

LED: Light Emitting Diodes

FACTS GUIDE



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Photo Courtesy of Feiss

Lighting your home efficiently is continually becoming more popular. LED products are now available for every type of lighting. At A.D.Cola Lighting we understand that with this new technology finding the right product can be challenging. It is our goal to make this process easy for you. Our LED commitment begins with carefully choosing and quality testing all of our LED products and bulbs before bringing them into our store. LED is continually changing. We make it a priority to educate ourselves on new innovations so you can feel confident when choosing LED products from our showroom. This facts guide will go over information and benefits of using LED products. We hope you enjoy learning more about LED.

WHAT IS LED?

LED or light emitting diodes is a semiconductor device that emits light when an electrical current is passed through it. Typically, diodes have been used in many technologies such as radios, televisions and computers as an electrical component for conduction.

TOP 5 BENEFITS OF LED

1. LONG LIFE

LEDs have a long life, lasting on average up to 50,000 hours—longer than incandescent, halogen, and compact fluorescents bulbs. This is approximately 50 times longer than a typical incandescent, 20-25 times longer than a typical halogen, and 8-10 times longer than a typical CFL. LEDs do not have a filament, instead they are made of solid state technology. They will not damage like a regular incandescent bulbs. Resistant to bumping, drops and even the weather make it the most durable type of lightbulb today. Unlike other bulbs that become hot or need to heat up in order to operate, LED lights are much better at withstanding elements such as electrical surges, making for the longest lifespan of any light bulb at this time. This means less bulb replacements and in turn, more savings in replacement costs!

2. EFFICIENT

LEDs are more efficient, using approximately 80% less wattage than incandescent bulbs. Because less electricity is needed to light an LED bulb, it converts to huge savings on utility bills for the average consumer. LEDs are “directional” light sources, which means they emit light in a specific direction, unlike incandescent and compact fluorescent bulbs, which emit light and heat in all directions. For this reason, LED lighting uses light and energy more efficiently in many applications, for example, reflector bulbs. However, for an A-shape bulb, it requires special engineering to get the light to shine all around the bulb.

3. COOL

LEDs are cool to the touch because they don't produce heat in the form of infrared radiation (IR) (unless they are IR LEDs). Incandescent bulbs and other sources become hot because they produce IR radiation, which heats the enclosures and surrounding of the bulb. LEDs do not have IR radiation, which allows fixtures to be placed in locations where the heat would be a problem, e.g. illuminating clothes and artwork, or even children in reach of hot lamps. Another benefit is how much extra money can be saved on the cost of cooling homes. It may not seem like light bulbs can make a difference in the temperature of a room, but in fact they can. This allows for even more savings on energy bills.

4. GREEN & NON-TOXIC

LED lights are the greenest solution available on today's markets. They are non-toxic and greener than other alternatives as they do not contain any hazardous chemicals, mercury, gases or metals. LED lights are 100% recyclable, helping to reduce your carbon footprint. Their long life means that one LED light bulb can save the material and production of 25 incandescent light bulbs. LED bulbs are the greenest lighting solutions today.

5. FLEXIBLE

LED lighting is flexible in color and design. LED lights come in various colors, shapes and designs to produce creative solutions for both residential and commercial spaces. LEDs can be dimmed to change the mood in any room. A well-designed LED illumination system can achieve some dramatic lighting effects that influence not only the eye but create the mood for any atmosphere. Most LED bulbs in use today are clear or white bulbs, available in "cool" or "warm" white light. But LEDs are also available in colors—Red, Green, Blue (RGB). RGB give tremendous design options for LED lights. RGB LEDs can be combined to form thousands of other colors. This works great for accent lighting using LED tape. This type of lighting was thought only to be used on exteriors and interiors of hotels and buildings, but now homeowners use them as an affordable design option.

UNDERSTANDING LED LABELS

The Federal Trade Commission along with manufacturers have developed a new label to help consumers when purchasing the energy-saving bulbs. It looks similar to nutrition labels on food and will contain important information about the bulb's output and savings (see example below).

The labels will include:

- Brightness (Lumens),
- Estimated Yearly Energy Cost
- Life
- Light appearance
- Energy Used

each is explained below:

BRIGHTNESS (LUMENS)

Lumens measure the amount of light produced, whereas watts measure the amount of energy required to light products. Simply put, the more lumens in a light bulb, the brighter the light. Lumen measurements are needed when comparing LED bulbs to other light sources. We now need to rethink how we measure light. Shopping by lumens will be more important than shopping by watts when choosing which LED bulb will work best. The chart below shows the lumens values for common incandescent bulbs:

Watts	Lumens
40-watt incandescent bulb	450 lumens
60-watt incandescent bulb	800 lumens
100-watt incandescent bulb	1600 lumens

It's important to note that lumens are measured at the source. However in directional bulbs, what matters is the amount of light that is landing on the surface...

