

The Lighting Guide

A

Accent Lighting - Directional lighting to emphasize a particular object or draw attention to a display item.

Adaptation - The process by which the human eye adjusts to a change in light level.

Ambient Lighting - The general lighting present in an area --excluding task lighting and accent lighting but including general lighting and daylight streaming in.

Amperes - ("Amps.") A measure of electrical current. In incandescent lamps, the current is related to voltage and power as follows: Watts (power) = Volts x Amps (current).

American National Standards Institute (ANSI) A consensus-based organization which coordinates voluntary standards for the physical, electrical and performance characteristics of lamps, ballasts, luminaires and other lighting and electrical equipment.

Application - Also called "lighting application," it refers to the particular use the lamp is being put to. (e.g. high-bay industrial application or retail lighting application.) The term can also refer in a general way to "application engineering" which deals with specific parameters and usage of light sources. (e.g. how to do a lighting layout, where to place fixtures and so on.)

Arc - A general term for a high intensity electrical discharge occurring between two electrodes in a gaseous medium, usually accompanied by the generation of heat and the emission of light.

Arc Lamp - A light source containing an arc (see above). Also called a discharge lamp, or an arc discharge lamp.

Arc Length - In High Intensity Discharge lamps this is the distance between the electrode tips, which represents the physical length of the electrical discharge.

Atmosphere - This field designates the type of gas or vacuum filling a volume or chamber of the lamp. This chamber might contain a filament or it might refer to the bulb which contains the arc tube.

B

Baffle - A single opaque or translucent element to shield a source from direct view at certain angles, or to absorb unwanted light.

Ballast - A device used with an electronic discharge lamp to obtain the necessary circuit conditions for starting and operating all fluorescent and HID light sources.

Ballast Factor (BF) - This is the percentage of a lamp's rated lumen output that can be expected when operated on a specific, commercially available ballast. 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.

Base - the end of the lamp that fits into the socket. There are many types of bases used in lamps, screw bases being the most common for incandescent and HID lamps, while bi-pin bases are common for linear fluorescent lamps.

Bayonet - A style of bulb base which uses keyways instead of threads to connect the bulb to the fixture base. The bulb is locked in place by pushing it down and turning it clockwise.

Beam Angle - The angular dimension of the cone of light from lamps (such as R and PAR types) encompassing the central part of the beam out to the angle where the intensity is 50% of maximum. The beam angle sometimes called "beam spread" is often part of the ordering code for the lamps. Example: The 50PAR30/HIR/NFL25 is a 50 watt PAR30 narrow flood lamp with a beam angle of 25 degrees.

Beam Lumens - The total lumens present within the portion of the beam contained in the beam angle.

Beam Spread - For reflector type lamps. The total angle of the directed beam (in degrees horizontal or vertical) to where the intensity of the beam falls to 50% or 10% of the maximum candlepower value as indicated.

Bi-Pin - Any base with two metal pins for electrical contact. This is the typical base for a fluorescent tube of 1 to 4 feet in length. It consists of 2 prong contacts which connect into the fixture. Medium bi-pins are used with type T-8 and T-12 tubular fluorescent lamps, and miniature bi-pins are used for tubular T-5 fluorescent lamps.

Black Light - A popular term referring to a light source emitting mostly near UV (320 to 400 nm) and very little visible light.

Bollard - A short, thick post with a light at its top, used for grounds and outdoor walkway lighting.

Bulb - A loose way of referring to a lamp. "Bulb" refers to the outer glass bulb containing the light source.

Bulb Size - Bulb shape followed by its size (the maximum diameter of the bulb expressed in eighths of an inch). The code also includes a reference such as T8 or T5 to represent the size of the tube.

Brightness - Brightness can refer to any of several technical terms used in lighting and is, therefore, ambiguous.

C

Candela (cd) - The measure of luminous intensity of a source in a given direction. The term has been retained from the early days of lighting when a standard candle of a fixed size and composition was defined as producing one candela in every direction. A plot of intensity versus direction is called a candela distribution curve and is often provided for lamps and for luminaires with a lamp operating in them.

