



Future is bright for xenon

Excelitas Technologies lights up medical research and hospitals

By Nick Parkinson

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Xenon high-intensity arc lamps, an electric light that produces light by passing electricity through ionized xenon gas at high pressure, have a versatility which has seen its use grow year on year.

Xenon's spectral output and color temperature creates bright white light, like natural sunlight, which lends itself to aiding a physician observing tissue in situ, attempting to determine disease states.

As xenon behaves well when mixed with other noble gases, applications engineers can design systems that take advantage of xenon's native characteristics, while enhancing the near-infrared (NIR) spectroscopic output from lamps, creating an even broader spectral range for their products and systems.

Excelitas Technologies, which delivers high-performance optoelectronics solutions, introduced short-arc xenon lamps in the early 1980s. The Waltham, Massachusetts-based company claims

“The latest xenon lighting technologies deliver longer life for the lamps, and higher output from the systems”

that xenon light sources can be found in over 90% of hospitals worldwide. Jim Clements, Cermax® Product Manager, says xenon medical lighting is being used for a variety of purposes.

“Excelitas customers use Cermax Xenon medical lighting for a variety of applications including surgical headlamps for critical procedures (for example thoracic, liver), lighting systems for surgical microscopy, and illuminators for endoscopy (colonoscopy, ENT),” Clements told *gasworld*.

“Xenon is still considered the ‘gold-standard’ for high-performance light sources, typically from 150W to 450W.

Xenon remains the first choice for demanding, critical applications due to its ability to out-perform halogen and LEDs.”

“The latest xenon lighting technologies deliver longer life for the lamps, and higher output from the systems. For example, new fiber optic illuminators enable more light to travel through increasingly narrow fibers.”

Cermax Xenon lamps produce high-intensity, bright white light used for endoscopic illumination, surgical headlamps, and in robotic surgery equipment. The highly versatile Cermax Xenon short-arc lamps are also used in video projection lighting, solar simulation, dental UV curing, industrial UV curing, microscopic illumination, and other high-performance applications.

Xenon's growth in the car headlights and cinema projector markets may be affected by alternatives, but Clements is confident xenon lamps will continue to remain in demand.

“Demand for Excelitas’ Cermox xenon lamps continues to grow year-over-year as global healthcare improves, and preventive medicine becomes more commonplace,” Clements told *gasworld*.

“Physicians and hospitals appear very reluctant to retire or replace their high-performance xenon illuminators.”

“Excelitas’ heritage and technological innovation set our xenon lighting solutions for OEMs (original equipment manufacturers) apart from our competitors. Excelitas has the broadest array of fundamental lamp designs, and the widest portfolio of xenon-based products: everything from medical lighting, to aesthetic laser applications such as body hair and tattoo removal, to analytical spectroscopy products, to photonics flash lamps for laser pumping, to industrial flash lamps for safety.”

“Excelitas delivers not only unparalleled quality, but also a ‘first-mover’ tradition for innovation: e.g. Cermox metal-body lamps with diamond turned reflectors for enhanced precision, light-weight heat-sinks for aircraft-mounted applications, and discreet, ultra-quiet illumination systems for use in surgical suites.”

“Key OEMs continue to design new product platforms utilizing Cermox xenon for use in emerging applications such as robotic, mobile UV-disinfection systems for hospitals, so we expect to see its continued use into the future. For industrial applications, there has also been an increase in demand for lighter-weight, high output stage/studio lights and an uptick in the use of high performance, aircraft-mounted searchlights.”

LED v xenon headlights – who wins?

Xenon headlights is also growing market, even if it is not growing at a rate it once was due to the booming demand for LEDs. It is down to xenon’s qualities of being brighter, creating a wider beam pattern, and lasting longer than halogen bulbs. Xenon headlights are nothing new – they have been around since 1990 – and can be spotted on the road due to their bright, ice white/blue tint and extreme brightness. Their growing popularity has been helped not only



by their brightness but by regulations mandating energy-saving bulbs.

Linde supplies xenon to leading manufacturers of xenon headlights including OSRAM and PHILIPS.

Factors affecting the growth of xenon headlights include the popularity of LEDs, as well as the power of xenon headlights, which can be deemed dangerous as they obscure the vision of other drivers and pedestrians.

The xenon headlight market also hinges upon car sales and any drop, like the recent one in China for the first time since 1990, will be of concern. US auto sales saw a slight rise last year 17.3 million, but there have been predictions that car sales will fall to under 17 million in 2019.

Krypton is also increasingly being used in car lights to fill halogen sealed-beam headlights, as well as being employed as a filler gas in halogen bulbs, energy-saving bulbs and in illuminated billboards. For example, Excelitas’ xenon and krypton flash lamps are confined arc flashlamps which produce microsecond to millisecond duration pulses of broadband light of high radiant intensities, for use as medical and industrial laser pumping, digital and studio photography, warning beacons and strobes, stroboscopic and effect lighting.

Neon: slipping from view in Las Vegas

Finally, and perhaps the most widely recognizable gas used in lighting, is neon with its fluorescent qualities. Neon signs have been used in the US for almost a



century and the the “Welcome to fabulous Las Vegas” sign on the edge of town celebrates its 60th anniversary this year.

Young Electric Sign Company (YESCO) made one the earliest neon signs in Las Vegas for The Boulder Club in 1933. When tourism took off in the post-War period, neon signs became more popular around Las Vegas. The neon trend reached a peak point in the 1960s, before backlit plastic signs began being adopted instead. In recent years, neon casino and show signs have become less common in cities like Las Vegas, where the classic neon signs have disappeared from the Strip in place of more economical LED lighting.

Neon has become harder to spot around Las Vegas in recent years, although YESCO’s classic neon frontage at the Flamingo hotel, from 1976, can still be seen.

But if you go to downtown Las Vegas you will find the splendid Neon Museum and its collection of neon glow signs from neon’s heyday. It is a non-profit organization dedicated to collecting, preserving, studying and exhibiting iconic Las Vegas signs for educational, historic, arts and cultural enrichment.

It also includes the outdoor exhibition space known as the Neon Boneyard, where the museum has installed the iconic guitar-shaped sign of the Hard Rock Cafe – closed in 2016 – and plans to light it up on March 5. A fundraising campaign to restore the 80-foot tall guitar has reportedly raised over \$250,000, showing there is still plenty of love and interest for neon signs. 