

Lighting definitions.

Amp - Watts divided by Volts

ANSI (American National Standards Institute) - The organization that develops voluntary guidelines and produces performance standards for the electrical and other industries

Average Rated Life - An average rating, in hours, indicating when 50% of a large group of lamps have failed, when operated at nominal lamp voltage and current; manufacturers use 3 hours per start for fluorescent lamps and 10 hours for HID lamps when performing lamp life testing procedures; every lamp type has a unique mortality curve that depicts its average rated life. ARL for HID lamps is the time frame at the end of which 50% of lamps have failed

Ballasts - A device used with an electric discharge lamp to obtain the necessary circuit conditions (voltage, current and waveform) for starting and operating; all fluorescent light sources require a ballast for proper operation. Dimming ballasts are special ballasts which, when used together with a dimmer, will vary the light output of a lamp. Ballasts have two primary functions: 1) start the lamp and 2) control operation of the lamp once it has started. High frequency electronic ballasts operate lamps more efficiently and eliminate the hum and visible flicker normally associated with standard magnetic ballasts. Electronic ballasts also typically have better power quality than magnetic ballasts.

Ballast Factor(BF) - The measured ability of a particular ballast to produce light from the lamp(s) it powers; ballast factor 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.

Ballast Types - There are three types of lighting ballasts: 1) Magnetic: an inefficient device that uses a core and coil assembly transformer to perform the minimum functions required to start and operate the lamp; 2) Hybrid or "low frequency electronic": essentially a magnetic ballast with a few electronic components that switch off voltage to lamp coil once the lamp has started. A minimal increase in efficiency is obtained via more expensive magnetic core material and the absence of power to the lamp coils during operation; 3) High frequency electronic: a ballast that operates lamps at frequencies above 20,000 Hz. Maximum efficiency is obtained through the use of electronic circuitry and optimum lamp operating characteristics.

Color Rendering Index (CRI) - The Color Rendering Index (CRI) measures the effect a light source has on the perceived color of objects and surfaces. High CRI light makes virtually all colors look natural and vibrant. Low CRI causes some colors to appear washed out or even to take on a completely different hue

Color Temperature (CT) - Color temperature, which is measured in Kelvin, indicates whether a lamp has a warm, midrange or cool color appearance. "Warm" light sources have a low color temperature (2000-3000K) and feature more light in the red/orange/yellow range. Light with a higher color temperature (>5000K) features more blue light and is referred to as "cool."

Efficacy - The rate at which a lamp is able to convert power (watts) to light (lumens), expressed in lumens per watt (LPW or lm/W). See also LPW Performance

Energy - A measure of work done by an electrical system over a given period of time, often expressed in kilowatt-hours (kWh)

Fluorescent Lamp - A low pressure mercury vapor discharge light source. The electric discharge generates ultra-violet (UV) energy, which is absorbed by a phosphor and converted to visible light

Foot-candle (fc) - A unit of measure for the density of light as it reaches a surface. One foot-candle is equal to 1 lumen per square foot.

High-Intensity Discharge (HID) Lamps - Lamps in which an arc passing between two electrodes in a pressurized tube causes various metallic additives to vaporize and release light

Hot Ignition - The restarting of a previously operating lamp shortly after turn-off. Metal Halide lamps typically require a minimum of 4-15 minutes to restart after turn off

Illuminance - Light arriving at a surface, expressed in lumens per unit area; 1 lumen per square foot equals 1 foot-candle, while 1 lumen per square meter equals 1 lux

Initial Lumens - The lumens produced by a lamp after an initial burn in period (usually 100 hours). Initial lumens only reflect the amount of light produced by a lamp at beginning of lamp life and should never be used in comparing lighting alternatives. (See Mean Lumens)

Instant Start (IS) - Instant Start Ballasts apply high voltage across the lamp with no preheating of the cathode. This is the most energy efficient starting method for fluorescent lamp ballasting. IS ballasts use 1.5 watts less per lamp than rapid start ballasts. Other IS ballast benefits typically include parallel lamp circuitry, longer remote wiring, and capability to start lamps at 0 degrees (versus 50 degrees F for rapid start)

Kilowatt - 1000 Watts

Kilowatt Hour - 1000 Watts used continuously for one hour

Lamp - Manufactured light source, synonymous with light bulb; the three broad categories of electric lamps are incandescent, fluorescent and high-intensity discharge

Lamp Current Crest Factor (LCCF) - The ratio of peak lamp current to the RMS (average)

Lamp current - Lamp manufacturers require a LCCF of less than 1.70 in order to achieve full lamp Life

Lamp Disposal - When Disposing of spent lamps, always consult federal, state, local and/or provincial hazardous waste disposal rules and regulations to ensure proper disposal

Lamp Lumen Depreciation Factor (LLDF) - The multiplier to be used in illumination calculations to relate the initial rated output of light sources to the anticipated minimum rated output based on the relamping program to be used. (See Lumen Depreciation and Mean Lumens.)

