



## Commercial Lighting Business Partners Program Glossary of Lighting Terms

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This glossary lists terms commonly used in the Commercial Lighting Business Partners Program (CLP) training and support materials. It provides definitions and usage that apply to the CLP.

### **Accent Lighting:**

Accent lighting is used to accentuate selected objects in relation to their surroundings. Accent lights count toward the lighting power density (LPD), but do not have to meet the CLP spacing criteria or luminous intensity criteria. In some space types, the accent lights are part of the overall LPD (such as industrial spaces), while in other areas (such as retail) a separate allowance is given for accent lighting, but they must be switched independently from the general lighting.

### **Ambient Light Level:**

Ambient light level refers to the amount of general uniform lighting in a space. Ambient light is provided from luminaires that distribute the light widely, directly or indirectly. Ambient light levels are measured in footcandles (fc). CLP criteria include recommendations for ambient light levels depending on the type of space and the tasks performed.

### **Ballast:**

A ballast is a device used to operate fluorescent and high intensity discharge (HID) lamps such as metal halide (MH) and high pressure sodium (HPS). The ballast provides the necessary starting voltage, while limiting and regulating the lamp current during operation. A ballast can be magnetic, electronic, or a hybrid of magnetic and electronic. CLP and other NYSEERDA incentive programs require electronic fluorescent ballasts.

### **Bay Luminaires (Fixtures):**

The term Bay Luminaires, as used in CLP, refers to both High Bay and Low Bay Luminaires. Other NYSEERDA end-user incentive programs may restrict the light source (see "high intensity fluorescent"), require minimum fixture efficiency, or limit mounting height.

### **Brightness:**

Brightness is an attribute of visual perception in which a source appears to emit a given amount of light. "Brightness" is used only for non-quantitative references to physiological sensations and perceptions of light. "Brightness" was formerly used as a synonym for the photometric term "luminance." For the purpose of CLP, we refer to brightness as it relates to glare where glare is the effect of brightness, or differences in brightness, within the visual field sufficiently high enough to cause annoyance, discomfort, or loss of visual performance.

**Candela:**

The Candela (cd) is the unit of luminous intensity, describing the intensity of a light source in a specific direction. In CLP, qualifying luminaires may not exceed certain luminous intensity thresholds based on the type of fixture and/or the application. These criteria help limit excessive glare.

**Candlepower:**

Candlepower was used to express levels of light intensity in terms of the light emitted by a candle of specific size and constituents. In modern usage Candlepower equates directly to the unit known as the candela (cd).

**Candlepower Summary:**

The candlepower summary or “candela distribution chart” is part of the photometric report, and provides a listing of the candela values to evaluate the luminous intensity of the luminaire.

**Color Rendering Index (CRI):**

The Color Rendering Index uses a scale from 0 to 100 to describe the effect of a light source on the color appearance of an object in comparison with the color appearance under a reference light source, where 100 indicates no color shift. A low CRI rating indicates that the colors of objects will appear less natural under that light source. A high rating indicates that the colors of objects will appear more natural under that light source. For most applications CLP requires a CRI ≥80 for all light sources. Some common examples of CRI:

<b>Light Source</b> (Examples Only – check the manufacturer’s lamp catalog for the source you select)	<b>CRI</b>
Compact Fluorescent	82
Daylight	100
High Pressure Sodium	
Standard	20-25
Color Improved	60-80
Incandescent / Halogen	96–100
LED, ultraviolet white phosphor	70–95
Linear Fluorescent	
T8 High Performance	>80
T8 Standard (i.e. 741)	>70 but <80
T5 and T5HO	>80
T12 Cool White	62
Low Pressure Sodium	negative <0
Metal Halide	
Standard Clear	65
Standard Coated	70
Ceramic	80–96
Mercury Vapor	22–50

### **Compact Fluorescent Lamps (CFLs):**

CFLs are small, low wattage fluorescent lamps that are often used as an alternative to incandescent lighting. They are also referred to as PL, DL, Quad-tube, Triple-tube or BIAx lamps. Lamp types include plug in socket (powered by a separate ballast), or with integral ballast for use with medium (screw) base or twist-and-lock (GU24) sockets.

### **Daylight Harvesting System:**

Daylight harvesting systems are electronic control systems (typically including a photocell) that automatically adjust the output level of electric lights (through switching or dimming) in response to the amount of daylight detected. This energy saving technology is used in areas with significant daylight contribution. Dimming ballasts are needed for fluorescent and HID dimming systems.

