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Sudnya Industrial Services Pvt.
Ltd., Pune

Energy Efficient Lighting
Technologies



The L's in Lighting

- ❖ **Lumen: Light Emitted by Source**
- ❖ **Lux: Lumens per square meter**
- ❖ **Luminous Efficacy: Lumens per Watt**
- ❖ **Luminaire: Houses light source & control gear. Determines Light Distribution.**
- ❖ **Luminaire Efficiency: Ratio of Lumens Leaving the Luminaire to Lumens generated by lamp**



Quality of Light

- ❖ **Color Rendering Index (CRI):** Resemblance to true colors
- ❖ **Color Temperature (°K):** Appearance of different colors
- ❖ **Brightness:** Impression of the amount of light leaving a surface & reaching the eye
- ❖ **Contrast:** The difference between brightness of the object compared to that of its immediate background
- ❖ **Glare:** Extremely bright object against a dark background



- ❖ **Lamps** and lamp holders or sockets
- ❖ **Ballast or Control Gear** to start & operate the lamp
- ❖ **Reflectors** to direct the light
- ❖ **Shielding or Diffusion components** to shield lamps from the eyes, reduce glare & distribute light evenly
- ❖ **Housing** to contain the above elements, electrical components such as wiring connections



Lighting Energy Efficiency

❖ Does it mean only the lamp Efficacy?

- NO -

❖ Lighting Energy Efficiency means

ζ Lamp Efficiency, plus

ζ Ballast Efficiency, plus

ζ Luminaire Efficiency or CoU –Coefficient of Utilization



Indoor- Efficient Lighting Technologies : (Section 3.1 – 3.4)

❖ General Indoor Lighting

- ζ T-8 Halo Phosphor FTL
 - ✦ 36 W and 18 W
- ζ T-8 Tri Phosphor FTL
 - ✦ 36 W and 18 W
- ζ T-5 Tri Phosphor FTL
 - ✦ 28 W and 14 W



❖ Passage Lighting

- ζ CFL – Compact Fluorescent Lamps
 - ✦ 4 W to 40 W



Note: FTL – Fluorescent Tube Light



Ballasts: (Section 3.1 – 3.4)

❖ **Low Loss Copper Ballasts**

- ζ Operates at normal frequency, 50 Hz
- ζ Low power factor, 0.5 to 0.6 typically
- ζ Consumes about 5-6 W for a 36 W FTL

❖ **Electronic Ballasts**

- ζ Operates at High Frequency, 25-30 kHz
- ζ Consumes about 2-3 W for a 36 W FTL
- ζ High power factor, 0.95 plus
- ζ Higher light output due to HF operation



How Efficient is CFL?

- ❖ CFL is promoted as an Efficient lamp
- ❖ **BUT Efficient Compared to What?**
- ❖ Efficient only when compared with Bulbs
- ❖ Saves about 80% power compared with Bulbs

- ❖ Not efficient when compared to FTL technology
- ❖ CFL can't be replacement for FTL



Comparison of FTL Technologies: T8 versus T5

Parameter	T8 FTL	T5 FTL
Luminous Efficacy, Lm/W	95-98	100-103
Rated Life, (Hrs)	15000-18000	15000-18000
CRI	> 85	> 85
Lamp Price	-	↑ 30%
Ballast Price	-	↑ 30%



Outdoor Lighting Technologies: Conventional (Section 1.19)

❖ High Pressure Sodium Vapor Lamps:

- ξ 70, 150, 250, 400 Watts

- ξ Highly Energy Efficient, 80-120 Lm/Watt

- ξ Used when Color rendering not critical

❖ Metal Halide Lamps:

- ξ 70, 150, 250, 400 Watts

- ξ 70-75 Lm/Watt

- ξ Used when color rendering is the criteria



Outdoor Lighting Technologies: Non-Conventional (Section 1.19)

❖ **Solar Photovoltaic Street Lights:**

- ζ **Non conventional energy source**
- ζ **37 Wp & 75 Wp SPV models available**
- ζ **Green Power**





Lighting Controls:

- ❖ **Group Control Switches / Units**
- ❖ **Occupancy Sensors**
- ❖ **Photocell controls**
- ❖ **Timer operated controls**
- ❖ **Computerized Lighting Control Programs**



Luminous Efficacy Comparison:

Type of Lamp	Ave. Lm/Watt	Life, Hrs
Incandescent	14	1000
FTL	50	5000
High Lumen FTL	90	15000-18000
CFL	60	8000-10000
HPMV	50	5000
Halogen	20	2000-4000
HPSV, SON	90	6000-12000
LPSV, SOX	150	6000-12000



Day lighting Techniques:

❖ Proper design & orientation by using passive architectural techniques:

❖ Light Pipes:





Thank You



Contact Us

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