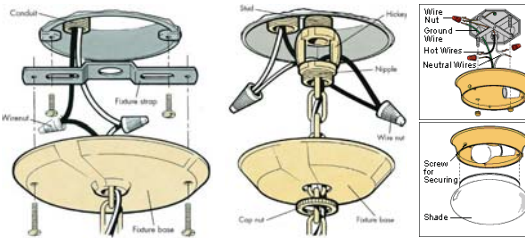
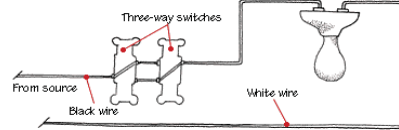
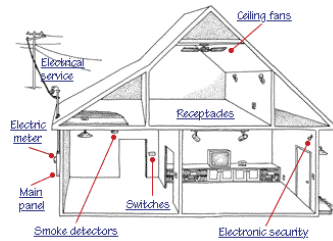


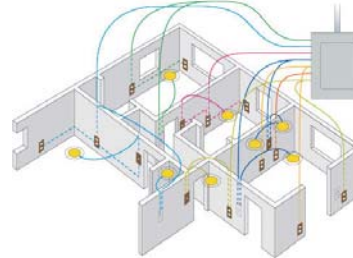
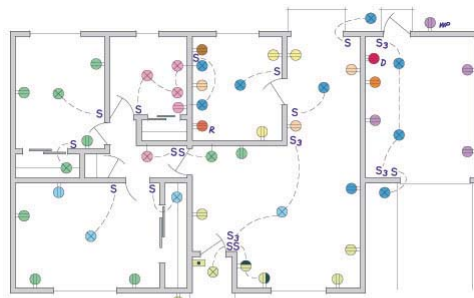
Light Fixtures

All Light Fixtures Need Electricity



3

Electrical Distribution



- Range (240-volt circuit)
- Dryer (240-volt circuit)
- Kitchen and dining room, 20 amp
- Kitchen and dining room, 20 amp
- Washing machine, 20 amp
- Dishwasher, 20 amp
- Bath and hall, 15 amp
- Bedroom #1, 15 amp
- Bedroom #2, 15 amp
- Living room, 15 amp
- Living room, 15 amp
- Garage, 20 amp
- ⊗ Light fixture
- ⊖ Duplex receptacle
- ⊖ Duplex receptacle, half controlled by switch
- S Single-pole switch
- S₃ Three-way switch
- ⊖ Range outlet
- ⊖ Dryer outlet
- ⊖ Special outlet
- ⊖ Doorbell
- ⊖ Weatherproof receptacle
- Switch wiring

4

Light Fixtures

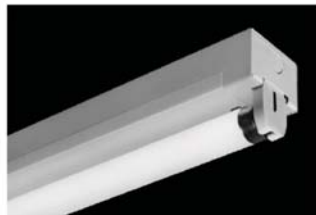
Bare Lamps can be a Light Fixture?



5

Bare Lamps can be a Light Fixture?

*Bare Lamp Channels
Socket Strips*



6

Light Fixtures

Bare Lamps can be a Light Fixture?



7

Bare Lamps can be a Light Fixture?



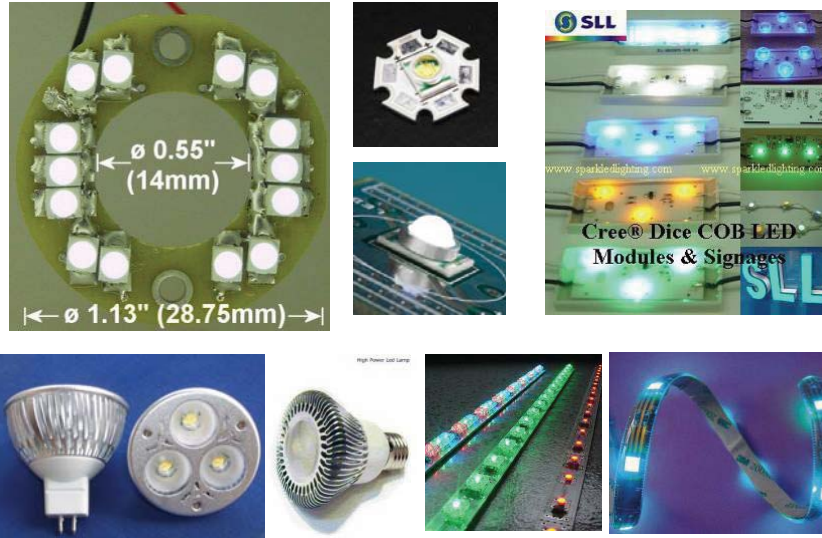
Techtrac / Tru-Lux - Cove Perimeter Lighting



8

Light Fixtures

LED Sources are Electronics



9

What is a Light Fixture?



10

Light Fixtures

Light Fixtures: “A Lamp in a Box”

- Light fixtures are MORE than a decorative object.



