

Lighting Glossary

Ballast Factor

The ballast factor determines the light output for a particular lamp-ballast system. The ballast factor is an actual measurement of the lumen output for a specific lamp-ballast system. Ballast factor is not a direct measure of energy efficiency. Ballast factor does not just apply to the ballast itself – it takes into account the entire lamp-ballast system as a whole. This means that ballasts that can operate more than one type of lamp will generally have a unique and different ballast factor for each ballast/lamp combination.

Example: A T8 ballast with a normal ballast factor of .87 will operate the T8 lamp at 87% of the stated/rated lamp wattage. If a 32 watt lamp runs at .87 ballast factor, it will really only use [32 x .87] 27.84 Watts.

Ballast Start Type

Applies to fluorescent ballasts and relates to the delivery of the initial voltage to the lamps. Typically instant start or programmed start, the two different start types are used for different applications and functions for particular lighting areas.

Instant Start

Delivers a high initial voltage to start the lamp without preheating the cathodes. Instant start ballasts are the most energy efficient type, but are only appropriate when the lamps in the fixtures will not turn on and off very often. The more you turn lamps on and off, the shorter the lamp life will be.

Programmed Start (Rapid-Start)

Delivers a low initial voltage to the lamp to heat it up first, followed by a higher starting voltage. Preheating the cathodes in the lamp decreases the required starting voltage and cathode wear, allowing the lamp to have a longer lifespan with more frequent starting cycles (on/off). Programmed start ballasts should always be used with occupancy or light sensors or areas where the lights are turned on and off frequently.

Base Type

There are a number of different types/size of bases for bulbs. The base of a bulb is the part at the bottom that fits into light sockets for different applications. They typically consist of metal prongs, screws, or pins.

Beam Angle

Beam angle is the light spread that emits from a light bulb or fixture, and is chosen to suit the conditions and activities for an energy efficient lighting project. It can be as tight as 8 to 10 degrees or as wide as around 140 degrees. For lower ceiling heights a wider beam angle works best as it provides a softer, more diffused beam, whereas tighter beam angles are used for higher heights.

Bulb Type

For energy efficient lighting, the bulb type will vary in terms of shape, size, base type, lumen output, color rendering index (CRI), and Kelvin temperature. Bulb type indicates the type of technology and application it is for.

Case Quantity

Some lamps are extremely hard to ship without breakage during shipping if they are not in their original case packaging, particularly fluorescent linear lamps. Though we try to package lamps as best as possible, sometimes shipping carriers are careless with handling them and they are broken upon delivery. To avoid breakage and to make sure you get what you ordered correctly, we only ship fluorescent lamps in their original case quantity, which ranges typically from 25-50 lamps per case.

Our website and shopping cart system has a configuration for some products to sell in case quantities only, so you can order them in the increments easily. For instance, if a case of 32W T8 Lamps includes 25 bulbs, you can order in 25, 50, 75, or more lamps in increments of 25.

CFL

A compact fluorescent lamp (CFL) is also a compact fluorescent light, energy-saving light, or a compact fluorescent tube. The goal is to replace incandescent lamps, certain types fit into the same light fixtures that fit incandescent lamps. CFLs use a tube with a curve or a fold to fit into the space of an incandescent bulb and a compact electronic ballast in the base of the lamp. In comparison with general-service incandescent lamps, CFLs use 1/5 to 1/3 the electric power and last 8-15 times longer.

Color Temperature [Kelvin]

The Kelvin Color temperature is a ratings system for the characteristics of visible light. The color temperature of a light source is the temperature of light hue and color in relation to an absolute lack of color or black body. The spectrum ranges from reddish/orange via yellow to white/bluish white. Cool Colors are bluish white and have color temperatures over 5,000K. Warm Colors are yellowish/white through red and have color temperatures which range between 2,700 – 3,000K.

