

# The museum case for LEDs

A US project shows that some LEDs can be on a par with halogen for use in museum accent lighting – and they save energy. **Francis Pearce** reports



**Numero Uno** Quartet Uno spots incorporating the Xicato Artist Series LED have replaced halogen lighting at Sunderland Museum and Winter Gardens following a separate trial to the US study

LED modules designed for high quality lighting are on a par with halogen when it comes to the quality of accent lighting in museums. They also offer energy savings of nearly two-thirds and longer term benefits which can include greater protection for delicate 'fugitive' artefacts.

These are the conclusions of a trial that compared the two technologies at the Field Museum for Natural History in Chicago under the auspices of the US Department of Energy. It was one of a series of DoE Gateway demonstration projects on solid-state lighting technology and involved museum exhibition staff and lighting professionals.

The performance of a track system with 32 halogen lamped luminaires was compared to another with 26 LED fixtures from the same manufacturer, Lighting Services Inc. Since most exhibits had been lit to conservation levels, low-wattage (less than 60W) halogen lamps had been used:

Osram Sylvania Capsylite PAR38s; GE PAR 36s and Osram Sylvania MR-16s, with UV filters. Three-quarters of the halogen fixtures in the baseline installation were line-voltage (120V) PAR 38 fixtures.

## Spot on

The replacement LEDs were Xicato Spot Modules used with either a 20-degree or 40-degree reflector, housed in LX2024 series luminaires from LSI.

Power and illuminance measurements were taken for the baseline halogen-based lighting installation, which operated for about two months before the LEDs were installed and measured. As halogen lamps suffer only minimal lumen depreciation over their lifetime, relamping was deemed unnecessary. The new LED system produced more lumens and, in some cases, a slightly wider beam angle than the >>



**On Trial** The US study compared LEDs with halogen at the Field Museum for Natural History in Chicago



**Two degrees** The replacement LEDs were Xicato Spot Modules used with either a 20-degree or 40-degree reflector

» baseline halogen, which allowed the total number of luminaires to be reduced.

The LED system produced 63 per cent energy savings compared with the halogen system. A straight fixture-to-fixture comparison showed the LED luminaires to be more efficacious. The payback period for replacing the halogen system with the LED system as a whole was calculated at roughly three years compared with between five and 11 for luminaire-for-luminaire replacement. The short payback results from using fewer fixtures, eliminating UV filters and reducing the load on the air-conditioning system.

**Point of fact**

The LED system produced comparable illuminance on the lit artefacts. In total, more than 200 different illuminance points were measured. For a majority of those points, the LED installation either met or exceeded the illuminance provided by the baseline installation. But more light is not always preferable in a museum setting, where illumination levels must be balanced against the potential for fading or other damage.

“Halogen is the benchmark for light quality,” says Roger Sexton, Xicato’s vice-president for marketing and R&D, “but it has shortcomings which include relatively poor energy consumption and lifetime performance. High quality LED lighting solves these problems but museums also have to think about the viewing experience and exposure times: how long can artefacts be displayed per year. Qualitatively, the curators in this trial felt that there was no compromise and that the colour rendering of the LEDs was on a par with halogen. Halogens’ colour temperature gets warmer when they are dimmed which can be a problem when there are different levels on say paintings in one gallery, but

LEDs’ remains the same. Also colour point consistency and evenness of intensity distribution are vital. Quantitatively, the potential for these LED modules to damage artefacts was actually lower than halogen because of the attention paid to the shorter wavelengths of the spectrum in their design.”

**Beam me up**

Although the LED system was considered a success, the LED system that was tested could only provide beam angles from 20-degrees to 60-degrees where some installations might call for smaller beam angles. In contrast, halogen sources have the advantage of offering a wide variety of beam angles and wattage combinations. Since the trial, however, Xicato has developed a 12-degree spot reflector for the Xicato light engine.

The space had a standalone Leviton a-2000 lighting control system. Dimming the LEDs produced mixed results. One run of track with only one LED fixture was connected to one dimming module in the control system. This LED fixture flickered as it was dimmed past 60 percent.

To combat the flicker issue, extra fixtures had to be installed on the track to increase the load. ■



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**ROGER SEXTON, XICATO**