

# Principles of Task Lighting

ERGONOMICALLY, THE ONLY CHOICE IS ASYMMETRIC



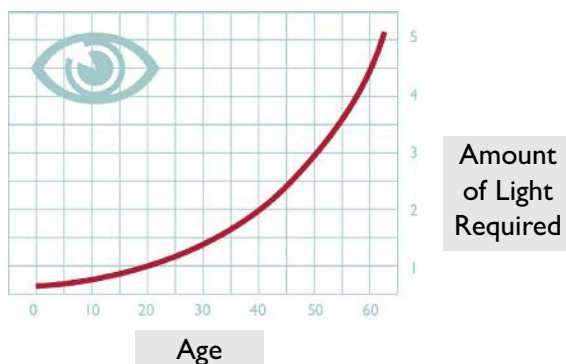
# Nothing Is More Important Than Good Lighting

While a functional workplace has many elements: computers, desks, and furniture, none are more important than good lighting. Over eighty percent of our sensory experience is visual.

With the growing trend in lower energy costs and ubiquitous computer screens, **task lighting** has become an increasingly integral part of good lighting for the workplace.

## WHAT CONSTITUTES GOOD LIGHTING?

- Combination of ambient and task lighting:
  - Ambient or general lighting provides even, overall illumination.
  - Task lighting provides the light needed for a particular task such as reading, computer work, assembling, etc...
- Avoidance of severe contrast between ambient and task lighting:
  - The eye's pupil will dilate in low levels of light and contract in high levels of light.
  - Constant dilating and contracting is the major cause of eye strain and eye fatigue.
  - A recommended ratio between localized task lighting and ambient lighting is 5:1.
- Flexible task lighting must accommodate a variety of situations and individuals:
  - A variety of tasks performed in one space
  - Movement of people in the workspace.
  - Duration of tasks
  - Visual ability of individual people.
    - Susceptibility to glare increases with age. Therefore, glare-free lighting is critical for older individuals.
    - A 40 year old requires twice as much light as a 20 year old; and a 60 year old requires four to five times the light of a 20 year old, to accomplish the same task.



- Appropriate footcandle levels as recommended by the Illuminating Engineering Society (IES) depending on the task being performed:

Activity	Footcandle Level
Public Spaces	3FC (30Lux)
Simple orientation for short visits	5FC (50Lux)
Working spaces where simple visual tasks are performed	10FC (100Lux)
Performance of visual tasks of high contrast and large size	30FC (300Lux)
Performance of visual tasks of high contrast and small size, or visual tasks of low contrast and large size	50FC (500Lux)
Performance of visual tasks of low contrast and small size	100FC (1000Lux)

- Glare should be eliminated as much as possible:
  - Use asymmetrical task lighting whenever possible.
  - Space downlight fixtures in ceilings so that they do not produce glare on the work surface.
  - Use shield and/or louver fixtures to prevent glare to aperture.
  - Use indirect ambient lighting as an alternative to downlighting.
- Easy to adjust spring-balanced task light arms:
  - Position fixture heads unobtrusively outside of work areas, thus eliminating direct glare
  - Sharply cut off light below computer screens to avoid screen "washout"
  - Provide light from an angle that eliminates indirect glare.



Air



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Vision



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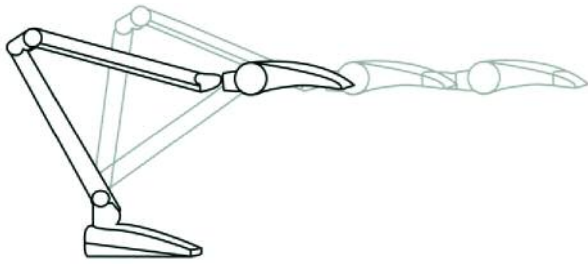
Air



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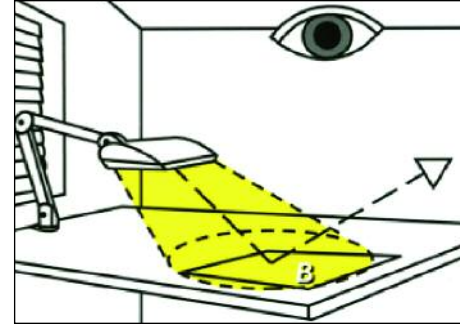
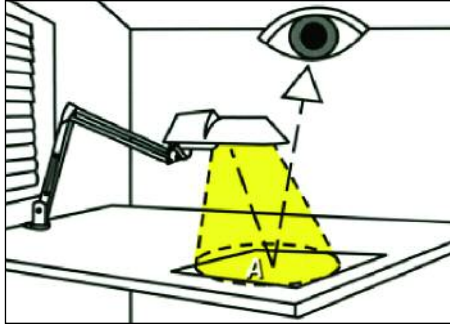


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**80% of our impression of the world is visual.**

## SYMMETRIC VS. ASYMMETRIC TASK LIGHTING:



### ■ Symmetrical Lighting:

- Produced by fixtures that distribute light equally in **all** directions.
- Produces both direct and indirect glare.
- Produces veiling reflections.
- Usually get higher footcandles in a smaller/more condensed area.
- Good for inspections and performance of visual tasks of low contrast and small size.