### **Decorative Lighting:**

Decorative Lighting is allowed to be installed in addition to the general lighting for the purpose of decorative appearance, such as chandelier-type luminaires or sconces. Decorative Lighting counts toward the lighting power density (LPD), but does not have to meet the CLP spacing criteria or luminous intensity criteria. In some space types, decorative lights count towards the overall LPD (such as industrial spaces), while in other areas (such as retail) a separate allowance is given for decorative lighting, but they must be switched independently from the general lighting.

### **DesignLights Consortium<sup>®</sup> (DLC) Qualified Products List (QPL):**

Qualified Product List that establishes criteria for certain fixture categories not currently covered by ENERGY STAR<sup>®</sup>. To qualify for this list manufacturers must submit testing data for evaluation. Qualified fixtures are eligible for NYSERDA incentive programs subject to the other Program criteria. Fixture types include; stairwell and passageway; parking garage; wall-wash; track or mono-point directional lighting.

### **Direct Luminaire:**

Direct luminaires distribute 90-100% of the emitted light in the direction of the surface to be illuminated. The term usually refers to light emitted in a downward direction.

### **Direct/Indirect Luminaire:**

Direct/Indirect luminaires combine direct and indirect lighting. The percentage of up-light and down-light will vary for each luminaire.

### **Efficacy:**

Efficacy is the measure of a luminaire's total light output for its input wattage, expressed in lumens per watt (lm/w).

### **Energy Cost:**

An electric lighting system's Energy Cost refers to both the total wattage used, measured in kilowatts (kW) and the hours of usage (measured in kilowatt-hours (kWh)). Reducing the total wattage and/or the hours of usage reduces the cost of operating the electric lighting system.

## **ENERGY STAR®:**

A voluntary government program that has set performance and energy-efficiency standards for certain fixture categories. Listed LED products are eligible for NYSERDA incentive programs subject to the other Program criteria. Some category examples are: Under Cabinet and Desk Task lights; Cove and Accent lighting; Downlights.

## **Fixture:**

See luminaire.

## **Fixture Efficiency:**

See luminaire efficiency.

## **Fluorescent Lamps:**

Fluorescent lamps produce light through fluorescence. In most fluorescent lamps, a mixture of gases contained in a glass bulb is stimulated by electric current, producing ultraviolet rays. These rays strike a fluorescent phosphor coating on the interior surface of the bulb, causing it to emit visible light. Fluorescent lamps are considered to be an “energy-efficient” source because very little energy is lost as heat as compared to incandescent lamps.

## **Footcandles (fc):**

The footcandle is the unit of measurement of illuminance (or light level) on a surface. One footcandle is equal to one lumen per square foot.

## **Glare:**

The sensation produced by bright sources or surfaces in the field of view that are sufficiently greater than to which the eye is adapted. It can cause annoyance, discomfort, or a loss in visual performance and visibility.

Direct Glare – results from high luminances or insufficiently shielded light sources in the field of view. It is usually associated with bright areas, such as luminaires, ceilings, and windows, which are outside the visual task or region being viewed. A direct glare source can also affect performance by distracting attention.

Disability Glare – is the effect of stray light in the eye where visibility and visual performance are reduced. A direct glare source that produces discomfort can also produce disability glare by introducing a measurable amount of stray light in the eye.

Discomfort Glare – produces a sensation of discomfort in the observer, and does not necessarily interfere with visual performance or visibility. It is the most difficult to identify as it is subjective for each person.

Veiling Glare – reflections in the visual target that reduces contrast and visibility. A veiling reflection could be the image of a bright element on a target such as a glass window or magazine page.

## **Halogen Lamps:**

Halogen lamps are incandescent lamps with tungsten filaments sealed into an envelope filled with an inert gas and a small amount of halogen such as iodine or bromine. The halogen cycle increases the lifetime of the lamp and prevents its darkening by re-depositing tungsten from the

inside of the bulb back onto the filament. The halogen lamp can operate its filament at a higher temperature than a standard gas filled lamp of similar power without loss of operating life. This gives it a higher efficacy (lumens/Watt). Some halogen lamps are able to use a smaller size envelope, and therefore can be used with optical systems that are more efficient (such as MR lamps).

