

***Headlamp Comparison!***

***Test report for Motorists.***

***Hella original parts compared  
with other headlamps.***



***Ideas today for the  
cars of tomorrow***

**Cheap or  
good value?**



# 1. **More and more headlamps are entering the market. Be careful however: saving money can become expensive.**

What appears at first sight to be an expensive original part often turns out in the testing laboratory to be a product of inferior quality, and is then unreliable and endangers safety.



# 2. **Motorists can often be in for a few nasty surprises.**

Perhaps the problem which is easiest to get over is when a product quite simply refuses to fit in the installation recess and the Hella original part is the only one to work perfectly. Our tests show that drivers could be in for a nasty surprise: If, on the basis of inferior quality, the product does not survive the first

visit to the car wash, for example, or if components melt away like ice in slow-moving summer traffic or if a strange rattling noise starts coming from a new headlamp. All this costs time and money – as well as the risks and hassles of night driving that can consequently arise.

# 3. **The Hella test centre has had a close look at appearance and reality.**

All comparative tests were carried out in accordance with international standards. They can be followed up at any time, the test subjects were archived. With this test documentation we would like to help you

understand the risks and dangers which, on the basis of inferior quality, could lie in wait for you. And it would be a good idea if you passed on this information to all the motorists in your circle of friends.

# 4. **How reasonable is reasonable and what is truly value for money?**

These are questions which more and more consumers are being forced to think about. Everyone wants costs to be as economic as possible. However, headlamps cannot be treated as if they were a bag of sugar! They are an investment in safety! A second pair of eyes. Or, to put it another way: Every driver is proud of the excellent running of his car

engine. So why should the thinking be any different when it comes to headlamps? Products with sub-standard quality are anything but favourably-priced – they can really demand a high price from the car driver and not just in financial terms.

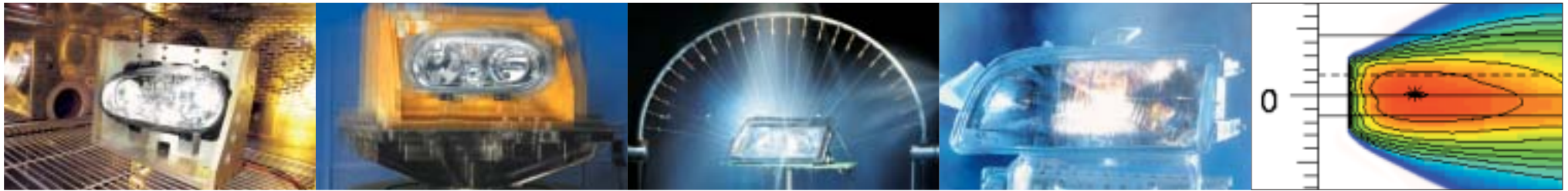


**The naked  
truth.**



## How we had a close look at Hella headlamps (original parts) and the other test subjects.

**Equal rights for all.** We at Hella carry out the tests described in detail here as a measure accompanying the manufacturing process of all our headlamps. The production batch is released only if it passes all the tests. The products tested here were tested in accordance with exactly the same test specifications as our original parts. All the detailed results can be found on the following pages. These are the five tests which the test subjects had to face:



### 1. Heat test: Part 1: 24-hour test.

The headlamp remains switched on constantly for 24 hours – alternating between dipped beam and main beam. This can lead to damage to the reflector. The surface metallization can flake off. Reflector characteristics are changed, which means not enough light is projected onto the road. In the case of headlamps with a clear-glass design, this damage becomes visible immediately.

**Part 2: Heat test.** The headlamp is subsequently exposed to a temperature of 50 °C for one hour. This temperature can develop very quickly in the housing during slow-moving traffic in summer. The same damage can occur as during the 24-hour test.

**Conclusion: Four of the six subjects did not pass the test.**

### 2. Vibration test:

This test simulates the behaviour of the headlamp during driving. The stability of the vertical and horizontal axes is tested separately. Whereas Hella headlamps have passed both these tests without difficulty, none of the test subjects of inferior quality were able to survive the test undamaged. The list of defects included pressure spots and abrasion as well as reflectors that had come loose from their fittings.