11

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

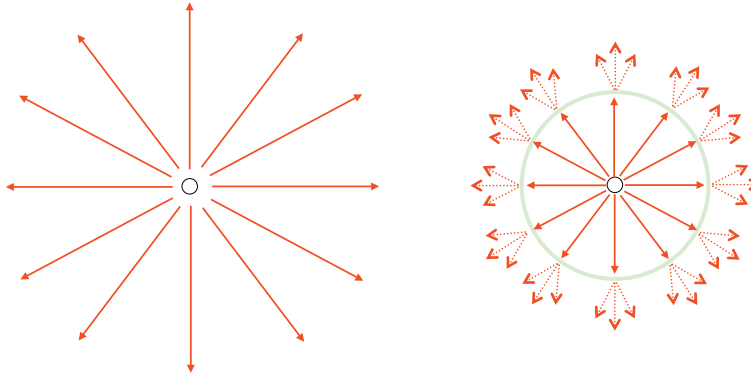
Pendant Indirect Office Light
Pendant Downlight
Pendant Troffer

12

Light Fixtures

Light Direction

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



13

Light Direction

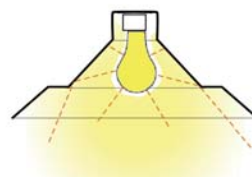
Light travels in a straight line...radiates out from the source

Omni
Distribution
Light Goes
Everywhere



Bare Lamp
100 watt A-lamp = 1650 Lumens

Directional
Distribution
Light Goes
Downward



Lamp in a Fixture
Fixture = 1240 Lumens
Fixture is approx 75% Efficient

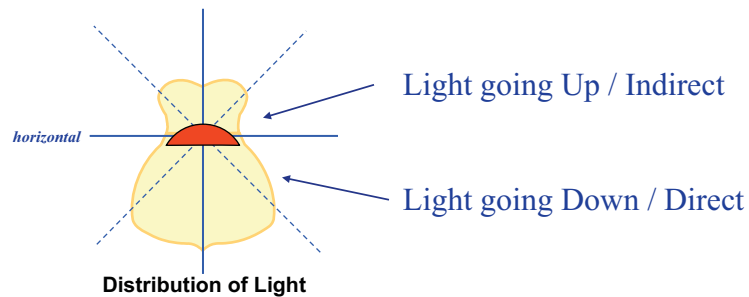
25% is lost

14

Light Fixtures

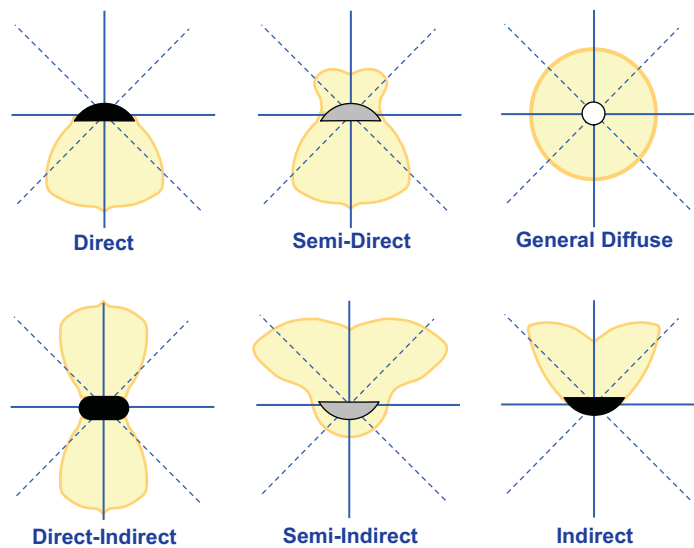
We Define Light Fixtures by their... Distribution of Light

- 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



15

Distribution Types

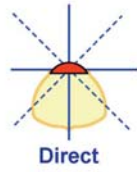


16

Light Fixtures

Distribution Types

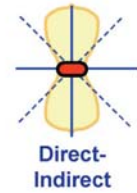
Suspended Linear Pendants



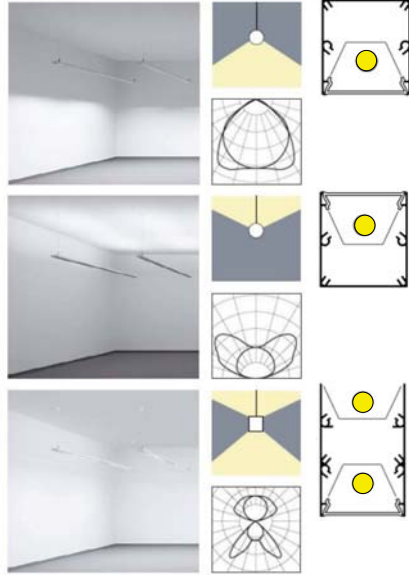
Direct



Indirect



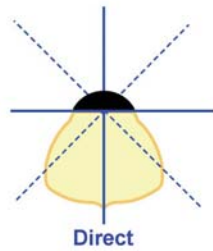
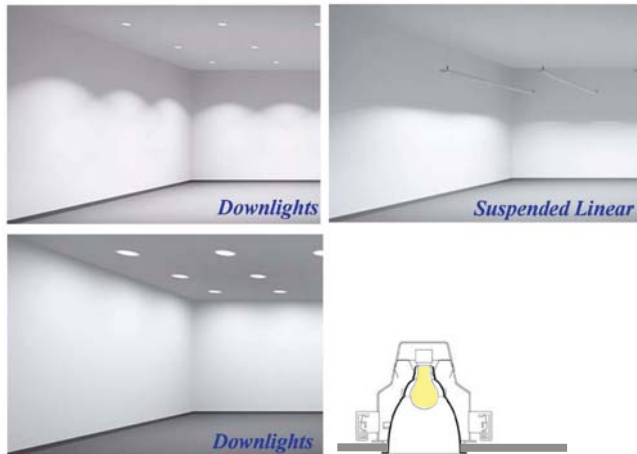
Direct-Indirect



