

## Philips Hanover Lantern Responses to the “12 Questions You Must Answer in Specifying LEDs”

### 1. Is your LED supplier a reliable company?

Philips Hanover Lantern only uses products from top LED suppliers in the industry including Philips Lumileds, Nichia, and Cree. These suppliers have been manufacturing LEDs and the phosphors used in them for many years and they guarantee quality, reliability, and IP.

### 2. Has your supplier provided an IESNA LM-80 test report?

All LED suppliers used by Philips Hanover Lantern provide IESNA LM-80 test reports when available. For legacy LEDs that preceded IESNA LM-80, our suppliers provide test reports that are equivalent to or more stringent than IESNA LM-80 requirements, and they are in the process of obtaining IESNA LM-80 test reports on those legacy LEDs.

### 3. What is the operating temperature range specification and what is the maximum junction temperature (T<sub>j</sub>) of the LED lamps over that operating range?

Operating and junction temperatures vary by application and LED manufacturer. However every Philips Hanover Lantern commercial LED luminaire is designed and tested to be operational within a minimum temperature range of -40°C to +45°C while maintaining a junction temperature equal to or lower than the recommended limit from the supplier.

### 4. What is the expected L70 lifetime of your luminaire? How did you calculate it?

Minimum L70 lifetime for any Philips Hanover Lantern commercial LED luminaire is 60,000 hours. These numbers include LED engines AND drivers. This value is calculated based upon LED suppliers' IESNA LM-80 LED lumen maintenance data in conjunction with in-situ LED fixture test reports tested per UL 1598 and UL 8750 where the LEDs' maximum case temperature is measured at the exact same test point as was measured in the IESNA LM-80 test report as designated by the LED suppliers. Using LED supplier calculations, we then calculate maximum junction temperature (T<sub>j</sub>) when the LED is installed in-situ in our LED luminaires and refer to LED supplier data to calculate L70 lifetime. Likewise, the LED driver maximum case temperature is measured at the test points designated by those suppliers based upon the maximum temperatures they provide, and we then calculate LED driver lifetime using supplier provided data.

## **5. Can you supply an IESNA LM-79 test report from a 3rd party laboratory as well as an .ies data file?**

Yes. Philips Hanover Lantern can provide IESNA LM-79 test reports from a 3rd party laboratory for all commercial LED luminaires. These reports include both colorimetric data and .ies files. In addition, Philips Hanover Lantern creates .ies files internally on our goniophotometer to ensure we are comparable to 3rd party equipment.

## **6. What are the delivered lumens and LPW of the fixture?**

These numbers vary from luminaire to luminaire, but are available on every IESNA LM-79 test report.

## **7. Is the chromaticity in the ANSI C78.377A color space and is it stable over time? How do you know?**

We specify LEDs that fall within the ANSI C78.377A color space. Bear in mind that many LED suppliers are still in the process of producing yields with commercial availability that meet this requirement, and we are working with our LED suppliers to update the LEDs used in our products to this requirement as they become commercially available. Currently there is no accepted industry standard to determine chromaticity stability over time. The DOE has contracted PNNL to continue testing with regards to chromaticity stability over time and we remain in contact with the DOE and PNNL on this testing. The worldwide Philips lighting division and Philips Hanover Lantern are currently in the process of researching and testing this topic, too, and we look forward to implementing a rigorous testing regimen for chromaticity stability over time in the near future.

## **8. Does the color of the light output vary from luminaire to luminaire or in different spatial locations for a single luminaire?**

The 3rd party laboratories we work with test per IESNA LM-79 as do we in our in-house goniophotometer laboratory. Per this lighting measurement document spatial distribution of chromaticity is measured and reported on our IESNA LM-79 test reports. As with incumbent technologies including fluorescent, compact fluorescent and High Intensity Discharge, color can vary from luminaire to luminaire. With incumbent technologies this was due in large part to

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color variations of the lamps; likewise, color can vary from LED to LED. Color can also vary from luminaire to luminaire as a function of the thermal management and heat sinks utilized in different designs / different luminaire model numbers. Color can also vary for the same luminaire as a function of ambient temperature and as the LEDs age.

**9. What is the power factor of your luminaire? How much power does it consume in the “off state”?**

The ENERGY STAR® requirement is 0.9 or greater for commercial applications. No commercial LED luminaire manufactured by Philips Hanover Lantern has a power factor of less than 0.9.

**10. Have you applied for the DOE Energy Star?**

To date, ENERGY STAR® does not apply to the products within the Philips Hanover Lantern Commercial portfolio. However, we are designing products within the “spirit” of ENERGY STAR® and will apply for ENERGY STAR® as soon as it applies to luminaires for commercial outdoor general illumination applications.

**11. Is your luminaire lead-free, mercury free and RoHS compliant?**

Yes. Every LED luminaire manufactured by Philips Hanover Lantern is free of lead, mercury and other substances specified by the RoHS (Restriction of Hazardous Substances) directive.

**12. What is your warranty and do you have the means to stand behind it?**

DOE ENERGY STAR® requires a minimum 3 year warranty. All Philips Hanover Lantern LED luminaires carry an extended 5 year warranty. As a Philips company, Philips Hanover Lantern is capable of supporting this warranty, but more importantly we are committed to ensuring our products meet the warranty.