LED-ing The Way

Amanda McGowan, editor

LED usage and advanced technology continues to shine in the OR.

September 27, 2010

Since their introduction to the surgical market in 2007, light emitting diode (LED) surgical lighting has seen dramatic growth in the operating room. According to Joey Knight, Vice President of Sales at MAQUET Surgical Workplaces, in the approximately three years since LEDs have been available as lighting options for the surgical suite, the technology has claimed more than 50 percent of the market from the previous halogen technology, and projections for the future say that growth will only continue.

Both globally and in the United States, projections indicate that in the next five years, that ratio will be more like 90 LED to 10 halogen," Knight says. The expansion of LEDs has been so apparent that Chris Walters, senior product manager for ceiling systems at STERIS, says the company, which introduced LED lights less than three years ago, expects that by the end of 2012 they will no longer sell halogen overhead lighting solutions in the United States.

Performance Benefits

According to Randy Tomaszewski, Vice President of Marketing at Skytron, the

acquisition cost of LED lights remains 20 to 30 percent higher than halogen. However, because LED technology has so drastically improved over the past few years, more and more customers are turning to it for their OR lighting needs.

According to Walters, the difference between halogen and LED lighting starts with the design. Halogen lighting contains a filament that heats up and glows to produce light. However, the filament is thin, and over time in the process of heating up and cooling down as lights are turned off and on, that filament will break and the bulb must be replaced. LED is a solid state technology, meaning there is no filament present. The LED is not a bulb, it's a source.

These core differences between LED and halogen, then, help to explain why the surgical marketplace is increasingly turning to LED lighting solutions for the OR. As Walters states, the benefits of LED can be seen from all surgical perspectives – the surgeon, the OR manager and the patient.

The Surgeon’s Perspective

From the surgeon’s standpoint, Walters says surgeons appreciate the ability of LED lights to remain cool during long cases. Because of the technology’s solid state, the amount and type of energy emitted from the lighthead is better controlled. Less heat – as much as one-third less, according to Tomaszewski – is emitted, helping surgeons stay comfortable. Additionally, LED lighting often appears whiter and brighter than the halogen lights, whose color is more yellow-white due to the filament’s glow.

“Because we have so much more control over LED design parameters, we can deliver what I would call a much ‘truer white’ light, so it renders the colors more naturally and accurately,” Walters says. “From a surgeon standpoint, they see better – the reds are redder and the blues are bluer, and the colors are so much more vivid and crisp.”

Knight adds that because halogen lighting is a convergent light, surgeons need to re-focus and re-position the light more often. LEDs offer divergent technology, meaning it lights the bottom of the surgical cavity and the sides, reducing the need to refocus, and also offers more control over shadows and glare.

The OR Manager’s Perspective

For an OR manager, an LED surgical lighting solution will help them achieve some of their main goals for a surgical suite: added reliability, maximum uptime and a lower cost of ownership. An LED sources' useful life can range from 20,000 up to 40,000 hours, Walters says. As Tomaszewski explains, LED lighting does not “burn out” because they are not bulbs. Instead, the intensity of LED lighting systems gradually diminish.

“Therefore, the replacement costs and maintenance to perform frequent halogen bulb replacements over 10 to 15 years is not required with LED lights,” Tomaszewski says.

Knight adds that the expense associated with bulb exchange, bulb holders, the work associated with changing light bulbs, along with the related OR downtime, is

dramatically reduced with LEDs, improving OR uptime and reducing the total cost of ownership.

Finally, Tomaszewski says LED lighting is a “green” technology, often resulting in an energy and cost savings for the hospital. LEDs require one-half to one-third of the energy required to power the light when compared to halogen, he says. This can net a yearly energy savings for the facility as a whole and have a cumulative effect over several years for each OR, and in multiple ORs within each facility.

The Patient Perspective

According to Walters, the patient also benefits from the reduced heat generated by LED technology. Because of their design, LED lights produce only the wavelengths of energy that are necessary in the surgical field.

This is unlike halogen, in which the glowing filament emits radiation at all different wavelengths – ultraviolet light and infrared light, along with energy in the visible spectrum. However, UV and IR light do nothing to help the surgeon see, but are emitted as heat, which is not only inefficient, but can dry out patient tissue. Meanwhile, LED technology allows wavelengths of energy to be precisely controlled, so IR and UV energy is not produced.

The Future

LED manufacturers are continually working to improve the quality and consistency of LED lights, Knight says. Therefore, it’s important for facilities to stay up-to-date on the latest developments before making a purchasing decision. Knight offers four key attributes to look for when purchasing LEDs:

- Flexibility with the design and layout of the OR.
- HD Compatibility. “Boom cameras as well as in-light surgical cameras are all going to HD,” he says. “It is important that lights and lighting systems as well as the visualization systems are HD compatible.”
- Pre-focused lighting, meaning adequate volume and depth of field.
- Patented technology such as light guides, consistency assurance programs and shadow control features.

Walters warns that not all LEDs are created equal. Be sure to try all the lights you’re considering before you make the commitment, he says. Don’t just rely on the spec sheet. From there, Tomaszewski says to examine the light’s performance qualities, such as brightness, shadow control, coolness, sterile focus, intensity control, color temperature control and ease of positioning.

Walters also offers some considerations he feels some may not necessarily be thinking about:

- The manufacturer's experience. LED is still a new technology, so think about how many installations the manufacturer has before buying.
- Upgradability of the system. Think about how the system could grow over

time as the surrounding technologies and cases change. “Think about where you want to be in 10 years,” Walters says, “and try to build that flexibility on day one.”
- Laminar flow design in the lighthead. The lightheads should have a cool flow design that maximizes air exchange within the room.
- Recycled materials. Lights are now available that are made of aluminum and other materials with proven low energy consumption analysis.

In the future, LEDs will begin to appear in other areas of the hospital such as emergency trauma bases and exam rooms and in other types of equipment, including surgical headlights, endoscopes, etc. Walters also mentions organic LEDs (OLEDs), which are expected to be the ‘next frontier’ in lighting, but it will take some time before this technology begins to surface in surgical lighting.

For now, it seems LED surgical lights will only continue to improve and expand their presence in ORs. As Walters says, customers looking to make a new lighting purchase need to seriously consider an investment in LEDs. The technology is here, it’s here to stay, and it’s shown to provide hospitals the efficient, high-performance lighting solution they need to get the job done.

Source URL (retrieved on *07/24/2014 - 12:26pm*):
http://www.surgicalproductsmag.com/articles/2010/09/led-ing-way