

Solar Powered LED Lighting...

inefficient, power hungry and low brightness lamps!!!

LEDs are much less efficient than halogen filament lamps and thousands of times less efficient, than other form of lighting.

So why are people buying them for lighting purposes???

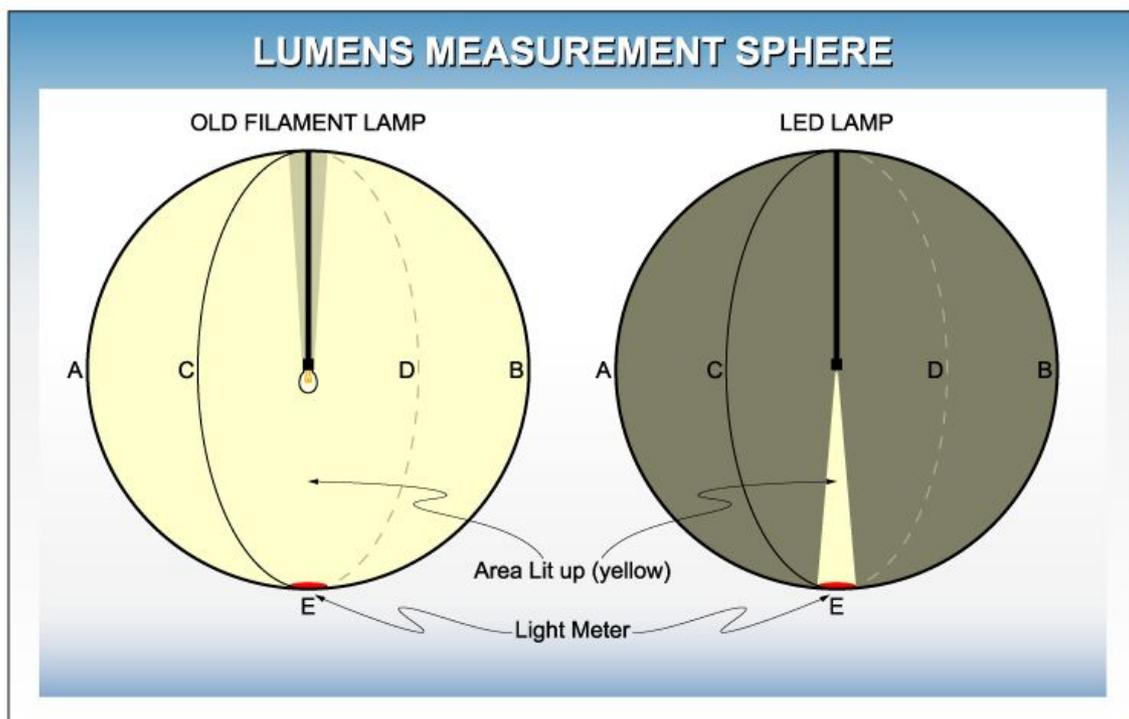
The problem is due to the clever manipulation of the measurements, of brightness and power, by the manufacturers and misleading information.

When stating how bright a lamp is, Lumens of brightness is the total brightness of Luminous Flux coming from the light source. No lens, mirrors or reflector can be used. Just the bare light source is measured. Only visible light is measured.

For example;

A Modern Filament lamp, with Halogen, is far brighter than the Old Filament lamps of the last Century. The old Filament lamp, is the ONLY form of lighting, with very low efficiency. So compared to this, the LED does not appear so bad. *(But only compared to this very old type of lamp.)*

Here is how the newest LED light, was compared to an old fashioned type of Filament lamp, from the last Century.



Both lamps are measured in the same way. The small sensor, part of the Light Meter is placed a distance of 1 metre from each lamp at E in the diagram. A, B, C and D are Not measured.

The LED has a plastic lens which focuses ALL of the light into a very small spot. All of this light is focused onto the Light Meter. There is NO light outside this small spot. A, B, C and D are in Darkness, so the TOTAL light output reaching A+B+C+D+E, is being measured at the sensor with this small spot E, Not just the light that would have reached this area without the Lens.

The Filament lamp is measured without any lens or reflector, so the light is NOT focused on the light sensor E. *(If the same lens was used as in the LED, the Lumens would appear 14 times More, as they do with the LED Lens.)* Only a very small proportion (1/14) of the light reaches the sensor E and is measured, because the 'Lens' is Not used. The surrounding area A, B, C, D and the rest of the sphere, in ALL Directions is lit with equal brightness, to that reaching the sensor E but is NOT measured.

