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A  
**FLASHAHOLIC'S**  
Guide to LED Flashlights

A Coast Products Resource

[www.CoastPortland.com](http://www.CoastPortland.com)

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# Introduction

**U**sed to be, a flashlight was a flashlight. As long as it had a bulb, a handle and an on/off switch, you could pretty much count on it to accomplish whatever task needed doing.

Not so anymore. Flashlight technology has evolved to the point where you almost have to be an engineer to understand the differences between models.

With a mind-boggling array of options to choose from – presented in packaging smeared with confusing terminology and unsubstantiated claims – many consumers simply give up and make their decision based on price.

However, if you've ever bought the cheapest flashlight available only to have it break the first time you took it camping, or if you've ever spent \$80 on a high-end torch but were disappointed with the light it shed, you know that going by price alone is one of the worst ways to choose a flashlight.

This is especially true of LED flashlights. Introduced a decade ago, LED flashlights have quickly become the new standard in handheld lighting.



**With a reputation** for being brighter, more rugged and longer-lasting than their incandescent counterparts, these energy-efficient torches represent some of the latest in portable light technology. Yet the more widespread acceptance LEDs have gained, the more the market has become flooded with poorly constructed flashlights that don't live up to their manufacturers' claims.

Unfortunately, shopping for an LED flashlight is made even more confusing by the fact that manufacturers often use a variety of different terms to measure the performance of their flashlights, making it nearly impossible to compare features from brand to brand. Although a group of flashlight companies banded together two years ago to create a set of [uniform](#)

[performance standards](#) to make choosing a flashlight easier, these standards are strictly voluntary and can be just as confusing to consumers who don't know what they mean.

**“There are two kinds of light: the glow that illumines, and the glare that obscures.”**

— James Thurber

This book aims to help you make an informed decision about the best type of LED flashlight for your

needs. Whether you're shopping for a basic torch for home emergency use or a high-performance flashlight to light your way on a backpacking trip, the following pages will help you understand how to compare different models to get the best LED flashlight for your money.

# How to Use this Guide



**T**his book doesn't make any specific flashlight recommendations, nor does it draw any definitive conclusions about what type of flashlight you should buy. That's because the features you need will depend heavily on how you plan to use the torch. Instead, this book seeks to explain what all that packaging mumbo-jumbo means so you can make an informed decision.

In the following pages, you'll be bombarded with a lot of technical information. By the end, your head may be spinning as you try to decide whether you're any closer to figuring out what type of flashlight you want. The important thing is to home in on what's most important to you and stay focused on your goals by keeping the following in mind:

**Type of use.** How you plan to use your flashlight will help determine which features are essential and which ones you can give up. Is it for general home use, or are you gearing up to survive a major disaster? Are you a casual hiker and

camper, or are you planning a long-distance backpacking trip? Do you intend to take your flashlight hunting, fishing, boating, rock climbing or spelunking? Will you be using it in extreme weather? Your answers to these questions should guide your decisions on everything from [brightness](#) to [water resistance](#) to [battery type](#).

**Price vs. value.** Buy a cheap flashlight, and that's exactly what you're likely to get. But that doesn't mean you'll be better off shelling out top dollar. Instead of price, think in terms of value. A good value is the price point at which more money does not buy you a significantly better flashlight.

**Size.** In some cases, you may have to settle on a heavier, bulkier flashlight in order to get the features you need. Other times, a compact size may be the most important feature. Figure out what size best suits your needs, and decide how far you're willing to compromise.

# Flashlight Standards Explained



**U**ntil recently, there has been no standardized testing procedure or uniform system for rating a flashlight's features. In order to make comparing flashlights easier, a group of leading companies within the industry collaborated to create a set of standards for indicating flashlight's performance. When shopping for an LED flashlight, you can use these ratings to help determine which model is best for you.

Made official in 2009 by the American National Standards Institute and the National Electrical Manufacturers Association, these ratings are commonly known as the ANSI FL1 Standards and apply to hand-held portable flashlights, spotlights and headlamps. They're used to measure a flashlight's performance based on several key factors: light output, beam distance, run time, peak beam intensity, impact resistance and water resistance.

In the following pages of this book, you'll find a detailed explanation of what each of these standards measure and what they mean to you.

