Intro to Light Fixtures

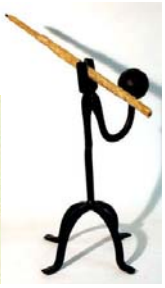
IN THE BEGINNING

PRIMITIVE LAMPS - (c 13,000 BC to 3,000 BC)
Prehistoric man, used primitive lamps to illuminate his cave. These lamps, made from naturally occurring materials, such as rocks, shells, horns and stones, were filled with grease and had a fiber wick. Lamps typically used animal or vegetable fats as fuel.

In the ancient civilizations of Babylonian and Egypt, light was a luxury. The Arabian Nights were far from the brilliance of today. The palaces of the wealthy were lighted only by flickering flames of simple oil lamps. These were usually in the form of small open bowls with a lip or spout to hold the wick. Animal fats, fish oils or vegetable oils (palm and olive) furnished the fuels.

Early Developments

- Rush lights:
  - Tall, grass-like plant dipped in fat



Early Developments

- Candles:
  - Most expensive candles made of beeswax
  - Most common in churches and homes of nobility
  - Snuffers cut the wick while maintaining the flame

Early Developments

Early Developments

New Developments
There was a need to improve the light several ways:

1. The need for a constant flame, which could me left unattended for a longer period of time
2. Decrease heat and smoke for interior use
3. To increase the light output
4. An easier way to replenish the source....thus, the development of gas and electricity
5. Produce light with little waste or conserve energy

Intro to Light Fixtures

Industrial Revolution - Europe

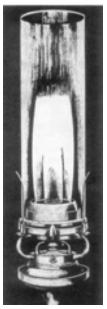
- Gas lamps developed:
  - London well known for gas lamps
  - Eiffel Tower (1889) originally used gas lamps

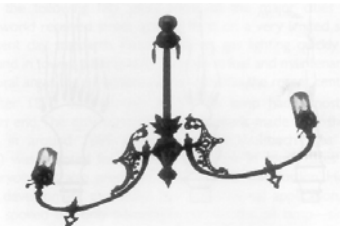
Argand Lamp

The Argand burner, which was introduced in 1784 by the Swiss inventor Argand, was a major improvement in brightness compared to traditional open-flame oil lamps.

Argand employed scientific knowledge on the role of the newly discovered oxygen in combustion, and by adding a chimney managed to increase the flow of air to the flame thus increasing its light output significantly. The new lamp was as much as tenfold brighter than the most advanced oil lamps of the time.

Argand lamps were first introduced in the French theatre in 1784, but due to their high cost did not become a standard fixture in all theatres.





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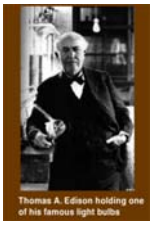
Electrical Lighting



Thomas A. Edison holding one of his famous light bulbs

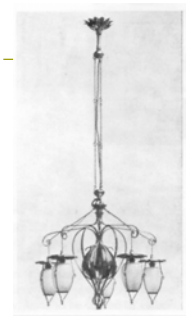
A drawing of an early light bulb design by Edison. Edison tried numerous different materials and designs before he was successful in developing a practical incandescent bulb.

A modern light bulb.

1907

The first commercial tungsten filament for incandescent lamps became available in the United States. Tungsten wire manufacturing was still costly and difficult, but the problem was to soon be overcome.

A modern tungsten light bulb filament.



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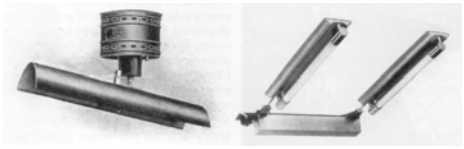
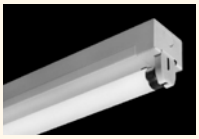
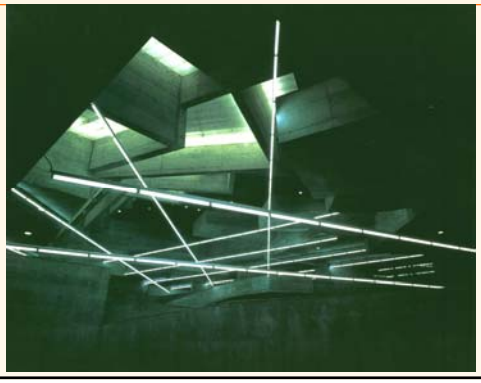