17

Distribution: Direct

100% of the light directed down



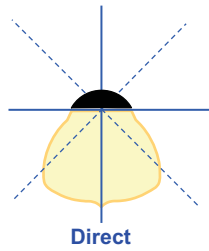
Direct

18

Light Fixtures

Distribution: Direct

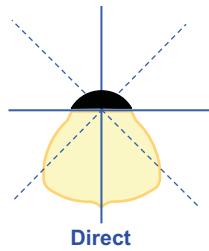
100% of the light directed down



19

Distribution: Direct

100% of the light directed down



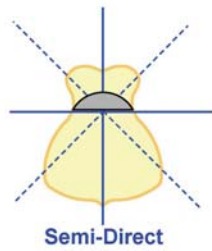
20

Light Fixtures

Distribution: Semi-Direct

Smaller
portion direct
up

-
Most of the
light directed
down

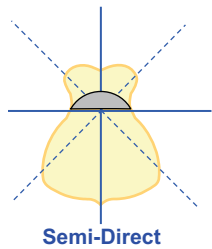


21

Distribution: Semi-Direct

Smaller
portion direct
up

-
Most of the
light directed
down



22

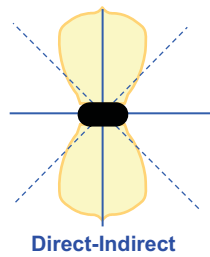
Light Fixtures

Distribution: Direct - Indirect

50% of the light directed up

-

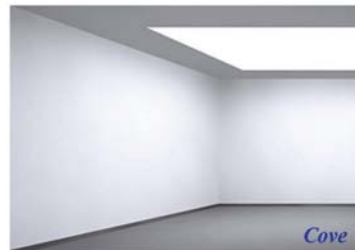
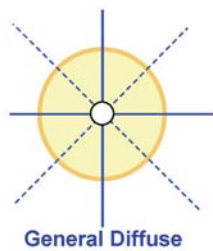
50% of the light directed down



23

Distribution: General Diffuse

Light directed evenly around

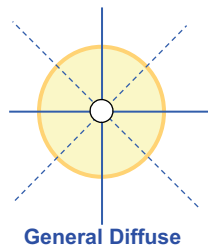


24

Light Fixtures

Distribution: General Diffuse

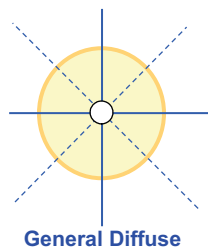
Light directed evenly around



25

Distribution: General Diffuse

Light directed evenly around

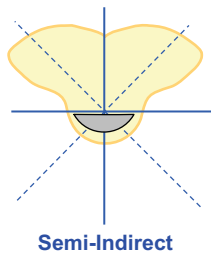


26

Light Fixtures

Distribution: Semi-Indirect

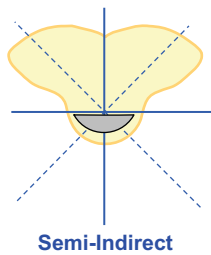
Most of the light direct up
-
Small portion of the light directed down



27

Distribution: Semi-Indirect

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



28

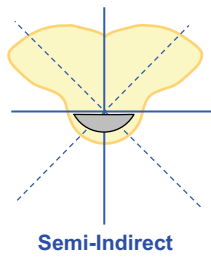
Light Fixtures

Distribution: Semi-Indirect

Most of the light direct up

-

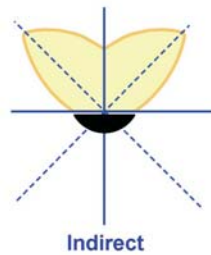
Small portion of the light directed down



29

Distribution: Indirect

100% of the light directed up

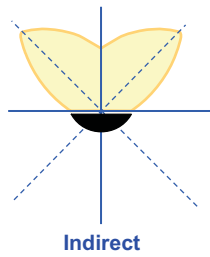


30

Light Fixtures

Distribution: Indirect

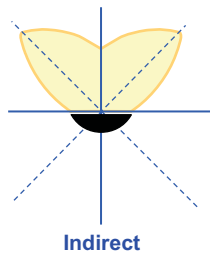
100% of
the light
directed
up



31

Distribution: Indirect

100% of
the light
directed
up



32

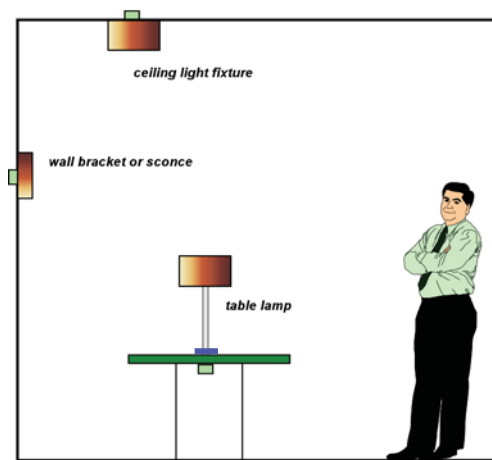
Light Fixtures

We Define Light Fixtures by their... *Mounting*

33

Mounting

■ Surface



Section

Typical Components:

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

34

Light Fixtures



ceiling light fixture

*Surface Mounted Ceiling Light
Flush Mounts*

ExtraLarge > 22 Inch			
HELIX 24 \$464.40	ROUND STAR 24 \$546.30	SQUARE STAR 24 \$553.10	ROUND SQUARE CHANDLER RECESSED \$2,336.80

Large 17-22 Inch			
O-12 \$255.97	SQUARE 22 \$326.40	SQUARE STAR 18 \$303.10	WELL DONE \$627.20

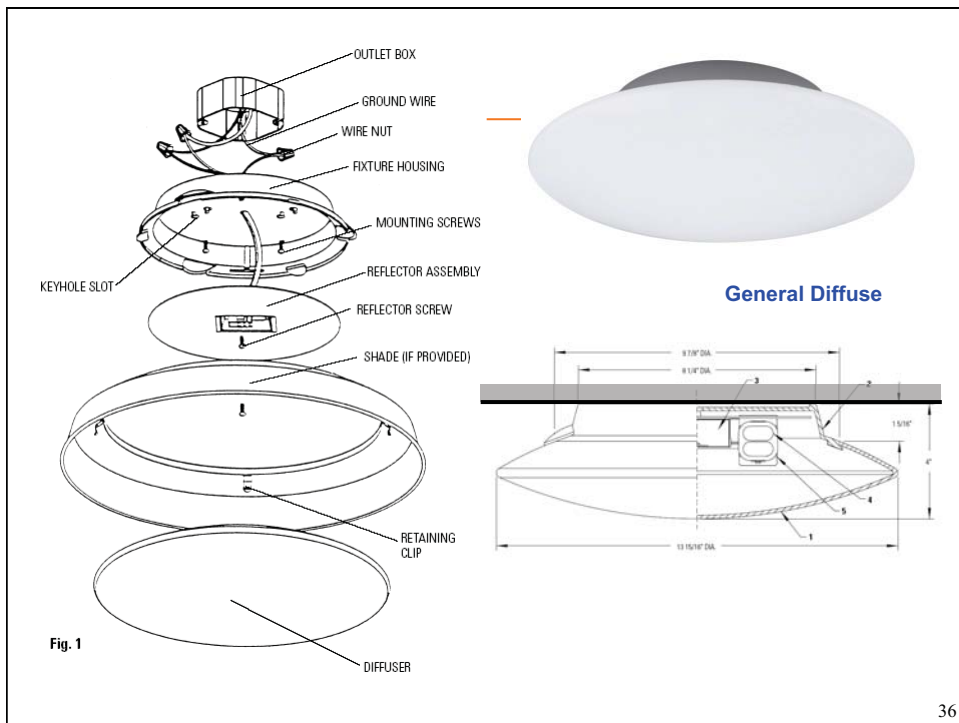
Medium 12-16 Inch			
SOAR \$164.00	SQUARE 12 \$236.00	SOFT SQUARE 12 \$200.00	SMA 12 \$377.10

Small 8-11 Inch			
SMITH CEILING \$148.50	O-10 \$217.36	HOLE PUNCH P \$270.00	SMA 11 \$334.80

