



CITA Task Force

Lighting devices and reflectors

Status paper for GRE Task Force "Glare Prevention"

Final version, 27. November 2025

The CITA Task force on Lighting devices and reflectors (CITA-TF-LDR), based on the ADAC Symposium Glare (25. - 26. March 2025 Penzing, Germany), followed by the internal discussions, concluded that one of the key problems causing the glare in road traffic is improper adjustment of the vehicle's headlights.

CITA-TF-LDR is also facing difficulties during the process of updating CITA Recommendation no. 25 on Headlamp Alignment Testing in Vehicle Inspection (rel. February 2022), because on the one hand, there is a strong need for adaptation of the current inspection procedures used during periodic technical inspections (PTI) of the vehicles in use accordingly to the present headlight technology, followed by the improvement of the measurement precision, repeatability of the results the evaluation of the headlight cut-off position is subjected to strong influence of human factor.

But on the other hand, any improvement of the situation related to the headlight adjustment in PTI environment is very complicated nearly impossible, if the fundamental requirements related to headlights and definitions laid down on the type approval level are weak, non-consistent and are missing an important criterion.

Thereof CITA-TF-LDR identified as a starting point following problems to solve:

In type approval requirements UN-ECE-R149 the current method of finding horizontal and vertical setting of headlamp before photometric measurement is visual. This method delivers subjective and not repeatable results. The description of shape of cut-off with the horizontal and elbow-shoulder part is insufficient. There is neither a definition nor given tolerances of the shape of the horizontal and elbow-shoulder parts.

If the results of visual method are not repeatable, it is possible to use the instrumental method. The starting point for instrumental aim is however the visual one. Because of that, the final result of instrumental aim is also not repeatable. In the instrumental method, three vertical lines are scanned at a specific position to find the position of the cut-off line. These positions depend on the initial aim of the headlight by visual method. This gives ambiguous results. The goal is to achieve reproducibility of the results.

To achieve this, two things must be fulfilled:

- The methods must fulfil the requirement for reproducibility
- The definition required to align the headlight (shape of cut-off, kink point) must be so clear that it can be determined instrumentally using a standardized method for TA and PTI.



CITA-TF-LDR is already working on proposals to solve these challenges. These methods are briefly described:

- High-resolution scanning in horizontal and vertical directions and evaluation of the entire cut-off line
- The cut-off includes a horizontal and shoulder part, which must contain clear lines delimited by tolerances
- A method feasible to determine the kink point on all headlamps, which is the point for alignment

The methods to determine the cut-off and kink point described for type approval or equivalent methods should also be feasible in the PTI. The same methods should also be used to check the adjustment of the headlights in the installed state in the vehicle. This ensures that the PTI and the tested aiming value correspond to the measurements in the type approval, which are designed to prevent glare effectively and to guarantee minimum road illumination.

To ensure that future headlights can also be tested independently and correctly, they must be compatible with the existing systems for testing. It has to be guaranteed, that the entire low beam pattern can be projected in a headlight tester with a lens size diameter of 200mm. So, it shall allow to collect the low beam pattern, that creates the essential part of cut-off to accurately find kink point. According to the requirements, the results of the measurement cut-off at 10 m and 25 m shall give the same results.

The initial aim and standard passing beam (class C) should be possible to activate on the vehicle in any conditions for everybody without special tools.

To reduce glare in road traffic even more effectively, it is necessary to link the initial value for alignment more closely to the mounting height. The existing range for selecting the initial headlamp aim is so wide that very different road illumination distance can be achieved. This leads to a different glare effect in road traffic, depending particular combination of actual aim and beam pattern of given vehicle. To solve this problem, the range for selecting the possible setting must be specified precisely. It is the most advantageous that the initial aim value should be prescribed strictly depending on the mounting height. A linear function that provides equivalent road illumination distance for all possible mounting heights can serve as a basis. The accuracy of the initial aim is set to an accuracy of 0.1%. Additionally, the tolerance band for automated levelling systems should be required at the highest technically possible and reasonable precision and sensible level to ensure appropriate alignment in all conditions.

CITA will also propose Provisions for PTI in the certain UN lighting regulations.