

DELTA

Snapshots

Issue 6 Lighting for Dormitories

The risk of fire associated with tungsten-halogen ("quartz") lamp torchieres has prompted many colleges and universities in North America to ban their use in dormitories. Now ambient lighting can be produced safely and efficiently with torchieres and task lights that use compact fluorescent lamps.

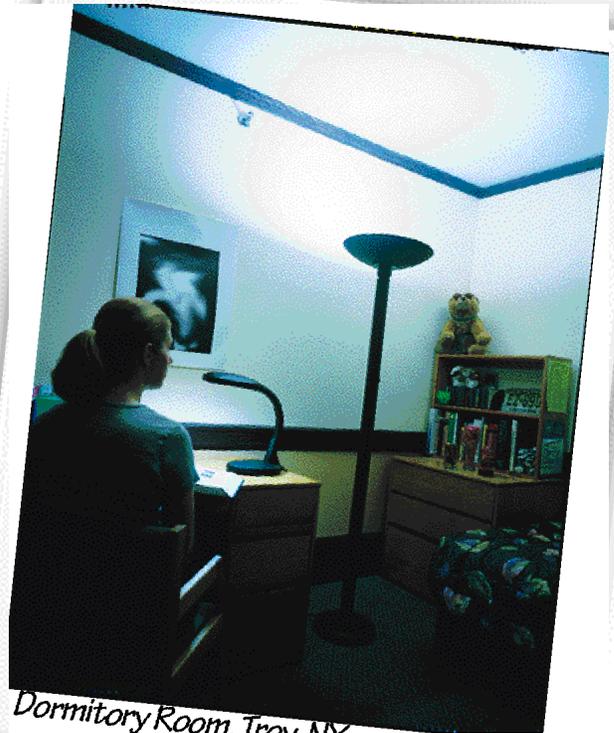
Application Profile

Buck Hall is an ivy-covered dormitory at Rensselaer Polytechnic Institute, in Troy, New York. Students live and work in their rooms, studying long hours. Despite their young eyes, they often find the standard room lighting inadequate for prolonged reading.

Rensselaer banned tungsten-halogen lamp torchiere in 1996 when one dorm building sustained damage from a fire caused by such a luminaire. Students instead began to bring in incandescent table lamps and task lights, often several per dorm room, to meet their lighting needs.

The dorm room illustrated here features an ENERGY STAR® torchiere with two 36-W compact fluorescent lamps that can be switched to provide two levels of uplight. A compact fluorescent task light supplements the illuminance on the desktop.

What is the ENERGY STAR program? The U.S. Environmental Protection Agency and the U.S. Department of Energy have initiated a program to encourage the use of energy-efficient appliances and lighting products. Manufacturers that join the program with products that meet the ENERGY STAR performance criteria can label these products ENERGY STAR luminaires. See the ENERGY STAR web page for more information.
<http://www.epa.gov/appdstar/fixtures/>



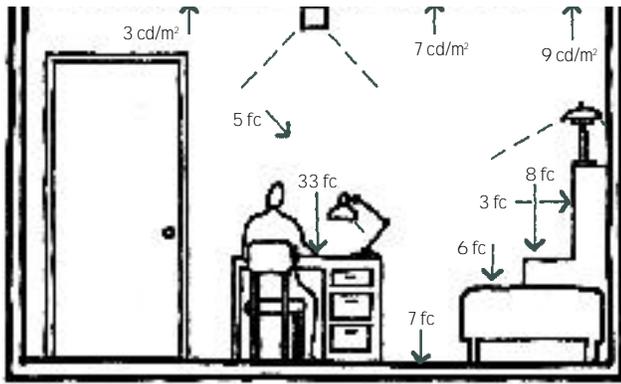
Dormitory Room, Troy, NY

Lighting Objectives

- Increase general light levels
- Provide good color rendering, warm-color light
- Minimize glare and reflections in computer monitors
- Avoid the fire hazard of hot tungsten-halogen lamps
- Reduce frequency of lamp replacements
- Avoid high energy use
- Keep low initial cost for student

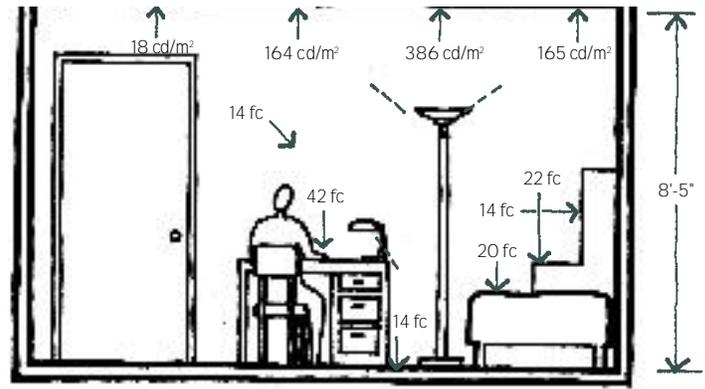
Lamps, Ballasts, and Energy

The torchiere uses two CFM36W/2G10 ("flat" configuration) lamps and, with the ballast, uses 65 W. Rapid-start electronic ballasts are used for energy efficiency, reduced noise, and minimal lamp flicker. The task light uses one CFT13W/GX23 lamp with a magnetic ballast. When these two luminaires are on, this 100 ft² dorm room uses approximately 83 W.



Before retrofit

Illuminances measured with existing 60-W incandescent task light, 80-W table lamp, and 20-W compact fluorescent cylinder downlight. Total room power: 160 W



After retrofit

Illuminance measured with only compact fluorescent torchiere and task light operating. Total room power: 83 W



Design Highlights

Illuminance: Vertical and horizontal illuminances have dramatically increased compared to the use of the overhead light alone. Students comment that the space seems brighter and more pleasant.

Color: The compact fluorescent lamps in the torchiere have a correlated color temperature (CCT) of 3000 K (warm), while the CFL in the task light has a CCT of 2700 K (warm). Both lamp types have a color rendering index (CRI) of 82.

Visual Comfort: All compact fluorescent lamps are concealed from the student's direct view.

Light Output and Heat: The lamps in this ENERGY STAR torchiere are rated at 2800 lumens each, to produce a total of 5600 lumens, not including light loss factors. When both lamps are operating, their output is comparable to that of some 300-W halogen lamp torchieres. However, the surface temperature of the compact fluorescent lamp ranges only from 90 to 185°F, far lower than the 750 to 860°F temperatures of a 300-W halogen lamp.

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