Example: Typical offices, workspaces, libraries, schools, and retail stores typically use a 4,000-4,500K lamp, which is a white color with slight yellow tint for comfort. Warehouses, pole lights, wall packs, gyms, and other industrial areas typically use 5,000K due to its pure white color.

CRI [Color Rendering Index]

The CRI measures the ability of a light source to faithfully reveal an object's color by comparing it with a natural light source. The scale moves from negative values on up to 100. The higher the number, the more closely the product output resembles natural light or sunlight. With energy efficient products, we consider 80+ CRI as very good and 90+ is excellent.

Example: When retrofitting a metal halide [HID] system with an inherent CRI of 65 with a T5HO fluorescent system that has a CRI of 85, it not only saves energy but the new system naturally looks much more crisp and bright due to the human eye's perception of the 20 CRI increase with the T5HO.

Dimmable

Dimmable lights are lights that can ‘fade up’ or ‘fade down’ by increasing or decreasing the RMS voltage (power to the lamp, ballast, or fixture itself). There are many types of low voltage and line voltage dimming systems specific to each type of product with the main purpose of comfort, energy savings, and the longevity of the product. Please consult a qualified lighting specialist for the best options for your project.

Example: A 10,000 Sq Ft warehouse facility needs a retrofit for existing metal halide [HID] high bay fixtures currently installed. This old system not only uses a lot of energy, but the ballasts and lamps constantly fail and need replacing all the time. It is determined that new induction high bays would be the best solution for their extra long life for these hard to reach and high ceilings, but energy savings is the top priority. The high bay system includes a 50% step down dimming system with occupancy sensors that automatically dim the lights down to 50% power (and light output) when no one is around after 15 minutes.

DLC (Design Lights Consortium)

The Design Lights Consortium (www.designlights.org) approval rating is the strictest rating system for lighting products. To qualify as DLC products, they need to file a 5-part application which includes: 1) application contact, 2) model information, 3) photometric and electrical data, 4) lumen maintenance, and 5) document checklist. Each of the 5-part sections requires IES LM-79 test reports, LM-80 reports, ANSI/UL 1598-04 reports and full IES files. Once they pass the approval process, products are you will find them in the DLC products listings catalog.

ETL (Electrical Testing Laboratory)

Product safety testing and certification. also known as ETL SEMKO.

Fixture Mounting Height

The ideal energy efficient fixture mounting height based on its wattage, light output, and beam spread (beam angle).

High Pressure Sodium

High Pressure Sodium (HPS) lamps are relatively small in size compared with mercury vapor and metal halide. They contain additional elements such as mercury and can produce a dark pink glow when first struck and an intense pinkish orange light when warmed. HPS lamps are quite efficient – about 100 lm/W and the higher power versions of 600 W have an efficacy of even 150 lm/W. They are popular for outdoor light areas such as streetlights and security. HPS systems are no longer the best option in commercial lighting. Today's technology uses less energy, has a higher CRI, emits more light, and lasts longer.

Incandescent Equivalent

Incandescent bulbs date all the way back to when Thomas Edison had his first successful test in 1879, yet this same exact bulb is still very common today. These bulbs use lots of energy, burn out quickly, and over 95% of the energy becomes heat and not visible light. We match up all of our energy efficient bulbs with the equivalent incandescent bulb you may have that will be equal in light output, yet last longer, run cooler, and use typically 70-80% less energy.

Example: A hotel currently has 250 candelabra bulbs in the main lobby chandelier with each bulb using 40 watts a piece. Under our LED Candelabra section you may select 40 watt incandescent equivalent, and the products shown will be the equivalent light output yet use 80% less energy.

Induction

An induction light is a light source in which the power to generate light is transferred from outside the lamp envelope to inside via electromagnetic fields. This is in contrast to a typical electrical lamp which uses electrical connections through the lamp envelope to transfer power. Advantages over traditional light sources include: high energy efficiency, very long life, high CRI, and high lumen/watt ratings.

