



10 Factors to Evaluating the Best LED Light Bar



Light Bar Length

Enclosed LED light bars typically come in the following lengths: 4 inch led light pod, 6 inch led light bar, 10 inch led light bar, 20 inch led light bar, 24 inch led light bar, 30 inch led light bar, 36 inch led light bar, 40 inch led light bar, 50 inch led light bar.



Shape

Light bars can be round, rectangular or square. Round ones are able to fit more LEDs in a smaller area and may complement your vehicle's design better than square lights.



Beam Angle

As discussed previously, the beam angle dictates the width and depth of the area of illumination. For driving, deeper penetration is usually better and to light up work sites a wide angle works well.



Brightness

For LED light bars, brightness is expressed in lumens. Measuring lamps in watts became obsolete when different lighting technologies came to market. The lumen indicates how much human visible light a device outputs. However, some light bar makers list their lights in raw lumens, which is the theoretical maximum, instead of effective lumens, which is a true measure of light output. A rule of thumb is to convert raw lumens to effective lumens by multiplying the former by 0.8.



Efficiency

Lumens per watt, or lm/W, measures the efficiency of a single LED or an entire LED light bar. This is a good, though not perfect, indicator as to the quality of the LEDs in the light bar. Higher efficiency LEDs have a longer life and resist fading. Manufacturers can fudge this number by measuring lumens at a voltage lower than the normal 13.8 VDC found in most vehicles.

LED Color Temperature

Correlated Color Temperature, or CCT, specifies where a lamp's output falls in the visible light spectrum. The unit of measurement is on the Kelvin temperature scale. Thus, a particular lamp's temperature is a number followed by a K, such as 5000K.

Cooler light temperatures are at the red end of the spectrum but are perceived by humans as "warm," whereas higher temperatures are seen as "cool." LEDs can produce light all over this scale, from about 1000K to 9000K, but only a small range is useful for an LED light bar.

Since the sun on a clear day produces light in the range of 5000K to 5400K, that range is excellent for night driving because human eyes evolved to work well in that range. Above that, around 6000K, the light may appear brighter, but your eyes work harder to recognize terrain, which induces eye fatigue. However, LEDs running at higher CCT are more energy efficient than at lower color temperatures.

Color temperatures in the yellow part of the spectrum are ideal for fog lights because of significantly reduced backscatter from the water droplets. Other temperatures that produce blue, amber, red or green are important for LED lights being used for alert signals.

Water and Dust Resistance

Manufacturers have adopted an IEC standard known as the IP Code, where IP stands for Ingress Protection. Good LED light bars carry an IP rating to indicate resistance to dust and water entering the light.

All you need to be concerned with regarding IP ratings are two numbers. The first, on a scale of 0 to 6, indicates the light bar's resistance to dust penetration and the second number indicates resistance to water intrusion on a scale of 0 to 8, plus a special 9K rating. You see these numbers preceded by "IP." For example, a light bar may have a rating of IP67, meaning it is completely sealed against dust and can stand immersion in one meter of water for 30 minutes.

These are typical IP ratings found on LED light bars:

- IP65 – dust tight and protected against water projected from a nozzle
- IP66 – dust tight and protected against heavy seas or powerful jets of water
- IP67 – dust tight and protected against immersion
- IP68 – dust tight and protected against continuous submersion in water
- IP69K – dust tight and protected against high temperature, close-range, high pressure spray



Electrical Connectors

Two types of waterproof connectors are used on quality LED light bars, which are referred to as ATP or DT connectors. Both types are made from thermoplastic and have IP ratings of IP67 or above. They operate within a wide temperature range and use corrosion resistant contacts and silicone seals. They accommodate several wire sizes.



Light Bar Operating Voltage

Most, not all, LED light bars are made to run within the 13.8 DC voltage supplied by most cars or trucks without modification to the light bar or your vehicle's electrical system.

For instance, it is common to see "9-30 VDC" or "10-70 VDC" as the bar's input voltage range. These mean that you can operate the LEDs in a 12V, 24V or 48V system as long as that voltage falls within the specified range for the light bar.



LED Drivers

Do not get the idea that if you apply more voltage that the LEDs should give off more light. The amount of light an LED gives off is determined by current, not voltage. The current at each LED is maintained within a narrow range by a device known as an LED Driver.

Without an [LED driver](#), your light bar's color temperature and brightness would vary considerably. Sometimes, you see in LED light bar reviews owners who apply higher voltage to brighten their lights. Unfortunately, this is an indication that cheap LED drivers were used and this will shorten light bar lifespan.



PWM Drivers

The most sophisticated LED light bars have LED drivers that use Pulse Width Modulation to control LED current. There are also available external PWM units that effectively do the same thing for LED light bars without built-in PWM.

A PWM adjusts the energy frequency applied to the LED. It turns the LED off and on at a high, controlled rate within milliseconds. The rate is well above what the human eye can detect, so there is no flickering effect. This technology offers several benefits:

- LEDs do not overheat even at 100 percent capacity.
- LED lifespan is increased.
- With an external control, you can dim or strobe the light bar.
- Amperage draw is reduced overall
- It adds protection against voltage spikes from vehicle electrical systems.



Other Features

There are additional features you should keep in mind when evaluating LED light bar products:

- Warranty – Warranty length and terms help you gauge the confidence a manufacturer has in their product.
- LED Arrangement – LEDs may be arranged with a single, double or quad row pattern. Multi-row bars often have both spot and flood function.
- Wiring Harness – The **best LED light bar** comes with a wiring harness that includes cables, fuse holder, one or more switches and a relay.
- Multiple Circuits – Some light bars separately switch banks of LEDs for spot or flood. They may include amber, red or blue LEDs on a separate circuit.
- Color Lenses – Snap-on colored lenses change the light bar's color.
- Multi-position Brackets – Some light bars come with optional brackets or a system of brackets that clamp to channels on the light bar housing.

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