Lens - A glass or plastic element used in luminaires to change the direction and control the distribution of light rays

Light Loss Factor (LLF) - A factor used in calculating illuminance after a given period of time and under given conditions. It takes into account temperature and voltage variations, dirt accumulation on Luminaire and room surfaces, lamp depreciation, maintenance procedures and atmosphere conditions. Formerly called maintenance factor

Light Pollution - The amount of non-useful light produced by a fixture

Lumens Per Watt - The number of lumens produced by a light source for each watt of electrical power supplied to the light source. See Efficacy

Lumen Depreciation - The decrease in lumen output of a light source over time; every lamp type has a unique lumen depreciation curve (sometimes called a lumen maintenance curve) depicting the pattern of decreasing light output. Fluorescent lamps typically maintain 93% of initial lumens at end of rated lamp life. Many other types of lamps depreciate much more during rated lamp life. Metal halide lamps typically maintain less than 70% of initial lumens by end of rated lamp life. See Lamp Lumen Depreciation Factor, and Mean Lumens

Lumen Maintenance - (See Lumen Depreciation)

Lumens (lm) - A unit of luminous flux; overall light output; quantity of light, expressed in lumens. For example, a dinner candle provides about 12 lumens and a 60-watt soft white incandescent lamp provides about 840 lumens

Luminaire - A light fixture; the complete lighting unit, including lamp, reflector, ballast, socket, wiring, diffuser and housing

Luminaire Efficiency - The ratio of luminous flux (lumens) emitted by a luminaire to that emitted by the lamp or lamps used therein

Lux (lx) - A unit of illuminance equal to 1 lumen per square meter

Mean Lumens - The average lumen output of a lamp over its rated life. Mean lumen values for fluorescent and HID lamps are typically measured at 40% of their rated lives. Most high pressure sodium and mercury lamps are measured at 50% of their rated lives. All measurements are made on ANSI reference ballasts. Mean lumens are sometimes useful in comparing the amount of light produced by different lamps. Quality of light (CRI) and useful light must also be considered when designing or evaluating the efficiency and effectiveness of lighting alternatives

Parallel vs. Series - Wiring configurations for ballasts. Ballasts with parallel lamp circuitry have the benefit of companion lamps remaining lit, even if one of the lamps operated by the ballast should fail. Systems with series lamp wiring (magnetic ballasts and many rapid start electronic types) result in all lamps operated on the ballast going out if one should fail

Power - The rate at which energy is taken from an electrical system or dissipated by a load, expressed in watts (W); power that is generated by a utility is typically expressed in volt-amperes (VA)

Power Factor - A measure of the effectiveness with which an electrical device converts volt-amperes to watts; devices with power factors (>0.90) are "high power factor" devices

Programmed Rapid Start (PS) - A method of starting fluorescent lamps where cathode heat is applied prior to lamp ignition, then removed or reduced once the lamp has ignited

Rapid Start (RS) - Rapid start ballasts apply a low filament voltage to preheat the cathodes. Simultaneously, a starting voltage (lower than that used in instant start) is also applied to strike the arc. When the cathodes are hot enough, the lamp will strike. The filament voltage continues to be applied throughout the operation of the lamp. Rapid start ballasts appear to have a slight turn on delay compared to instant start

Ready Connect - Pre wired Flexible electrical conduit which uses specially designed connectors to reduce the amount of hard wiring needed for a lighting system

Reference Ballast - A ballast specially constructed to have certain prescribed characteristics for use in testing electric-discharge lamps and other ballasts are typically defined by ANSI

Reflector - A device used to maximize the useful light produced by a fixture

Safety - Luminaires should be installed and operated in compliance with the National Electric Code (NEC), Underwriters Laboratories Inc. (UL) requirements, and all applicable codes and regulations

Total Harmonic Distortion (THD) - A measure of the distortion of an electrical wave form. Excessive THD (defined by ANSI as greater than 32%) may cause adverse effects to the electrical system. <20% THD ballasts are fine for most applications

Useful Light - The amount of light produced by a fixture which is beneficial to the lighting system

Voltage (V) - A measure of electrical potential, expressed in volts (V). Voltage is the “force” that pushes electrical current through a conductor

Watt (W) - A unit of electrical power equal to 1 joule per second. Lamps are rated in watts to indicate power consumption. See Nominal Watts