Auto Leveling for LED Headlamps in Regulation R48.

Context of the current regulation.

• Installation regulation: R48.
  – Currently in force: series 04 (*), 05 and 06.
  – Auto-leveling device for low-beam with:
    • light source whose reference luminous flux > 2,000 Lm
    • LED module(s).

• GTB Study.
  – GTB got a mandate from GRE to define new prescriptions for the auto-leveling device, based upon scientific analysis.
  – Conclusions of the GTB study were presented to GRE (Document 71-32).
  – In the future, a new proposal based on this study could become a new series of amendment of R48 with new prescriptions for auto leveling devices.

(*) Approval extension only.
Current prescriptions of R48 Series.

For all Series, Automatic leveling device required for:
- Light sources whose Luminous Flux is > 2,000 lm
- LEDs.
Results of GTB study

- Based upon the analysis of Klettwitz night test.

Results for Halogen, Xenon, LED

* Width of the bars covers app. 70% of all ratings

NO influence of the light source on the dazzle of the oncoming drivers
Conclusions of GTB Study.


Summary

- Results of Discomfort Glare and disability glare show clearly, that the behaviour of the vehicle is the important factor for deciding on levelling needs.
- Light source is not significantly contributing.
- Pitch angle is a qualified parameter for new regulation criteria.
Proposal

• Document n° 2015-21 proposed by France.
• Taking into account GTB conclusion, Modification of ECE R48 series 04, 05 & 06 so that prescriptions for auto-leveling devices are the same for LED headlamps as for headlamps of other types (halogen and xenon).
• It is an intermediate situation which does not interfere with a future proposal which could be introduced in a new series of amendments (07).
Proposal of new prescriptions.

For the Series 04, 05 & 06, Automatic leveling device only for Light sources including LED module(s) whose Luminous Flux is > 2,000Lm.

Further series with new prescriptions upon auto leveling devices
Advantages

• To remove the hurdle for the broadcasting of LED headlamps on the roads.
• More LED headlamps on the road (see next pages).
   – Safety impact.
      • By increasing the number of vehicles equipped with LED HLs (See page 9).
        – Less “blind in one eye” cars on the roads.
   – Energy saving.
      • By reducing the power consumption of headlamps: Average CO\textsubscript{2} emissions of a car is decreased by 1 g CO\textsubscript{2} /km, based upon Technical guidelines of the European Commission (See page 10).
Marketing study.

- Removing the auto-leveling requirement for LED headlamps whose luminous flux of the source is less than 2,000 Lm has a significant impact on the equipment rate of the vehicles.
- => in 2020, between 2.6 and 5.2M vehicles in more with LED due to the proposed modification.

Impact of the proposal on the LED equipped vehicles: (Europe + Turkey)
CO₂ emissions impact

• Hypothesis:
  – LED headlamps save 1g CO₂ /km.
  – Average mileage : 15000km/year.

Between 110,000 and 220,000 tons CO₂ saved per year in 2020 in Europe.
One return Flight Paris New-York by a B777 ~ 400 tons of CO₂.
Conclusions.

• No influence of the light source type on the dazzle of the other road users.

• Proposal: Same requirement upon the auto leveling for LED as for other light source types in the current R48 Series (04, 05, 06).

• No interference with any other proposal which could be introduced in the future in a new series (07) of R48.

• Consequences:
  – More LED headlamps fitted on new vehicles.
    • => improvement of road safety.
    • => reduction of CO2 emissions.

• Any question?