

**Economic and Social Council**Distr.: General
27 July 2022

Original: English

Economic Commission for Europe

Inland Transport Committee

World Forum for Harmonization of Vehicle Regulations**Working Party on Lighting and Light-Signalling****Eighty-seventh session**

Geneva, 25–28 October 2022

Item 6 (a) of the provisional agenda

Installation UN Regulations:**UN Regulation No. 48 (Installation of Lighting and Light-Signalling Devices)****Proposal for a new supplement to UN Regulation No. 48****Submitted by the expert from Germany***

The text reproduced below was prepared by the experts from Germany. The modifications to the existing text of the UN Regulation are marked bold for new and strikethrough for deleted characters.

* In accordance with the programme of work of the Inland Transport Committee for 2022 as outlined in proposed programme budget for 2022 (A/76/6 (Sect.20), para 20.76), the World Forum will develop, harmonize and update UN Regulations in order to enhance the performance of vehicles. The present document is submitted in conformity with that mandate.



I. Proposal

Paragraph 2.3.8., amend to read:

"2.3.8. "Movable components" of the vehicle mean those body panels or other vehicle parts the position(s) of which can be changed by tilting, rotating or sliding without the use of tools. They do not include tiltable ~~driver~~ cabs of trucks."

Paragraph 2.5.3., amend to read:

"2.5.3. "Direction-indicator lamp" means the lamp used to indicate to other road-users that the driver **or the vehicle** intends to change direction to the right or to the left. A direction-indicator lamp or lamps may also be used according to the provisions of UN Regulations Nos. 97 or 116."

Paragraph 2.5.18., amend to read:

"2.5.18. "Exterior courtesy lamp" means a lamp used to provide supplementary illumination to assist the entry and exit of the vehicle ~~driver and passenger~~ or ~~in~~ loading operations;"

Paragraph 2.7.4.7., amend to read:

"2.7.4.7. "Adaptive main-beam" means a main-beam of the AFS that adapts its beam pattern to the presence of oncoming and preceding vehicles in order to improve the long-range **[illumination or]** visibility **ahead of the vehicle** ~~for the driver~~ without causing discomfort, distraction or glare to other road users."

Add a new paragraph 2.7.4.8. to read:

"2.7.4.8. "**Driving system**" means for the purpose of this Regulation the part of the vehicle which controls its operation; it may be operated by driver support features or automated driving features."

Add a new paragraph 2.7.4.9. to read:

"2.7.4.9. "**Driving mode**" means for the purpose of this Regulation a type of driving scenario with characteristic dynamic driving task requirements."

Paragraph 5.14.4., amend to read:

"5.14.4. It shall not be possible deliberately, from the driver's seat **if any**, to stop the movement of switched ON lamps before they reach the position of use. If there is a danger of dazzling other road users by the movement of the lamps, they may light up only when they have reached their position of use."

Paragraph 5.26.4., amend to read:

"5.26.4. No sharp variation of intensity shall be observed during transition.
It may be possible ~~for the driver~~ to set the functions above to luminous intensities."

Paragraph 6.1.7.3. amend to read:

"6.1.7.3. It shall always be possible to switch the main-beam headlamps ON and OFF manually and to manually deactivate the automatic control of the main-beam headlamps.

Moreover, the switching OFF of the main-beam headlamps and the deactivation of their automatic control shall be by means of a simple and immediate manual operation; the use of sub-menus is not allowed.

In the case of an activated driving system, it may not apply."

Paragraph 6.2.6.1.1., amend to read:

"6.2.6.1.1. The initial downward inclination of the cut-off of the dipped-beam to be set in the unladen vehicle state with one person in the driver's seat, **if any**, shall be specified within an accuracy of 0.1 per cent by the manufacturer and indicated

in a clearly legible and indelible manner on each vehicle close to either headlamp or the manufacturer's plate by the symbol shown in Annex 7.

The value of this indicated downward inclination shall be defined in accordance with paragraph 6.2.6.1.2.

However, in the case of being in an autonomous driving mode the initial downward inclination of the cut-off of the dipped beam shall be the same as befor in the unladen vehicle state with no person in any seat."

Paragraph 6.2.6.2.1., amend to read:

"6.2.6.2.1. In the case where a headlamp levelling device is necessary to satisfy the requirements of paragraphs 6.2.6.1.1. and 6.2.6.1.2. **or a driving system**, the device shall be automatic."

Paragraphs 6.2.7.6. and 6.2.7.7., amend to read:

"6.2.7.6. Irrespective of the requirements of paragraph 6.2.7.5., **with the exception of a driving system**, it shall always be possible to switch the dipped beam headlamps ON manually.

