

Comparing LED performance standards for Signify products

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Introduction

In the field of lighting, various standards have been developed to ensure safety, quality, and efficiency. These standards serve as guidelines for manufacturers, designers, and installers when creating and installing lighting systems. One critical aspect is determining the expected lifetime of a light source or luminaire.

Among these standards, IEC 62717, IEC 62612, IEC 62722-2-1, and IEC 63013 define the photometric performance requirements and lifetime metrics for LED products used in general lighting applications. These IEC standards have been adopted by CENELEC and turned into European Standards. Additionally, lifetime metrics are also covered by the American standards ANSI LM-80 and LM-84. These international standards and ANSI standards provide comprehensive guidelines for LED modules and luminaires, ensuring consistent performance and quality across diverse applications.

In this paper, we will delve into the details of IEC 62717 and IEC 62722, combined with IEC 63013, highlighting how they can be used to accurately determine luminaire lifetime while being able to optimally use LED lifetime tests. By leveraging these standards, manufacturers and designers can create lighting solutions that meet global requirements while adhering to best practices.



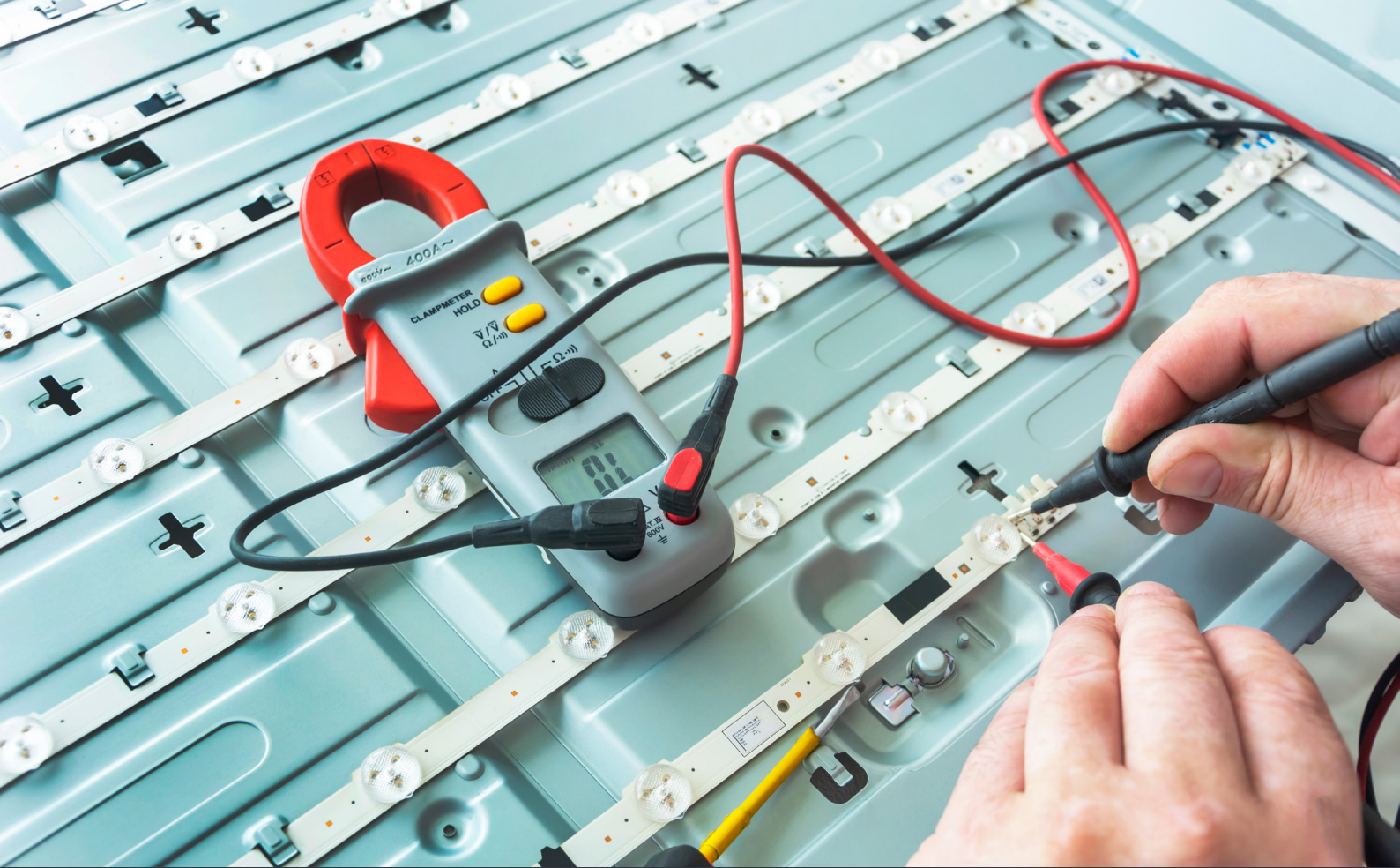
International
Electrotechnical
Commission