Candlepower - current practice is to refer to this simply as candelas. An obsolete term for luminous intensity

Candlepower (Mean Spherical) - Initial mean spherical candlepower at the design voltage. Mean spherical candlepower is the generally accepted method of rating the total light output of miniature lamps. To convert this rating to lumens, multiply it by 12.57 (4 pi)

Case Quantity - Number of product units packed in a master case. Also known as Standard Package Quantity.

Cathode Resistance - Resistance of the cathode in a Fluorescent lamp. It is measured "cold" before the lamp is turned on (R_c) or "hot" after the lamp is turned on (R_h). The ratio of the hot resistance to the cold resistance is also measured (R_h/R_c).

Center Beam Candlepower (CBCP) - Refers to the luminous intensity at the center of the beam of a blown or pressed reflector lamp (such as a PAR lamp). Measured in candelas.

Chromaticity - Measure to identify the color of a light source, typically expressed as (x,y) coordinates on a chromaticity chart.

Chromaticity Coordinates - A system for measuring the color of the light emitted from a light source--either a primary source like a lamp or a secondary source like an illuminated object. Usually two numbers, x and y coordinates ranging from 0 to 1 specify the chromaticity.

Coefficient of Utilization (CU) - In general lighting calculations, the fraction of initial lamp lumens that reach the work plane. CU is a function of luminaire efficiency, room surface reflectances and room shape.

Color Rendering Index (CRI) - An international system used to rate a lamp's ability to render object colors. The higher the CRI (based upon a 0-100 scale) the richer colors generally appear. CRI ratings of various lamps may be compared, but a numerical comparison is only valid if the lamps are close in color temperature. CRI differences among lamps are not usually significant (visible to the eye) unless the difference is more than 3-5 points.

Color Rendering Indicator - Draws attention to the fact that this is a lamp with high color rendering, which helps objects and persons illuminated to appear more true to life.

Compact Fluorescent Lamp (CFL) - The general term applied to fluorescent lamps that are single-ended and that have smaller diameter tubes that are bent to form a compact shape. Some CFLs have integral ballasts and medium or candelabra screw bases for easy replacement of incandescent lamps.

Color Temperature (Correlated Color Temperature - CCT) - "white and bluish-white ("cool") sources, such as cool white (4100K) and natural daylight (6000K), have higher color temperatures. The higher the color temperature the whiter, or bluer, the light will be. "A number indicating the degree of "yellowness" or "blueness" of a white light source. Measured in kelvins, CCT represents the temperature an incandescent object (like a filament) must reach to mimic the color of the lamp. Yellowish-white ("warm") sources, like incandescent lamps, have lower color temperatures in the 2700K-3000K range

Cool White - A term loosely used to denote a color temperature of around 4100 K. The Cool White (CW) designation is used specifically for T12 and other fluorescent lamps using halophosphors and having a CRI of 62.

Cost of Light - Usually refers to the cost of operating and maintaining a lighting system on an ongoing basis. The 88-8-4 rule states that (typically) 88% is the cost of electricity, 8% is labor and only 4% is the cost of lamps.

Crest Factor (Max Current) - The ratio of the peak lamp current to average lamp operating current (RMS). The lower the current crest factor is, the gentler the ballast is on the lamp.

Current - A measure of the flow of electricity expressed in amperes.

Current Type (AC/DC) - Whether the operational voltage is based on Alternating Current or Direct Current.

D

Daylight Harvesting - Lighting design for building interiors that makes of daylight as a way of reducing energy consumption.

Daylight Lamp - A lamp resembling the color of daylight, typically with a color temperature of 5500 K to 6500K

Diffused Lighting - light that is not predominantly incident from any particular direction.

Diffuser - A device to redirect or scatter the light from a source by the process of diffuse transmission.

Dimmable - Whether or not the lamp lumens can be varied while maintaining reliability.

Dimmer, Dimming Control - A device used to lower the light output of a source, usually by reducing the wattage it is being operated at. Dimming controls are increasing in popularity as energy conserving devices.