Light Fixture

Specifications:

- Method of Mounting
- Method to make Electrical Connection
- Housing
  - *Lamp*
  - *Lamp Socket*

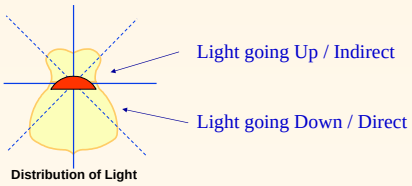




Intro to Light Fixtures

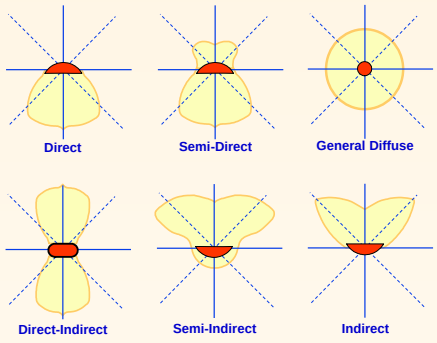
Direction of Light

- Goal of a luminaire is to put light where the user needs it
- Convenient way to classify luminaires is by the *direction* of light emitted from the luminaire



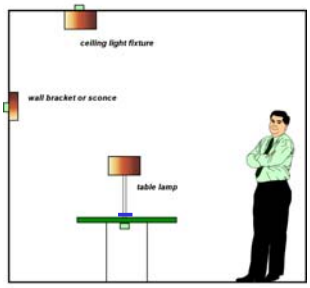
Distribution of Light

Distribution Types



Mounting

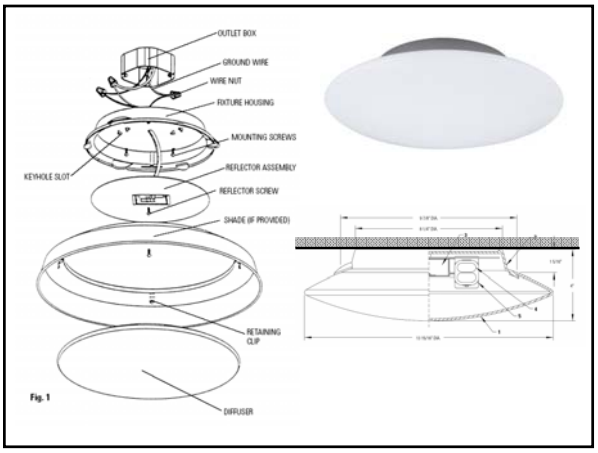
- **Surface**



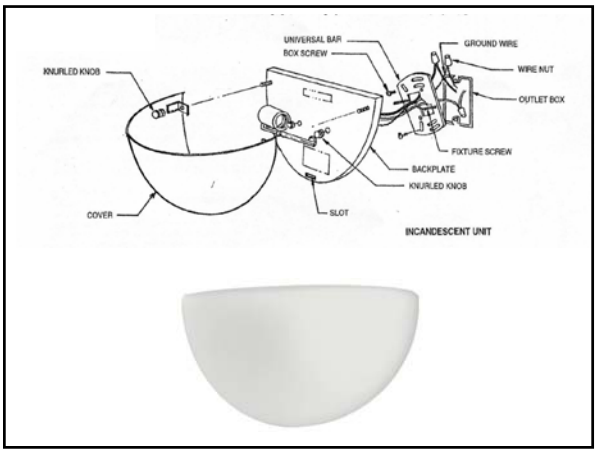
Section

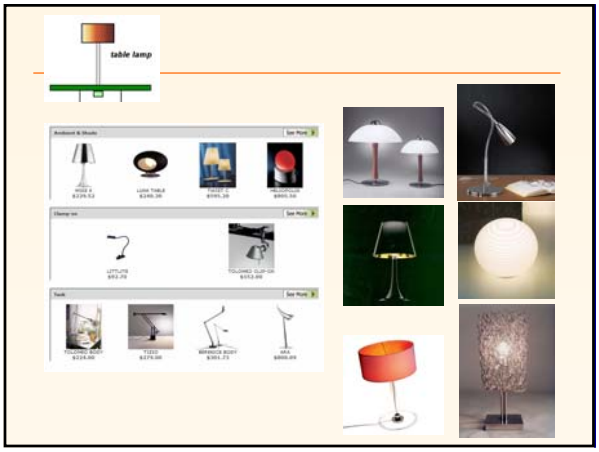
Typical Components:

- **Recessed Junction Box**
- **Housing**
  - Back Plate
  - Lamp and Lamp Socket
  - Diffuser or Shielding
  - *Base or Leg for Table Lamp*



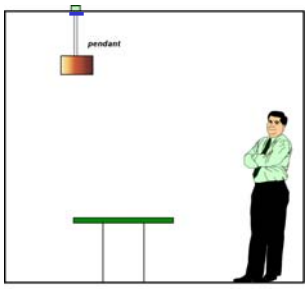
Intro to Light Fixtures





Mounting

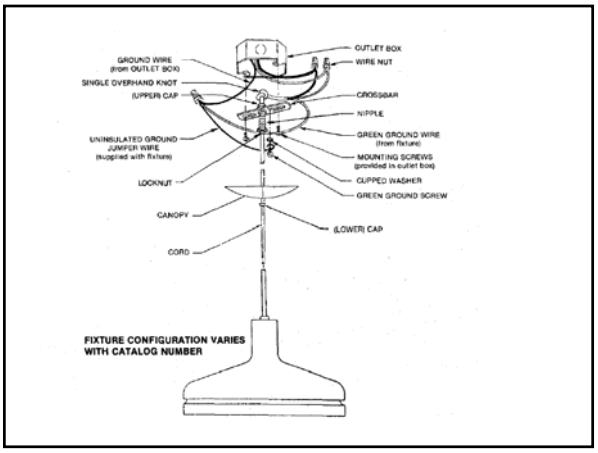
- **Pendant**



Section

Typical Components:

- **Recessed Junction Box**
- **Housing**
  - **Canopy**
  - **Stem**
  - **Lamp and Lamp Socket**
  - **Diffuser or Shielding**



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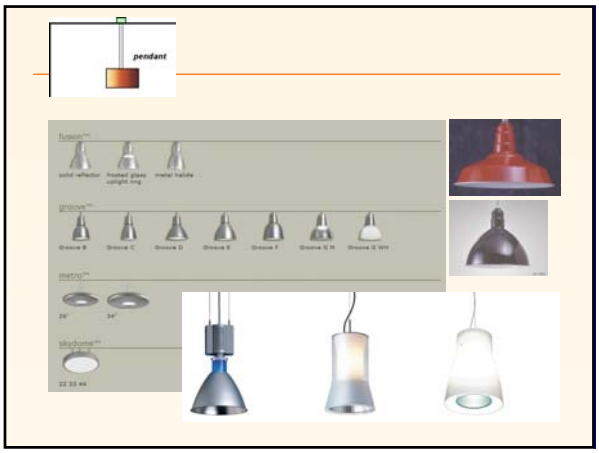
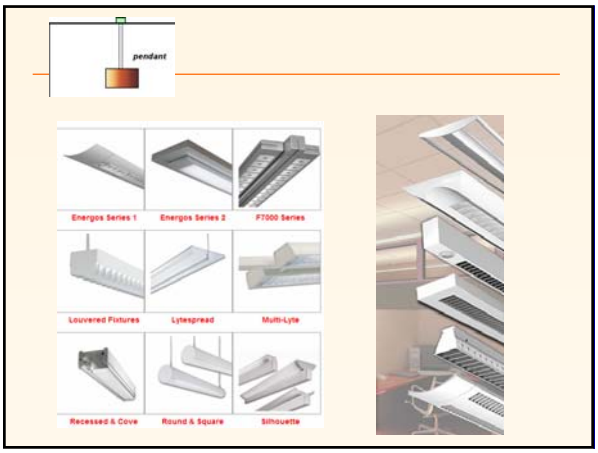
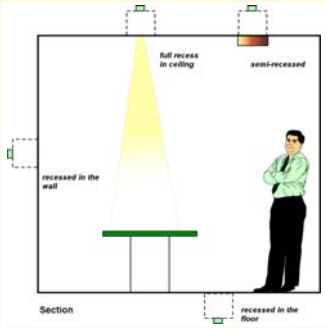