Very Small 4-6 Inch		
SUFFICIENT CELL \$157.00	CHERRY \$177.30	FRANK \$845.60



35



36

Light Fixtures

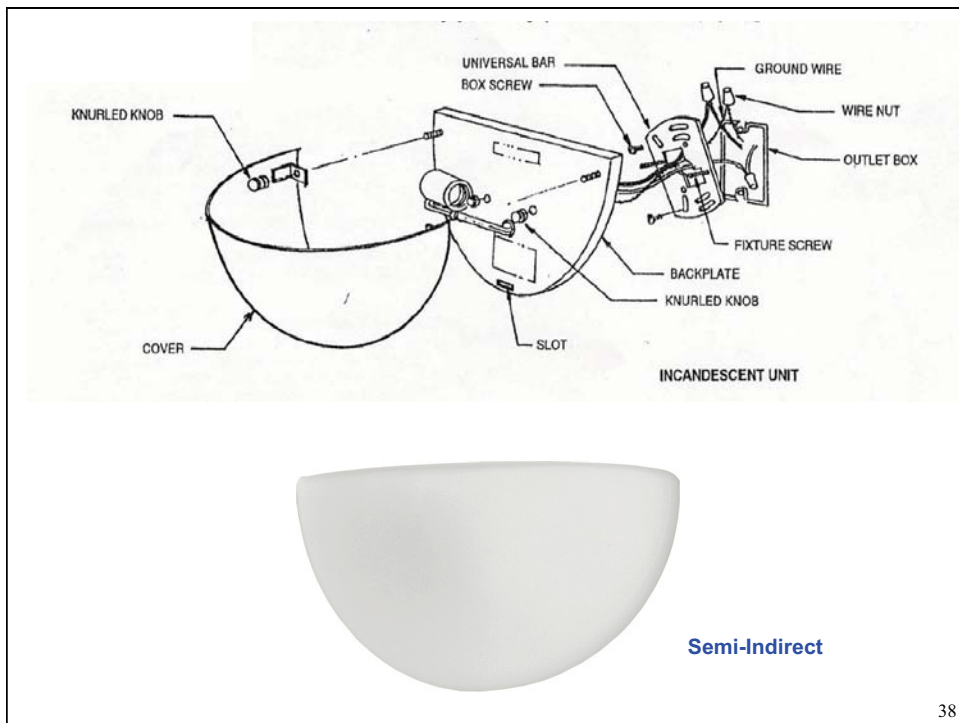
wall bracket or sconce

*Wall Sconce / Wall Bracket / Wall Marker Lights
Wall Mounts*

Extralarge > 24 Inch	See More		
 <p>ROCHETTE 23 \$693.90</p>	 <p>CLAVIUS 5M ENC \$660.00</p>	 <p>TKLYON \$711.00</p>	 <p>MISTRAL 21 \$1,910.70</p>
Large 13-24 Inch	See More		
 <p>REGAL \$223.20</p>	 <p>QUINTA \$319.50</p>	 <p>BOUQUET \$404.00</p>	 <p>KORNI WALL \$660.00</p>
Medium 7-12 Inch	See More		
 <p>OVAL FLUSH WAVE \$169.20</p>	 <p>GALLEO \$263.70</p>	 <p>A-1220 \$302.45</p>	 <p>LOOP WALL \$823.50</p>
Small < 7 Inch	See More		
 <p>TULIP WALL \$100.00</p>	 <p>FIREBIRD WALL \$228.00</p>	 <p>DAU \$220.80</p>	 <p>EMERGE COVANE \$304.00</p>



37



Light Fixtures

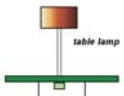








table lamp

*Table Lamps / Floor Lamps
Task Lights*





Ambient & Shade See More >


 <small>MISS K \$229.52</small>	 <small>LUNA TABLE \$240.30</small>	 <small>TWIST C \$595.20</small>	 <small>HELIOPOLIS \$805.50</small>
---	---	--	---

Clamp-on See More >

 <small>LITTLE \$92.70</small>	 <small>TOLOMEO CLIP-ON \$152.00</small>
--	--

Task See More >

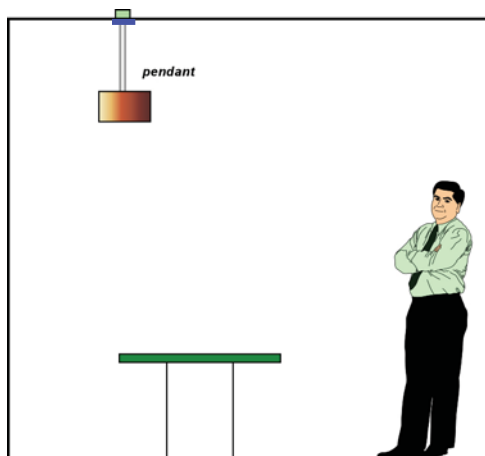
 <small>TOLOMEO BODY \$224.00</small>	 <small>TIZIO \$279.00</small>	 <small>ESERNICE BODY \$301.73</small>	 <small>ARA \$800.09</small>
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39

Mounting

■ Pendant

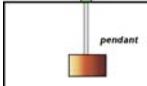


Section

Typical Components:

















