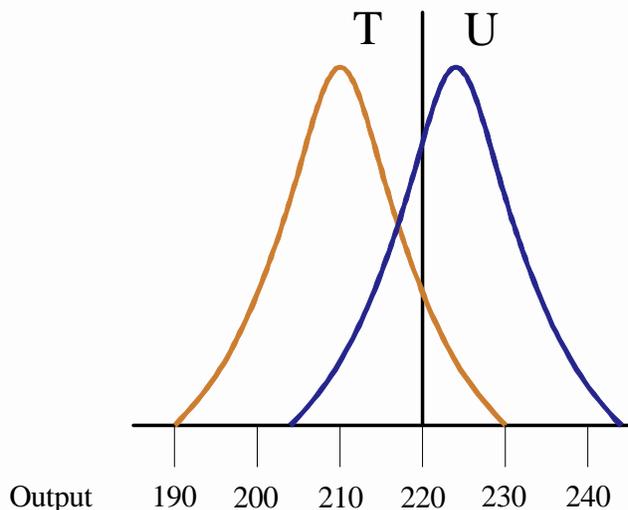


Jim Dilbeck, General Manager, Cireon

Process improvements continually increase LED outputs (in our case the Philips Luxeon ES). Luminaire manufacturers contract LM-79 data periodically to heighten their performance data. As a result, the more recent the data, the higher the performance *appears*; this is not necessarily true.

Presently, Cireon published data is based upon LM-79 reports from the early adoption of the Philips Luxeon ES LED. LM-79 data is always obsolete by the time it is published as, by that time, the LEDs used in the test luminaires will have been at least a month old. With outputs are doubling every 24 months or less, even one month can mean a big difference.

Many manufacturers will update their data as time progresses based upon the assumption of their present LED outputs. Cireon publishes data only based upon actual test results. Despite the competitive disadvantage, we do not believe in publishing data based upon speculation.



To further clarify the significance of this, the chart on the left represents the evolution of the ES LED.

ES LEDs are “binned” by output into either “T” or “U” bins with the demarcation point being at 220lm. However, despite the fact that these bins contain LEDs that are either below 220lm (T-bins) or above 220lm (U-bins), the *average* output of the LEDs within those bins is perpetually increasing.

The gold curve represents the first LEDs yielded from this line. At that time, even though all U-bin product exceeded 220lm, the average of the U-bin LEDs was statistically likely to be very close to 220lm. Similarly, the average T-bin product was likely to be well below 220lm.

The blue curve represents today’s output (hypothetically), 8 months after the introduction of the ES. This shows that not only do all of the LEDs in the U-bin exceed 220lm, but that the *average* of that bin is at a much higher output than the average of the same output bin in preceding months.

As time goes by, since all Cireon products use U-bin LEDs and because there are multiple LEDs within a luminaire, our published data is increasingly below the actual outputs of our luminaires.

Cree recently completed a study of three of our luminaires comparing their product to our ES LEDs. Cree measured the average output of our 106W product, populated with their XPE and XPG LEDs at 7427lm (higher of the two) while the Philips ES-populated luminaire measured 8260lm. Certainly Cree has no incentive to bias the data of the ES higher than is actual.

Our last LM-79 tested level showed the exact same ES-populated luminaire at 7542lm. Considering the 8240lm Cree measured to be conservative, this puts our products (as of this date) at least a 9.5% higher in output than the data we presently publish. The newest data always looks better, even though it may not truly represent what the customer receives.

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