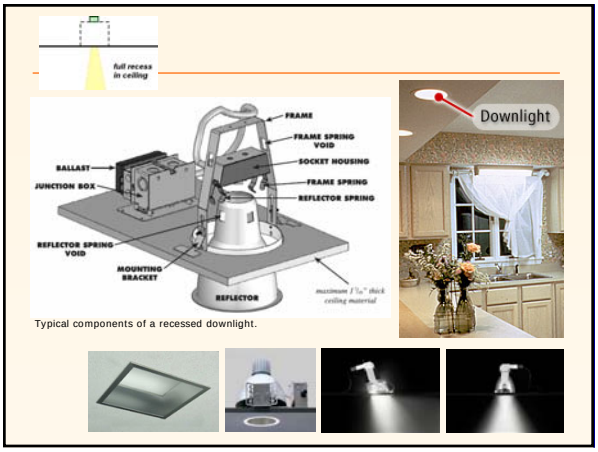
Mounting

- **Recessed**

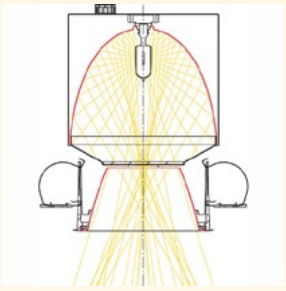


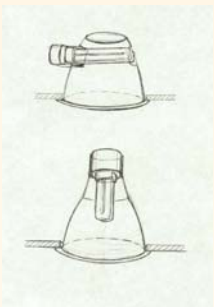
Typical Components:

- Splice Box
- Housing
  - Lamp and Lamp Socket
  - Aperture Cone
  - Diffuse or Shielding

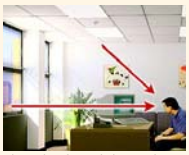


Typical components of a recessed downlight.





Glare



Direct glare from windows and luminaries.

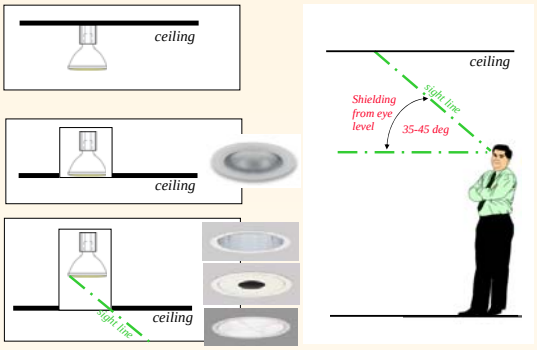
Reflected glare on computer screen from ceiling luminaries.

GLARE PREVENTION TIPS

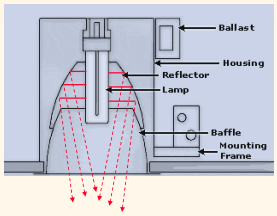
- Distribute light to walls and ceilings. Bi-directional fixtures such as A, D, and E (see p. 7) work well.
- Use daylight to light walls and ceilings.
- Use adjustable blinds or shades that control window glare while retaining view.
- Choose higher reflectance room surfaces.
- Select only semi-specular or white painted louvers and reflectors. Avoid mirrored or specular (shiny) reflectors or louvers that can be seen from any angle.
- Shield the lamp from view with baffles, louvers, lenses or diffusing overlays.