Induction Light

Induction lighting is a light source in which the power to generate light transfers from outside the lamp to inside via electromagnetic fields. This technology offers advantages like very long lamp life, higher energy efficiency, and improved CRI vs. old technologies we typically retrofit. A proven and energy efficient technology dating back to 1890, it is a great solution to eliminate maintenance costs in hard to reach or high

areas with its 80,000+ hour rated lamp life. The light output is very intense as well, and allows to save 50-60% energy over metal halide systems and similar technologies with equivalent light output.

Example: A parking garage currently has standard 175 watt metal halide fixtures in it mounted at 8ft standard ceiling height. Due to the energy efficiency and light output of induction technology, replace these with an 80 watt induction retrofit kits, which consist of installing a new induction lamp and ballast in the existing fixture. The benefits are huge including saving money not needing to buy a new fixture, saving over 55% in energy use, brightening up the garage for safety, and eliminating maintenance costs for the next 10-15 years.

Lamp Life

Lamp life is how long a lamp will last before burning out. Energy efficient lighting fixtures have a much longer lamp life and lower energy output than more traditional fixtures. As of right now, each of these technologies usually have the following lamp life hours:

CFL: Up to 10,000 hours

Fluorescent: 20,000-36,000 hours

Induction: 80,000-100,000 hours

LED: 25,000-50,000+ hours

Example: A gas station is looking to reduce maintenance costs because each time their metal halide [HID] bulbs go out they need to call in a bucket truck to get up to 16ft canopy height, which can be expensive. These existing bulbs only last 12,000 hours, or roughly 2.5 years at current store operating hours. The owner decides to replace all fixtures with new LED fixtures, which have a rated lamp life of 50,000 hours or more, providing for 10+ years of maintenance free operation.

LED

A light-emitting diode (LED) is a semiconductor light source. We use LED's for indicator lamps in many devices and increasingly for other lighting. First appearing as practical electronic components in

1962, early LED's emitted low-intensity red light. Modern versions, however, are available across the visible, ultraviolet and infrared wavelengths, with very high brightness. When you switch an LED on, electrons are able to recombine with holes

within the device. This releases energy in the form of photons. LED's present many advantages over incandescent, metal halide, high pressure sodium, and other light sources. These advantages include: lower energy consumption, longer lifetime, improved physical robustness, smaller size, and faster switching.

Lighting Certifications (UL, ETL, DLC, etc)

These are the quality standards for the lighting industry. The top three are UL, ETL, and DLC. Other common ones include IP65, IP66, IP67, Energy Star, Dark Sky Compliant, and more. These certifications help in determining requirements with rebates. Cities and counties used these certifications to determine eligibility of lighting products.

Lighting Controls

We use Lighting Controls to indicate stand-alone control of the lighting within a space. These may include occupancy sensors, time clocks, and photocells that we hard-wire to control fixed groups of lights independently. Adjustment occurs manually at each device's location based on specific project or area needs.

Example: A software company has installed new 0-10 volt dimmer switches on all the circuits to go with their new LED troffer fixtures. This gives everyone working in the office the freedom to set light levels at their desired level. This allows the freedom to reduce glare and set personal preferences in order to have the highest productivity.

Lighting Retrofit

A lighting retrofit means that pre-installed fixtures are being re-fitted or retrofitted with newer, more energy efficient lamps and/or ballasts. It can also mean that the fixtures themselves are replaced. Typical lighting retrofits result in overall savings of 30% - 70% or more. They also enhance efficiency and improve commercial facility value.

Lumen Output

The lumen (lm) is the measurement of the total visible light emitted by a specific light fixture, lamp or bulb. It shows the sensitivity of the human eye to different wavelengths

of light. Lumens per watts (lm/w) is the standard measurement of energy efficiency, and the higher the lumen output of any source, the brighter it will appear. The lumen output is different with each lighting technology, and much match up correctly when retrofitting any old technology with a new one.