### **High Efficiency Low Glare Luminaires (HEF-LG):**

High Efficiency Low Glare Luminaire is a relatively new term and has not been formally defined by the IES. These luminaires have also been referred to as “volumetric lighting,” or High Efficiency Advanced Recessed. For the purpose of CLP, HEF-LG luminaires are defined in the NYSERDA Existing Facilities Program and require greater than 80% fixture efficiency and a minimum of 15% of the zonal lumens be produced between 60 and 90 degrees.

### **High Intensity Discharge (HID):**

HID is a generic term used to describe a group of arc-light sources that includes mercury vapor, metal halide, and high pressure sodium and low pressure sodium.

### **High Pressure Sodium Lamps (HPS):**

High pressure sodium lamps are high intensity discharge lamps which use sodium in an excited state to produce light. HPS lamps require HPS ballasts. While this source is very efficacious, it is not typically used in indoor applications due to its poor color rendering ability. However, specialty HPS lamps with higher color rendering indexes are available.

### **Horizontal Mean Illuminance:**

Horizontal Mean Illuminance refers to the average light level (expressed in footcandles) on the horizontal work plane. CLP uses the IES recommended light levels for project evaluation. The recommended footcandle level depends on the task, and refers to the average, maintained ambient light level over the entire area.

### **IES File:**

The term “IES File” refers to a raw set of data derived from the photometric testing of a specific luminaire with a specific lamp and ballast. The numbers, presented in the IES-standardized format can then be entered into various software tools to simulate luminaire performance.

### **Illuminating Engineering Society (IES):**

The IES is the recognized technical authority on illumination and develops lighting recommendations and best practices for the industry and the general public. CLP follows the recommendations of the IES for appropriate light levels based on the type of space and the tasks performed within the space.

### **Illuminance:**

Illuminance refers to the amount of light falling on a surface. It is calculated as the number of lumens per unit area of surface. Usually expressed as lumens per square foot (lm/ft<sup>2</sup>) or footcandles. The 10th Edition of the IES Lighting Handbook recommends illuminance values for a wide variety of lighting applications, categorized according to the level of complexity of the visual task being performed. These recommendations are the basis of the target minimum light level criteria of the NYSERDA Commercial Lighting Business Partners Program.

**Illuminance Levels:**

Illuminance level refers to the average light levels (footcandles) measured in, or predicted for a space.

**Illuminance Uniformity:**

Illuminance uniformity is achieved by not exceeding recommended maximum to minimum light levels on the work plane throughout the work space. CLP uses luminaire spacing criteria to evaluate uniformity. Luminaires must be spaced within the fixture manufacturer's spacing criteria as listed on the luminaire's photometric report.

**Incandescent Lamps:**

Incandescent lamps (commonly called light bulbs) are a source of electric light, in which an electrical current is passed through a thin filament, heating it until it produces light. The enclosing glass bulb prevents the oxygen in the air from reaching the hot filament, which otherwise would be destroyed rapidly by oxidation. Incandescent lamps come in a wide variety of shapes, sizes, and wattages, and the group includes general and directional sources. While this source has a very high Color Rendering Index (CRI), it typically has the lowest efficacy (lm/W) compared to other sources. Halogen lamps are part of the incandescent family of lamps.

**Indirect Luminaire:**

An indirect luminaire distributes 90-100% of the emitted light upward. For indirect luminaires, the maximum to minimum ratio of light on the ceiling, as opposed to spacing criteria is the key to evaluating the uniformity. CLP uses ceiling ratio, based on luminaire suspension and spacing to evaluate uniformity. The formulas for calculation are part of the CLP Online Project Qualification Tool.

**Initial Lumens:**

See Lumen.

**Initial System Cost:**

The initial system cost refers to the total cost of purchasing a lighting system and may include the materials, labor, and other costs associated with purchasing the system. See Life Cycle Cost for more information.

**Lambertian:**

A surface quality where incident light is reflected equally in all directions; perfectly diffuse.

**LED Array or Module:**

An assembly of LED packages or dies on a printed circuit board – possibly with optics and additional thermal, mechanical, and electrical interfaces that connect to the load side of an LED driver.

**LED Package:**

This is an assembly of one or more LED semiconductor dies that include a wire bond and other electrical connections. It does not include power source (driver) and standardized base, and cannot be connected directly to the branch circuit.

**LED Driver:**

The power source and control circuitry designed to operate an LED lamp, package, or array. It is similar to the ballast in a fluorescent lighting system.

