



AGC train, fully illuminated with 154 LED reading lights and 85 LED down lights.

LED lighting systems...

LPA Excil Electronics, Railway interior lighting experts for 20 years, have for the last few years been working on many innovative and leading edge interior designs using an all LED Lighting Solution. Before focusing on three specific projects, it is worth mentioning the advantages and benefits of LEDs.

Huge potential savings

There are many advantages associated with LEDs, the main one being reliability. A typical high power LED will realise 70,000 to 100,000 hours to the point of 70% initial lumen output and millions of hours to total electrical failure. In comparison, a low voltage halogen dichroic, as typically used within the industry, would return 3,000 to 9,000 hours maximum. Hence, from a reliability view point alone, the huge potential savings in vehicle operating and life cycle costs can instantly be appreciated.

More comfortable passenger environment

It is not only from a reliability aspect that the LED scores. It has many other advantages

such as cool beam temperature, low current consumption and higher luminous efficacy than that of a halogen lamp. The low beam temperature, due to lack of infra red heat emission, results in a more comfortable passenger environment and the low current consumption has obvious implications for emergency lighting.

A number of general lighting products have also been released including down lights and reading lights, all of which use either a single or multiple LED emitter in conjunction with focussing optics, and replace conventional halogen type usage. This range is available with either built in conversion electronics permitting direct connection to the vehicle control voltage or for use with an external, LPA-Excil power supply.

LED lighting can be suitable for either refurbishment / retrofit or new builds. Below are three projects recently conducted in France.

The first project is a French DMU/EMU regional train from Bombardier, AGC (pictured left). SNCF depots were facing increasing maintenance cost due to the poor reliability of halogen lamps (154 reading lights and 85 down lights per train set, 24VDC power supply). Also SNCF had not enough power to run vending machines on DMU trains.

A power saving of 2,700W per train set (3 cars)

LPA has worked in partnership with SNCF to develop a drop in replacement unit with built-in power supply for down lights and reading lights. LPA designed a triple LED unit with a narrow beam angle (+/- 6 degrees) for reading light and medium beam angle (+/-30 degrees) for down lights. The Colour temperature chosen was natural white (3500-4500K), integrating high output (54-70lm/W) LEDs for down lights and lower output for reading light.

Replacing all halogen lamps with LPA LED units resulted in a power saving of 2700W per train set (3 cars). Additionally less air conditioning is needed due to the cool beam temperature of LPA LED lighting (see AGC picture). This power saving now enables SNCF to add vending machines. The payback of such a replacement is about two years.



NAT / Transilien, fully illuminated with LED down lights.

...significantly reduce vehicle life cycle costs

"Stars in the sky"

The second project utilising LPA Excil product is the new Bombardier NAT / Transilien train running around Paris (see picture). The end customer and designers had several requests regarding the lighting scheme: a perception of the night sky, reduced power consumption and, maintenance cost. LPA Excil Electronics then designed a lighting scheme entirely based on single LED down lights, giving the required effect of 'stars in the sky'.

When the project started three years ago, technology only allowed cool white LEDs (brighter than warm white LEDs) but today's final design includes warm white LEDs with very high output (see NAT picture). This system easily satisfies the

lighting requirements of UIC 555. Also, such a design saves around 200kg per car compared with traditional fluorescent luminaires. Other designs with triple LED down lights would require half the amount of down lights.

The latest project of LPA Excil electronics has been a French regional train called ZTER. LPA developed again a triple LED drop in replacement unit (3W) for the original 20W halogen lamps (12V DC) to populate centre ceiling (see ZTER picture). This train will be exhibited at Innotrans by SNCF, 23-26 September in Berlin.

Significantly reduce life cycle costs

These three projects show that LED lighting systems can significantly reduce vehicle life cycle costs, crucial to



ZTER train, centre ceiling with triple LED down lights.

competitive rolling stock operation. LEDs also offer huge environmental benefits with reduced consumption and CO2 emissions together with secondary energy savings associated with reduced air conditioning requirements. With luminous efficacy figures in excess of 100lm/w, LEDs are now serious contenders for general illumination and utility lighting schemes. ■

LPA Excil Electronics will be exhibiting on stand 125, Hall 2.2 at Innotrans Exhibition, Berlin.

LPA Excil Electronics Railway Lighting Experts

LED Lighting Solutions

- High lumen output with colour choice
- Low power consumption
- Cool to touch
- Long life > 70,000 hours
- True "Green" solution
- Reduces maintenance costs significantly
- Standard LPA Excil down lights, reading lights, emergency lights available as well as drop-in replacement designs
- Compatible with all train power supply
- Fully compatible with Railway standards
- Suitable for Newbuild or Retrofit



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