Example: A basketball gym is interested in saving energy by replacing the traditional 1000 watt metal halide [HID] high bay fixtures. Each 1000W HID bulb initially emits 110,000 lumens, but due to lumen depreciation (the bulb puts out less light as it gets older) and the technology, by today's standards the gym is not very bright given the energy it is using. The gym decides to do a 1-for-1 direct replacement with a 10-lamp T5HO fixture which uses half the wattage. Technically this new fixture only emits 49,000 lumens but due to other factors such as CRI, this new T5HO actually appears brighter to the human eye and uses only 50% of the electricity! Please consult a lighting specialist for your specific project.

Lumens per Watt

Lumens per watt (LPW) is a measure of the efficacy of a light source in terms of the light it produces for the power it consumes. It is a way of measuring how well a light source produces visible light. Old technology such as incandescent, T12, or metal halide [HID] systems typically have a lumen/watt rating of anywhere between 40 and 60. Newer technology such as T8 and T5 fluorescent, Induction, and LED are 65+, with newer products upwards of 100+.

Example: One 100-watt lamp producing 1750 lumens gives 17.5 lumens per watt [1750 / 100 = 17.5].

Manufacturer

An energy efficient lighting manufacturer is the individual or company responsible for making lighting products. The manufacturer is comprised of the people who use the tools, machines, and labor to make the lighting fixtures. A distributor is a company that does not make the lighting products. They act as an agent to provide the right products.

Manufacturer's Warranty

The manufacturer's warranty is the promise to stand behind the product it sells by each individual manufacturer. Elements of manufacturer's warranties can include how long it will last, who to contact if there is a problem, and parts or repairs that qualify. There can also be extended warranties which provide coverage for services like repair and maintenance.

Example: A new LED troffer 2x4 ft fixture will carry a 5 year manufacturer's warranty, which means that if anything happens to the fixture at all in that time period, the manufacturer will replace it for free under warranty due to defects.

Maximum Operating Temperature

This is the highest or hottest temperature which a light fixture will operate effectively in without overheating or burning out prematurely. The maximum operating temperature of a fixture will vary based on the device function and application context.

Metal Halide

A metal-halide lamp is an electric light which produces light by an electric arc through a gaseous mixture of vaporized mercury and metal halides. It is a type of high-intensity discharge lamp. This is 2x the efficiency of mercury vapor lights and 3-5 times that of incandescent lights. As one of the most efficient sources of high CRI white light, we use metal halides for overhead lighting of commercial, industrial, and public spaces – parking lots, sports arenas, factories, and retail stores – as well as residential security lighting. Metal halides [HID] are no longer considered the standard for commercial lighting because they use lots of energy compared with new technology, burn out quickly, do not have a very good light quality, and are noisy in operation due to the ballasts.

Metal Halide Equivalent

Bulbs or fixtures which are not metal halides but have the same qualities in light output and practical use. This means the replacement product can emit the same amount of light as the metal halides. The new energy efficient options typically have higher CRI. They also use less energy, last longer, are quieter in operation, and are more reliable.

Example: A large mall in New York is looking to save energy by retrofitting their parking lot 400 watt metal halide [HID] existing pole lights. In our pole light category under LED, you can select the option to show only those LED retrofit kits that work well as a 400W metal halide retrofit. This will show products with LED wattage and light output similar to the 400W existing system, so you know they will match up.

Minimum Starting Temperature

The lowest possible temperature at which an energy efficient light or ballast will easily switch on within its constructed temperature range. Typically minimum starting temperature for T8, T5, and induction systems is -20 degrees Fahrenheit.

New Fixture

There are many new fixtures which are far more energy efficient than a traditional retrofit. For example, new technologies such as light-emitting diodes [LED] can be used to drastically reduce energy usage. New Fixtures often are designed to be natural extensions of existing architecture as well as energy efficient. We need new fixtures for new buildings, when retrofit kits don't fit, or when old fixtures are in bad condition.