Direct Lighting - If luminaires distribute 90-100% of the emitted light in the general direction of the surface to be illuminated.

Driver (LED) - Power source and control circuitry designed to operate an LED package, module, or lamp.

E

Efficacy - A measurement of how effective the light source is in converting electrical energy to LUMENS of visible light. Expressed in LUMENS-PER-WATT (LPW) this measure gives more weight to the yellow region of the spectrum and less weight to the blue and red region where the eye is not as sensitive.

Efficiency - The efficiency of a light source is simply the fraction of electrical energy converted to light, i.e. watts of visible light produced for each watt of electrical power with no concern about the wavelength where the energy is being radiated. For example, a 100 watt incandescent lamp converts 7% of the electrical energy into light. The efficiency of a luminaire or fixture is the percentage of the lamp lumens that actually comes out of the fixture.

Electrical Discharge - A condition under which a gas becomes electrically conducting and becomes capable of transmitting current, usually accompanied by the emission of visible and other radiation. An electric spark in air is an example of an electrical discharge, as is a welder's arc and a lightning bolt.

Electrodeless Lamps - Light sources where the discharge occurs in a chamber with no electrodes (no metal.) The energy for the discharge is supplied by radio frequency excitation, e.g. microwaves.

Electromagnetic Ballast - A ballast used with discharge lamps that consists primarily of transformer-like copper windings on a steel or iron core.

Electromagnetic Interference (EMI) - High frequency electronic ballasts and other electronic devices can produce a small amount of radio waves which can interfere with radio and TV. Federal mandated requirements must be met for EMI levels before an electronic device is considered FCC compliant. (FCC is the Federal Communications Commission.)

Electromagnetic Spectrum - A continuum of electric and magnetic radiation that can be characterized by wavelength or frequency. Visible light encompasses a small part of the electromagnetic spectrum in the region from about 380 nanometers (violet) to 770 nanometers (red) by wavelength.

Electronic Ballast - A short name for a fluorescent high frequency electronic ballast. Electronic ballasts use solid state electronic components and typically operate fluorescent lamps at frequencies in the range of 25-35 kHz. The benefits are: increased lamp efficacy, reduced ballast losses and lighter, smaller ballasts compared to electromagnetic ballasts. Electronic ballasts may also be used with HID (high intensity discharge) lamps.

Energy Policy Act (EPACT) - Comprehensive energy legislation passed by the U. S. Congress in 1992. The lighting portion includes lamp labeling and minimum energy efficacy (lumens/watt) requirements for many commonly used incandescent and fluorescent lamp types. Federal Canadian legislation sets similar minimum energy efficacy requirements for incandescent reflector lamps and common linear fluorescent lamps.

Energy Policy Act (EPACT) Indicator - Means this lamp is Federally regulated for Energy Efficiency.

ESCO - Energy Savings Service Company

Eye Sensitivity - A curve depicting the sensitivity of the human eye as a function of wavelength (or color). The peak of human eye sensitivity is in the yellow-green region of the spectrum. The normal curve refers to photopic vision or the response of the cones.

F

Field Angle - The angular dimension of the cone of light from reflectorized lamps (such as R and PAR types) encompassing the central part of the beam out to the angle where the intensity is 10% of maximum.

Fixture - Also known as a luminaire. A light fixture is the complete unit including lamp, reflector, ballast, sockets, wiring, diffuser, and housing.

Flicker - The periodic variation in light level caused by AC operation that can lead to strobe effects.

Flood - Used to refer to the beam pattern of a reflector lamp, which disperses the light over a wide beam angle, typically 20 degrees or more. ("Flood" as opposed to "spot")

Floodlight - A luminaire used to light a scene or object to a level much brighter than its surroundings. Usually floodlights can be aimed at the object or area of interest.

Fluorescence - A physical phenomenon whereby an atom of a material absorbs a photon of light and immediately emits a photon of longer wavelength. If there is a significant delay the phenomenon is called phosphorescence rather than fluorescence. It is interesting that "phosphors" used in lamps exhibit "fluorescence," not "phosphorescence."

