



# BRIGHT IDEAS

## Illuminations for Office Productivity

*The challenge of lighting design for the office environment*

Excerpts from LITECONTROL's study on illumination for the research environment. Part three of a five part study.

*The definition of productivity in offices extends beyond output per-hour to a composite of such things as worker satisfaction, health, and company image. Research into the subject, conducted by the Light Right Consortium\*, supports what has long been assumed – that the transition from direct to indirect/direct lighting leads to overall productivity improvement. Research also suggests that additional productivity improvement can accrue with more personal control of lighting through the use of dimming.*

Office lighting continues to be the most frequently studied topic in the field of lighting. There is a multitude of related issues - energy conservation, employee health and well-being, worker productivity, the aging of the working population, the proliferation of computers - all drawing attention to the need for appropriate, well-designed lighting. Lighting design of offices is a complex issue. Due to the interrelation of ceiling heights, windows, placement of offices, surface finishes, different ceiling types, HVAC, and other electrical and telecommunications equipment, lighting selection needs to be an integral part of the initial architectural and interior design. Once the architectural design has been finalized, the lighting choices become limited. Considering lighting needs from the beginning of a new construction or renovation project expands the possibilities and ensures an appropriate design in terms of lighting system type, user needs, energy efficiency and flexibility. Budget is always an important issue. Although budgets vary greatly, office construction is typically budgeted around \$150 per square foot. Computer costs per employee may be \$1500 to \$3000, and an ergonomically correct chair could cost \$500 and up. A low-cost lighting system may only cost \$1 per square foot but could create problems

with computers, productivity etc. In the 21st century a lighting system designed to enhance employee satisfaction and productivity makes the most sense, even at slightly higher initial cost since efficiency in long term operation will generally result in substantial cost savings.

### Office Areas

Lighting for offices – individual and open area - accounts for approximately 80 percent of the fixture budget and a majority of the annual energy expense in an office building. Because offices represent about 80% of the floor space and also represent the areas in which employees spend most of their time, proper lighting design and installation is extremely important to maximize employee well-being and office productivity while minimizing energy and maintenance costs. Illuminance, luminances, and contrast all must be considered in the design of the lighting system. Illuminance, or the amount of light measured in footcandles (fc) on the horizontal plane, is the first choice to be made. Ranges from 10 to 50 fc may be chosen for offices, depending on the tasks performed, corporate norms and the current environment. See Lighting Design Factors Matrix on page four for detailed qualitative and quantitative information. Visually intensive tasks must be considered on an individual basis. Such tasks as drafting or accounting may require 75 to 100 fc. Luminance (the brightness of surfaces) and contrast are related topics. The human eye is comfortable within a limited range of contrast. Therefore, contrast is important for variety and interest. However, excessive contrast means the eye has to constantly adjust – similar to the effect on a driver of oncoming car headlights at night – and leads to premature fatigue in workers. Luminances on various surfaces, as well as the luminance on the lighting fixtures themselves, must be designed to create interest, but be of low intensity and gentle gradation to avoid distracting brightness. Luminance ratios on the ceilings and walls of 10:1 or 12:1 are generally considered acceptable if the gradient is smooth, but 8:1 and 4:1 are preferable in computer-intensive offices. A ratio of 2:1 can be achieved with appropriate fixtures and layout. Lighting systems interact differently with different sized spaces such as large, open offices and small individual offices. In an open office area, the height of wall panel systems will have an impact on the lighting. Shorter 42-inch panels typically have no overhead shelving, while 60 to 72 inch panels utilize shelving over work surfaces that may create shadowing. Care should be taken when lighting calculations are done, since many calculation programs assume an empty space. The average footcandle level may actually be reduced 25 to 40 percent by the presence of panels and shelving. In small offices, the proximity of the lighting system to the walls must be considered carefully. Otherwise, the lighting could create overly bright or overly dark walls. University-based research\* has shown that people prefer rooms with wall lighting, but it must be properly modulated without excessively bright areas in illogical locations.

## Klopfenstein's Lighting Inc.

1128 Nuuanu Ave Suite 101  
Honolulu, HI 96817-5119

Phone: 808-533-0558 x100  
Fax: 808-526-4085  
E-mail: [info@kli-hi.com](mailto:info@kli-hi.com)  
[www.kli-hi.com](http://www.kli-hi.com)

KLI is known as the premiere lighting manufacturer's representative in Hawaii since 1976. In general, we promote our lighting manufacturers through Architects, Engineers and Designers and distribute through wholesale electrical houses.

KLI was originally incorporated in 1976 under the name KLOPFENSTEIN'S and operated out of a house in Hawaii Kai. In December of 1987 we moved our operations into our present location on Nuuanu Ave in Downtown Honolulu. In 1997 we reincorporated as KLOPFENSTEIN'S LIGHTING INC (KLI).

Our primary purpose is to provide the best product for your application with efficient service for all your needs.

F.Y.I.

- Upcoming Rep visits
  - 5-6 June                      SPECLIGHT    Johnny Summers
- KLI will be closed on the following days:
  - Monday 12 June in observance of    KAMEHAMEHA DAY
  - Tuesday 04 July in observance of    INDEPENDENCE DAY
- LITECONTROL has just released their 2006-2007 Product Catalog.
- CON-TECH's Retail Store Lighting Solutions catalog is now available.