**LED Lamp:**

A complete integral unit that can replace lamps in existing sockets.

**LED Fixture (or Luminaire):**

Unlike many existing fixtures the LED units are part of the luminaire.

**LED Luminaries:**

LED Luminaries are allowed on CLP projects if listed by ENERGY STAR<sup>®</sup>, or The DesignLights Consortium<sup>®</sup>. Integral LED lamps do not qualify for lower wattage rating of the fixture. See last page for more information.

**Life Cycle Cost (LCC):**

LCC is a method of comparing the cost of a lighting system over a period of time, usually the number of years the system is expected to be in use. It includes the initial system cost, lamp replacement costs, and energy costs/savings. CLP provides a LCC tool on the website to help calculate the life cycle cost.

**Lighting Power Allowance (LPA):**

LPA refers to the watts per square foot allowed for a lighting system based on a standard, code, or energy-efficiency program. The required LPA for CLP is 10%, more stringent (less) than listed by the ASHRAE/IES 90.1 – 2007.

**Lighting Power Density (LPD):**

LPD is a measurement of the watts per square foot consumed by the lighting system. The total watts of the lighting system (including ballast watts) divided by the square footage of the space equals LPD. The LPD for CLP must be at least 10% less than listed by the ASHRAE/IES 90.1 – 2007.

**LM-79:** Electrical and Photometric Measurements of Solid-State Lighting Products.

IES procedures for testing luminaires and lamps. Light output, electrical power, luminous intensity distribution, and chromaticity.

**LM-80:** Measuring Lumen Maintenance of LED Light Sources.

IES approved testing method procedures for inorganic LED-based packages, arrays and modules.

**Lumen (lm):**

The Lumen is the unit of luminous flux. The lumen rating of a lamp is a measure of the total light output of the lamp in all directions. Lumen ratings are listed in the lamp manufacturer's specification guide. The lumen output of all electric light sources depreciates over time. For traditional light sources (e.g., fluorescent, halogen, and HID lamps) output is listed two ways: initial lumens refer to the light output of the lamp after 100 hours of operation under laboratory

conditions; mean lumens (sometimes referred to as design lumens) refer to the light output of the lamp at 40% of its rated life under laboratory conditions.

For LED light sources, initial output is typically reported, along with a prediction of the sources at L70 (or the length of time before output drops to 70% of initial).

### **Luminaire:**

A luminaire is a complete lighting unit consisting of a lamp or lamps and ballast (when applicable) together with the parts designed to distribute the light, to position and protect the lamps, and to connect the lamps to the power supply. Luminaires are often referred to as “fixtures.”

### **Luminaire Efficiency:**

Luminaire Efficiency refers to the ratio of the luminous flux emitted by the luminaire to the luminous flux of the lamp (or lamps) installed in the luminaire. Luminaire efficiency is an important criterion in gauging the energy efficiency of a luminaire compared to other luminaires of the same classification. For certain luminaire types, luminaire efficiency ratings (LER) have been established.

### **Luminaire Efficiency Rating (LER):**

LER is part of a voluntary national testing and information program for "widely used luminaires with the potential for significant energy savings." LER is a single figure that expresses luminaire efficacy that is derived by dividing the luminaire's light output by the input power.

The formula is:

$LER = \frac{[\text{luminaire efficiency (EFF)} \times \text{total rated lamp lumens (TLL)} \times \text{ballast factor (BF)}]}{[\text{luminaire input watts}]}$ . Note that the effects of all components of the luminaire system are included in the LER.

It is important to note that the LER is only published for certain luminaire categories and changes based on the lamp type and the ballast factor. Only luminaires within a product category should be compared. As an example, by the nature of their different applications, a lensed fixture and a strip fixture would fall into different LER ranges.

### **Luminaire Suspension:**

For CLP, luminaire suspension refers to the distance from the ceiling to the bottom of the luminaire, measured in inches. Luminaire suspension is part of the formula used to determine light levels and compliance with the recommended spacing criteria as it affects the distance to the workplane.

### **Luminance:**

Luminance is the photometric quantity most closely associated with one's perception of brightness. It is the luminous intensity divided by the projected area of the source, expressed as candelas per meter square (cd/m<sup>2</sup>).