Fluorescent Lamp - A high efficiency lamp utilizing an electric discharge through low pressure mercury vapor to produce ultraviolet (UV) energy. The UV excites phosphor materials applied as a thin layer on the inside of a glass tube which makes up the structure of the lamp. The phosphors transform the UV to visible light.

Footcandle (fc) - A unit of illuminance or light falling onto a surface. It stands for the light level on a surface one foot from a standard candle. One footcandle is equal to one lumen per square foot. See also Lux.

Footcandle Meter - A device that measures the illuminance at a location calibrated either in footcandles or in lux. (Also known as a light meter or illuminance meter)

Frequency - The stated operating frequency in Hz of a discharge lamp.

Fovea, Foveal Vision - A small region of the retina corresponding to what an observer is looking straight at. This region is populated almost entirely with cones, while the peripheral region has increasing numbers of rods. Cones have a sensitivity peaking in the yellow and corresponding to the eye response curve.

Full Spectrum Lighting - A marketing term, typically associated with light sources that are similar to some forms of natural daylight (5000K and above, 90+ CRI), but sometimes more broadly used for lamps that have a smooth and continuous color spectrum.

G

General Lighting - designed to provide a substantially uniform illuminance throughout an area.

Glare - Visual discomfort caused by excessive brightness is called discomfort glare. If task performance is affected it is called disability glare. Glare can be direct glare or indirect (reflected) glare.

H

Halogen Lamp - A halogen lamp is an incandescent lamp with a filament that is surrounded by halogen gases, such as iodine or bromine. Halogen gases allow the filaments to be operated at higher temperatures and higher efficacies. The halogen participates in a tungsten transport cycle, returning tungsten to the filament and prolonging lamp life.

High-Bay Lighting - Lighting designed for (typically) industrial locations with a ceiling height of 25 feet and above.

High Intensity Discharge (HID) - A general term for mercury, metal halide and high-pressure sodium lamps. HID lamps contain compact arc tubes which

enclose various gases and metal salts operating at relatively high pressures and temperatures.

High-Pressure Sodium (HPS) Lamp - HPS lamps are high intensity discharge light sources that produce light by an electrical discharge through sodium vapor operating at relatively high pressures and temperatures.

Ignitor - An electronic device providing a high voltage pulse to initiate an electrical discharge. Typically, the ignitor is paired with or is a part of the ballast.

Illuminance - the light level on a surface. Illuminance is measured in footcandles or lux. The density of light (lumens/area) incident on a surface.

Illuminance Meter - A device that measures the illuminance at a location calibrated either in footcandles or in lux. (Also known as a light meter)

Incandescent Lamp - A light source that generates light utilizing a thin filament wire (usually of tungsten) heated to white heat by an electric current passing through it.

Indirect Lighting - The method of lighting a space by directing the light from luminaires upwards towards the ceiling. The light scattered off the ceiling produces a soft, diffuse illumination for the entire area.

Induction Lighting - Gases can be excited directly by radio-frequency or microwaves from a coil that creates induced electromagnetic fields. This is called induction lighting and it differs from a conventional discharge, which uses electrodes to carry current into the arc. Induction lamps have no electrodes inside the chamber and generally, therefore, have longer life than standard lamps.

Infrared Radiation - Electromagnetic energy radiated in the wavelength range of about 770 to 1,000,000 nanometers. Energy in this range cannot be seen by the human eye, but can be sensed as heat by the skin.

Instant Start - A type of ballast designed to start fluorescent lamps as soon as the power is applied. Most T8 fluorescent lamps are being operated on electronic instant-start ballasts. Slimline fluorescent lamps operate only on instant start circuits.

Inverse Square Law - Formula stating that if you double the distance from the light source, the light level goes down by a factor of 4, if you triple the distance, it goes down by a factor of 9, and so on.

Isocandela Plot - A plot with lines connecting points of equal luminous intensity around a source.

Isolux Plot (or Isofootcandle Plot) - A line plotted to show points of equal illuminance (lux or footcandles) on a surface illuminated by a source or sources.