## What you should know about the FL1 Standards:

- **They're are strictly voluntary**, which means not all manufacturers use them. However, many leading companies have chosen to adopt them.
- **Flashlights that feature** FL1 Standards ratings display the information using an easily recognizable logo. [View a chart of all FL1 logos.](#)
- **Flashlight companies** are allowed to conduct their own testing, but they must follow specific procedures.
- **Each manufacturer can choose** which FL1 Standards they wish to apply to their products; however, if one claim is made based on these standards, all other claims presented on the packaging must also adhere to the FL1 Standards.

## FL1 Standards Logo Chart

Standard	Measured in	Test requirements	Logo
<p><b>Light Output</b></p> <p>The total amount of light a flashlight generates, without regard to focus, direction or quality of the beam.</p>	Lumens	If the flashlight has multiple brightness or beam focus settings, it will be tested at the setting that provides maximum light output. Output must be measured using a new set of batteries.	
<p><b>Beam Distance</b></p> <p>The distance at which a flashlight produces a useful amount of light - 0.25 lux, or roughly equal to a full moon “on a clear night in an open field.”</p>	Meters	Measurements must be taken within 30 seconds to two minutes of turning on the flashlight and must use the same new batteries as packed with the light.	
<p><b>Run Time</b></p> <p>The continuous length of time the flashlight can run on a single set of batteries, measured from 30 seconds after it’s switched on until the light reaches 10 percent of its initial output.</p>	Hours and/or minutes	Run time must be measured using the same new batteries as packed with the light.	

## Flashlight Standards Explained

Standard	Measured in	Test requirements	Logo
<p><b>Peak Beam Intensity</b></p> <p>The intensity of a flashlight's beam at its brightest point.</p>	Candelas	Must be measured within 30-120 seconds of turning on the flashlight and from a distance of at least 10 times the largest dimension of the flashlight's lens or output height or width.	
<p><b>Impact Resistance</b></p> <p>The distance a flashlight can be dropped onto concrete and remain fully functional, without visible cracks or breaks.</p>	Meters	The flashlight must be dropped onto concrete six times with all components (such as batteries) included and remain fully functional, with no visible cracks or breaks.	
<p><b>Water Resistance</b></p> <p>The ability to be splashed from all sides with water and remain fully functional.</p>		The flashlight must function normally both immediately after and 30 minutes after the test.	
<p><b>Waterproof</b></p> <p>The depth to which a flashlight can be submerged. Indicates at least an IPX7 rating; sample is submerged to a minimum of one meter for 30 minutes.</p>	Meters	The flashlight must function normally both immediately after and 30 minutes after the test.	

# Light Output



## Light Output

The total amount of light an LED flashlight generates, without regard to the focus, direction or quality of the beam.

**Measured in:**  
Lumens

*See FL1 Standards chart*

**A weak flashlight beam** may be sufficient for inspecting a tripped circuit breaker, but when you're in the woods at night it's a different story. That's why, for most people, the first factor to consider is a flashlight's brightness, or light output.

Once upon a time, a light bulb's brightness was indicated in watts. Watts actually measure the amount of energy the bulb uses, rather than the amount of light it emits, but consumers became accustomed to gauging how much brightness they could expect based on wattage.

That was when most flashlights used incandescent bulbs. With LEDs and other energy-efficient options on the market, all of your watt-based expectations have flown out the window. LEDs produce more light using fewer watts than a traditional bulb, which makes for an apples-to-mangoes comparison.

Instead, a flashlight's output is now expressed in lumens. Lumens measure the total amount of light energy produced by a bulb, without regard to the quality or direction of the beam.



## Lumen

One lumen equals the amount of light produced by a single birthday candle positioned one foot away from you. A hundred lumens would be roughly as bright as 100 candles one foot away.

*See full glossary*

## How Many Lumens Do I Need in a Flashlight?

Lumen counts in LED flashlights run all over the map. A small keychain light might yield only one or two lumens, while a high-performance tactical torch can emit upwards of 1,000. Most flashlights on store shelves, however, fall within the 10-100 lumen range.



The number of lumens required for a specific task can depend on many factors, but 30 lumens are usually sufficient for general use, such as lighting up a hiking trail or fixing a car engine. For cycling at night, a minimum of 200 lumens is recommended, while tactical flashlights, such as those used by the police and military, typically start at 100 lumens and go up from there.



When comparing flashlights with multiple brightness settings, keep in mind that the lumen rating generally indicates how much light the device produces on its brightest setting. It may be worthwhile to ask about the product's minimum lumen rating (the amount of light given off on the dimmest setting) to ensure you get the range you're looking for.

