



**20 YEARS OF  
LED COMPETENCE**

**LIGHT IS  
TECHNOLOGY**

[www.hella.com](http://www.hella.com)

# Welcome to the age of the LED

There are many reasons why light emitting diodes are being used in more and more automotive areas. First of all, they have simply proven themselves to be the better solution in many ways. Secondly, as a lighting pioneer, HELLA made use of these "better solutions" early on in a broad range of applications.

When it comes to lighting technology, achieving milestones is nothing new for HELLA. Again and again, the international family-owned and operated company has assumed a pioneering role by pooling its expertise from the fields of light, electronics and thermal management to create new and innovative products. A uniquely strong combination for developing LED products, especially with regard to dynamic LED lighting systems, which will be increasingly relied on for active lighting functions.

## **Technology follows design!**

Cutting-edge product designs can only be realised by applying the best possible technological expertise. Long-term experience in electronics, thermal engineering and design ensure that LED headlights and lighting systems are developed with consistently high lighting performance.

By constantly developing and enhancing the options and areas of applications for LEDs, HELLA is not only involved in definitively shaping the LED era, but is also making a significant contribution toward increasing active safety.

## **The technical, economic and safety-related advantages of**

### **LEDs speak for themselves**

- High service life
- No downtimes or assembly times
- Minimal energy consumption
- Wear-free and maintenance-free
- Higher effective visibility
- Dust and water-resistant
- Compact sizes
- Rapid response times
- New scope for design

**HELLA built 364,000,000 LEDs in 2010.**





# Trendsetter

The prevalence of LEDs in more and more areas of automotive technology is noticeably increasing and serial productions are reflecting this unmistakable new trend, which can be clearly seen in the complete LED headlights in the new Audi A6. After introducing the complete LED headlight in the Audi A8, the high-end variant is currently introduced in the new Audi A6. The combination of sportiness and dynamics characterises its unmistakable face. Demanding design and intelligent LED lighting technology are optimally combined here in a small installation space. 64 LEDs distribute the light necessary for a given situation by switching ON/OFF individual LEDs automatically depending on the weather, road and speed conditions. For example, the all-weather light, which replaces the fog light, reduces the back-glare when driving in fog or heavy rain by scattering the light more broadly.





# LEDs – Benefits in series production

LEDs are replacing conventional light bulbs in more and more vehicles - in the meantime, even in series production at many locations. Decisive in this case are the technical benefits, such as longer service life or smaller sizes, which guarantee, among others, better feasibility from an ergonomic perspective. For design engineers, an important factor resulting from this is the considerable increase in design freedom. The result is cutting-edge product designs, such as the "LEDayFlex" daytime running light modules for passenger cars, trucks and caravans.

HELLA installs LEDs in different optical lighting systems based on customer requirements or special product requirements. In this case, simply through LED positioning, new design possibilities can be tapped into. In conjunction with the so-called light aperture bodies or light transmitters, technology is increasingly becoming an inherent element in innovative developments for combination rear lights.



Complete LED headlights  
**2008**



Complete LED headlights  
with AFS functions  
**2010**



First signal functions in headlights  
**2003**



Hybrid combination rear lights  
**2000**



High-mounted stop lights  
**1992**

# Operational safety

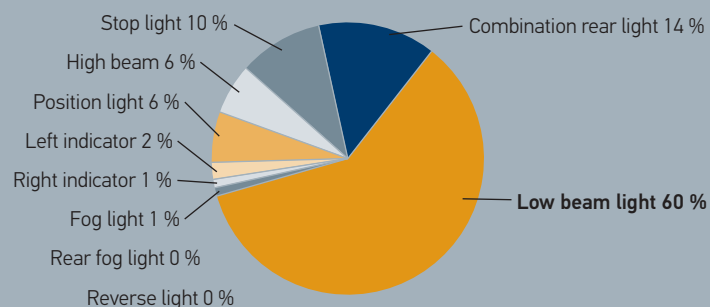
Using the LED stop lights as an example, it can be clearly explained how a supposedly small difference can have considerably positive effects: In conventional bulbs, the filament has to be warmed 200 ms so that it can transmit the necessary brightness. LEDs, on the other hand, require no warm-up phase. This means the light signal reaches its target value faster. This optimises the early warning system for the road users following your car and reduces their response time. Such fractions of a second can prevent or mitigate rear-end collisions: at a speed of 90 km/h, the braking path is reduced by about 4 m (see graphic 2).