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

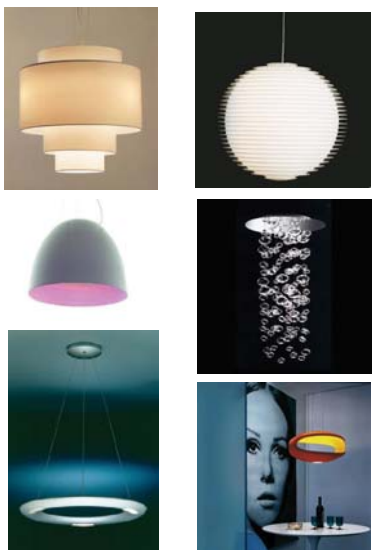
Light Fixtures



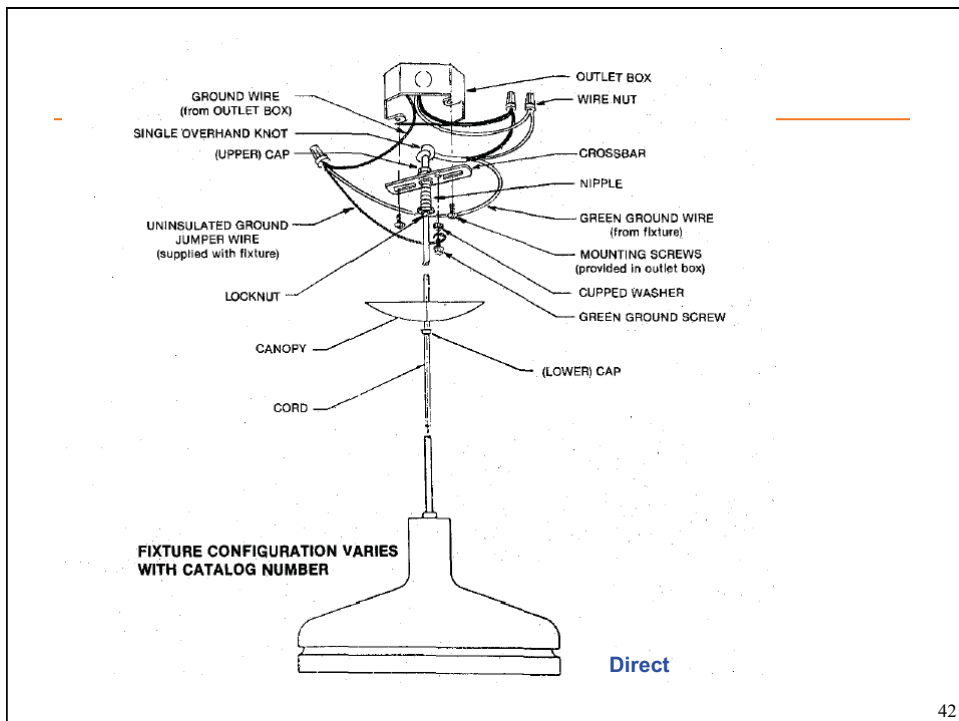
pendant

Pendants
Suspended Lights / Chandelier

Extralarge > 36 Inch	See More >			
 Knapsoy 32 \$3,000.00	 Etnus \$2,508.90	 Veronis 6-LT \$3,436.97	 Schwarzade 3 Geometric \$7,413.60	
Large 24-36 Inch	See More >			
 Vesa Oval 28 \$534.66	 Presto 32 \$852.00	 Sclou Sakaceng Plak Medium \$2,186.40	 Ela 22 \$3,946.50	
Medium 12-30 Inch	See More >			
 La Klint 149 \$252.00	 Society 14 \$449.60	 Gulm 1 \$561.60	 Lodico No. 18 H \$1,200.00	
Small 7-12 Inch	See More >			
 Melos Pendant \$264.00	 Pucsa 1 \$317.46	 Pondo 12 \$460.00	 Scale Copenhagen Classic Medium \$517.60	

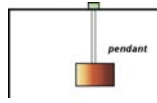


41



42

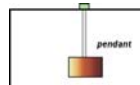
Light Fixtures



Industrial Pendants High Bays / RLM Pendants



43



Office Pendants Suspended Linear Pendants

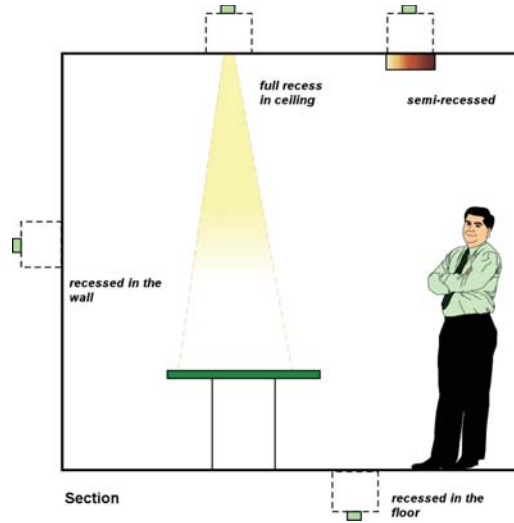


44

Light Fixtures

Mounting

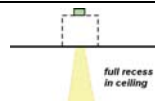
Recessed



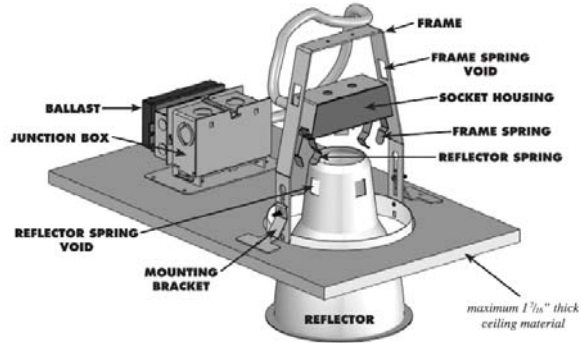
Typical Components:

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

45



Downlights High Hats / Recessed Cans / "Holes in the ceiling"



Typical components of a recessed downlight.



Square Downlight



Round Downlight



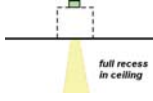
Adjustable Accent



Downlight

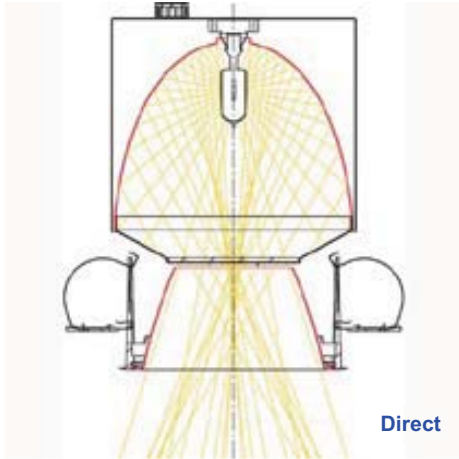
46

Light Fixtures

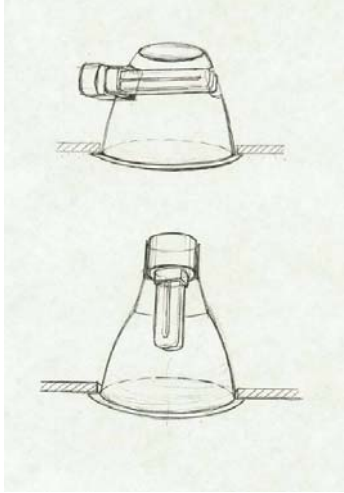


full recess
in ceiling

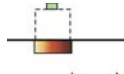
Downlights
High Hats / Recessed Cans / "Holes in the ceiling"