Under real conditions, if the reflector tilts backwards, it dazzles oncoming traffic. If it tilts forwards, it reduces the driver's visual range.

**Conclusion: Five of the six subjects did not pass the test.**

### 3. Splash test:

How does the headlamp react when it is exposed to rain, splashes of water and the car wash? To test this, the headlamp is placed in a closed chamber and sprayed with water constantly as though from a high-pressure cleaner. Even a tiny amount of humidity leads to corrosion and damage to the components inside the headlamp. Side effect: a green film forms on the inside of the lens, leaving it clouded.

**Conclusion: Two of the six subjects did not pass the test.**

### 4. Fogging test:

The headlamp is left switched off and exposed to water steam (20 °C, 100 % air humidity). Dew forms in the headlamp. It is then switched on. The fogging must disappear after a certain time which is defined in Hella's test standard 67017-02.

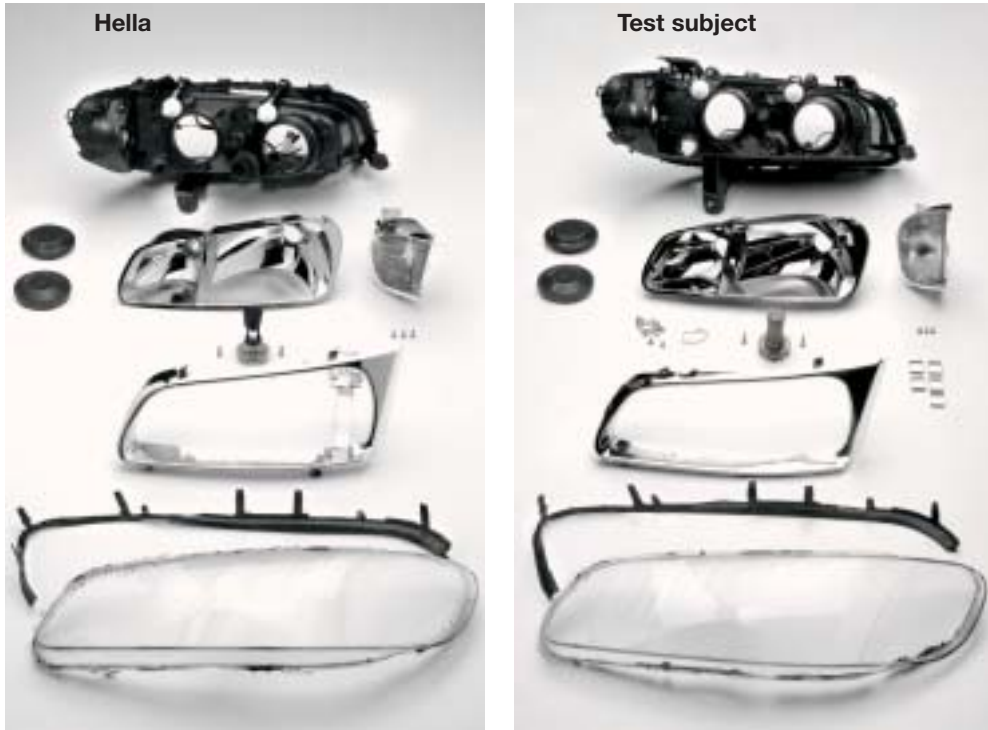
**Conclusion: All six products tested passed the test.**

### 5. Evaluation of lighting technology:

Technical lighting investigations are carried out at Hella, in accordance with internationally agreed guidelines. This concerns the testing equipment (including vehicle-specific test benches) and the standards which have to be achieved by the headlamps tested. The technical specifications required by the vehicle manufacturers are usually somewhat above these values. In other words: they demand even more from the headlamps than the already stringent international standards do. All the more alarming is the fact that not one of the six test subjects of inferior quality tested was able to achieve all the standard values – despite ECE approval.

**Conclusion: All six test subjects produced non-homogeneous road illumination which leads to a reduced visible range, for example. Production-related fluctuations and insufficient quality inspections by the manufacturers make choosing one of these headlamps a game of "Russian roulette" for the garage – complaints procedures included.**

Here you can see the fine differences between a Hella original part and a test subject.