Number of Lamps in Fixture

All light fixtures have a fixture body and a light socket to hold the lamp(s) and allow for their replacement. Each lamp emits a certain amount of light, and fixtures can be made to fit any amount of lamps in them to be designed for different mounting heights and brightness.

Example: A 2-lamp T8 fixture is great to use for 8-10ft mounting height, whereas a 6-Lamp T8 fixture is necessary for 22 ft mounting height to reach that same brightness.

Occupancy Sensor

An occupancy sensor is a lighting control device which detects occupancy of a space by people and turns the lights on or off automatically by using infrared or ultrasonic

technology. Occupancy sensors save energy, provide automatic control, and comply with building codes.

Ex.: Install occupancy sensors on all T5HO high bay fixtures during a warehouse lighting retrofit project. With the timing set to 15 minutes per sensor, the fixture automatically dims to 50% power when no one is in the area for that period of time, saving 50% energy.

Part Number

Part numbers are the codes which identify items for sale. They may include make and model number, year of manufacturer, wattage, volts, type of fixture and its serial number.

Example. GE432MV-H is the part number for a GE ballast which is compatible with a number of ShineRetrofits.com lighting fixtures.

Photocell

Photocells are sensors on light fixtures that control the fixture or lamp by turning it off or on according to the light levels in the environment. When light levels from natural sources like windows, skylights, or the sun provide more than the light fixture itself can emit, it is efficient for the photocell to turn the fixture off to save energy. When light levels from natural sources become too dim or dark, the photocell turns the fixture back on.

Example: To save additional energy along with installing new LED fixtures in a parking lot, a recreational facility added on photocell sensors to each fixture. Now every time the sun goes down, the lights turn on automatically. When the sun comes up in the morning, the fixtures shut off. This is especially useful in outdoor applications because the sun rises and sets at different times throughout the year.

Power Factor

The power factor of an AC electrical power system is defined as the ratio of the real power flowing to the load over the apparent power in any circuit. It typically is a number between -1 and 1. A negative power factor can occur when the device which is normally the load generates power. This then flows back towards the device which is

considered the generator. Power factor is the ratio between the kW and the kVA drawn by an electrical load where the kW is the actual load power and the kVA is the apparent load power. Simply, it is a measure of how efficiently the load current is being converted into useful work output and more particularly is a good indicator of the effect of the load current on the efficiency of the supply system.

Example: A typical 2-Lamp T8 ballast has a power factor of .97 or higher.

Product Dimensions

The sizing of a fixture, lamp or energy efficient lighting accessory based on length, width and height. Necessary for correctly retrofitting existing fixtures or identifying the size required for new fixtures.

Product Lead Time

Each lighting product has a specific lead time or time it takes for the product to be shipped out. While a lot are premade and in stock like regular bulbs, ballasts, components, and other items, many light fixtures are custom made. Due to manufacturing these fixtures with your specific order and configurations, lead time can vary between 1-6 weeks depending on the product if they need to be assembled or manufactured. We do our best to list the exact amount of time each product takes but it can vary depending on stock, shipping hold ups, and other variables outside our control. If you would like to confirm the current lead time on any item, please contact us!

Reflector Type

For light fixtures and retrofit kits, there are metal reflectors that shape and intensify the lamp's beam and light output. Lighting products become much more efficient when specific reflectors are used for specific applications, typically increasing the light output while lowering the energy needed to supply that same light otherwise needed without channeling the light. Typical reflectors used in fixtures and retrofit kits include glossy white aluminum for lower ceiling heights, and specular or mirror (sometimes called MIRO – shiny aluminum) which provide a more direct beam and can push light farther out for higher ceiling heights.

Example: An office has a 9ft ceiling height with a 2x4 troffer fixtures in a grid drop ceiling configuration, and is looking to use 2x4 retrofit kits in their existing T12 fluorescent fixtures to increase the light quality and to save energy. To minimize glare and provide a more even light distribution at this lower ceiling height, a 2x4 white aluminum reflector retrofit kit is ideal, to be used with new T8 lamps and ballasts.