## What Lumen Ratings Won't Tell You

While lumens can give you a basic idea of a flashlight's relative brightness, it's unwise to choose a flashlight based on lumen count alone. There are many other factors that contribute to a flashlight's performance, which is why a model can have the highest lumen count on the shelf but still throw a disappointing beam. Here's what you won't learn from the lumen rating:



### How the lumens were measured.

Ten different manufacturers could produce the same exact LED flashlight, yet each end up with a different lumen count. That's because the measurement can vary depending on the method of testing used. If you want a truly accurate comparison, look for products whose lumens are displayed within the FL1 Standard logo – these flashlights have been tested using a specified procedure to ensure consistency.

### How intense the light is.

It may seem like splitting hairs, but light output and intensity are two different things. For example, two flashlights may feature the same lumen count, but one might throw a wider, diffuse beam over a greater area, while the other might focus the light into a smaller, more intense spot beam. To get the full picture, consider the flashlight's [peak beam intensity](#) as well.

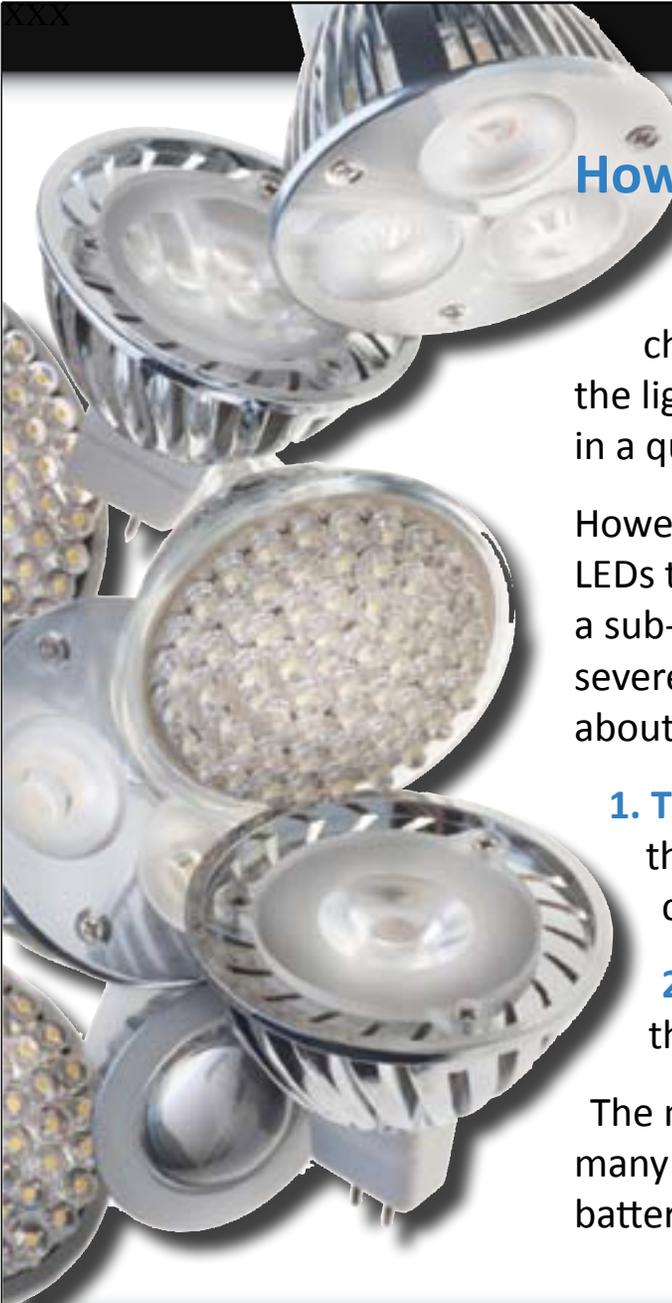
### How effective the flashlight's optics are.

Even if two LED flashlights have the same lumen count, they may not produce equal light. Many manufacturers will combine a high-quality LED chip with a cheap reflector, resulting in a weak, spotty beam. Some use no optics at all and simply allow the light output to be driven by the performance of the LEDs. An advanced optics system is required to focus the light into the most usable beam pattern. Look for a flashlight with a cutting-edge optics system, such as the Coast Pure Beam™ Focusing System and Max Beam Technology.

