SHARING COMPETENCE

Pfannenberg
ELECTRO-TECHNOLOGY FOR INDUSTRY

White Paper on the topic “Xenon-Technology versus LED-Technology”

Nowadays LED-technology is a hot topic in light generation. In the area of signaling technology LED is also becoming more and more significant. LED is especially associated with the positive features like energy efficiency, length of life and insensitivity towards mechanical influence. These features generally offset its negative side, the price.

Visual signaling technology has to cover different applications in the 3 areas:

- Informing
- Warning
- Alarm

in which different demands e.g. light effects and perceptibility are made on the product.

Whereas the positive features of the LED-technology apply almost 100% to the area “informing”; the advantages of LED-technology for the areas “warning” and “alarming” have hardly any significance. If you look at the area “alarming”, the main focus is on good perceptibility in order to communicate the urgency of the alarm to the observer. In this event, it is important that the person who is to be alarmed perceives the signal every time even if he or she doesn’t have the signaling device directly in his line of vision. Here, devices based on Xenon-technology have clear advantages; for example the difference in light density which is due to the shape of the light pulse.

A xenon flashing light generates a very short (approx. 250 ms.) yet very intensive light pulse with a peak value of luminous intensity of over 100 000 cd; this cannot be generated with LED-technology. Typical curve progressions are shown in images 1 and 2.

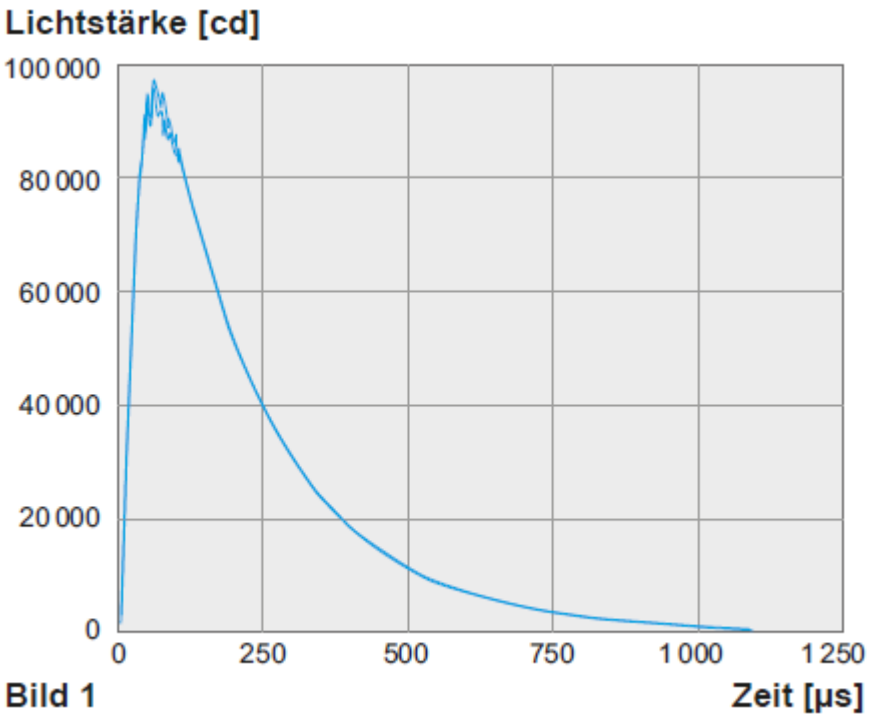
It is clear to see that the light intensity of LEDs only have a flat progression in comparison to the xenon flash tube. Both lights have almost the same effective light intensity.

If you compare the energy balance of both of these technologies then the LED has no advantage here, either. The effective power consumption of a xenon flashing light is smaller compared to an LED flashing light which has almost the same effective light intensity as the xenon light. In addition, the LED lights with the same effective light intensity as comparable xenon lights are significantly more expensive. That means that not only the operating costs but also the acquisition costs speak for xenon technology.

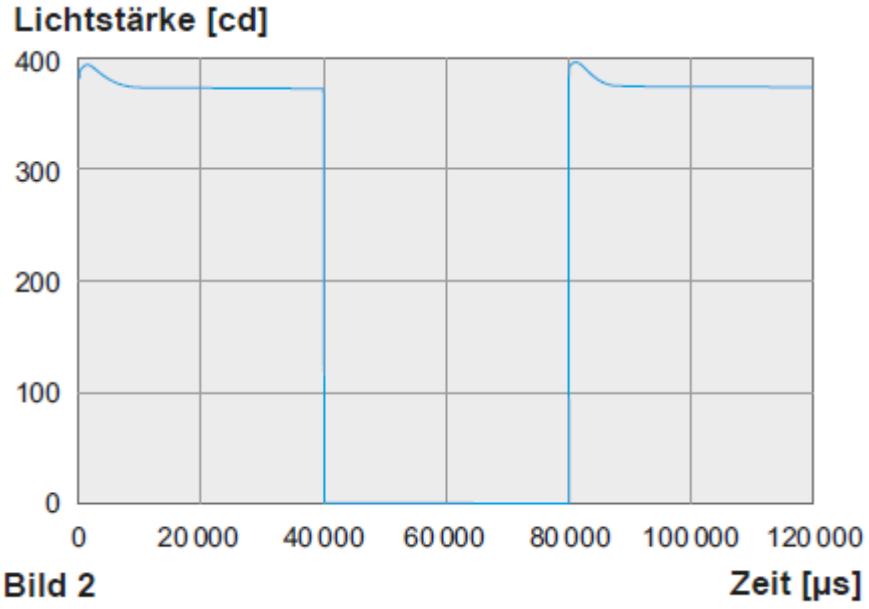
Another advantage of the xenon light is the emission characteristics. While an almost omni-directional characteristic is only created by the alignment of the LEDs in the housing, the xenon technology already has this characteristic as a spotlight. The directional characteristics are identical in all directions and no “optical gaps” are generated in the signal reception area.

A further positive feature of the LED, the length of life, is indeed an advantage over the xenon technology.
However, if one assumes that the alarm devices are only activated and are only needed in dangerous situations, then the light’s durability is not a crucial factor. In addition, Pfannenberg’s xenon flashing lights last for at least 8m flashes, this should be sufficient to warn about all dangerous situations over a time period of at least 20 years. All xenon flashing tubes are secured on Pfannenberg’s products by an additional steel bracket so that the mechanical influences (shock/vibration) are reduced to a minimum and the length of life is not limited.

In applications from the category “informing”, where the signaling devices are not only operated very frequently, but often also function as permanent lights, the advantage of LED based devices is obvious: length of life and the low power consumption are not to be outdone here.



Light intensity/Time progression of a Xenon-flashing light



Light intensity/Time progression of an LED-flashing light

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