T5

T5s are a type of LED tube T which is 5 x 1/8" in thickness. The most common tube thicknesses for commercial facilities are T8s and T5s

T5 Fluorescent

T5 Fluorescent lamps are T-shaped lamps with a 5/8 inch diameter which can sometimes even operate from a battery-powered device. Advantages over traditional light sources include: high energy efficiency, very long life, high CRI, and high lumen/watt ratings.

T8

Any type of LED tube T has a name with a number. The most common one is a T8 tube which is 8 x 1/8". The most common tube thicknesses for commercial facilities are T8s and T5s.

T8 Fluorescent

T8 Fluorescent lamps where the first number indicates either the power in watts or length in inches. The T indicates that the shape of the bulb is tubular and the last number is the diameter in eighths of an inch. T8s are a common size of commercial energy-saving lamps with electronic ballasts. Advantages over traditional light sources include: high energy efficiency, very long life, high CRI, and high lumen/watt ratings.

T12 Fluorescent

T12 Fluorescent lamps are T-shaped lamps with a 1 ½ inch diameter which are most commonly used with magnetic ballasts. T12s are traditionally the most common type of linear fluorescent but are now being phased out in favor of T8, T5, and LED lamps due to their energy efficiency and better design.

Total Harmonic Distortion [THD]

Total Harmonic Distortion, or THD, is the distortion of the relationship between line power and load current draw. It also can be explained as the ratio of active power (watts) to the apparent power (volt-amps). High THD can interfere with the operation of electronic equipment and improper operation of power grid protective equipment like fuses, circuit breakers, and relays. ANSI has therefore required that the latest electronic ballasts have less than 32% THD, though most now are produced with less than 10% THD as a standard.

UL(Underwriters Laboratories)

UL rating is one of the highest standards. It is an official approval by the US Federal Occupational Safety and Health Administration (OSHA). UL ratings can apply to safety standards, product inspection, product testing, and even training services.

Voltage

Voltage is the electric potential difference between two points. It can also be the difference in electric potential energy of a unit test charge that transports between two points. Voltage is equal to the work done per unit charge against a static electric field which moves the charge between two points. An easy way to think of it is to picture water pressure in a hose (voltage), with water flow pushing water from the source to the end of the spout. Electrical resistance is similar to the water valve that allows flow. If electrical resistance is too high (water valve not open) yet you have high voltage (pressure), there will be no flow. Likewise if there is no resistance (valve open) but no voltage (pressure), there will still be no flow.

With lighting products we must match your specific voltage with the voltage that the lighting fixtures or bulbs operate at. Typically products operate anywhere from 120-277V, and sometimes 347V (Canada) or 480V.

Watts

Wattage measures the work the light is performing at a given point in time. We calculate watts by multiplying voltage by the current which flows in a wire. The term itself is named after the Scottish engineer James Watt (1736 -1819). It measures electrical consumption.

Example: A 100-watt light bulb burning for 10 hours uses 1,000 wattage hours – or one kilowatt hours (kWh). A kWh equals 1,000 watts per hour.

Weight (product)

Product weight is a unit of measurement for items used in trade and commerce. It can be metric or standard. Product weight is important because heavier products will be more difficult to install. The weight will also affect shipping fees.

Wet Location Rated (IP65, IP66, IP67)

The wet location rating means that that fixture is suitable for outdoor or other wet or damp locations that receive direct contact with rain, snow or excessive moisture (such as fog or ocean spray). Commonly used in car washes, food processing locations, paint booths, barns, or any outdoor location.

Ex.: IP65 – Means Ingress Protection - 6 = dust-tight; 5 = water jet protection.

IP66 – Means Ingress Protection – 6 = dust-tight; 6 = protection against heavy seas.

IP67 – Means Ingress Protection – 6 = dust-tight; 7 = protected against effects of immersion.