

FLASHLIGHT RUNTIMES

WHAT THOSE NUMBERS REALLY MEAN IN REAL LIFE

BY RICHARD JOHNSON



Flashlights are indispensable illumination tools and should be carried by anyone who chooses to carry a firearm. Many self-defense encounters happen in low-light or no-light conditions. Without a flashlight, you may be unable to properly identify your target. That could lead to a preventable tragedy.

While any flashlight is likely better than no flashlight, there are vast differences among modern torches. Some companies use quality

materials and offer great performance, while others mimic the look but not the quality.

One of the biggest areas of concern for me is runtime. Runtime is a frequently listed specification on flashlight packaging, but I'm betting you don't know what it really means. Even if you do understand it, it can still be gamed by unscrupulous companies.

■ SPECIFICATIONS

Pick up a flashlight package in your local store and you will

likely see a variety of specifications listed: output, beam distance, impact resistance, runtime and more. Each of these specs is supposed to convey tangible information you can use to compare different lights. Here's a quick overview of the common specifications you might see.

Light output: This is the entire amount of light a flashlight puts out. It is measured in lumens.

Peak beam intensity: This is a measurement of the

brightest spot of the flashlight beam. It is measured in candelas. A higher number indicates a brighter point and is suggestive of a tighter beam.

Beam distance: How far a beam will project 0.25 lux of light, 0.25 lux being an amount of light that is equivalent to what a full moon on a cloudless night would project.

Impact resistance: Measured in meters, this is the height from which the flashlight can be dropped and continue functioning.



Water resistance: Typically listed as an ingress protection (IP) number, this is an indication of how well the flashlight is sealed against water intrusion. Some lights are submersible, while others are just splash-resistant.

The final specification typically listed is runtime.

■ RUNTIME

Of all the specifications offered about flashlights, runtime might be the most misunderstood. Sadly, some

manufacturers seem to take advantage of that to inflate the perceived capabilities of their flashlights.

Consider this scenario: When searching for a new flashlight, you examine the packaging of a light that claims it is capable of 1,000 lumens of output and a runtime of two hours. You might reasonably infer that means the flashlight will put out 1,000 lumens of light for two hours. You'd be wrong.

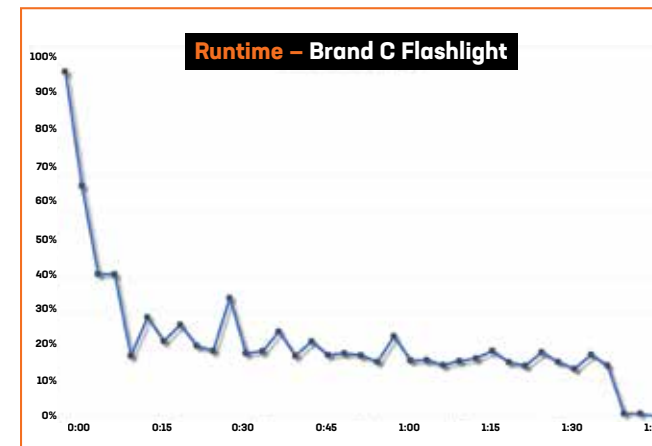
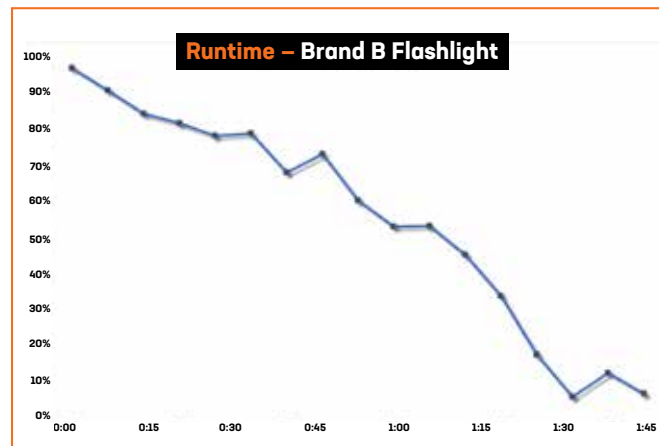
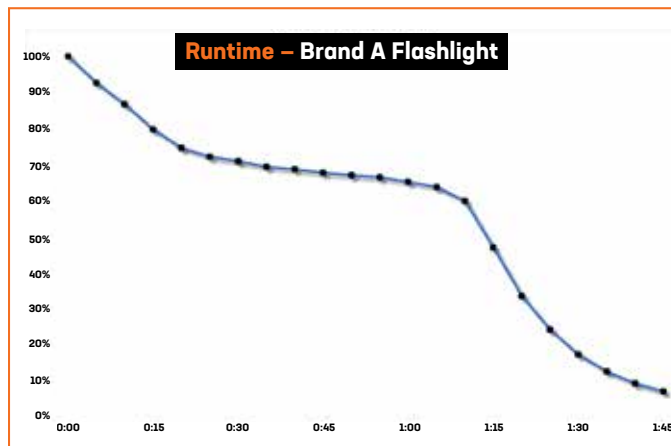
The generally accepted standard for measuring runtime is the total time the flashlight is constantly on from the initial output until the light output dwindles to just 10 percent of the initial output. In other words, the