K

Kelvin - A unit of temperature starting from absolute zero, parallel to the Celsius (or Centigrade) scale. 0C is 273K.

Kilowatt (kW) - The measure of electrical power equal to 1000 watts.

Kilowatt Hour (kWh) - The standard measure of electrical energy and the typical billing unit used by electrical utilities for electricity use. A 100-watt lamp operated for 10 hours consumes 1000 watt-hours (100 x 10) or one kilowatt-hour. If the

utility charges € 0.10/kWh, then the electricity cost for the 10 hours of operation would be 10 cents (1 x € 0.10)

L

Lamp - The term used to refer to the complete light source package, including the inner parts as well as the outer bulb or tube. "Lamp", of course, is also commonly used to refer to a type of small light fixture such as a table lamp.

Lamp Types - Filament lamps: Incandescent, Halogen, Halogen-IR. Discharge Lamps: Fluorescent, HID (High Intensity Discharge) HID Lamps: Mercury, HPS (High Pressure Sodium), MH (Metal Halide) and CMH (Ceramic Metal Halide)

Lens - A transparent or semi-transparent element which controls the distribution of light by redirecting individual rays. Luminaires often have lenses in addition to reflectors.

Light - Radiant energy that can be sensed or seen by the human eye. Visible light is measured in lumens.

Light Emitting Diode (LED) - A solid that directly converts electrical impulses into light. Some LED's today incorporate fluorescent materials to change the color characteristics of the emitted light.

Light Loss Factor - The product of all factors that contribute to lowering the illumination level including reflector degradation, dirt, lamp depreciation over time, voltage fluctuations, etc.

Light Meter - A device that measures the illuminance at a location calibrated either in footcandles or in lux. (Also known as a foot-candle meter)

Light Pollution - Light that is directed to areas where it is not needed, and thereby interferes with some visual act. Light pollution directed or reflected into the sky creates a "dome" of wasted light and makes it difficult to see stars above cities.

Light Trespass (Spill Light) - Light that is not aimed properly or shielded effectively can spill out into areas that don't want it: it can be directed towards drivers, pedestrians or neighbors. It is distracting and annoying and can sometimes be disabling.

Louver - A series of baffles used to shield a source from the view at certain angles or to absorb unwanted light. The baffles are usually arranged in a geometric pattern.

Lumens - A measure of the luminous flux or quantity of light emitted by a source. For example, a dinner candle provides about 12 lumens. A 60-watt Soft White incandescent lamp provides about 840 lumens.

Lumen Maintenance - A measure of how well a lamp maintains its light output over time. It may be expressed numerically or as a graph of light output vs. time.

Luminaire Efficiency - The ratio of total lumens emitted by a luminaire to those emitted by the lamp or lamps used in that luminaire.

Luminaire - A complete lighting unit consisting of a lamp (or lamps), ballast (or ballasts) as required together with the parts designed to distribute the light, position and protect the lamps and connect them to the power supply. A luminaire is often referred to as a fixture.

Luminance - A measure of "surface brightness" when an observer is looking in the direction of the surface. It is measured in candelas per square meter (or per square foot) and was formerly referred to as "photometric brightness."

Lux (lx) - A unit of illuminance or light falling onto a surface. One lux is equal to one lumen per square meter. Ten lux approximately equals one footcandle.

M

Mean Lumens - The average light output of a lamp over its rated life. Based on the shape of the lumen depreciation curve, for fluorescent and metal halide lamps, mean lumens are measured at 40% of rated lamp life. For mercury, high-pressure sodium and incandescent lamps, mean lumen ratings refer to lumens at 50% of rated lamp life.

Medium Base - Usually refers to the screw base typically used in household incandescent lamps. There is also the medium bi-pin base commonly used in T12 and T8 fluorescent lamps.

Mercury Lamp - A high-intensity discharge light source operating at a relatively high pressure (about 1 atmosphere) and temperature in which most of the light is produced by radiation from excited mercury vapor. Phosphor coatings on some lamp types add additional light and improve color rendering.