### How far the beam will penetrate.

If you're concerned about how far away your flashlight can illuminate an object, don't look to lumens alone for the answer. A flashlight's ability to project light on distant objects is largely determined by the quality of its beam-focusing optics. A well-designed torch with fewer lumens can produce a longer beam than a poorly designed flashlight with more lumens.

However, even [beam distance](#) doesn't give you the full picture. The usable beam pattern must also be taken into account. A light can be engineered with very tight optics that will throw a beam a considerable distance but will be too narrow to be useful. Consider a laser beam, which has a very tight focus but is not usable as a flashlight. A more reasonable approach is to look for an optics system that gives you both beam distance and a good beam pattern closer in.



## How Many LEDs Are Enough (Or Too Many)?

In order to exceed the brightness of an incandescent bulb, most high-powered LED flashlights employ multiple LED light chips. The reflectors within the device's optical system then gather the light and focus it into a single beam. At least, that's what happens in a quality flashlight.

However, some manufacturers of inexpensive flashlights use multiple LEDs to achieve a high lumen count but place them in a flashlight with a sub-par optics system, resulting in a weak or spotty beam. To avoid a severe case of buyer's remorse, there are two things you should note about LED count:

- 1. The superiority of the beam** isn't determined by how many LEDs the torch has; rather, it's determined by the quality of the LED chips and optical system.
- 2. The more LEDs a flashlight contains,** the faster it will go through batteries. This can severely affect a flashlight's [run time](#).

The moral of the story: Be wary of a cheap flashlight that touts how many LEDs it has. You'll probably get a shoddy beam that drains batteries like nobody's business.

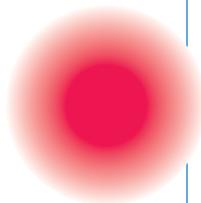
## Different Beam Colors and their Uses

When most people think of flashlights, they picture a standard white beam – the ideal color for all-around brightness and general use. However, thanks to advances in LED technology, some flashlights can also produce different colored beams for specialized applications. Here’s a look at some of the available colors and when they come in handy:



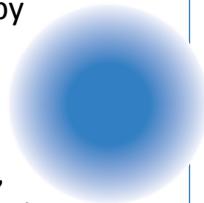
### Red lights

are useful when you want to preserve your night vision, such as when traveling to a hunting location. They’re also helpful in smoke-filled environments and can be attention-getting as an emergency signal; however, they can also make it difficult to see red markings on a map.



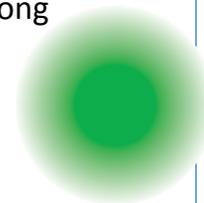
### Blue lights

are often used by hunters when following blood trails left by injured animals, as they can reveal traces of blood that are harder to spot under a white light. Blue lighting is also adept at cutting through fog.



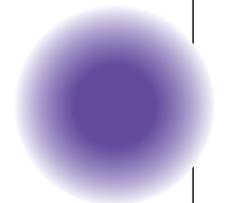
### Green lights

are popular among hunters and fisherman because they are less likely to spook fish or game. Unless viewed straight-on, green light is harder to detect than white light.



### Ultraviolet lights

can be used to recharge luminescent items, such as watch faces, compass needles or luminescent fishing lures. However, they can be harmful if shone directly in the eyes.



# Beam Distance



## Beam Distance

The distance at which an LED flashlight produces a useful amount of light (0.25 lux, or roughly equivalent to a full moon “on a clear night in an open field”).

**Measured in:**  
Meters

*See FL1 Standards chart*

**Lumens are like brains:** It’s not just about how many you have; it’s about what you do with them. A quality LED flashlight will use beam-focusing optics to make the most of the light it produces, while a shoddy model may provide plenty of lumens but still emit a weak glow.

When discussing beam distance, it’s important to differentiate between two things:

- 1. How far away** the beam can be spotted from a distance.
- 2. How far away** the beam can illuminate an object you are looking at.

Some flashlight manufacturers make extravagant claims such as, “Can be seen from over two miles away!” This implies that if you are stranded in the wilderness, your flashlight will act as a beacon for any searchers within a two-mile radius. This may or may not be true – beware of such vague and unsubstantiated claims – but it doesn’t give you a reliable picture of how well the flashlight can light up a far-away object.

## Meters to Feet

To calculate beam distance in feet, multiply by 3.28.



## Lux

A measurement of light intensity over a given area (also known as lumens per square meter); 0.25 lux is considered a useful amount of light.

*See full glossary*

## Beam Focus: Spot vs. Flood

Of course, a highly focused flashlight isn't always a good thing. For that reason, there are two main types of flashlights – spots and floods – and the one you should choose depends on how you plan to use it.