At first glance they seem to be as alike as twins.  
A closer look reveals details which lead to great differences in quality.

Read here where Hella has invested in quality and where costs have been saved with the test subjects.

Hella	Technical Aspect	Test subject
As a partner of leading vehicle manufacturers (OEM supplier), Hella develops and manufactures headlamps exactly in accordance with their tolerances. Every Hella headlamp has this original parts quality. This is why it fits into the bodywork perfectly during repairs as well. No gaps arise. This makes it easy for garages to install the headlamp.	<b>An exact fit</b>	In the test it was shown that on the basis of inferior quality, the products have an individual tolerance spectrum. Possible problems for the garage: if the housing is too small it cannot be installed correctly (leading to vibration, rust formation etc.), if the housing is too big it makes installation more difficult.
The surface quality of the Hella reflector is extremely high – there is no inclusion of dust or so-called spots.	<b>Absence of dust / decorative quality of the reflector</b>	On the basis of inferior quality, spots as an optical defect lead to complaints from customers. The more defective points, the greater the dazzle for oncoming traffic.
Hella only uses new material or recycled material with well-known and defined properties.	<b>Use of materials</b>	The products tested were partly made of materials with unknown or inferior properties. This leads to mechanical damage (breakage) or thermal damage (melting, burning) to the headlamp components.



Hella	Technical Aspect	Test subject
Mounting instructions and hardware included such as metal bushings or washers increase the mechanical stability of the Hella headlamp in the vehicle.	<b>Installation aids</b>	In the case of the tested products, not all installation aids were included – to the disadvantage of the garage.
At Hella, an automated adhesive process makes sure that the adhesion of the headlamps is standardised and constant. Both the functional and the decorative quality of the headlamp remain on a constant high level. Hella caps fit perfectly. They are developed and produced in such a way that mechanical deformation is impossible.	<b>Adhesion / air-tightness of the rubber and plastic caps</b>	The six products tested do have ECE approval, but the test results convey the impression that there were fluctuations in quality during production.
Hella original parts comply with all mandatory regulations as well as the requirements of vehicle manufacturers, which go further than the legal criteria in many areas. Points such as the homogeneity of a beam pattern, for example, and the interaction of several beam patterns are not regulated by legislation. In these cases, the manufacturer's sense of responsibility is decisive in terms of the overall headlamp design.	<b>Design of lighting technology</b>	The six products tested do have ECE approval, but the test results convey the impression that there were fluctuations in quality during production.
Hella uses methods of metallization and paint application with optimised surface adhesion.	<b>Surface adhesion</b>	The metallization and paint flaked off some of the products tested.
Hella mainly uses materials which do not tend to exhale. Where such materials are necessary for functional reasons, the material is tempered before assembly: The exhalation process is triggered under defined conditions outside the headlamp.	<b>Exhalation</b>	Some of the products tested release softeners or other additives when heat develops. This results in precipitation on the headlamp lens which impairs the impression of quality and, in extreme cases, the light output.
Hella original parts have some technical design details, the functions of which are only known to Hella as the developer. The stiffeners which make a major contribution to the permanent fulfilment of functions are just one example.	<b>Technical design and geometry</b>	With the tested products, structural parts have sometimes been left out. This leads to a loss of mechanical stability in comparison with the original part.
The light functions of the Hella headlamp have been adjusted in relation to one another in the factory. If then, for example, the dipped beam is readjusted later, all the other settings for main beam and fog light are automatically in the correct position.	<b>Pre- and post-adjustment of the light functions</b>	None of the six products had been pre-adjusted in the factory. The garage is then faced with the unsolvable problem of being able to set either only the dipped beam or only the main beam in accordance with the regulations.
During final inspection, illumination and air-tightness of Hella headlamps are tested 100 % with live current.	<b>Final inspection</b>	The quality level of the six products tested allows the conclusion to be drawn that a 100 % inspection did not take place.