Metal Halide Lamp - A high intensity discharge light source in which the light is produced by the radiation from mercury, plus halides of metals such as sodium, scandium, indium and dysprosium. Some lamp types may also utilize phosphor coatings.

Mesopic - Typically referring to nighttime outdoor lighting conditions, the region between PHOTOPIC and SCOTOPIC vision.

Mogul Base - A screw base used on larger lamps, e.g. many HID lamps.

Monochromatic Light - Light with only one wavelength.

Mounting Height - Distance from the bottom of the fixture to either the floor or work plane, depending on usage.

MR-16 and MR-11 - A line of low voltage compact reflector lamps used for accent and spot lighting. The 16 and 11 refer to 16 eighths of an inch diameter and 11 eighths.

N

Nanometer - A unit of wavelength equal to one billionth of a meter.

O

Open Circuit Voltage (OCV) - Open Circuit Voltage measured across the socket the lamp screws into, with the ballast powered on. It is dangerous to stick a voltmeter into such a socket without precise knowledge of the ballast because exceedingly high voltages could be present.

Operating Voltage - For electrical discharge lamps, this is the voltage measured across the discharge when the lamp is operating. It is governed by the contents of the chamber and is somewhat independent of the ballast and other external factors.

P

Package (LED) - An assembly of one or more LED modules

PAR Lamp - PAR is an acronym for parabolic aluminized reflector. A PAR lamp, which may utilize either an incandescent filament, a halogen filament tube or a HID arc tube, is a precision pressed-glass reflector lamp. PAR lamps rely on both the internal reflector and prisms in the lens for control of the light beam.

Phosphor - An inorganic chemical compound processed into a powder and deposited on the inner glass surface of fluorescent tubes and some mercury and metal-halide lamp bulbs. Phosphors are designed to absorb short wavelength ultraviolet radiation and to transform and emit it as visible light.

Photometry - The measurement of light and related quantities.

Power - The rate at which energy is taken from an electrical system or dissipated by a load, expressed in watts.

Power Factor (PF) - A measure of the phase difference between voltage and current drawn by an electrical device, such as a ballast or motor. Power factors can range from 0 to 1.0, with 1.0 being ideal. Power factor is sometimes expressed as a percent. Incandescent lamps have power factors close to 1.0 because they are simple "resistive" loads. The power factor of a fluorescent and HID lamp system is determined by the ballast used. "High" power factor usually means a rating of 0.9 or greater. Power companies may penalize users for using low power factor devices.

Q

Quartz - A name for fused silica or melted sand from which many high-temperature containers are fashioned in the lighting industry. Quartz looks like glass but can withstand the high temperatures needed to contain high intensity arc discharges.

R

Radiation - A general term for the release of energy in a "wave" or "ray" form. All light is radiant energy or radiation, as is heat, UV, microwaves, radio waves, etc.

Rapid Start Circuit - A fluorescent lamp-ballast circuit that utilizes continuous cathode heating, while the system is energized, to start and maintain lamp light output at efficient levels. Rapid start ballasts may be either electromagnetic, electronic or of hybrid designs. Full-range fluorescent lamp dimming is only possible with rapid start systems.

Rated Lamp Life - For most lamp types, rated lamp life is the length of time of a statistically large sample between first use and the point when 50% of the lamps have died. It is possible to define "useful life" of a lamp based on practical considerations involving lumen depreciation and color shift.

Reflectance - The ratio of light reflected from a surface to that incident upon it.

Reflector - A device used to redirect the light by the process of reflection.

Reflector Lamp - at other times, it includes all reflectorized lamps like PAR and MR. A light source with a built-in reflecting surface. Sometimes, the term is used to refer specifically to blown bulbs like the R and ER lamps

Resistance (R) - A measure of resistance in the flow of current, expressed in ohms.

Room Cavity Ratio (RCR) - A shape factor (for a room, etc.) used in lighting calculations.

$RCR = 5H (L+W) / L \times W$, or, alternately,

$RCR = (2.5) \text{ Total Wall Area} / \text{Floor Area}$.