Some of the best LED flashlights allow you to switch back and forth between a flood and spot beam. When shopping for these versatile torches, keep in mind that the beam distance displayed on the packaging typically refers to the maximum distance your flashlight can achieve when optimally focused (in “spot” mode).



### Flood Beam

A flood light has a broadly focused beam that sheds light on a wide area but doesn't penetrate very far. Flood beams are good for walking, reading and performing general tasks around the campsite.

### Spot Beam

A spot light has a narrowly focused beam designed to provide intense, penetrating light. Spot beams generally offer a greater beam distance than flood beams, and that can be useful when you're mountain biking at night or engaging in any other fast-paced activity. However, a highly focused light can make it difficult to see objects just outside the beam, increasing your chances of tripping over something while walking around. Spot lights can also make close-up activities, such as studying a map, more difficult.

### Throw

Beam distance, or how far a flashlight can light up an object with a useful amount of illumination.

*See full glossary*

## Sample Beam Patterns for High-Quality Flashlights

Optical quality makes the difference between a powerful LED flashlight and a weak one. The optics system is what gathers the light and focuses it into a useful beam.

Unfortunately, optical quality can be hard to gauge without testing a flashlight. Rather, your best bet is to stick with a manufacturer that takes pride in its innovative and proprietary optics systems.

To give you an idea of the types of beam patterns a quality flashlight can produce, here are some of the options available using the Coast Pure Beam™ Focusing System and Max Beam Technology.

### Flood Beams

Even a simple flood beam can come in a variety of patterns, as shown below:



### Spot Beams



Inspection beam

Bulls-eye spot beam

### Beam Controls

How you switch between beam patterns on



a flashlight can be important. For example, many Coast flashlights employ Fingertip Speed Focus™ and Beam Lock™ technology.

# Run Time



## Run Time

The continuous length of time the flashlight can run on a single set of batteries, measured from 30 seconds after it's switched on until the light reaches 10 percent of its initial output.

**Measured in:** Hours and/or minutes

*See FL1 Standards chart*

**W**hen you're backpacking in the middle of nowhere, the last thing you need is for your torch to die prematurely, leaving you scrambling in the dark for batteries. That's why run time is another key factor in choosing a flashlight.

Run time is a measurement of how long a flashlight can run on a single set of batteries. Although LED flashlights are more energy efficient than incandescent models, their run times vary depending on quality and light output. Typical run times can range anywhere from 30 minutes for a small keychain light to eight hours or more for a high-performance flashlight.

The best way to guarantee an accurate comparison between LED flashlights is to look for products whose run times are displayed within the FL1 Standard logo, as these have been tested based on specific criteria. However, keep in mind that according to the FL1 Standard, run time is measured only until the light dims to 10 percent of the initial output. So if a flashlight emits 300 lumens at full strength, it can still produce a usable 30 lumens beyond its official run time. That's why some manufacturers choose not to use the FL1 standard.



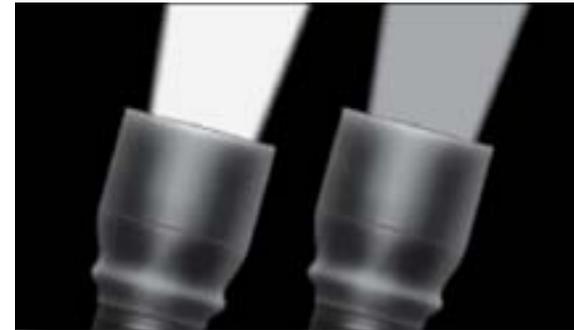
## Run Time vs. LED Life

When comparing flashlights, don't confuse run time with LED life, which indicates how long the LEDs within the device can last before expiring. For example, a product may tout a 50,000-hour LED life, but it may run only a few hours on a set of batteries.

## Other Factors that Affect Run Time

### Brightness Settings

On flashlights with multiple brightness settings, keep in mind that the run time will vary depending on which setting you use. Most run times reported on the packaging are based on the highest power setting, which means you can extend the battery life past the official run time by consistently using a dimmer setting. However, if the packaging doesn't specify which power setting was used to determine the run time, it might behoove you to ask – some manufacturers may try to make their products more appealing by reporting a run time based on a lower power setting.



### Battery Size

Run time can also depend on the size and number of batteries the flashlight uses. For example, a flashlight may have a higher run time than a similar model but require more batteries to operate. This may or may not factor into your decision when comparing run times.