## Six products in the Hella test. Here are the most serious defects:

### Fiat Punto (headlamp of inferior quality)

#### Splash test: *Not passed.*

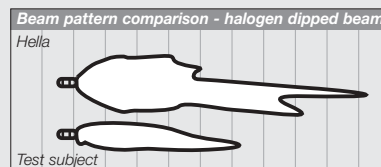
- During the test approx. 20 ml of water penetrated the inside of the device.
- In order to analyse the fault, an excess pressure test was carried out in the immersion tank. This revealed marked air bubble formation in the cap area.

#### Vibration test: *Not passed.*

- After the test the bulb shield was found to have broken off.
- The metal insert on the bracket for fixing the housing in place inside the vehicle was also broken.

#### Technical lighting results:

- Dipped beam: Non-homogeneous road illumination.
- Glare far too high at 2.73 Lux (lx) (a maximum value of 1 lx is allowed in series production – 0.7 lx in the type approval test).
- The headlamps can hardly be adjusted.
- Dipped beam left and right: The range is drastically reduced since the beam is too low / the maximum in the area in front of the vehicle gives drivers the impression they are "driving on rails". Legal requirements are not met.
- Main beam left: The maximum is too low and oriented to the right.
- Main beam right: The maximum is oriented to the right.



#### These defects can have the following effects during driving:

- The broken bulb shield causes serious dazzle to oncoming traffic.
- Water penetration leads to corrosion and eventually to light loss.
- A broken bracket on the housing makes the headlamp rattle about.
- **In the case of this test subject, the certification of approval for use can become invalid on account of the broken bulb shield.**



A shows the correct beam pattern of the Hella halogen dipped beam. B is a product of inferior quality which clearly causes excessive glare. In addition, the beam pattern is very speckled. The test subject has a significantly reduced visible range near the left-hand side of the road.

### VW Golf A3 (headlamp of inferior quality)

#### Heat test: *Not passed.*

- Following the test, the reflector revealed clear signs of damage above the ABBL/BL function.
- Large areas of the reflector metallization are iridized and appear rainbow-coloured.
- No further heat tests could be carried out with our test subject on account of this damage from the first part of the test.

#### Splash test: *Not passed.*

- Since there is nothing to prevent the cap from being fitted with the ventilation opening pointing downwards, and since there is not a TOP marking indicating which is the right way

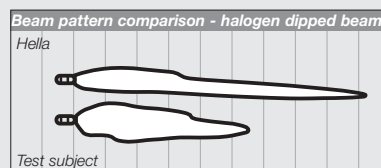
up, the splash test was repeated with the cap mounted the wrong way round.

#### Vibration test: *Not passed.*

- The bulb shield had already fallen off following the horizontal test.

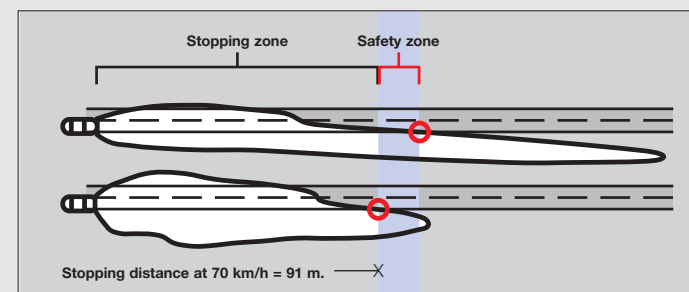
#### Technical lighting results:

- Dipped beam: Non-homogeneous illumination of the road
- Main beam: Directed to the left to extremely varying degrees/leading to two light fingers on the road/non-homogeneous illumination of the road/reduced visible range.



#### These defects can have the following effects during driving:

- The damage caused during the vibration test leads to extreme dazzling of oncoming traffic.
- When the cap is installed the wrong way round, water penetrates the device. The resulting corrosion causes light loss.



A bird's eye view of the halogen beam pattern. The non-homogeneous road illumination can be seen clearly.

The broken off bulb shield can be clearly seen inside the headlamp housing.