6.2.7.7. The driver **or the driving system** shall at all times be able to engage the automatic operation."

Paragraph 6.3.6.1.1., amend to read:

"6.3.6.1.1. In the case of class "B" front fog lamps the vertical inclination of the cut-off to be set in the unladen vehicle state with one person in the driver's seat **if any**, shall be -1.5 per cent or lower. ¹³ "

Paragraph 6.3.6.1.2.1.1., amend to read:

"6.3.6.1.2.1.1. The vertical inclination of the cut-off to be set in the unladen vehicle state with one person in the driver's seat shall be – 1.0 per cent or lower

However, in the case of an autonomous driving mode this condition shall be fulfilled in the unladen vehicle state with no person in any seat."

Paragraph 6.3.6.1.2.2.2., amend to read:

"6.3.6.1.2.2.2. The initial downward inclination of the cut-off to be set in the unladen vehicle state with one person in the driver's seat shall be specified within an accuracy of one decimal place by the manufacturer and indicated in a clearly legible and indelible manner on each vehicle close to either the front fog lamp or the manufacturer's plate or in combination with the indication referred to in paragraph 6.2.6.1.1. by the symbol shown in Annex 7 to this Regulation. The value of this indicated downward inclination shall be defined in accordance with paragraph 6.3.6.1.2.2.1.

However, in the case of an autonomous driving mode the initial downward inclination of the cut-off of the front fog lamp shall be fulfilled in the unladen vehicle state with no person in any seat."

Paragraph 6.4.7.2., amend to read:

"6.4.7.2. Moreover, the electrical connections of the two optional devices mentioned in paragraph 6.4.2.2. shall be such that these devices cannot be switched ON unless the lamps referred to in paragraph 5.11. are switched ON.

The devices fitted on the side of the vehicle may be switched ON for slow manoeuvres in forward motion of the vehicle up to a maximum speed of 15 km/h, provided that the following conditions are fulfilled:

- (a) The devices shall be switched ON and OFF manually by a separate control;

However, in the case of a driving system it shall be automatically.

Paragraph 6.6.7.1. and 6.6.7.2., amend to read:

- "6.6.7.1. The signal shall be operated by means of a separate manual control **or in the case of an activated driving system it may be automatically** enabling all the direction-indicator lamps to flash in phase.
- 6.6.7.2. The hazard warning signal may be switched ON automatically in the event of a vehicle being involved in a collision or after the emergency stop signal has been switched OFF, as specified in paragraph 6.23. below **or in the case of an imminent danger identified by the driving system**. In such cases, it may be switched OFF manually.

In addition, the hazard warning signal may be switched ON automatically to indicate to other road-users the risk of imminent danger as defined by Regulations; in this case, the signal shall remain switched ON until it is manually or automatically switched OFF."

Paragraph 6.11.7.3.2., amend to read:

- "6.11.7.3.2. A warning, at least audible, additional to the mandatory tell-tale (paragraph 6.11.8.) shall be given if the ignition is switched OFF or the ignition key is withdrawn and the driver's door is opened **if any**, whether the lamps in (paragraph 6.11.7.1.) are ON or OFF, whilst the rear fog lamp control is in the ON position."

Paragraph 6.19.7.1.3., amend to read:

- "6.19.7.1.3. Prior to the vehicle being set in motion for the first time after each ~~manual~~ activation of the device, which starts and/or stops the propulsion system."

Paragraph 6.20.7.2., amend to read:

- "6.20.7.2. When the reversing lamp is switched ON, both cornering lamps may be switched ON simultaneously, independently from the steering **angle wheel** position or direction-indicator position.
- If so switched ON, both cornering lamps shall be switched OFF either:
- (a) When the reversing lamp is switched OFF; or
 - (b) When the forward speed of the vehicle exceeds 15 km/h."

Paragraph 6.22.6.1.1., amend to read:

- "6.22.6.1.1. The initial downward inclination of the cut-off of the basic passing-beam to be set in the unladen vehicle state with one person in the driver's seat shall be specified with a precision of 0.1 per cent by the manufacturer and indicated in clearly legible and indelible manner on each vehicle, close to either the front lighting system or the manufacturer's plate, by the symbol shown in Annex 7.
- However, in the case of an autonomous driving mode the initial downward inclination of the cut-off of the basic passing-beam shall be the same as befor in the unladen vehicle state with no person in any seat.**

Where differing initial downward inclinations are specified by the manufacturer for different lighting units that provide or contribute to the cut-off of the basic passing-beam, these values of downward inclination shall be specified with a precision of 0.1 per cent by the manufacturer and indicated in clearly legible and indelible manner on each vehicle, close to either the relevant lighting units or on the manufacturers plate, in such a way that all the lighting units concerned can be unambiguously identified."