LUMENS & DIRECTIONAL LAMPS. While lumens can be a guide to measure directional lamps, they do not tell the full story. Directional lamps are measured by the amount of light that gets to the surface you are lighting. This measurement is called footcandles. Directional lamps can come in different spreads—flood, narrow flood, and spot, to name a few. The light that is on the surface will look very different depending on the spread, but the lumen output can be the same. Most LED bulbs to this point do not have a footcandle measurement on the box, but we can help determine the best bulb for your situation.



ESTIMATED YEARLY ENERGY COST

Estimated yearly energy costs is included on the label to show approximately how much this bulb will cost you to operate per year. It is expressed in dollars and based on the average initial wattage, a usage rate of 3 hours per day, and 11 cents (\$0.11) per kWh.

LIFE EXPECTANCY OF THE BULB

The life of each lamp is included on the label. It is expressed in years rounded to the nearest tenth (based on 3 hours operation per day).

LIGHT APPEARANCE

The color temperature is expressed as “Light Appearance” on the label. The light appearance is usually described as “Warm White” or “Cool White.” This is measured in degrees Kelvin on a scale ranging from 2,600 K to 6,600K. Warm white is a lower kelvin temperature, giving a softer feel to a room- good for family rooms, living rooms, and bedrooms. A cool white is a higher kelvin temperature, giving a whiter brighter light- great for kitchens and task areas. When choosing what is best for you, consider your environment and the mood you want to convey.

The following is a guide to various color temperatures:

- Warm White: *typically from 2600 Kelvin to 3500 Kelvin*
- Natural White: *typically from 4000 Kelvin to 4500 Kelvin*
- Daylight White: *typically from 5000 Kelvin to 5500 Kelvin*
- Commercial or Cool White: *typically above 6000 Kelvin*

ENERGY USE

The wattage for each lamp is listed on the label and expressed as “Energy Used.” The lower the number the less energy it uses. Replacing a 60 watt incandescent bulb with an equivalent LED bulb will be typically 9.5 watts energy used.

ENERGY STAR LOGO

Products that comply with ENERGY STAR regulations will display the energy star logo on its packaging. LED bulbs that have earned the ENERGY STAR are subject to very specific requirements designed to replicate the experience you are used to with a standard A-type bulb, so they can be used for a wide variety of applications. [Click here to see more information on Energy Star products.](#)



COMPARE LED TO OTHER LIGHT SOURCES

LED lights differ from incandescent, halogen, and compact fluorescent lighting in several ways. They are more efficient, durable, versatile and longer lasting. Incandescent and halogen bulbs use a wire filament that is more sensitive to breakage making their life shorter (1-3 years). They also require more electricity to reach it's brightness. Compact fluorescents, although last longer than incandescent bulbs, have many disadvantages. They do not have an instant-on, causing it to flicker and heat up before reaching full brightness. They contain mercury which complicates their disposal. LEDs use light emitting diodes to produce light very efficiently. Electrical current passes through semiconductor material, which illuminates the tiny light sources we call LEDs. Many LED bulbs look like familiar traditional light bulbs making it easy to find replacement for your current bulbs. Some LED light fixtures may have LEDs built in as a permanent light source. For these fixtures, when the bulb goes out you need to replace the entire fixture. However, many of these fixtures have up to a 50,000 hour life expectancy.

DIMMING

Yes, you can dim LED! However, they do dim differently than incandescent bulbs. You must first choose the appropriate dimmer for your LED light. LEDs can flicker, or dim unevenly if you use the incorrect dimmer. Manufacturers specify which dimmers are compatible with their products. With incandescent dimming the color temperature will warm as you dim, some LEDs do not warm as they dim. If this is important to you , when choosing LED you must look for “warm dim” otherwise the bulb will dim in intensity only, not in color.

INTEGRATED OR REPLACEMENT LAMPS

LEDs bulbs are available for almost all incandescent and halogen light sources, making it easy to retrofit your existing fixture with LED ... just change the bulb. However when doing so, you have to consider several factors. 1. If you use a dimmer for your light sources, you must make sure it is compatible with the LED bulbs. 2. LED bulbs come in a variety of lumens and color temperatures depending on the manufacturer. This could be an issue when you have multiple light sources that need to emit the same light. 3. For enclosed fixtures it is important to check that the bulb is rated for use in an enclosed fixture. Some manufacturers do not rate their bulbs for enclosed fixtures so using the incorrect bulb can result in a premature failure of the bulb.