Scope

The US-based IES standards and the international IEC standards that deal with this topic have comparable but different scopes, as shown in the table below. These standards cover a wide variety of lighting products.

LED package	LED module	LED engine	LED lamp	LED luminaire
IES LM80		IES LM84		
IEC 62717			IEC 62612	IEC 62722

The combined scope of the ANSI IES LM80 and LM84 standards is comparable to the combined scope of IEC 62717, IEC 62612, and IEC 62722-2-1.



Testing methods

LM84 specifies a single testing method for measuring the photometric performance of LED products. In contrast, IEC 62717 and IEC 62722-2-1 provide multiple testing methods, which are more comprehensive and accurate. For example, IEC 62717 includes a test for color rendering, which is not covered by LM84. This ensures that LED products meet the requirements for color quality in addition to other performance parameters.

Lumen maintenance or lifetime tests are of particular concern due to the long test duration. Currently, it is common practice in the industry to combine the lifetime test results from the LED package or LED module with an in situ temperature measurement from the LED luminaire to determine the lumen maintenance or the expected lifetime of the light source in the LED luminaire. In many cases, the manufacturer of the LED or the manufacturer of the LED module will provide LM80 data.

Further lifetime testing is typically based on this data. The IEC performance standards allow for this, as follows:

- IEC 62722-2-1 applies to LED luminaires and indicates when data is available from the LED module level according to IEC 62717, which would allow a quicker lifetime test to confirm the results from the module level lifetime test.

- IEC 62717 defines a similar test method as IES LM80, but also indicates that if LM80 test results are available, these may be used to satisfy the lumen maintenance test.

This layered setup allows for optimal use of the LM80 test results for the LED package or the LED module, as only limited further testing is required at luminaire level, assuming that the conditions in the luminaire, namely LED drive current and temperature, are equal or more favorable than those with which the LM80 data was obtained.

In contrast, ANSI IES LM84 does not permit the use of LM80 data but requires another long-duration lifetime test at luminaire level. The associated cost and delay to product launch timelines are unnecessary and disadvantageous for both the manufacturer and the end users of the LED luminaire. While LM80 is a US-based standard, it is the de facto standard to which LED package manufacturers test their devices and this data is generally available.

Performance requirements

LM84 and TM28 standards define the testing procedures and lumen maintenance projection method, respectively, while IEC 62717 and IEC 62722 standards specify the initial requirements for measured products. IEC 62717, for instance, sets a maximum deviation of 10% from the rated values on flux, ensuring that LED products meet their declared photometric values and perform consistently over time, which benefits the end user by providing better value.

International acceptance

European Standards (EN) based on International Electrotechnical Commission (IEC) standards offer significant advantages for global markets. Here's why:

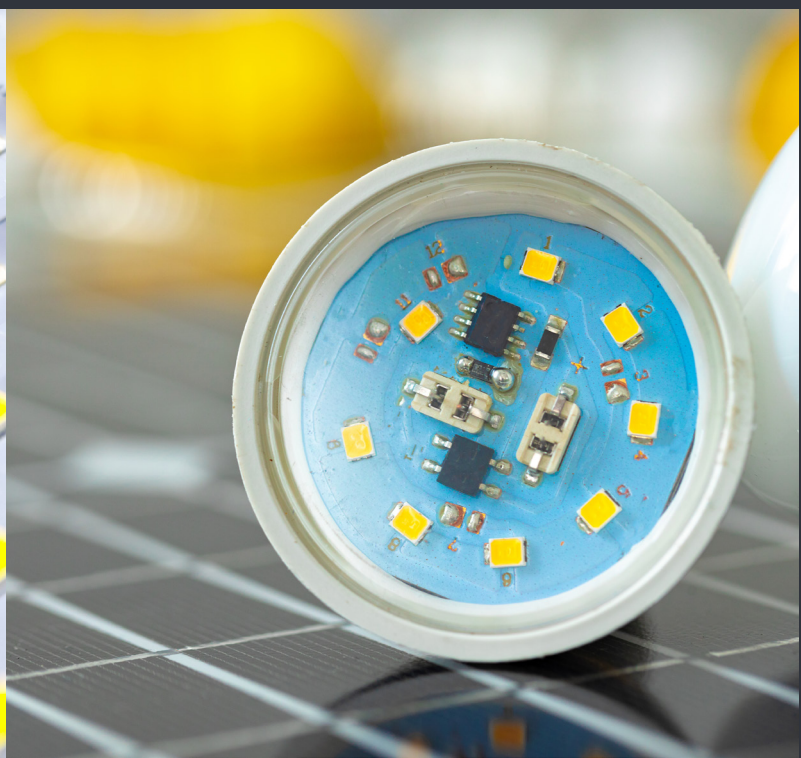
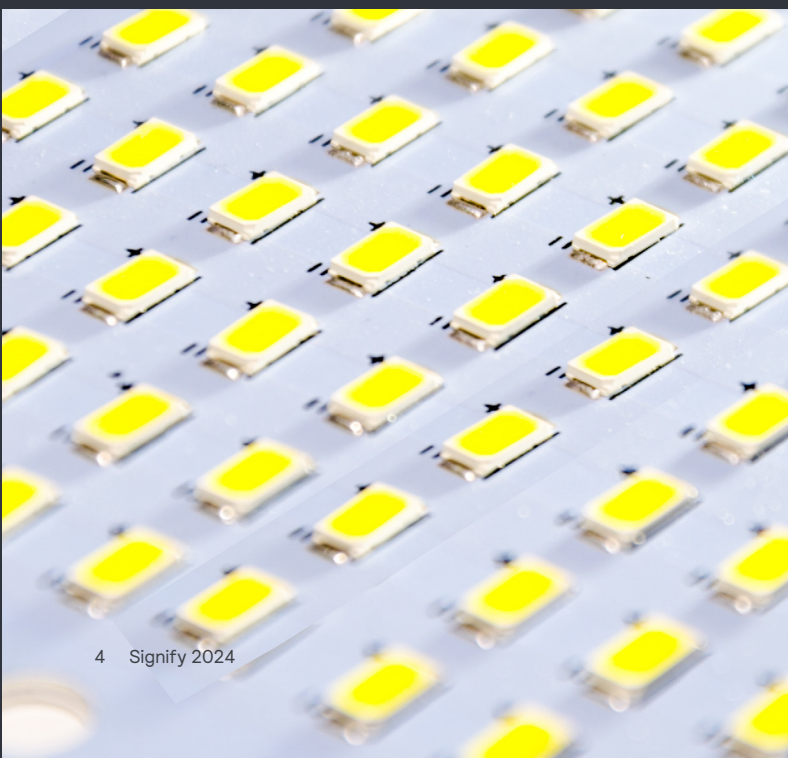
1. Global recognition: IEC standards are universally recognized and accepted. This recognition extends across borders, making them suitable for international trade and collaboration.

2. Widespread applicability: IEC standards are applicable to a wide range of industries and technologies. Their adoption ensures compatibility and harmonization across diverse sectors, promoting seamless integration and innovation.

3. The Committee for Electrotechnical Standardization has embraced IEC standards by creating European Standards (EN). For instance, EN IEC 62722-1 (2023 version) aligns with global best practices while catering specifically to European requirements. This also makes it more straightforward to comply with EU regulations and procurement requirements or guidelines.

4. EU member state compliance: All EU member states have adopted EN standards into their national frameworks. This alignment ensures consistency and facilitates compliance with public procurement laws.

Choosing EN standards derived from IEC guidelines enhances product quality, fosters international cooperation, and streamlines regulatory adherence.



Conclusion

In conclusion, EN IEC 62717 and EN IEC 62722 are effective standards for determining the expected lifetime of LED light sources and LED luminaires. Most importantly, they avoid the need for costly and unnecessary lifetime tests of the luminaires when LED module data is available. They cover the same range of LED products, provide more comprehensive testing methods, have more stringent performance requirements, and are recognized worldwide.

Signify recommends the use of IEC 62722, in specifications, tender requirements, procurement guidelines, and benchmarks to ensure long-lasting, safe, high-quality, and efficient LED lighting systems.





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