**Luminous Flux:**

Luminous Flux is the total light output (or lumen output) of a light source expressed in lumens. Whereas a lamp will have many candela (intensity) values, depending upon one's direction of view, it will have only one lumen output rating. The lumen rating is the measure of the total light output of a lamp. Ratings are determined and published by the lamp manufacturer.

**Luminous Intensity:**

Luminous intensity refers to the intensity of a light source in a specific direction, expressed in candelas (cd). Any given light source will have many different intensities depending upon one's direction of view. Intensity is a property of the light source itself regardless of distance from the source.

To help avoid excessive glare, CLP has criteria for maximum luminous intensity—based on the candlepower summary chart on a luminaire's photometric report—and varying depending on the application.

**Mean Lumens:**

See Lumens.

**Mercury Vapor Lamps:**

Mercury vapor lamps are high intensity discharge (HID) lamps which use mercury in an excited state to produce light. The arc discharge is generally confined to a small fused quartz arc tube mounted within a larger borosilicate glass bulb. The outer bulb may be clear or coated with a phosphor; in either case, the outer bulb provides thermal insulation, protection from ultraviolet radiation, and a convenient mounting for the fused quartz arc tube. Mercury vapor is considered an inefficient light source when compared to other available HID sources such as metal halide, and is being phased out under federal legislation.

**Metal Halide Lamps:**

The Metal Halide lamp, a member of the high intensity discharge (HID) family of lamps, is available in numerous sizes and configurations. Like most HID lamps, metal halide lamps operate under high pressure and temperature, and require the appropriate ballast. While older versions of metal halide lamps had poor color rendering, many of these lamps, especially those with ceramic arc tubes, now offer improved color rendering suitable for retail applications. Standard metal halide lamps (known as probe start) are being phased out under federal legislation to be replaced with more-efficient pulse-start lamps. All MH Fixtures must be pulse-start to qualify for CLP Incentives.

**Mounting Height:**

For determining CLP qualification, the mounting height refers to the distance from the floor to the bottom of the luminaire. For NYSERDA end-user incentives, some luminaire types have minimum mounting height requirements for eligibility.

**MR-16 Lamps:**

MR-16 low-voltage halogen reflector lamps are two inches in diameter. Typically the lamp and reflector is one complete unit. These lamps are able to direct light in a sharp, precise beam of

light, and are often used for accent lighting. MR-16 lamps typically use halogen sources, although other sources may be used such as LED.

### **Occupancy Sensors:**

Occupancy sensors are devices that sense people within a space. Luminaires are automatically turned on when someone enters the space and automatically dimmed or turned off when movement is not present, indicating that the space is not occupied. Four main types of sensor technologies exist: passive infrared, ultrasonic, dual technology, and microphonic. These energy saving devices may be wall mounted, ceiling mounted, corner mounted, or built into the luminaire. Occupancy sensors are required in some spaces in new construction or major renovation to meet Code. CLP requires sensors in multiple space types.

### **Online Project Qualification Tool:**

CLP provides an online application tool for the purpose of determining project qualification. CLP allows for alternative documentation for project submittal so long as light levels, glare control, uniformity, and energy efficiency (W/sf) can be derived from the alternative documentation.

### **Open Office Space:**

An open office is defined as any office area greater than 300 square feet where general office tasks are performed. CLP distinguishes between open office spaces and private offices.

### **Parabolic Aluminized Reflector Lamp (PAR):**

PAR Lamps are lamps used to redirect light from the source, using a parabolic reflector. Halogen PAR lamps are available with very precise beam control, from very narrow spots to very wide floods. An energy-efficient alternative is the Halogen Infrared (IR) lamp which uses a burner with a special coating to optimize lumen output so you can use a lower wattage lamp to achieve energy savings.

### **Parabolic Luminaires:**

A Parabolic Luminaire is a type of luminaire which has a louver composed of aluminum baffles that are curved in a parabolic shape. In the proper application, the distribution can provide reduced glare based on luminous intensity and better light control (distribution). The parabolic louvers can be different sizes and different depths to accommodate different applications.

### **Pendant Mount:**

Pendant Mount refers to luminaires that are suspended from the ceiling (by chain, cable or rods). This can refer to direct, indirect, or indirect/direct luminaires.

### **Photocells (aka Photo Sensors):**

A photocell is a type of resistor that decreases in resistance when it is exposed to light. In interior lighting applications, photocells are used to dim or turn-off electric light sources in the space when sufficient light levels are produced by daylight or electric sources. Because these devices can reduce the electrical load, they are considered energy-saving devices. Note that appropriate ballasts and other controls may be needed in addition to the photocell to allow for dimming.