Choosing an integrated LED light fixture is becoming more popular. This means that the LED module is integrated in the fixture, making for a consistent light source in lumens, kelvin temperature and CRI. These fixtures usually have a long life of typically 50,000 hours. It is important to check on the life span and warranty when purchasing an integrated light fixture. Popular integrated light fixtures include recessed, under cabinet, decorative, and landscape lighting.



IMPORTANT FACTORS WHEN CHOOSING LED

LUMENS. To replace existing fixtures or bulbs you must understand the equivalence of wattage to lumens. This is important to continue the same brightness. Most packaging will show the equivalence from wattage to lumens. e.g. typically 9.5 watts LED is equivalent to 60 watts incandescent. Keep in mind, directional bulbs, with the same lumens can produce a different amount of light at the surface depending on the spread of the bulb.

COLOR TEMPERATURE or light appearance. The color temperature of a bulb will create the mood in a room. LED color temperature defines the amount of pure white, yellow, red and blue in a light. Color temperature is measured in degrees Kelvin. Another way to think of the color temperature is how ‘warm’ or ‘cool’ the white LED light is emitted. A “warm” color (similar to incandescent) is great for a family room or bedroom, and a “cool” color (similar to halogen) for a kitchen or work spaces.

CRI: Color Rendering Index. CRI is a measure of how well light sources render the colors of objects, materials, and skin tones and surfaces. The CRI measurement determines the ability to show object colors “realistically” or “naturally” compared to the source of incandescent light or daylight. It is rated on a scale from 1-100. The higher the CRI rating, the better accurately colors will be reproduced.

WARRANTY. As with any product that has a long life, check the warranty and what it covers. LED products usually come with a warranty rated by years or hours. LED bulbs and integrated LED fixtures may carry different warranties.



Photos Courtesy of Feiss



PLACES TO USE LED

It is becoming easier to find great quality LED fixtures of all types for your home or office. For existing fixtures, making the switch is easy by replacing the current bulb with the right LED bulb.

Using LED has become very popular in rooms where you may leave the lights on for extended periods of time, like kitchens, family rooms, bathrooms, and finished basements (where lights are sometimes forgotten about!)

LEDs are perfect for places that are hard to reach or fixtures that are difficult to change bulbs, including recessed and track, shower lights.

Because LEDs are cool to the touch, they are great for under cabinet, closets, and hall/step lights.

Outdoor is an ideal place for LED, both decorative and landscape lighting benefit using LED.

1. For its efficiency—many of us leave outdoor lights on for hours.
2. For its instant-on—compact fluorescents need to heat up before full brightness, LED have an instant-on to full brightness, even in cold weather.
3. For its “no bug” attractions—Bugs are attracted to ultra violet light, as this is the only light in the spectrum their vision can detect, much like the light produced by the sun. Unlike LEDs, both incandescent and fluorescent lights give off ultra violet light. Bugs are also attracted to heat, since LEDs do not produce heat, bugs are not attracted to it.

THE COST OF LED

LED is still a new technology, so producing a quality product can make the expense fairly high. Luckily, pricing has come down dramatically in the past several years and prices are expected to continue to drop. Because of this, it has made LEDs a cost effective choice for home lighting. Considering whether LEDs are worth the extra up front cost, you need to look at the cost to operate a bulb in addition to the savings of replacement costs. The energy savings realized by switching to LED means that the extra up-front cost is often paid back rather quickly, and you'll wind up saving money over the life of the bulb.

VISIT OUR LED CENTER

A.D.Cola Lighting created an interactive LED center to educate you on the variety of ways you can use LED lighting in your home. Experience hands-on how LED bulbs will look compared to incandescent light sources. We carefully choose each LED light and bulb that we offer including all the best manufacturers and products, so you can feel confident when choosing LED products from our showroom. As LED is changing the lighting industry, we feel it's important to be a leader in LED. We continually educate ourselves as new products develop. Please contact us with any questions.



We hope you found this guide helpful. Lighting is what we do. At A.D.Cola Lighting we understand the importance lighting has on your home and business. Our continued training and knowledge of new and innovative products enables us to give you the best advice in lighting. Combine that with our large selection of top brands and we are able to complete your project of any size. At A.D.Cola Lighting it is our dedication to lighting that sets us apart from others. Exceptional customer service and our lighting knowledge enables us to give the best in your lighting experience.



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