### Temperature

Extreme weather can have an impact on your flashlight's run time. Cold, heat and humidity can all affect the efficiency and life of your batteries. While this may not influence your decision to buy a particular flashlight, you should keep it in mind when planning for its use.

# Peak Beam Intensity



## Peak Beam Intensity

The intensity of a flashlight's beam at its brightest point.

**Measured in:**  
Candelas

*See FL1 Standards chart*

## Candela

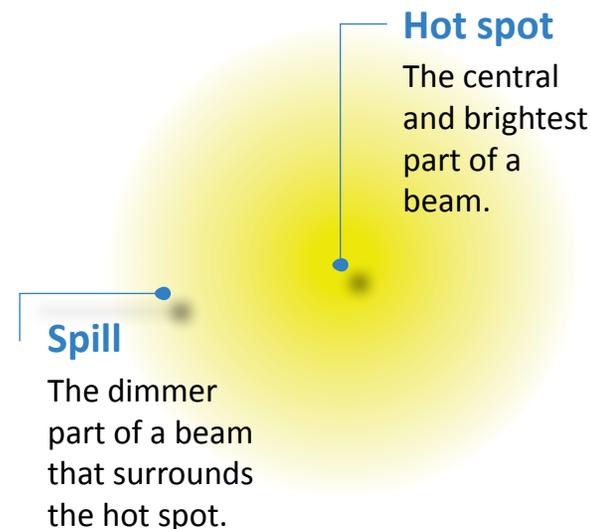
A measurement of the intensity of light at its source.

*See full glossary*

**A**t one point or another, you've probably shone a flashlight on the wall and noticed it produces concentric circles of light. Most flashlight beams have a hot spot, where the light is most intensely focused, surrounded by a second circle of slightly dimmer light, known as the corona. Beyond the corona is an even dimmer ring of light, known as spill or side spill.

Whereas lumens tell you how much total illumination a flashlight gives off, peak beam intensity indicates how intense the light is at the beam's brightest point, or hot spot. Like beam distance, peak beam intensity is influenced by how diffuse or focused the light is. The difference is that beam intensity refers to the amount of light given off at the bulb itself, not the amount that's shed on the object you are illuminating.

Peak beam intensity is typically reported in candelas, which is a measurement of luminous intensity. When considered along with beam distance and lumens, it can give you a rough picture of a flashlight's optical quality. Most flashlights feature a beam intensity numbering at least in the thousands, while high-performance models will offer tens of thousands of candelas.



# Impact Resistance



## Impact Resistance

The distance a flashlight can be dropped onto concrete and remain fully functional, without visible cracks or breaks.

**Measured in:**  
Meters

*See FL1 Standards chart*

## Meters to Feet

To calculate impact resistance in feet, multiply by 3.28.

**A flashlight needs to be able** to take some abuse. Whether you're outdoors or in an emergency situation, you never know when your flashlight might get dropped, crushed or otherwise banged around.

Many manufacturers who follow the FL1 Standards include an impact resistance rating for each flashlight. This rating tells you, in meters, from how high a flashlight can be dropped onto concrete without breaking. If you plan on using your flashlight for a particularly rugged activity, such as rock climbing, spelunking, mountain biking or boating, you may want to give extra consideration to impact resistance.

The beauty of LED flashlights is that they can take a lot more abuse than incandescent models simply because the lights do not contain any breakable filaments. However, the true impact resistance of any flashlight depends a lot on its casing, or the outside material used to protect its inner workings.



## Casing

The material within which the inner workings of a flashlight are encased.

*See full glossary*

## Common Flashlight Casing Materials

The casing or body of a flashlight is what gives the device its size, shape, texture and overall appearance. It also determines how well the flashlight can take a beating.

Most LED flashlights are encased in either aluminum or plastic. The material used can affect the weight of the torch as well as its impact resistance.



### Aluminum Casings

The most rugged flashlights are usually encased in aluminum, which has proven to be strong and more lightweight than other metal casing materials.

Aluminum flashlights can take a lot of abuse, giving you a flashlight that will last for years or even a lifetime; however, the initial investment will be higher. Because this material is not as pliable as plastic, aluminum flashlights typically come in the standard cylindrical body shape.

