Fluorescent Dimming Ballasts, Acceptable Manufacturers:
Advance
Lutron
Sylvania
Warranty shall be for a period of five years or UNH Facilities-approved equal.
- F. HID Metal Halide Pulse Start Ballasts, Acceptable Manufacturers:
Venture
GE
Osram/ Sylvania
Advance
Warranty two years or greater or UNH Facilities-approved equal.
- G. Occupancy Sensors, Acceptable Manufacturers:
Watt Stopper
Cooper
Warranty shall be for a period of five years or UNH Facilitiesapproved equal.

END OF SECTION 26 5100