## Energy consumption

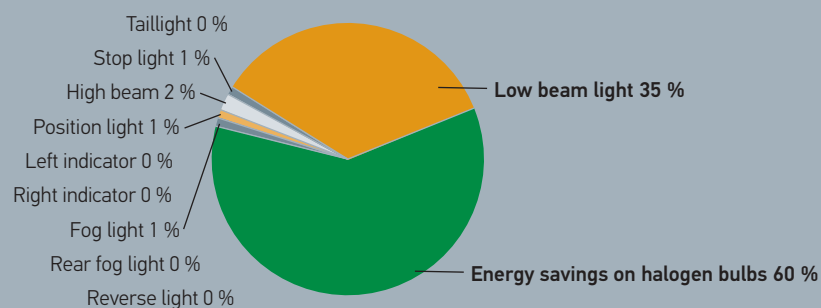
Compared to conventional bulbs, the use of LEDs considerably reduces energy consumption with the same light output. Consequently, fuel consumption and exhaust gas emissions are also reduced (see graphic 1).

## No maintenance

LEDs with a service life of up to 100,000 hours last almost as long as the service life of a vehicle. Because they are non-wearing and maintenance-free, there are no additional costs from failures or service downtimes.



100 % energy demand of a vehicle: equipped with a combination of bulbs (rear lights) and halogen lights (headlights)



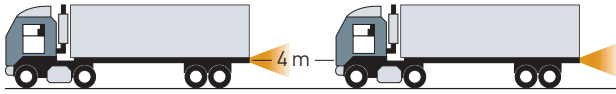
If LED lighting is used exclusively (headlights and lights), this reduces energy consumption by about 60 %.

Information in 0 % = energy demand is so low that it is not accounted for.

Combination rear lights with bulbs at 90 km/h



Combination rear lights with LEDs at 90 km/h



2 Early warning through LED: shortens the response time



3 Halogen – yellowish

Xenon – bluish

LED – like daylight

## Worthwhile from many perspectives

50 % of all drivers feel more stress if visibility is poor. A well-lit road can help here because good lighting is the best night vision system. Ever since there have been cars, HELLA has been setting innovative milestones and creating cutting-edge lighting products and systems. LED headlights as a ground-breaking innovation in the field of automobile lighting mark the current high point of a rapid development that LED technology has assumed since the introduction of the first lighting functions as high-mounted stop lights at the beginning of the 1990s.

Bulbs in combination rear lights become stressed due to vibrations, dampness, cold, heat, etc. Due to their construction criteria, a standard P21W bulb has a service life of about 500 hours. LEDs, on the other hand, have a service life of up to 100,000 hours. An LED can also provide light up to 11½ years without interruption.

Thanks to cutting-edge LED technology, the need to frequently change bulbs is a thing of the past. Because LEDs are non-wearing and maintenance-free. This pays off quickly compared to bulbs: As a rule, LED lights already compensate for their somewhat higher purchase costs after just a few saved bulb changes.

## Functional safety

Drivers expect functional safety without any ifs, ands or buts. In other words, vehicle components with a high quality standard and long service life. HELLA LED lights meet these requirements. They are developed and produced according to the strictest quality standards. HELLA tests their everyday driving suitability in the toughest series of simulations: Stress factors such as temperature, moisture and current feed lead to internationally recognised AEC-Q101 qualification in long-term reliability tests. But this norm is not sufficient for HELLA. The LEDs are therefore subjected to thousands of hours of additional stress and service life testing. That is why, in addition to the visual features, the electrical and thermal features are decisive for HELLA.



