Light Fixtures

What is a Light Fixture?

Specifications:
• Method of Mounting
• Method to make Electrical Connection
• Housing
  • Lamp
  • Lamp Socket

Keyless Porcelain Socket

Keyed (pull chain) Porcelain Socket
Light Fixtures

All Light Fixtures Need Electricity

Electrical Distribution
Light Fixtures

Bare Lamps can be a Light Fixture?

Bare Lamp Channels
Socket Strips
Light Fixtures

Bare Lamps can be a Light Fixture?

[Images of light fixtures and installations]

Bare Lamps can be a Light Fixture?

[Images of various lighting solutions]

[Images of light fixtures and installations]
Light Fixtures

LED Sources are Electronics

What is a Light Fixture?
Light Fixtures

Light Fixtures: “A Lamp in a Box”

- Light fixtures are MORE than a decorative object.

Define Light Fixtures by their....

Mounting & Distribution & Application

- Recessed Direct Downlight
- Recessed Indirect In-Grade Light
- Surface General Diffuse Ceiling Light
- Surface Indirect Wall Bracket
- Surface Direct Task Light
- Pendant Indirect Office Light
- Pendant Downlight
- Pendant Troffer
Light Fixtures

Light Direction

Light travels in a straight line…radiates out from the source

Omni Distribution
Light Goes Everywhere

Directional Distribution
Light Goes Downward

Bare Lamp
100 watt A-lamp = 1650 Lumens

Lamp in a Fixture
Fixture = 1240 Lumens
Fixture is approx 78% Efficient

25% is lost
Light Fixtures

We Define Light Fixtures by their... Distribution 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
- Commission Internationale de l'Eclairage (CIE) sets up these classifications

Distribution of Light

- Light going Up / Indirect
- Light going Down / Direct

Distribution Types

- Direct
- Semi-Direct
- General Diffuse
- Direct-Indirect
- Semi-Indirect
- Indirect
Light Fixtures

Distribution Types

Direct

Indirect

Direct-Indirect

Distribution: Direct

100% of the light directed down

Direct
Light Fixtures

**Distribution: Direct**

100% of the light directed down

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**Distribution: Direct**

100% of the light directed down
Light Fixtures

**Distribution: Semi-Direct**

Smaller portion direct up
- Most of the light directed down

![Semi-Direct Diagram](image)

Suspended Linear Pendants

Pendants

**Distribution: Semi-Direct**

Smaller portion direct up
- Most of the light directed down

![Semi-Direct Diagram](image)
Light Fixtures

Distribution: Direct - Indirect

50% of the light directed up

50% of the light directed down

Distribution: General Diffuse

Light directed evenly around

Wall Source / Wall Bracket

Core
Light Fixtures

**Distribution: General Diffuse**

Light directed evenly around

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**Distribution: General Diffuse**

Light directed evenly around
**Light Fixtures**

**Distribution: Semi-Indirect**

Most of the light direct up
- Small portion of the light directed down

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**Distribution: Semi-Indirect**

Most of the light direct up
- Small portion of the light directed down

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Light Fixtures

**Distribution: Semi-Indirect**

Most of the light direct up
- Small portion of the light directed down

**Distribution: Indirect**

100% of the light directed up

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Light Fixtures

**Distribution: Indirect**

100% of the light directed up

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**Distribution: Indirect**

100% of the light directed up

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We Define Light Fixtures by their… *Mounting*

**Mounting**

- **Surface**

  Typical Components:
  - Recessed Junction Box
  - Housing
    - Back Plate
    - Lamp and Lamp Socket
    - Diffuser or Shielding
    - Base or Leg for Table Lamp
Light Fixtures

Surface Mounted Ceiling Light
Flush Mounts

General Diffuse

Fig. 1
Light Fixtures

Wall Bracket or Sconce

Wall Sconce / Wall Bracket / Wall Marker Lights
Wall Mounts

Semi-Indirect
Light Fixtures

Table Lamps / Floor Lamps
Task Lights

Typical Components:

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

Section

Mounting

- Pendant

Pendant

Typical Components:
Light Fixtures

Industrial Pendants
High Bays / RLM Pendants

Office Pendants
Suspended Linear Pendants
Light Fixtures

Mounting

- Recessed

Typical Components:

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

Typical components of a recessed downlight.

Downlights
High Hats / Recessed Cans / “Holes in the ceiling”

Typical components of a recessed downlight.
Light Fixtures

**Downlights**
- High Hats / Recessed Cans / “Holes in the ceiling”

**Direct**

**Semi-recessed Downlights**
- Decorative High Hats

**Semi-Direct**
Light Fixtures

Step Lights
Marker Lights / Wall Path Lights

Recessed Wall Uplights

In Grade Lights
Landscape Uplights / Burial Lights
Light Fixtures

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 lenses and reflectors. Avoid mirrored or specular (shiny) reflectors or lenses that can be seen from any angle.
- Shield the lamp from view with baffles, leaves, lenses or diffusing overlays.

Downlight Glare Control

ceiling

Shielding from eye level 35-45 deg
Light Fixtures

Downlight Shielding

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

Downlight Reflector

**Reflectors** around or above the lamp used to increase performance of the fixture.
Light Fixtures

Downlight Glare Control

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

Direct

Trims
Aperture Cones / Aperture Trims
Light Fixtures

**Troffer Shielding**

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

**Reflector**

**Reflectors** around or above the lamp used to increase performance of the fixture.
Light Fixtures

Glare Control

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

Troffer

2 ft x 4 ft Louvered Troffer
Light Fixtures

General or Ambient: Troffer

The sharp cut-off provides good glare control, but creates dark walls and ceilings, leading to darker glare-like environments.

People and objects have a direct view of the lamp.
Light Fixtures

A small amount of controlled brightness is introduced to the walls and ceiling, creating a brighter, more pleasant environment without causing unwanted glare.

Exterior

- Pole or Post Mounted
Light Fixtures

**Exterior**

- Building or Ground Mounted

**Exterior**

- Ground Mounted for Object Lighting
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