- Stronger
- Heavier
- Shows dents and dings easily
- Can get cold in extreme temperatures



### Plastic Casings

While cheaper and lighter than their aluminum counterparts, plastic flashlights don't hold up as well under extreme use. However, they are

sufficient for use around the house or campsite. Additionally, because plastic can be easily molded, these flashlights are available in a variety of shapes and colors. The more expensive the flashlight, the better quality the plastic is likely to be.

- Resilient but not as strong
- Lighter
- Doesn't show dents as readily
- Better insulated so it's less cold

# Water Resistance



## Waterproof

The underwater depth to which a flashlight can be submerged. This icon indicates at least an IPX7 rating, which means the sample is submerged to a minimum of one meter for 30 minutes.

**Measured in:**  
Meters

*See FL1 Standards chart*



## Water Resistance

The ability to be splashed from all sides with water and remain fully functional.



**In any outdoor or survival situation**, there's always a chance your flashlight may get wet. When you're dealing with flooding, heavy storms or other unexpected weather, your problems will be compounded if your flashlight becomes too waterlogged to function.

There are three basic levels of measurement for how waterproof an LED flashlight is: water resistant, waterproof and submersible. Which level of resistance you need will depend on your activity. The FL1 Standards specify that if a flashlight is tested for water resistance, the test must be performed after the impact resistance test to ensure water resistance under real-life conditions. A flashlight will pass muster only if it remains fully functional both immediately after and 30 minutes after the test.

Keep in mind that if a product claims to be waterproof or water resistant but doesn't bear the FL1 Standard logo, you have no way of validating how its water resistance was tested.

## IP Ratings and Levels of Water Resistance

Water resistance in flashlights is typically expressed using a number known as the IP rating, typically shown as the letters IP followed by two numbers. This number, also known as the Ingress Protection rating, forms the basis for the FL1 Standards for water resistance. You'll typically see one of three main IP ratings:

**IPX4: Water resistant.** A flashlight is deemed water resistant if it can be splashed with water from all angles. This level of water resistance is usually sufficient for basic indoor and outdoor use.

**IPX7: Waterproof.** A flashlight is labeled as waterproof if it can be submerged in one meter of water for 30 minutes without suffering any ill effects. While flashlights with this rating can withstand more moisture than a water resistant model, they are not meant for extended use in water.

**IPX8: Submersible.** A flashlight is considered submersible if it can function under more than one meter of water for four hours. The manufacturer will state the maximum depth.



### Submersible

Capable of functioning when submerged under water.

*See full glossary*

# Battery Options

**T**he batteries in your LED flashlight can affect everything from run time to usability, so before you settle on a flashlight you should take into account the type and size of batteries it uses. For example, when comparing run times and lumen counts, you should also find out how many batteries (and what size) are required to achieve those numbers.

Most flashlights run on either lithium or alkaline disposable batteries. Each has its advantages over the other, so it's up to you to decide which type best suits your purposes.

## Alkaline batteries

These are the typical batteries you find in most standard electronic devices. They're cheaper than the higher-end lithium batteries, and their biggest advantage is that they're readily available just about anywhere. In long-term storage, expect a shelf life of about five years.

## Lithium batteries

These provide more power output per size than alkalines – one lithium battery weighs about half as much as an alkaline and puts out more than double the power – plus they're more resistant to temperature extremes and feature a shelf life of 10-15 years. However, they also cost more, and specialized sizes, such as CR123As, can be harder to find. Lithium batteries can also be found in common sizes such as AA and AAA in some retail stores.



## Disposable vs. Rechargeable Batteries

While most LED flashlights are made to run on disposable batteries, rechargeable flashlights feature a built-in power source that simply plugs into a socket or charging device.

Rechargeable flashlights come with obvious advantages. They create less waste, which is often a concern for eco-minded outdoorsmen, and they can save you money in the long run on replacement batteries. On the other hand, they come with a higher up-front cost; they tend to have shorter run times than disposables; and over time they can lose their ability to hold a charge.

The real kicker, however, is that rechargeable flashlights require a source of electricity in order to recharge. Unless you have a solar-powered charger, you won't be able to charge your flashlight in a home emergency or on a backcountry trip.

### For basic home use:

A rechargeable flashlight can save you money.

### For frequent, wilderness or emergency use:

Disposable batteries are the way to go.

