

PRESS INFORMATION

Distinct endorsement for the DL 10



A test road implemented by Darmstadt Technical University compares the DL 10 LED luminaire from Siteco with conventional road luminaires in terms of energy efficiency and quality of light. The result: a distinct endorsement for the DL 10.

Obsolete technology, environmental protection, tight budgets; many towns, cities and council authorities are being faced with the task of renewing their road lighting. The need for action is urgent, and the breadth of solutions on offer is diverse. LED technology is seen to be especially fit for the future. But can today's LED luminaires compare favourably with modern, conventional luminaires? A typically average residential road in Darmstadt, Germany was selected as a test road in order to provide some answers to this question. The DL 10 LED outdoor luminaire from Siteco was able to achieve a higher level of energy efficiency, superior light output ratios and a more positive evaluation from users than a conventional luminaire with modern technology.

Those who today must make an investment decision for new streetlighting are faced with a complex selection procedure, and the spectrum of lamps and luminaires is large. The juxtaposition of various technologies makes it difficult to evaluate both in terms of energy and in a photometric regard for specific applications. In general it is wise not just to evaluate lamps but the complete system, because the interplay of electronics, optics and light sources is decisive when it comes to suitability and efficiency.

"It doesn't make much sense to consider the lm/W factor with a specific operating temperature for a light source. For better comparison, the following must be asked: what electrical power does a complete luminaire need within the defined parameters of mast distance, mast height, carriageway width and carriageway surface for illumination, according to relevant standards and in accordance with the required lighting class?" explained Professor Khanh from the Department of Lighting Technology at Darmstadt Technical University.

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Together with the City of Darmstadt, the energy provider HSE and Siteco Lighting, his institute implemented the test road in Autumn 2008 in a residential area of Darmstadt and carried out scientific analysis. For this purpose a 500 m long residential road was divided into four sections and equipped with four different lighting solutions:

Section 1: HME 125W mercury vapour lamps with conventional ballasts in the existing, cleaned diffuser luminaires

Section 2: SON-H 68W high pressure sodium vapour lamps with conventional ballasts in the existing, cleaned diffuser luminaires

Section 3: HST 70W high pressure sodium vapour lamps with electronic ballasts in new SR 50 luminaires from Siteco

Section 4: DL 10 LED luminaires from Siteco

The measurement of the luminaires in a laboratory, the determination of illuminance on the carriageway as well as the required power consumption and a survey of pedestrians and car drivers concerning acceptance level, safety and light colour supplied a data basis that enabled a comparison of the luminaires tested, despite differing lamp technologies.

The optical, energy-related and qualitative evaluation convinces

In terms of optical and energy related evaluation, the SR 50 luminaires with HST lamps and the LED luminaires were clearly superior. In order to achieve a mean illuminance of 6.3lx on the carriageway, a power consumption of 68W was required with the LED luminaires, whereas the modern luminaires with high pressure sodium vapour lamps and ECGs required 61W. If LEDs of the latest generation were implemented, the DL 10 in this case would only require 56.6W, therefore proving its superiority to the other systems in terms of energy efficiency and light output ratio.

But it's not only light output ratio that determines the quality of a lighting system: other quality criteria such as homogeneity, glare and colour rendering are also highly important. And in order to make statements in this regard, the scientists measured among other factors the light output distribution on the carriageway and also colour temperature. Mesopic tests for reaction time, colour perception and detection ability of objects are currently still being carried out.

The judgement of users was used by the survey for the qualitative evaluation of lighting conditions in the different road sections. Residents independently answered questionnaires, and surveys of

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pedestrians and car drivers were carried out, supervised by a survey manager. The statistical evaluation of the questionnaires resulted in a distinct endorsement for the LED luminaires. The following perception criteria were taken into account:

- general brightness of the carriageway
- recognition of pavement edges
- recognition of impediments
- recognition of people with warning vests
- perceived safety
- colour rendering
- colour of light

In all seven categories the complete evaluation showed the highest test results for the section with DL 10 LED luminaires.

This survey is the first scientifically-based study that has directly compared conventional luminaires and an LED luminaire in real conditions. The field test shows that LED technology is about to overtake conventional technologies. In addition to superiority (as proven in this application example) in terms of energy efficiency, light output ratio and user acceptability the operator benefits from further advantages.

Profound engineering expertise

LEDs are extremely long life components, and as such the maintenance costs for streetlighting are therefore reduced significantly. LEDs can be steplessly dimmed from 0% to 100%. And what's good about it: luminous flux and dimming factor are linearly related; a quality that high pressure sodium vapour lamps do not have. If luminous flux with such lamps is reduced by 50%, in terms of electricity only about 30% of previously required energy can be saved. And with these lamps there is a minimal dimming level of 40%. While conventional lamps encounter difficulties with low ambient temperatures, the lumen output of LEDs increases with cold temperatures. And in addition, the light beam of LEDs as point light sources can be easily controlled and directed.

In order to be able to implement these advantages for the user though, a profound level of engineering expertise is required. Intelligent LED drivers and efficient thermal management are the keys to long product life. Custom designed optics are required in order to transport the light without glare onto the road. The DL 10 LED luminaire from Siteco represents a product that is able to fulfil these expectations: 86 high power LED units with perfectly matched optical systems of lenses and special reflectors fulfil the DIN EN 13201 road lighting standard. The system has a pleasant white

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light colour of 4000 Kelvin. The DL 10 in a second variation features decorative LED coloured lighting accents, setting both the luminaire and its surroundings effectively in scene.