

Understanding L70 and Why it Matters



An LED Lamp doesn't "burn out," so how do you determine when to change it?

LED Operation and Temperature

LED lamps and luminaires use solid state LED components as the light source. When the circuitry in a LED component, or Light Emitting Diode, is energized, it creates a forward current and light is emitted. The life of the LED component is primarily affected by the temperature at which it operates, with a lower temperature equating to a longer life. To remove heat from the LED components, lamps and fixtures, they may be designed in several ways including:

- Heat sinks that passively conduct heat to the air surrounding the lamp, which then convects it away
- Fans that actively cool the lamp through airflow convection
- Circuitry that will automatically dim the lamp (reducing forward current and therefore temperature)
- Or some combination of any of these approaches.

The other way to manage temperature, and therefore affect the life of the lamp or fixture, is to operate the LEDs with a lower forward current level. The higher the current, the brighter the light emitted – but with a higher temperature. Designers of LED lamps and luminaires will determine which LED components to use and how many are needed to incorporate into a lamp or fixture to best manage current and heat. For example, a lamp with more LED components will enable it to have the desired brightness at a lower temperature, but it will add cost and consume more power. Conversely, a lamp with fewer components can achieve the desired brightness by driving a higher current, but the temperature goes up which can shorten the product's life.



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L70

LED modules used in fixtures typically don't "burn-out" – they just gradually dim over their rated life. A higher temperature translates to a faster dimming for the LED components. Manufacturers will specify the rated life of the LED lamp or fixture in terms of hours of operation.

An LED is considered to have reached its rated life at that point in time when it emits 30% less light than it initially did. This 70% brightness level is termed "L70" and may also be referred to as Lumen Maintenance. The 70% light level was established as the level at which the human eye can perceive the lumen depreciation.

LEDs don't suddenly fail beyond their rated life. They continue to produce light but at a lower brightness until it becomes too dim to be useable. L70 is calculated utilizing LED component test data gathered at multiple temperatures and points in time. The component data (referred to as LM-80) takes greater than a year to gather.

Universal Lighting Technologies products specify the L70 rating for each product. For example, the EVERLINE High Efficiency T8 LED Tubes have a L70 rating of 50,000 hours.

Why does it Matter?

Understanding the L70 rated life and any conditions that may affect it (dimming,

occupancy detection, and daylight harvesting may extend it for example) are important to consider when selecting the LED lamp or luminaire. This is especially important if the installation is in areas that are difficult to reach or if a future replacement could create disruption.

For specific questions about LED L70:

- Send your questions to Technical Engineering Services at tes@unvlt.com
- Contact your local Universal Lighting representative
- Email marketing@unvlt.com