Have you practiced what you'll do if someone breaks into your home? What will your spouse and children do? Plan ahead and practice now, before it's too late.

runtime has little to do with maintaining the rated output.

Under this standard, a light could output 1,000 lumens for five minutes and then drop to 100 lumens for 115 minutes, to claim a 1,000-lumen output and two-hour runtime. Although these specifications might be considered legitimate, would you feel misled?

I believe one can only understand a true runtime by graphing the output over time. In this manner, you can see exactly how much light is generated during the life of



the batteries. With a graph, you can immediately see if a light's output falls off a cliff or maintains a respectable level.

I should note that manufacturing variances can affect output and runtime. I've spoken to one flashlight developer who claimed that LED modules from a reputable manufacturer can vary in output by as much as 10 percent. Likewise, batteries can impact flashlight performance when capacity and voltage vary from their ratings.

■ TALE OF THREE LIGHTS

To illustrate the above problems with the runtime specification, let's take a look at three different flashlights. All of these flashlights are popular models, and all are rated by their manufacturers with a total light output of 600 lumens. Brand A has a runtime of 1.5 hours, Brand B has 1.23 hours and Brand C has 2.5 hours.

All three flashlights are of the same general size and price range. Each of the manufacturers is well known in the shooting industry. Each of the lights is rated with slightly different runtimes. Based only on the output and runtime specifications, I'd venture to guess most people would purchase the Brand C light.

Knowing that the runtime specification can be gamed, I tested each of these lights in an integrating sphere. An integrating sphere is a tool that allows you to measure various characteristics of a light source such as a flashlight. In this test, I measured light output over time relative to the initial output.

The manufacturer of the Brand A flashlight states a total output of 600 lumens and a runtime of 1.5 hours. The flashlight exceeds the 1.5-hour runtime specification. However, note that total output drops below 50 percent of the



Have you practiced what you'll do if someone breaks into your home? What will your and.

initial output at about 1.25 hours.

In my experience, this flashlight's output over time is better than that of many comparable flashlights in its price range. Nevertheless, it does not maintain close to 100 percent of the rated output for the duration of the runtime.

As with the first light, the Brand B flashlight was rated for 600 lumens of total light output. However, the runtime was listed at a shorter 1.25 hours. The flashlight maintains the 50 percent light output level for less than one hour and drops below the 10 percent level short of the rated runtime. Keep in mind that reported variances in LED and battery manufacturing may account for the failure to achieve the rated runtime. Regardless, the graph again illustrates the problem with the runtime specification marketing.

The flashlight from Brand C is rated for

the same 600 lumens, but with a longer 2.5-hour runtime. However, it drops to about 20 percent of its initial output in less than 30 minutes. At that point, it hovers there for a little more than two hours. This flashlight clearly demonstrates how a company can achieve a high output rating and then drop output to much lower levels to stretch the runtime for marketing purposes.

Looking at these graphs, you can quickly determine which light may be best for your purposes. However, if you looked at just the specifications on the packages, would your purchase decision be the same?

■ FINAL THOUGHTS

Flashlight runtime specifications are a little like horsepower ratings on muscle cars in the 1960s: subject to abuse and inflation by marketing teams. With the current industry standards, there is no way of knowing how well a flashlight will perform over a period of time.

In general, I recommend treating all runtime specifications with a healthy dose of skepticism. Likewise, be cautious of any online review you see on flashlights. Many of the China-based companies are pushing hard with marketing efforts and pressuring reviewers to give glowing reviews of their products. Even the reviews on the large Internet shopping platforms are being gamed and cannot be trusted.

It would be great if companies listed runtime charts for their products, but don't hold your breath. In the meantime, I recom-

end staying with the reputable brands that have been in the law enforcement and shooting markets for years. I have found these lights tend to offer solid performance you can depend on. **PDW**

“
While any flashlight is likely better than no flashlight, there are vast differences among modern torches.
”