[www.daytime-running-light.com](http://www.daytime-running-light.com)

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## LEDayFlex

LEDayFlex makes the impossible possible: Ultimate extra safety with a personal touch. Two module chains with round high-performance LEDs are waiting only for that stylistic touch in the front of their vehicles to shine. Each module chain consists of five to eight LED light modules that can be flexibly installed within the framework of legal requirements and are available with or without position light. One revolutionary piece of freedom that additionally combines all the benefits of the LED daytime running light: Increased safety and reduced consumption compared to driving with low beam lights and imminent high-tech optics. The LEDayFlex daytime running light set consists of two pre-wired module chains with five to eight round light modules (diameter and installation depth about 30 mm) as well as two electronic boxes for controlling the daytime running lights. The system is connected to the vehicle's electrical system via a 3-pin AMP supersealed connector. For Ford Focus II and VW Golf V, vehicle-specific bezel kits for installation in LEDayFlex daytime running lights are available.



### **LEDayFlex**

LED daytime running light set with or without position light  
2 module chains with 5–8 round LED modules incl.  
electronics box 12/24 V, 5.8 W









## Luminator LED

The first HELLA auxiliary headlight in 100 % LED technology. This means never having to replace bulbs. Thanks to the computer-optimised fine-tuning of the three high-boost reflectors with the high-performance LEDs, the Luminator LED achieves an optimal light yield. This means you get: Greater comfort during night driving and less tiredness caused by homogenous and intensive high beam lights on the motorway. Additional increased warning effect with delay-free flasher function: With LED technology, the cold white light beam is immediately available at 100%. And do not forget the new design options that the LED light offers you both for daytime as well as night-time driving: The position light made of three Kartoval lenses arranged in a star shape creates a distinct night design on the vehicle. High energy efficiency with reduced current consumption: with the cold LED light, barely any heat radiation comes from the reflector. Thanks to passive heat dissipation with cooling ribs on the housing rear, an active fan for the electronics in the high-performance LEDs is redundant. In addition to all these LED benefits, the Luminator LED is above all: a robust full-metal headlight and a reliable HELLA quality product.



### **Luminator LED**

LED auxiliary headlight (Ref. 40) with LED position light  
30 W, Multivoltage 12 V – 24 V, weight: 2,800 g



# VEHICLE AND SMALL MANUFACTURERS RELY ON HELLA LED EXPERTISE





## 90 mm Premium LED low beam headlights

The light colour, which is similar to daylight, offers comfortable, fatigue-free driving and therefore greater safety. Three white high-performance LEDs function as a light source. The light is projected through the 70 mm glass lens homogeneously on the street. The service life of the headlight, normally more than 15,000 operating hours at a about a 50° operating temperature, offers major cost savings when it comes to maintenance and repair costs compared to other light systems. The Premium headlights without moving parts and with passive cooling system can be combined with more than 40 other modules in the 90 mm series.



### **90mm Premium LED low beam headlights**

LED low beam function, 35 W, Multivoltage 12 V – 24 V,  
no moving parts, with passive cooling system



## EasyConn Next Generation

The modular multifunction combination rear lights (24 V) with rear stop light in LED technology leaves nothing to be desired when it comes to customer needs. All additional optional functions can be selected with bulbs or LED technology. The patented lens is replaceable. Individual parts and modules can be replaced and upgraded according to the modular principle. By combining efficient LEDs with precision lenses, the lights achieve the light distribution specified by law - and all of this with up to 67 % less power in comparison with bulb lighting. Through the HELLA-patented system for monitoring the indicators, the light can be used together with the HELLA 5DS 009 552-001 ballast in accordance with ECE R48. The light (also the complete LED version) is designed so that, according to the current condition, no error message is displayed in the vehicle's electrical system. Inverse-polarity protection ensures that the light is not damaged due to accidental contact of the poles. To extend the service life, all components are attuned to one another's optimal temperatures in order to avoid an overload of the LEDs at high ambient temperatures. The lights are designed for the service life of a vehicle and are therefore a convincing, economic and environmental solution.



**EasyConn Next Generation**  
Modular hybrid trailer lights







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