The ABC of LED lighting

Our cut-out-and-keep series to assist retailers with product knowledge

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There's no doubt that LEDs have revolutionized the outdoor lighting market. But they've also introduced a fair bit of confusion! As the technology has advanced, so consumers have been bombarded with a stream of new terminology, from all the different types of LED (Cree, Luxeon, Super Bright, Single Power, Double Power, Triple Power) to the measurement of the light output (lux, lumens, candlepower, watts), not to mention a host of related concepts such as regulated power supply and IPX 7 waterproof ratings. Pretty bewildering, eh?

This article will bring you up to speed with current LED terminology, as well as advise on what are the most important features to focus on when selling a lighting product.

LED stands for light-emitting diode. It uses electricity to create light, much like an incandescent or fluorescent bulb, except the difference here is that the electricity is passed through a tiny semiconductor chip rather than a wire filament or gas.

Does it make a difference?

You bet. Not only is the semiconductor chip much smaller than traditional light bulbs, it's stronger and more energy efficient. For this reason LEDs are now found in a number of everyday applications: car brake lights, traffic lights... and torches and headlamps.

Benefits

So, convincing the customer of the benefits of buying a product with LEDs shouldn't be a difficult task.

- After all, it's smaller, which means less weight in their pocket or backpack.
- It's more efficient, which means less money spent on new batteries.
- And its superior durability and longevity means they will never have to replace the diode, as you do with conventional bulbs.

More challenging, however, is the multitude of different models and features now available. In order to help the customer find the product that best suits his or her needs, you need to be able to make sense of the blurb on the packaging.

What's in a name?

Potentially one of the biggest stumbling blocks is all is the different types of LED: Cree, Luxeon, Triple Power, etc.

My advice? Don't get too bogged down here – just explain that it's the make or model of the diode.

In the same way that the majority of people aren't too concerned about the internal components when they purchase a computer (they ask for an Apple or an HP, not the one with the Intel chip), there aren't many customers who really care whether a particular torch uses a Cree XP-G R5 or Luxeon III LED.

Far more useful when selecting an LED product are the following four factors:

1 How bright is it?
2 How far does the beam reach?
3 How long does it run off a set of batteries?
4 Is there some sort of a warranty ?

Brightness

There are a number of different ways to measure light output, or brightness – but essentially it refers the amount of light perceived by the eye.

- The light bulbs we use in our homes are rated in watts. LED manufacturers, however, have settled on a unit called the lumen. Don't lose sleep about the scientific explanation – it's pretty much gobbledygook to those of us who don't wear white lab coats to work, but an easy way to explain it is when you look at a full moon on a dark night, that full moon equals +/- 1 lumens.
- Like all units (kilograms, gigabytes, degrees Celsius and so on), a lumen is really just a way of comparing one thing with another, in this instance the brightness of an LED product. So, with that in mind, what's bright and what's not?
- As a rule of thumb, torches and headlamps that are rated below 20 lumens are considered low brightness – they'll get you to the ablution block in the middle of the night, but not much else;
- 20-30 lumens is medium brightness, more suitable for general use around the campsite or home;
- Hikers, who may need to locate a path or cairn on a dark and stormy night will require something brighter, typically in the 40-100 lumen bracket;
- Trail runners, adventure racers and mountain bikers, who need a bright beam because they're moving fast, will be better off with a light that's rated between 50-150 lumens;
- You do get torches that are rated higher than this, some up to several hundred lumens, but these are dazzlingly bright and best suited to security or tactical applications (blinding intruders or raiding Al Qaeda strongholds)... or showing off to your mates around the campfire.

Beam distance

But brightness isn't the only indication of performance. Take the Black Diamond Icon and the Black Diamond Storm. Both headlamps are rated to 100 lumens, yet the Icon's beam reaches 30 metres further than the Storm's (100 metres versus 70 metres).

Why? Because the reflector is constructed differently, so it's able to project the same amount of light further.