Direct

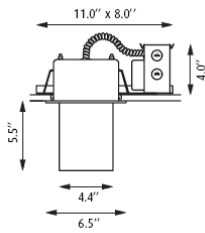


47

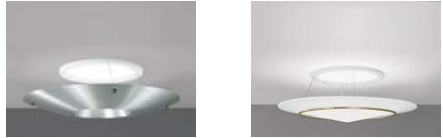


semi-recessed

Semi-recessed Downlights
Decorative High Hats

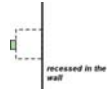


Semi-Direct

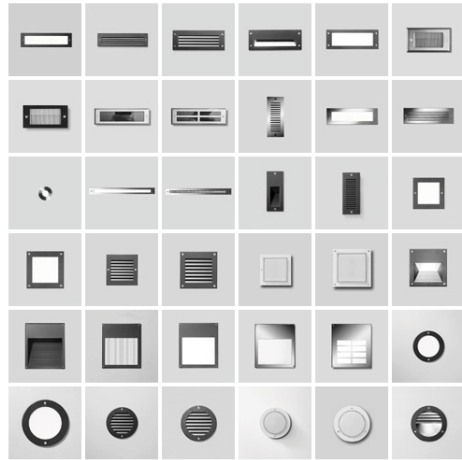


48

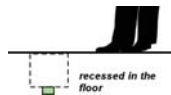
Light Fixtures



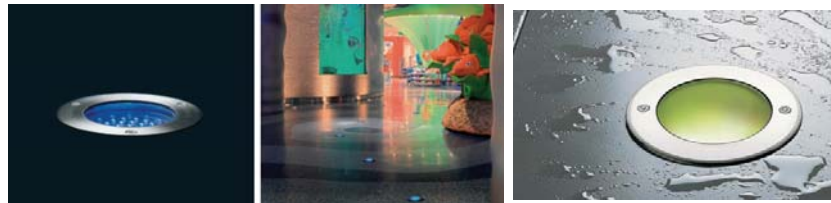
Step Lights Marker Lights / Wall Path Lights



49



In Grade Lights Landscape Uplights / Burial Lights



50

Light Fixtures

Glare



Direct glare from windows and luminaries.



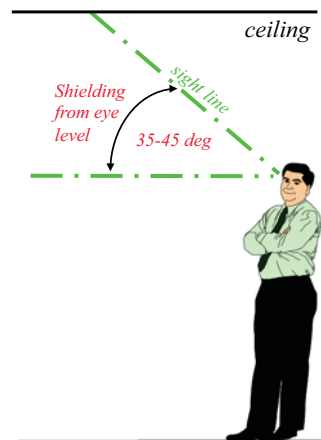
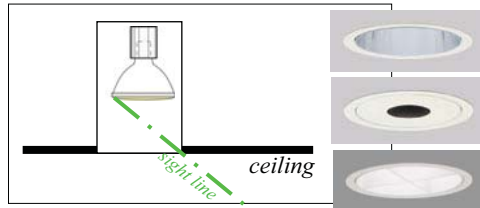
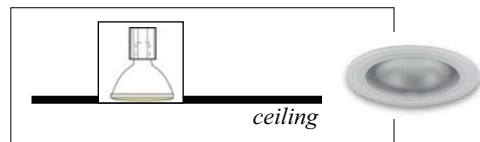
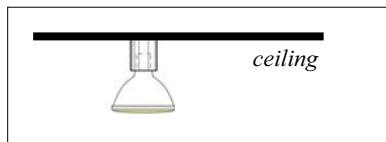
Reflected glare on computer screen from ceiling luminaries.

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 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.

51

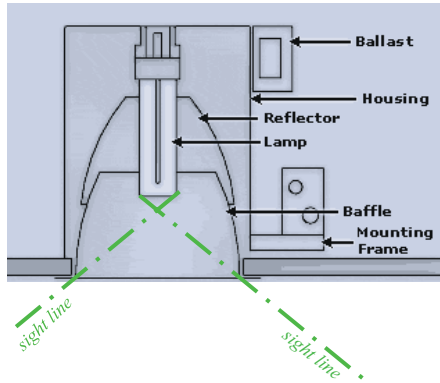
Downlight Glare Control



52

Light Fixtures

Downlight Shielding

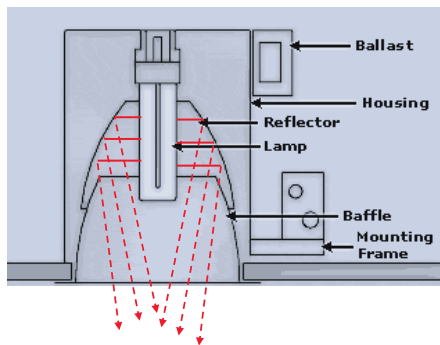


Lamp placed above ceiling aperture or louver to provide **shielding** from normal viewing angles