## Other Battery Considerations

- **Frequency of use.** The cost of batteries can add up over time. You may save money in the long run by buying a more expensive but energy efficient flashlight instead of a cheaper model that drains batteries quickly.
- **Battery size.** When preparing for a backpacking trip, you'll need enough extra batteries to last you through the trip – plus any unforeseen emergencies that occur. The larger and heavier your spare batteries, the more weight you'll have to carry.
- **Availability.** When it comes time to replace your batteries, how easily will you be able to buy them? Some types of lithium batteries are not as widely available as alkalines, which are sold pretty much everywhere.
- **Long-term storage.** If you update your home emergency kit regularly, battery shelf life may not be a major concern. However, if you want to buy batteries in bulk, keep in mind that lithium batteries last longer on the shelf – 10-15 years, compared to five years for alkalines.

# The Importance of Power Switches

**W**ith all of these lumens and candelas to think about, many people don't even give a second thought to how the power switch operates. Every flashlight has one, so what's the big deal?

However, the power switch is one of the most important features of your flashlight, because it determines how you will interact with the device. A flashlight is no good unless you are able to operate it easily. The best way to decide whether a power switch works for you is to try it out while simulating the real-life conditions in which you will use the flashlight. For example, if you'll be snow camping, try operating the torch with mittens on.

## Type of switch

Some flashlights can simply be clicked on and off with a button. Others switches slide into place. Still others require you to twist the bezel (head) or tail cap. Slide switches are the hardest to waterproof and are typically found on cheaper flashlights, while bezel switches offer the most water resistance but require both hands to operate. Some click switches are covered with a plastic membrane, which can make them harder to press.

## Location

The location of the power switch will help determine whether you can operate your flashlight one-handed. Do you hold your flashlight in the standard way, with your thumb pointing toward the bezel? A power switch located on the side of your flashlight might work best for you. Or do you prefer an inverted grip, with your thumb aimed at the back end? In that case, a tail cap switch may be the better option.

## Switch design

While you need to be able to turn on your flashlight without difficulty, you don't want a power switch that can get accidentally triggered inside your pack, needlessly draining the batteries. A well designed switch can be easily operated by a person but will resist getting turned on while bumping around in your pack.

## Bezel

The front or "head" piece of a flashlight that holds the lens in place.

*See full glossary*



# Last Words about LED Flashlights

**N**ow that you're armed with the basic information you need to make a thoughtful purchase, you're much better off than the average consumer. Just be careful: Flashlights can be addictive, as many of the flashaholics out there can attest!

Of course, even with knowledge of lumens and run times at your fingertips, choosing a flashlight can still be a baffling experience. Here are a few final guidelines before you head out and start shopping:

**Buyer beware.** Be extremely critical of any claims that you see on a flashlight's packaging. These are written by marketing experts whose only goal is to separate you from your money. Question everything, and look for the FL1 Standard logos whenever possible.

**Read the reviews.** Many reputable online shopping sites offer customers the option of rating their recent purchase. Before purchasing a flashlight, check out what other flashlight buyers are saying about it online. You can learn a lot from a well-informed review – most importantly, whether the device lives up to its manufacturer's claims.

**Field test.** If you have friends who own high-end flashlights, ask if you can borrow them. Test out as many flashlights as you can to get a better idea of what you want.



# Glossary of LED Flashlight Terms

## Bezel

The front or “head” piece of a flashlight that holds the lens in place.

## Candela

A measurement of the intensity of light at its source.

## Candlepower

An archaic measurement of light intensity, now commonly replaced by the candela.

## Casing

The material within which the inner workings of a flashlight are encased.

## Flood

A light’s ability to illuminate a large area, particularly at close distances.

## Hot spot

The central and brightest part of a beam.

## Incandescent

A bulb that emits light by passing an electrical current through a thin filament.

## LED

Light emitting diode, or a solid state lighting device that does not require the heating of a filament to create light.

## Lumen

A measurement of total light output. One lumen equals a single birthday candle located one foot away from you.

## Lux

A measurement of light intensity over a given area; also known as lumens per square meter.

## Optics system

The glass or acrylic piece that covers a flashlight’s light source, allowing the beam to be shaped into the desired pattern.

## Reflector

The optical device that some flashlights use to gather the light and focus it into a usable beam. Aside from having no optics at all, this is one of the cheapest and least efficient methods to focus a light beam.

## Run time

How long a flashlight can run off a set of batteries – not to be confused with LED life.

## Spill

The dimmer part of a beam that surrounds the hot spot.

## Submersible

Capable of functioning when submerged under water.

## Throw

Beam distance, or how far a flashlight can light up an object with a useful amount of illumination.

# A Flashaholic's Guide to LED Flashlights

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