

## GLOSSARY OF LIGHTING TERMS

**Ballast** is a device located between the power supply and one or more lamps, providing starting voltage and the appropriate level of electric current for proper lamp operation.

**Ballast factor (BF)** is the measured ability of a particular ballast to produce light from the lamp(s) it powers. The ballast factor itself is derived by dividing the lumen output of a particular lamp-ballast combination by the lumen output of the same lamp(s) on a reference ballast. This factor, which usually results in a number less than one, accounts for the fact that some lumen loss results when operating lamps on commercially available ballasts.

*For example, a ballast with a ballast factor of 0.93 will result in the lamp's emitting 93% of its rated lumen output. A ballast with a lower BF results in less light output and also generally consumes less power.*

**Correlated color temperature (CCT)** indicates the warmth/coolness of the light that a lamp emits, measured in degrees Kelvin (K).

<b>Correlated Color Temperature (CCT)</b>	
Warm white (red/yellow):	2700 to 3000 K
Neutral white:	3500 to 4100 K
Cool white (blue):	5000 to 6500 K

**Color Rendering Index (CRI)**, a scale from 0-100, is a measure of how well a lamp renders color. A lamp with a CRI of 100 makes objects appear as they do in sunlight. CRI can only be compared for lamps of similar correlated color temperature.

**Footcandle (fc)** is a measure of illuminance in lumens per square foot. One footcandle equals 10.76 lux, although for convenience 10 lux commonly is used as the equivalent.

**Illuminance** The amount of light (luminous flux) incident on a surface area. Illuminance is measured in footcandles (lumens/square foot) or lux (lumens/square meter).

**Lumen (lm)** The amount of light coming from a light bulb is measured in lumens. Energy Efficient light bulbs will provide more lumens per Watt.

**Luminaire** The complete lighting unit consisting of a lamp or lamps and the parts designed to distribute the light, to position and protect the lamp(s), and to connect the lamp(s) to the power supply. (Also referred to as fixture.)

**Lux (lx)** is a measure of illuminance in lumens per square meter. One lux equals 0.093 footcandle.

**Task lighting** is the use of individual fixtures that have a limited beamspread and illuminate a small area.

## MORE EFFICIENT LIGHTING “RULES OF THUMB”

### Lighting system improvements fall within four categories:

1. Reducing AMOUNT of light needed
2. Reducing operating TIME
3. Using more EFFICIENT lighting
4. Combination of types 1-3

### For existing T-12 systems (commonly seen in office spaces), it is often feasible to do a 2:1 bulb replacement as you upgrade to T-8.

1. As you often are changing the ballast when moving from T-12 to T-8, and the fixture has typically not been maintained (cleaned), entirely new fixtures are frequently the best way to go.
2. There are two ballast options: programmed start or instant start. With programmed-start ballasts the life of your bulbs is longer despite a slightly higher initial expense. Instant-start are less expensive, work fine, but both your bulb and ballast will not last as long. ENSURE you get T-8 bulbs designed to go with whichever ballast you choose, as they are best not interchanged.
3. Go with a ballast with a low ballast factor (BF<0.85). Lower ballast factor = less energy consumed.
4. Select fixtures with good reflectors so light goes into the space were you want it and try to select fixtures where you can easily clean any accessible reflectors and/or you can clean the lenses. Don't reuse faded, dirty lenses.

### If you de-lamp:

1. A connected ballast still consumes energy even if no lamp is connected.
2. Common areas for delamping:
  - a. Corridors
  - b. Work Stations
  - c. Warehouses
  - d. Office Spaces (May include reflectors and task lighting)
3. Calculation for cost savings:

$$\text{Lamp Replacement CS} = \frac{(\text{Current \# Lamps} - \text{Proposed \# Lamps}) \times \text{Lamp Cost} \times \text{Hours/yr}}{\text{Lamp Life}}$$

$$\text{Total Cost Savings} = \text{Energy Cost Savings} + \text{Lamp Replacement Cost Savings}$$