

Doing it Right

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August 2, 2007.-. A few weeks back, [we shared our experiences](#) with a fun little desk lamp we nicknamed "Robo-Dude" citing it as one example of a credibility-generating solid state lighting luminaire for the home. Basically a simple example of "doing it right". As a result of that editorial, we received a phone call from the folks at Lamina (www.Laminalighting.com) with an offer to give a test drive to their friend, SōL-Man. Upon arrival we discovered "him" (just a guess, since his shape better matches what's on the men's room door than on the ladies room) to be a retrofitted version of Robo-Dude, equipped with Lamina's 20-watt halogen MR16 replacement that they've branded "SōL". The SōL "bulb assembly" (my terminology) is currently in beta testing, and uses about 40% of the electricity needed by its incandescent equivalent. Frankly, it works better than I would have imagined.

A look at the data sheet and a discussion with their Director of Sales, John Ekis, revealed why it worked so well... they are committed to revealing the whole story in targeting the incumbent technology, which forces them to be accountable to their customers to provide a good solution today. They've included a fairly complete series of photometric data that shows the strengths and weaknesses of the product which allows maintenance, repair and operations (MRO) decision makers to make informed decisions on whether a solid state lighting solution will work for them. Highlights include details of the actual beam angle, which ranges from 30 to 50 degrees depending on the model and lux values "on the target" broken down for throw distances of 1, 2 and 3 meters, as well as CRI and color temperature information. Not surprisingly, there are trade-offs. The brightest sample version is the daylight white, which centers in on 4700K. SōL also comes in 3050K warm white and "TrueColor" with the latter 3050K version offering a wider beam and their highest color rendering.

John pointed out that MRO's and lighting designers ask some key questions in a specific order. 1) Does it have enough light? That's a gate that is either yes or no, and there is really nothing in between. 2) What is the quality of that light? That can include the color temp and CRI, as well as aspects such as whether the beam contains IR or UV emissions, which is especially relevant to retail display applications (or salad bars...) where merchandise can be adversely affected by those "bonus" wavelengths. The quality also embodies the consistency of the light from fixture to fixture. 3) What is the efficiency? That certainly includes the larger business case, including operations, maintenance and replacement costs. Of note is that the item most often touted by the LED industry at large is the lumen efficiency, while we often have to read the fine print, or even "read between the lines", to determine the amount and quality of the light being emitted.

The robo-to-robo comparison was a handy one for what the state of the art is yielding. When comparing the 12 element cool white output on the standard Robo-Dude to the single element Lamina retrofit, it's fair to say that things are progressing well. SōL-Man was a substantially brighter unit, with a bedroom-filling amount of light. I would have no hesitation using it to illuminate the workspace on a normal desktop. While the stock Robo-Dude got good marks for a pleasant reading light, SōL-Man felt like an order of magnitude increase in the overall CRI, and the color temp was far more pleasant. The heat generated on Robo-Dude was non-existent, while SōL-Man was warm to the touch, but not to any extreme. Interestingly, I pulled out a single element MR16 replacement that had been sampled our way about 12-18 months ago. It projected about a 10 degree beam and the front of the solid metal casing that acted as the heatsink was painful to touch. I don't recall many announcements that halogen MR16s had reduced the heat or increased their lumen output during the last year so given the observable progress, the SSL victory is inevitable from that standpoint.

Despite a confidence in where the progress is headed, the technology still isn't cheap. In OEM quantities, Lamina's price when they implement the production release is expected to be in the \$20 to \$30 neighborhood, compared to \$4 to \$8 for the halogen MR16s (open faces and 2000 hour lifetimes at the low end; sealed and 5000 hours at the high end). Is there a business case to back that kind of cost up? Again, Lamina does a credible job of painting the full picture by providing some estimates on potential savings to those MRO organizations. The 14-watt typical energy savings has a payback in about 15,000 hours (4 years of 12 hours/day commercial or retail usage, so there isn't a home-user case here).

For the commercial uses, the very compelling case is the maintenance savings, where a single replacement can easily run for \$30 to \$40 per bulb, with \$5 being the actual bulb cost, and the rest being the cost of service. The case is compelling without even looking into business interruption or lost retail sales where merchandise is unlit for a period of time. With a 50,000 hour lifetime according to the "[ASSIST recommends](#)" standard testing and calculations, SōL should outlast a standard MR16 by a factor of 10 to 25. Since a single service call alone makes the business case, whether it is at 2000 hours or 5000, the math is simple enough and suggests a payback in 6-18 months.

The natural concluding question is how they did that. Stay tuned for next time...