**Photometric Report:**

Photometric Report refers to a set of data describing the light distribution, efficiency, and zonal lumen output of a specific luminaire based on laboratory testing. The actual data is contained in a set of raw numbers known as the IES file. The photometric report for each luminaire used for general lighting on CLP projects must be submitted with the application and work sheet.

**Plenum (Ceiling Plenum):**

Ceiling plenum is an architectural term that refers to the space between the “finished” ceiling (such as ceiling tiles) and the structural components (such as decking). When selecting luminaires, the height of the plenum can limit the luminaire selection. In some buildings, the heating, ventilating, and air-conditioning (HVAC) system lies within the ceiling plenum, requiring careful coordination with lighting.

**Prismatic Lens:**

A Prismatic Lens is a type of diffuser that incorporates a series of small prisms. The lens scatters the light passing through it. The efficiency depends on the specific lens, but typically the lens reduces the percentage of lamp lumens reaching the surface to be lighted.

**Private Office Space:**

A private office is any space less than 300 square feet where general office tasks are performed. CLP distinguishes between private offices and open office spaces.

**Pulse Start Metal Halide:**

Pulse Start Metal Halide (PSMH) is a type of HID source that requires a different ballast than probe start (standard) MH. The combined ballast/lamp system provides superior performance. Specifically, they typically provide better energy-efficiency, better color uniformity, faster warm-up and re-strike, and longer life. It is important to compare the specific lamp ballast combination as performance varies by manufacturer. Recent federal legislation sets standards for MH system energy-efficiency that can be met by pulse start MH systems.

**Recessed:**

Recessed refers to luminaires that are mounted up in the plenum (the space above the ceiling).

**Reflected Ceiling Plan (RCP):**

The Reflected Ceiling Plan is an architectural drawing that shows a view of the room as if looking from above, through the ceiling, at a mirror installed at some distance below the ceiling level, which shows the reflected image of the ceiling above. The RCP is often used by designers and architects to demonstrate lighting, by showing the layout of the luminaires recessed into, mounted on, and hanging from the ceiling.

**RP-1:**

The American National Standard for Office Lighting ANSI/IES (Recommended Practice) RP-1-12 sets standards for office lighting to limit distracting reflections in the visual display terminal (VDT), and to limit the potential for eye adaptation problems. CLP has glare criteria for luminaires based on the general guidelines in RP-1. This criteria can also be met by using High Efficiency Low Glare Luminaires.

### **Spacing Criteria (SC):**

Spacing Criteria refers to the maximum recommended distance according to the luminaire manufacturer's testing report that interior luminaires should be spaced from each other in order to ensure uniform illumination on the workplane. The luminaire height above the workplane, multiplied by the spacing criteria listed on the photometric report is equal to the recommended maximum center-to-center luminaire spacing. The CLP criteria require luminaires to be spaced within the recommended spacing criteria.

### **Spacing to Mounting Height (S/MH) Ratio:**

S/MH is the ratio of actual distance between luminaire centers to the mounting height above the workplane of the installed luminaires. The actual distance must be entered on the CLP project application work sheet to verify that the actual spacing does not exceed the spacing criteria.

### **Specular:**

A surface quality where incident light is directed in a particular angle. Specular finish on luminaire louvers or reflectors resembles a mirrored or polished surface. This can often create excessive glare. Specular finishes can be used as treatments on walls and floors as well.

### **Surface Mount:**

Surface Mount refers to luminaires that are mounted directly to the ceiling or wall surface, as opposed to recessed luminaires or pendant mount luminaries.

### **T5 Lamps:**

T5 refers to linear fluorescent lamps with a diameter of 5/8". This typically refers to high-efficiency lamps requiring T5 electronic ballasts. T5 lamps are slightly shorter than T8 lamps. T5 lamps are available in both standard and high-output (HO) versions. 5/8" is also the diameter for many of the twin-tube compact fluorescent lamps, typically referred to as TT5, not T5.

### **T8 Lamps:**

T8 refers to linear fluorescent lamps with a diameter of 8/8" (1 inch). The first generation of T8 systems, commonly run on electronic ballasts were more efficient than the older T12 (12/8") systems. These lamps use a tri-phosphorous coating, which improved the color rendering when compared to standard T12 cool white lamps. The next generation of T8 systems is known as High Performance T8 (HPT8).

