Design guide for open office 3-lamp Lensed

The Problem

Provide high quality lighting that illuminates the work area to IESNA recommended light levels while achieving 0.75W/ft^2.

The Solution

Install (18) 2'x4' lensed luminaires equipped with T-8 high-performance, low ballast factor electronic ballasts and (3) 32W high-performance lamps to provide 35+ average maintained footcandles. This solution will not eliminate glare on traditional CRT screens, but will work well with LCD monitors. Low partitions (48" high) parallel to the window wall are used to bring daylight deep into the space.

Room Characteristics

Length	Width	Height
60'	29'	9'

- 2'x4' ceiling grid
- 48" high partitions parallel to window wall, 60" perpendicular

Surfaces/Reflectivity

- Ceiling: Acoustical Tile (0.80)
- Walls: Paint – Cream (0.50)
- Floor: Light Grey (0.20)
- Partitions: Light Grey (0.50)

Image courtesy of Lithonia Lighting

Product Specification

- Description: Recessed lensed
- Dimension: 23 ¾" X 48"
- Lens: Refractor
- Watts: 72.5
- Number of lamps: 3
- Lamp: F32T8 High-Performance
- Lumens per lamp: 3100
- Ballast Factor: 0.77
- Lamp Lumen Depreciation: 0.95

Product Installation

- Number of luminaires: 18
- Luminaire spacing: 8' X 10' O.C.
- Average Footcandles: 52
- Footcandle readings at: 2.5 feet AFF
- Watts/ft^2: 0.75

Affordability: This is a low cost option compared to other energy efficient lighting designs and specifications.

Design Implications

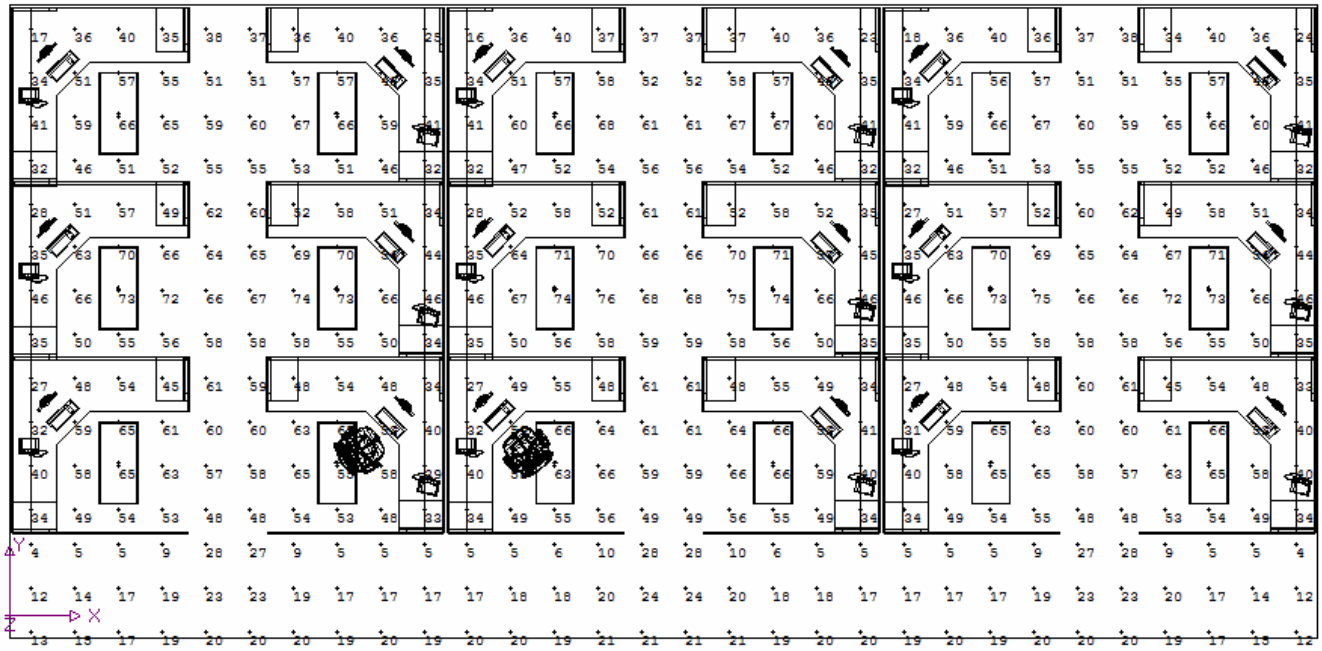
The furniture/luminaire layout is an important consideration because most of the light is located in the center of the room and cubicle. Task lamps may be needed for additional illumination and to overcome shadows from partitions. Corridor lighting is provided by the general office lighting. Additional lights may be required in the corridor depending on height of partitions. Glare on computer screens may be an issue with the lensed luminaires.

* This design is appropriate for 8 to 12 foot ceilings.

Energy Saving Options	*Watts per luminaire*	*Savings from base*	*Light level from base*
Daylight dimming ballasts (first row at windows controlled to save 50%)	~45 (at 50% dimming with losses)	50% (first row at windows)	Maintained from daylight

- Washington code allows 1.0W/sf
- Oregon code allows 1.0W/sf
- Idaho code allows 1.0W/sf
- Montana code allows 1.0W/sf
- EPACT 2005 – This guide represents a 40% energy reduction from the base ASHRAE-2001 level

lighting design lab



Lighting Calculations
The above image shows the floor plan and the footcandles provided at desk height. Light loss factors (lamp lumen depreciation and luminaire dirt depreciation) along with the ballast factor have been included into the calculated numbers. Task lighting may be required to meet user satisfaction needs.

If task lights are used they should be compact fluorescent or equal efficiency and should incorporate an occupancy sensor or other means of automatic shutoff.

Higher light levels would be provided if the luminaire is placed over the desk, but furniture layouts generally change and the luminaires don't move which can cause severe shadowing.

Design Issues
The above image is not exactly how the human eye will perceive the lighted space. The eye will see the surfaces as having a more gradated illumination and more light in the workspaces.

Lensed Luminaire
High glare potential on CRT computer screens. Low glare potential on LCD computer monitors. Good illumination on side walls which will make the space feel bright and open.

Luminaire Selection
Not all luminaires are created equally. Just because two luminaires look alike does not mean they perform the same. If you are unsure of a luminaires performance do not hesitate to ask distributors and representatives for calculations using their product. Make sure ballast information, light loss factors and reflectance's are the same for each calculation.

Partitions
Partitions have a large impact on the illumination of a space. Vertical surfaces absorb and block light, creating shadows if positioned off-center from direct fixtures. If possible, the partition and furniture layout should correspond to the lighting layout to minimize the shadows.

Affordability
Affordability is based on fixture and lamp costs only. Variables of cost include ease of installation, contractor knowledge of product and the time it takes for installation. In retrofit situations, costs are variable depending on existing wiring layouts.

Controls
Occupancy sensors or building energy management systems should be incorporated to turn the lights off when the occupants are away or after hours.

Daylight harvesting controls should be used on all luminaires within the daylight zone (typically the daylight zone is the same distance away from the window wall as the window height for windows and 70% of the ceiling height for skylights).