Direct

53

Downlight Reflector



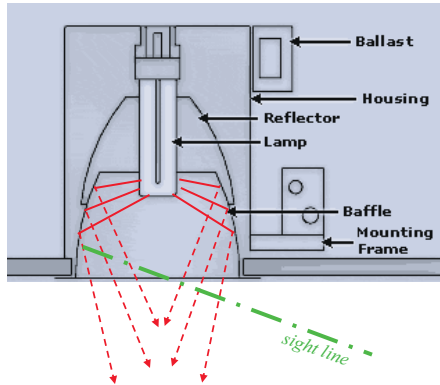
Reflectors around or above the lamp used to increase performance of the fixture

Direct

54

Light Fixtures

Downlight Glare Control



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

Direct

55

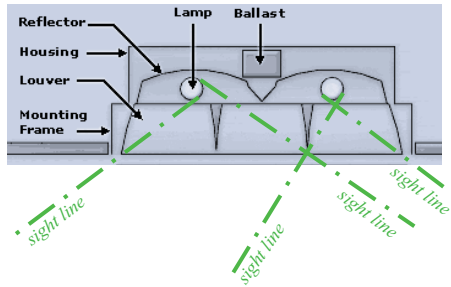
Trims Aperture Cones / Aperture Trims



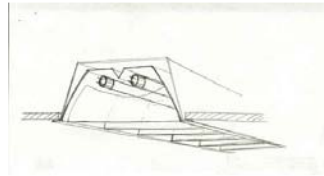
56

Light Fixtures

Troffer Shielding



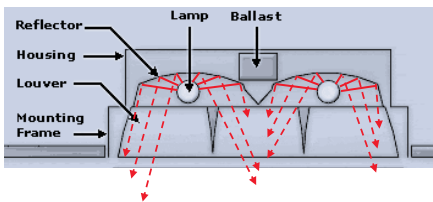
Lamp placed above ceiling aperture or louver to provide **shielding** from normal viewing angles



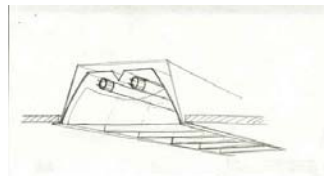
Direct

57

Reflector



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

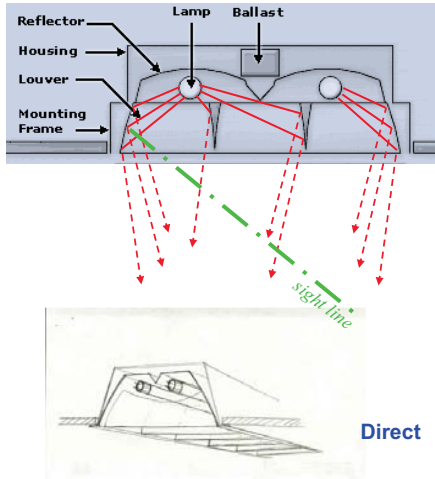


Direct

58

Light Fixtures

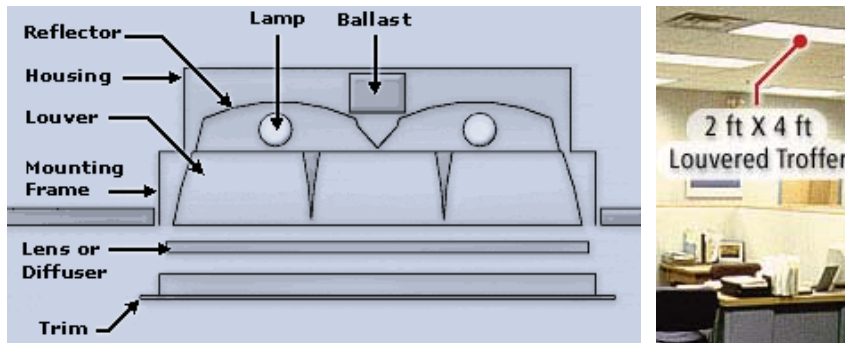
Glare Control



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

59

Troffer



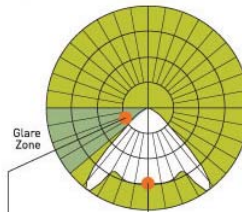
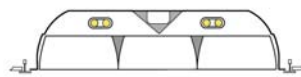
60

Light Fixtures

General or Ambient : Troffer



61

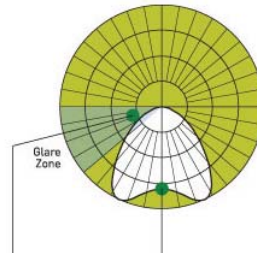


The sharp cut-off provides good glare control, but creates dark walls and ceilings, leading to darker cave-like environments.

People and objects have a direct view of the lamp.

62

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.

Batwing lighting distribution creates less brightness directly below the fixture, minimizing veiling reflections.

63

Exterior

■ Pole or Post Mounted



64

Light Fixtures

Exterior

■ Building or Ground Mounted



65

Exterior

■ Ground Mounted for Object Lighting



66

Light Fixtures

Fixtures **Inside and Out**

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

67

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

68