**High Performance T8 (HPT8)** - High Performance T8 systems refer to four-foot T8 fluorescent 32 watt lamps and their corresponding ballasts that meet Consortium for Energy Efficiency (CEE) ([www.cee1.org/content/cee-program-resources](http://www.cee1.org/content/cee-program-resources)) minimum energy efficiency specifications and performance characteristics, and are on one of the CEE Commercial Lighting Qualifying Products List. When using CEE-qualified T8 lamps and ballasts, HPT8 systems feature improved color rendering, lamps with a higher initial lumen output (minimum of 3100 initial lumens), higher maintained lumen output, longer life, and are generally 6-8% more energy-efficient than standard T8 systems.

**Reduced Wattage T8** – Reduced wattage T8 systems refer to four-foot T8 fluorescent 25 and 28 watt lamps and their corresponding ballasts that meet CEE minimum energy efficiency

specifications and performance characteristics, and are on one of the CEE Commercial Lighting Qualifying Products List.

**Task Lighting:**

Task lighting is the lighting, or amount of light, that falls on a given task. For the purpose of CLP, Task Lighting refers to lighting that is in addition to the general lighting system, such as portable lighting (desk, floor, and table lamps), as well as lighting that is part of modular systems. Also see Accent Lighting and Decorative Lighting, which is not the same as Task Lighting. Task Lighting is supplemental to the general ambient lighting. If a fixture is the only lighting for the space, it is not considered Task Lighting. Task lighting is not counted as part of the Lighting Power Density to meet CLP energy use criteria.

**TM-21:** Projecting Long Term Lumen Maintenance of LED Light Sources.

IES method for projecting an LED luminaire or integral replacement lamp's long term lumen maintenance (useful life), based on initial performance data collected per IES-LM-80 testing standards.

**Troffer:**

A Troffer is a recessed fluorescent luminaire that is typically square or rectangular in shape, and is installed with the opening flush with the ceiling.

**Vacancy Sensor:**

Vacancy sensors are devices that recognize the absence of people within a space. They require manual activation, automatically shut off electric lighting when a room is vacant, and are typically wall mounted in place of a switch. Vacancy sensors are useful when an auto-on occupancy sensor would be inconvenient.

**Visual Task:**

The visual task designates those details and objects that must be seen for the performance of given activity, and includes the immediate background of the details or objects. According to the Illuminating Engineering Society (IES), because it is uncommon for spaces to contain a single visual task, the determination of the optimum light level must begin by evaluating each visual task in terms of variables including size, contrast, and time. For CLP project qualification, light levels assigned to spaces are based on the most common tasks usually associated with the space type. Variances are allowed for specific space uses. As an example, the light levels required in a computer chip manufacturing facility, would be different than those required in a manufacturing space for large industrial components.

**Wall Wash:**

Wall Wash is a term used to describe luminaires designed to illuminate vertical surfaces. In CLP projects, wall washers must be mounted within three feet of the wall they are illuminating.

### **Watts per Square Foot (W/ft<sup>2</sup>):**

Watts per square foot (W/ft<sup>2</sup>) is the unit or measure for lighting power allowance (LPA) and lighting power density (LPD).

The formula to determine total watts allowed is:

$$LPA \times Total\ Square\ Footage\ of\ the\ space$$

The formula to determine LPD is:

$$\frac{Total\ System\ Watts\ within\ the\ space\ (including\ lamps\ and\ ballasts)}{Total\ Square\ Footage\ of\ the\ space}$$

### **Workplane:**

The Workplane refers to the level at which tasks are performed and for which the appropriate illuminance (light level) is specified. In a hallway the workplane would be at the floor, while in an office the workplane would be the horizontal plane 30 inches above the finished floor (desk height).

### **Zonal Lumens:**

As part of photometric testing of indoor luminaires, the quantity of light distribution at various vertical angles is measured. A “zonal constant,” a factor that, when multiplied by the average candlepower emitted by a light source in a specified angular zone, reveals the lumens in the zone, known as the zonal lumens. Various luminaire categories (such as strip light, downlights, parabolic, and lensed recessed luminaire) will typically have very different percentages of zonal lumens at different angles. Understanding “where” the lumens go helps lighting practitioners select the appropriate luminaire for the application.

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