Intro to Light Fixtures

Shielding

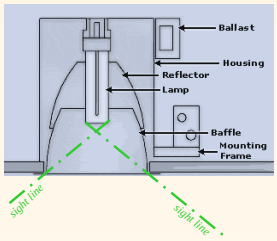


Reflector



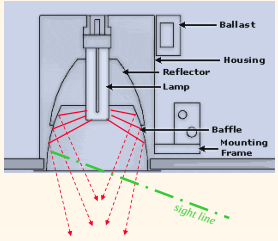
Reflectors around or above the lamp used to increase performance of the fixture

Shielding

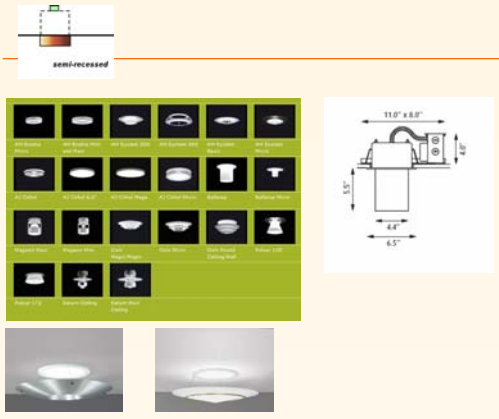


Lamp placed above ceiling aperture or louver to provide **shielding** from normal viewing angles

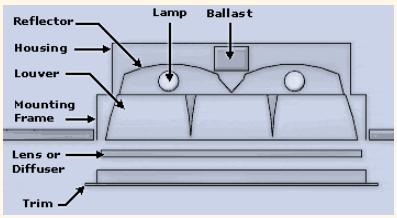
Glare Control



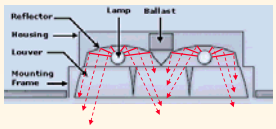
Contour of ceiling aperture or louver to provide **Glare Control** from normal viewing angles



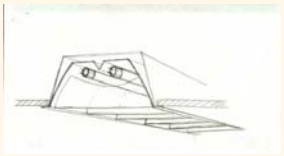
Intro to Light Fixtures



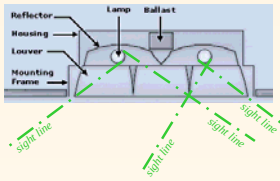
Reflector



Reflectors around or above the lamp used to increase performance of the fixture

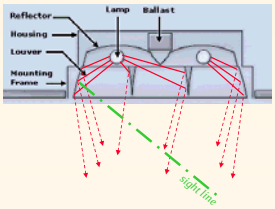


Shielding



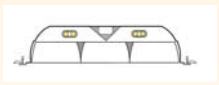
Lamp placed above ceiling aperture or louver to provide **shielding** from normal viewing angles

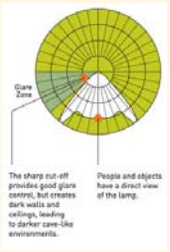
Glare Control



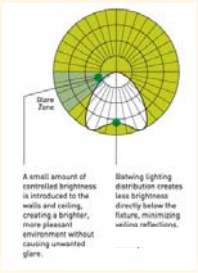
Contour of ceiling aperture or louver to provide **Glare Control** from normal viewing angles

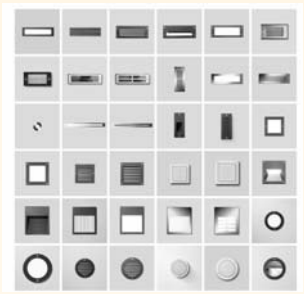
General or Ambient : Troffer

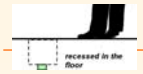




Intro to Light Fixtures







Exterior

- Pole or Post Mounted

Exterior

- Building or Ground Mounted

Exterior

- Ground Mounted for Object Lighting

Intro to Light Fixtures

Fixtures Inside and Out

- **Underwriters Laboratory Testing**
  - Dry Applications
  - Damp Applications
  - Wet Applications
  - Wet/Dry Applications
  - Underwater Applications
  - Corrosive Applications
  - Hazardous Applications

Finding Fixtures

- **General Lighting Mnfrs Websites**
  - www.Lightolier.com
  - www.Erco.com
- **Light Fixture Search Sites**
  - www.LightSearch.com
  - www.eLumit.com
- **Retail Sites**
  - www.Lightology.com
  - www.unicahome.com
  - www.lumens.com
  - www.100watt.net