LED Based Solid State Train Interior Lighting

LPA Excil Electronics (LPA) has designed, manufactured and supplied aesthetically pleasing, highly reliable and energy efficient, fully rail and underground standard compliant, LED based Solid State Lighting for passenger rail car interiors, in service in UK Europe and Asia for nearly eight years.

As LED technology has improved in terms of luminous efficacy and colour temperature, so LPA has developed its range of LED lighting products to offer train builders, refurbishers and maintainers opportunities to reduce maintenance, energy consumption, life cycle cost and environmental impact.

The luminous efficacy of LED lighting has improved to the extent that it is superior to both Halogen and Fluorescent and the white colour, once an inconsistent grey/blue is now available in predictable shades from Cool White, through Natural to Warm White.

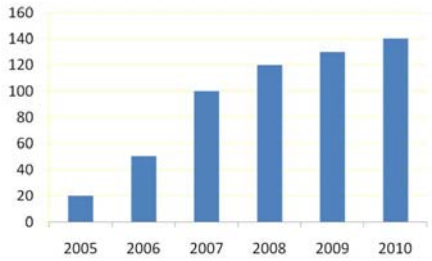


Fig 1. Luminous Efficacy

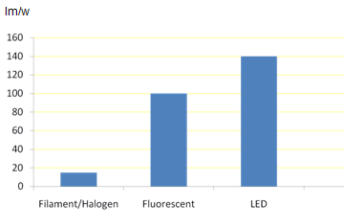


Fig 2. A comparison to Conventional Light Sources (lm/W)

The key factors in LED lighting are appropriate drive electronics, effective thermal management and optimal use of LED light output. LPA has developed world class expertise in all of these factors and can offer up to 15 years useful life from its LumiSeries™ range of LED based lighting products. Due to the absence of heavy metals such as mercury, on disposal LED products have an environmental advantage over fluorescent.

LED alternatives to Halogen spots have been available from LPA for seven years. These LumiSpot™ products are configured either with a built in power supply for individual applications such as a cab, vestibule or toilet compartment or to be driven by a central power supply where a broader application such as saloon lighting is required. These products are available in a choice of beam angles to suite all applications.

Case Study

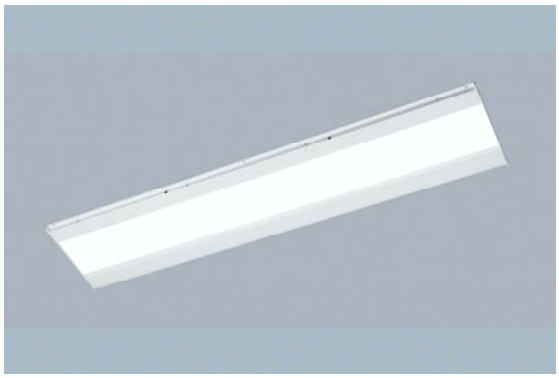
In one application, which won an award for improving passenger comfort, the car interior lighting which comprised a halogen system in a designer pod, was replaced with bespoke LPA LED units, resulting in an energy saving of 1500 watts per car. The pay back is two years.


View of car interior and detail of light pod showing LED unit (top) alongside the original Halogen

Development

LPA successfully developed an LED replacement for the Fluorescent Tube, but regarded this as a sub optimal outcome. Adopting a holistic approach LPA developed LumiPanel™, which replaces not only the Fluorescent Tube, but the entire Luminaire and power supply in a panel only 18mm thick available in any standard width above 200mm and in any length from 600mm in 300mm modules. Lumipanel™ weighs about 2 Kg less than a comparable fluorescent luminaire. LumiPanel™ delivers 10% more light output using up to 45% less energy than a comparable fluorescent luminaire.

Lumipanel™ is ideal for new build, where interior design can optimise the application by replacing the traditional two side rows of luminaires with a single central LumiPanel™ running the length of the car, affording additional weight and energy saving.



LPA LumiPanel ™

LPA, recognising that there is a requirement to reutilise existing luminaires in maintenance upgrade and refurbishment situations, developed LumiStrip™, which replaces the fluorescent tube and its power supply. LumiStrip™ is fixed directly to the back tray of the luminaire and is connected directly to the train supply by passing the inverter, which together with the fluorescent tube mountings, being redundant can

be removed. LumiStrip™ utilises the existing diffuser and offers up to fifteen years useful life and up to 25% energy saving compared with fluorescent.

LPA LumiStrip TM

Future near term development of the LED based LumiSeries of products include LumiAd TM, a back lit advertising panel and LumiTile, a 600mmsq luminaire based on LumiPanel TM.