- For folk who just want to light the campfire or read in the tent this isn't an is- **To p28**

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sue. But for activities where people need to see far into the distance — think trail running or adventure racing — a far-reaching beam is essential.

- When discussing beam distance with the customer, it's important to also point out that most new-generation torches and headlamps come with variable beam strength settings. In other words, they can choose if they want a high-, medium- or low-strength beam (usually by repeatedly clicking or holding down the power button after you've turned it on).
- This is important for two reasons. Firstly, while the full-strength beam might be good for checking what went bump in the night, it can be too dazzling for close-up activities like reading or cooking.
- Secondly — and this is really important — it also drains batteries faster. It's much more economical to use a light on medium or low-strength beam, only clicking to max when it's really needed.

Battery life

A number of manufacturers have started putting the battery life on the packaging. Also known as the *burn time*, this indicates how many hours of light you can expect off a set of batteries.

- It's important not only because it gives an idea of how often you will need to buy new batteries;
- For cavers, hikers and other outdoor enthusiasts who spend time in a wilderness environment, there are also important safety implications. For example, if you are caught in a storm and trying to find a cave to shelter in, a dead torch could be the difference between a warm night's sleep and shivering in the cold (or worse).
- Of course, given what we've just discussed about different beam settings and battery life, burn times can obviously vary.
  - o The problem is that manufacturers have a habit of displaying the maximum battery life (i.e. when the torch is used on the most economical setting, say 250 hours) next to the maximum brightness (e.g. 100 lumens), which can be misleading.
  - o The reality is that used on max beam the batteries may only last 50 hours — make sure the customer understands this.
  - o The problem is exacerbated by the fact that different manufacturers tune their chips differently; most of the bigger name outdoor brands tend balance output (beam brightness) with battery consumption — trying to give a good usable light for as long as possible. There are a couple of manufacturers however, who calibrate the chips to give an impressively bright light when the batteries are new, but they draw a lot of power causing the batteries to fade much more quickly. The user needs to decide what will suit him best for the activities for which he intends to use the lamp.

Splash! IPX rating

Because many customers use LED lighting outdoors, they may be interested to know if a product is water resistant or waterproof. Hikers, for example, sometimes end up walking in the rain, while adventure racers may need to do a nighttime river crossing.

- Terms like *splashproof* and *stormproof* sound good, but actually don't tell you much, which is why most manufacturers now use an international standard called the IPX rating.
- With lighting products you will mainly encounter IPX 4, which means that water can be splashed over the item indefinitely (so it's fine for use in the rain),
- An IPX 7 rating means the unit can be submerged under one metre of water for 30 minutes, so it is therefore considered waterproof.

Other features

It will help your customers if you can also explain the following important features to them.

Useful light: New developments in electronics have seen the advent of torches and headlamps with a regulated power supply. Essentially what this means is that the flow of electricity is controlled, in the same way that a dam controls the flow of a river, so that the LED delivers a more consistent level of light throughout the lifespan of the batteries. Products with regulated power are more expensive, but they guarantee a longer period of useful light (versus a torch that shines brightly at first, but fades quickly as the batteries become drained), so there are definitely customers who will be prepared to spend the extra money.

I'm seeing red: One feature that has become increasingly popular with LED torches and headlamps is the option of having a red beam. This is not intended to make the customer's camping experience prettier; instead, it's about functionality: red light isn't as harsh as white light, so it's easier on your eyes. It's a good choice for people who need to preserve their night vision, such as hunters.

Some headlamps come with dedicated red LEDs (e.g. Petzl Tikka Plus 2 or, Tikka XP2), while others come with coloured filters that clip over the lens (e.g. Princeton Tec Quad Tactical).

SOS! flashing: Also common is flashing mode, where the LED blinks continuously. This is a safety feature and is intended to help alert rescuers if there's been an emergency, such as a hiker who has broken her leg. If you've been involved in a car crash it's also an excellent way to warn oncoming traffic that there's an accident scene.