Where H = height, L = length and W = width of the room.

the flatter the room the lower the RCR.

A cubical room will have an RCR of 10

S

Self-Ballasted Lamps - A discharge lamp with an integral ballasting device allowing the lamp to be directly connected to a socket providing line voltage. (e.g. CFL)

Spacing to Mounting Height Ratio - sometimes called spacing criterion. It is OK to have fixture spaced closer than the spacing criterion suggested by the manufacturer but not farther, or you will get dark spots in-between fixtures.

Ratio of fixture spacing (distance apart) to mounting height above the work plane

Spectral Power Distribution (SPD) - A graph of the radiant power emitted by a light source as a function of wavelength. SPDs provide a visual profile or "finger print" of the color characteristics of the source throughout the visible part of the spectrum.

Specular Reflection - Reflection from a smooth, shiny surface, as opposed to diffuse reflection.

Spot - A colloquial term referring to a reflector lamp with a tight beam of light, typically around 10 degrees or less. It comes from the fact that such a lamp produces a narrow spot of light as opposed to a wide flood of light.

System - A term referring to the lamp and ballast combination, and sometimes to the entire lighting delivery system including the fixture, the optics, the particular layout and the lighting controls.

T

T-12, T-8, T-5 - T-12 is 12 eighths of an inch, or 1 1/2 inches. A designation for the diameter of a tubular bulb in eighths of an inch. T-8 is 1 inch, and so on.

Task Lighting - Supplemental lighting provided to assist in performing a localized task, e.g. a table lamp for reading or an inspection lamp for fabric inspection.

Total Harmonic Distortion (THD) - A measure of the distortion caused by ballasts and other inductive loads of the input current on alternating current (AC) power systems caused by higher order harmonics of the fundamental frequency (60Hz in North America). THD is expressed in percent and may refer to individual electrical loads (such as ballast) or a total electrical circuit or system in a building. ANSI C82.77 recommends THD not exceed 32% for individual commercial electronic ballasts, although some electrical utilities may require lower THDs on some systems. Excessive THDs on electrical systems can cause efficiency losses as well as overheating and deterioration of system components.

Troffer - A long, recessed lighting unit, usually installed in an opening in the ceiling.

U

Underwriters Laboratories (UL) - A private organization which tests and lists electrical (and other) equipment for electrical and fire safety according to recognized UL and other standards. A UL listing is not an indication of overall performance. Lamps are not UL listed except for compact fluorescent lamp assemblies - those with screw bases and built-in ballasts.

Uniform Product Code (UPC) - The 12 digit code on the salable unit that is used for scanning at the register.

Ultraviolet (UV) Radiation - Radiant energy in the range of about 100-380 nanometers (nm). For practical applications, the UV band is broken down further as follows:

- Ozone-producing - 180-220 nm
- Bactericidal (germicidal) - 220-300
- Erythematous (skin reddening) - 280-320
- "Black" light - 320-400

V

Valance Lighting - Lighting from light sources on a wall typically above eye level, shielded by horizontal panels. The light may be upward or downward directed.

Visual Task - objects and details that must be seen to perform an activity. The task associated with seeing

Volt - A measure of "electrical pressure" between two points. The higher the voltage, the more current will be pushed through a resistor connected across the points. The volt specification of an incandescent lamp is the electrical "pressure" required to drive it at its designed point. The "voltage" of a ballast (e.g. 277 V) refers to the line voltage it must be connected to.

Voltage - A measurement of the electromotive force in an electrical circuit or device expressed in volts. Voltage can be thought of as being analogous to the pressure in a waterline.

W

Warm White - Refers to a color temperature around 3000K, providing a yellowish-white light.

Watt - A unit of electrical power. Lamps are rated in watts to indicate the rate at which they consume energy.

Wavelength - The distance between two neighboring crests of a traveling wave. The wavelength of light is between 400 and 700 nanometers.

Work Plane - unless otherwise indicated, it is assumed to be a horizontal plane 30 inches above the floor (table-top height) having the same area as the floor. Plane at which work is done and at which illumination is specified and measured.