### ■ Asymmetrical Lighting:

- Produced by fixtures with specially designed reflectors that concentrate light in one direction.
- Preferred for large work areas where computer screens are used, since the lighting can be directed away from the screen and toward the work area.
- Provides the correct incidence of light to dramatically reduce obstructing shadows.
- Helps to avoid indirect glare.
- Recommended by ANSI/IESNA RP-1-04 to reduce

## UNDERSTANDING BASIC TERMS:

**Footcandles:** A measure of the amount of light on a surface.

**Lumens:** A measure of the actual light a source emits.

**Lumens per Watt:** The efficiency of light, i.e. the relationship between the lumens and the electrical power supplied in watts.

**Glare** occurs when the eye encounters more light than it can cope with.

**Direct Glare** occurs when light from fixtures or high levels of daylight fall within the visual field.

**Indirect Glare**, also known as Veiling Reflection, occurs when too much light is reflected. The two most common occurrences are light as it reflects off a glossy page or a computer screen.

**Shadows:** Shadow helps identify forms, textures and shapes. To avoid obstruction of view from too many shadows, light should come in the form of both ambient and task lighting to provide the necessary variety of light levels and angles.

**Contrast:** The difference in brightness between an object and its immediate surroundings. Studies indicate that for each 1% loss in contrast between a subject and its immediate background, 15% more light is required to maintain the same level of visibility.

**Veiling Reflection**, a type of "Reflected Glare" that results in a high brightness image reflected off a surface causing a reduction in contrast. Veiling reflections often occur when an image of the light source is reflected off a specular material, such as polished marble or a glossy magazine.

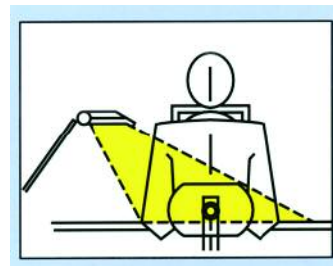
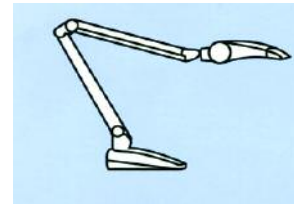
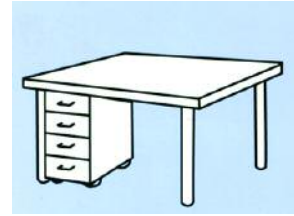
The right light

**LUXO**



## HOW TO SELECT THE LUXO LIGHT THAT IS RIGHT FOR YOU

- Decide whether you need symmetric or asymmetric light distribution:
  - Those who work at computers or at very large work surfaces, generally prefer asymmetrical light distribution.
  - Those who perform inspections or visual tasks of low contrast and small size generally prefer symmetrical light distribution.
- Select the type of light you need:
  - Incandescent lamps
  - Fluorescent lamps
  - Other
- Select the amount of light you need:
  - 60W to 100W for incandescent lamps
  - 13W to 26W for fluorescent lamps
  - 20W to 50W for low-voltage lamps
- Select appropriate arm lengths and mounting options:
  - 26"-46" Arms
  - Edge clamp, furniture mount, recessed mount, weighted base
- Select applicable mounting surfaces:
  - Walls
  - Desks
  - Inclined surfaces
  - Table tops
  - Floor



The important thing to remember is that the right task light can be the single most effective means of putting the principles discussed here into practice.

Luxo has been designing and perfecting task lighting for nearly seventy years. No other products offer the quality or advanced engineering of Luxo lamps. Features such as patented asymmetric reflector systems, spring-balanced arms that allow for perfect placement, space saver rail mount systems, dual-cool shades, rolled edges, and vented shields are unmatched by any other product.

Luxo lamps have been imitated, but never equaled. Coupling aesthetics with proper ergonomics, Luxo lamps are the answer to productive, energy-efficient lighting in today's workplaces. The right light.

Please refer to [www.luxous.com/test.html](http://www.luxous.com/test.html) to determine the efficiency of your lighting environment.

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