Explanation of abbreviations • ABBL = dipped beam/direction indicator • BL = direction indicator • FL = main beam • LW = lighting distance • PO = position light

## Six products in the Hella test. Here are the most serious defects:

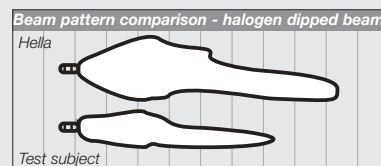
### VW Golf A4 (headlamp of inferior quality)

#### Heat test: *Not passed.*

- The BL lens reveals serious deformation following the test.
- The metallization on the cover frame is damaged above the BL function.
- The front area of the BL bulb holder has turned dark brown.
- The cover frame reveals minor deformation above the FL function.
- In addition, a visible film is formed on the inside of the cover lens when the headlamp is switched on.
- Since the headlamp revealed serious damage after the first part of the test, no further heat tests were carried out with this test subject.

#### Technical lighting results:

- Dipped beam: Non-homogeneous illumination of the road.
- Main beam: The maximum is far too low both on the left and right / making it outside the series tolerance / a lot of light in front of the vehicle – reduced visible range.



#### These defects can have the following effects during driving:

- Deformation of the indicator lens changed the beam pattern. The indicator could no longer be recognised.
- Discolouration of the indicator bulb holder is an indication of excessive material strain. At some stage the bulb will no longer be able to be replaced.



The headlamp with dismantled, and defective, direction indicator.



The deformation of the test subject's indicator lens can be seen quite clearly. The bulb has been destroyed by material contact.

### VW Polo (headlamp of inferior quality)

#### Heat test: *Not passed.*

- The housing locking cap cannot be locked tightly enough in place to enable it to stay in place on the housing for more than 5 minutes.
- Since this means the housing was not sealed during the heat test, these tests can only be evaluated with reservations.

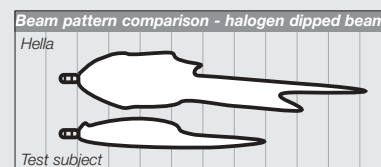
#### Vibration test: *Not passed.*

- Following the test in the vertical direction, the ball socket system had loosened itself from the reflector
- The adjustment elements in the housing had free play.

- The housing cap fell off during the test.
- The test in the horizontal direction could no longer be carried out.

#### Technical lighting results:

- Dipped beam left and right: strong non-homogeneity
- Main beam: right: oriented to the left / left: very much oriented to the left.



#### These defects can have the following effects during driving:

- A poor cap fit can lead to water penetration. Corrosion then leads to light loss.
- Since the adjustment elements have been worn prematurely, the headlamp can no longer be adjusted. The reflector rattles and the headlamp dazzles oncoming traffic.



The wrong housing cap design on the test subject leads to it not being able to be locked in place tightly. This allows water to penetrate the headlamp housing.



The housing material of the test subject does not comply with the specification. It is not rigid enough.

Explanation of abbreviations • ABBL = dipped beam/direction indicator • BL = direction indicator • FL = main beam • LW = lighting distance • PO = position light

## Six products in the Hella test. Here are the most serious defects:

### VW Passat B5 (headlamp of inferior quality)

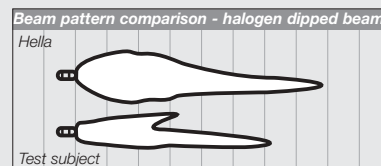
#### Vibration test: *Not passed.*

- Following the test in the vertical direction, all three screws for attaching the adjustment elements and the adapter for the HL actuator had been torn out of the reflector.
- The test in the horizontal direction could then no longer be carried out.

#### Technical lighting results:

- Dipped beam: left and right very non-homogeneous/left: high glare (+ 30 % above maximum tolerance).
- Heavy fluctuations in brightness on the road make drivers tire quickly.

- Main beam left and right: is far too low/reduced visible range (only 60–80 % of the required minimum values are achieved).
- The visible range is extremely short with both dipped beam and main beam. The light only shines around 20 m in front of the vehicle.



#### These defects can have the following effects during driving:

- The reflector has lost all the guidance it had had in the housing. It can knock around in all directions during driving.
- This leads to extreme glare and loss of visible range.



The broken reflector brackets of the test subject can be clearly recognised.

### Vauxhall/Opel Omega (headlamp of inferior quality)

#### Heat test: *Not passed.*

- Following the test, the bulb shield coating had flaked off over a large area at the top.
- Pronounced film formation can be seen on the FL reflector above the PO function.
- There is extensive film formation in the whole BL area on the reflector, which can even be seen with the lights switched off.
- Plug burnt on H7-bulb, lack of insulation can lead to short circuit. Fire hazard!