So the result given is the TOTAL Brightness of A+B+C+D+E from the LED, compared to a only 1/14 of the light, from the Filament lamp. Even so, the LED still only compares to 55 Lumens per watt *(without lens, Really only 4 Lumens per Watt)*, when measured in this unfair comparison. The modern, Halogen Filament lamp, still measures 55 Lumens per watt ALL Around, A, B, C, D and the rest of the sphere are lit.

By using this comparison, claims are made, that the LED is equivalent to 55 Lumens per watt.

You can also see how they make claims of differing Lumens per watt, against the angle of the Lens on the LED. If they use a wider angle of lens, then less light is concentrated on the sensor. This is NOT a measurement of the 'TOTAL LUMENS OF LIGHT' at all.

Calculating and comparing brightness of Lamps.

In defining how bright something is, we have two things to consider.

1. How bright it is at the source - How Bright is that light? Measured in LUMENS
2. How much light is falling on something a certain distance away from the light. Measured in LUX

Lets' do some definitions now.....

We're going to talk about "foot-candles". An outdated measurement but easier to explain.

This one's simple. Get a birthday cake candle. Get a ruler. Stick the candle on one end of the ruler. Light the candle. Turn out the lights. Sing Happy Birthday. OK, quiet down. Enough of that nonsense. One "foot-candle" of light, is the amount of light, that a birthday cake candle generates, one foot away in ALL Directions.

That's a neat unit of measurement. Why? Say you have a lamp. You are told it produces 100 foot candles of light. That means at one foot from the lamp, you will receive 100 foot candles of light, in any direction.

But here's where it gets tricky. The further away you move the light, from what you want to illuminate, the less bright the light seems! If you measure it at the light source, it's just as bright. But when you measure at the object you want illuminated, there is less light! A Physics teacher is going to tell you that light measured on an object, is INVERSELY PROPORTIONAL, to the distance the object is, from the light source. That's a very scientific and mathematical way of saying, the closer you are to the light bulb, the brighter that bulb appears. Or, think of it this way. You can't change how much light comes out of your light bulb. So, to make more light on an object, you have to either move the light closer, or add more lights.

Now, lets get to LUMENS.

A LUMEN is a unit of measurement of the Total amount of light produced. It measures light much the same way. Remember, a foot-candle is how bright the light is one foot away from the source.

A LUMEN is equal to one foot-candle falling on one square foot of area in ALL Directions.

So, if we take your candle and ruler, lets place a book at the opposite end from the candle. We'd have a bit of a light up if we put the book right next to the candle, you know. If that book happens to be one foot by one foot, it's one square foot. Ok, got the math done there. Now, all the light falling on that book, one foot away from your candle equals both.....1 foot candle AND one LUMEN!

Ahh, we've confused you. Let's split off from this and talk about the difference between RADIANCE and ILLUMINANCE.

RADIANCE is another way of saying how much energy is released from that light source. Again, you measure it at the source. Unless you're talking about measuring the radiance of something intensely hot, like the Sun. Then you might want to measure it at night, when it's off.

ILLUMINANCE is what results from the use of light. You turn your flashlight on in a dark room, and you light something up. That's ILLUMINANCE. Turning on a light in a dark room to make the burglar visible gives you ILLUMINANCE. It also gives you another problem when you note the burglar is pointing a gun at your bellybutton.

Illuminance is the intensity or degree to which something is illuminated and is therefore not the amount of light produced by the lightsource. This is measured in foot-candles again! And when people talk about LUX, it's illuminance measured in metric units rather than English units of measure. To reinforce that, LUX is the measurement of actual light available at a given distance. A lux equals one lumen incident per square meter of illuminated surface area. They're measuring the same thing, just using different measurement units.

Pretend you're an old photographer, like O. Winston Link, or Ansel Adams. These two gods of black and white photography (and a print made by either can fetch quite a hefty sum of money these days) used a device called a light meter to help them judge their exposure. (There is another way of judging exposure - that's when someone whispers in our ear at a cocktail party, "You silly twit, your fly's come undone!").

These light meters were nifty devices. You could use it to show how much light was falling on an object, light from the sun, and reflected light energy from every thing else. Or you could use it to show how much light energy was reflected off the object itself.

All this brings back two points.

The first point is if we measure the output of a light at the source that gives us one thing, Lumens.

The second point is that we use an entirely different unit of measure if we are measuring the results of that light's output, Lux.

GOT IT ?