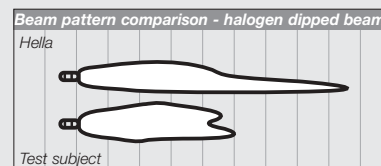
**Air-tightness:** The air-tightness tests were not able to be carried out since the BL bulb holder was missing.

#### Vibration test: *Not passed.*

- Following the test in both spatial axes the reflector had excessive play in the bracket.
- Rattling noises occur.

#### Technical lighting results:

- Dipped beam: Non-homogeneous / short visible range / high glare on the left (+ 14 % above maximum tolerance) / a lot of light directly in front of the vehicle – reducing light values even further.
- Main beam right: Maximum is far too low (only around 50 % of the minimum requirement for series tests)/beam pattern oriented too much to the right - even if the maximum were OK, it would not pass the type approval test.



- Main beam left: Maximum is too low on the road, the same as on the right/series values are not achieved either.

#### These defects can have the following effects during driving:

- The cable insulation is charred. This leads to a short circuit and loss of the light function.



Insufficient material properties on the test subject lead to excess load on the plug. The upper plug contact is not sufficiently crimped. This causes contact resistance and a reduction in light output.

**You shouldn't expect  
your customers to put  
up with products of  
inferior quality.**





**Conclusion of the headlamp test report: in comparison with original parts, the test subjects reveal one or more serious defects. Here is a summary of the most important defects of the products tested.**



#### **Technical production-related problems**

- Optical defects such as spots.
- Important structural components are missing.
- Poor final inspection increases the complaint rate.



#### **Installation problems**

- Incorrect tolerances make installation more difficult.
- Instructions and hardware parts are either missing or of poor quality.
- No pre-adjustment in the factory: dipped beam or main beam cannot be adjusted in accordance with the regulations.
- Important structural parts become bent during installation.
- Incorrect installation possible due to design defects.



#### **Technical lighting problems**

- The legally required minimum or maximum values are not achieved.
- Non-homogeneous road illumination from the left and/or right dipped beam.
- High glare values – sometimes extremely high – endanger traffic.
- Main beam is too low.
- Visible ranges are too small for both dipped beam and main beam.
- Strong fluctuations in brightness on the road.
- Reduced visibility becomes a risk for drivers, passengers and other road users.
- Headlamps can sometimes hardly be adjusted.

#### **Operating problems**

- Faulty material: parts break, melt or burn.
- Poor adhesion allows dust and humidity to penetrate.
- Mechanical deformation of the caps due to mould defects, wrong material choice or inaccuracies.
- Softeners and additives cause precipitation on the lens.
- Problems with air-tightness: water penetration can cause short circuits.
- Structural parts break even under normal stress conditions.
- Paint, reflector coatings and bulb holders become discoloured or large areas become flaky – ruining the headlamp.
- Film formation reduces headlamp performance.
- Burnt plugs and no insulation: acute fire hazard!

- Headlamp axes and setting elements have room to move and can no longer be set correctly.
- Material deformation under load.
- Parts are no longer locked in place, screw connections are torn out even under everyday stress conditions.
- Loose, and falling off, sealing caps.

**"Quality from Hella.  
My safety is really  
worth that to me."**



# 1. The all-over quality of your car is the decisive factor

There are four things that make the difference between good and bad when it comes to cars: the engine, brakes, shock absorbers and lighting. And for these reasons a growing number of garages recommend first and foremost Hella original equipment. The sooner, the better.

# 2. We have learnt our craft over a hundred years, and learn something new every day.

The history of the motor car is also the history of Hella lighting technology. We have worked hard for our success. Today, when leading vehicle manufacturers dream up a new model concept, Hella engineers are being involved more and more often right from the drawing board. This is because we are innovative, and strong in research and development. At the end of our value-added chain our products can be trusted completely.



**Benefit from the competence and strong performance of the Hella brand:  
Our innovative technology, consistent quality and competent garage services  
are able to literally beam you into the pole position when it comes to lighting  
for your car.**