Paragraph 6.22.7.1.3., amend to read:

- "6.22.7.1.3. It shall always be possible to switch the main-beam headlamps, adaptive or non-adaptive, ON and OFF manually and to manually deactivate the automatic control.

Moreover, the switching OFF, of the main-beam headlamps and the deactivation of their automatic control, shall be by means of a simple and immediate manual operation; the use of sub-menus is not allowed.

In the case of a driving system it shall be always automatically."

Paragraph 6.22.7.5., amend to read:

"6.22.7.5. It shall always be possible for the driver **or the driving system** to set the AFS to the neutral state and to return it to its automatic operation."

Paragraph 6.22.8.3., amend to read:

"6.22.8.3. If the main beam is adaptive, a visual tell-tale shall be provided to indicate ~~to the driver~~ that the adaptation of the main beam is activated. This information shall remain displayed as long as the adaptation is activated."

Annex 1,

Add new items 9.31. and 9.32. to read:

"**9.31. Driving system:** yes/no²

[9.32. [Autonomous] Driving mode: yes/no².....]"

Annex 5,

Paragraphs 2.1.1.1. to 2.4.2.2., amend to read:

- 2.1.1.1. One person in the driver's seat, **if any**;
- 2.1.1.2. The driver, **if any**, plus one passenger in the front seat farthest from the **front driver**;
- 2.1.1.3. The driver, **if any**, one passenger in the front seat farthest from the **front driver**, all the seats farthest to the rear occupied;
- 2.1.1.4. All the seats occupied;
- 2.1.1.5. All the seats occupied, plus an evenly distributed load in the luggage boot, in order to obtain the permissible load on the rear axle or on the front axle if the boot is at the front. If the vehicle has a front and a rear boot, the additional load shall be appropriately distributed in order to obtain the permissible axle loads. However, if the maximum permissible laden mass is obtained before the permissible load on one of the axles, the loading of the boot(s) shall be limited to the figure which enables that mass to be reached;
- 2.1.1.6. Driver, **if any**, plus an evenly distributed load in the boot, in order to obtain the permissible load on the corresponding axle.
- However, if the maximum permissible laden mass is obtained before the permissible load on the axle, the loading of the boot(s) shall be limited to the figure which enables that mass to be reached.
- 2.1.2. In determining the above loading conditions, account shall be taken of any loading restrictions laid down by the manufacturer.
- 2.2. Vehicles in categories M₂ and M₃¹;
- The angle of the light beam from the dipped-beam headlamps shall be determined under the following loading conditions:
- 2.2.1. Vehicle unladen and one person in the driver's seat, **if any**;
- 2.2.2. Vehicles laden such that each axle carries its maximum technically permissible load or until the maximum permissible mass of the vehicle is attained by loading the front and rear axles proportionally to their maximum technically permissible loads, whichever occurs first.
- 2.3. Vehicles in category N with load surfaces:

- 2.3.1. The angle of the light beam from the dipped-beam headlamps shall be determined under the following loading conditions:
 - 2.3.1.1. Vehicle unladen and one person in the driver's seat, **if any**;
 - 2.3.1.2. Driver, **if any**, plus a load so distributed as to give the maximum technically permissible load on the rear axle or axles, or the maximum permissible mass of the vehicle, whichever occurs first, without exceeding a front axle load calculated as the sum of the front axle load of the unladen vehicle plus 25 per cent of the maximum permissible payload on the front axle. Conversely, the front axle is so considered when the load platform is at the front.
- 2.4. Vehicles in category N without a load surface:
 - 2.4.1. Drawing vehicles for semi-trailers:
 - 2.4.1.1. Unladen vehicle without a load on the coupling attachment and one person in the driver's seat, **if any**;
 - 2.4.1.2. One person in the driver's seat, **if any**: technically permissible load on the coupling attachment in the position of the attachment corresponding to the highest load on the rear axle.
 - 2.4.2. Drawing vehicles for trailers:
 - 2.4.2.1. Vehicle unladen and one person in the driver's seat, **if any**;
 - 2.4.2.2. One person in the driver's seat, **if any**, all the other places in the driving cabin being occupied."

Annex 12,

Add new paragraphs 2.9. and 2.10. to read:

- "2.9. For the test sections A, B, C, D and E in the table above the engineers conducting the tests shall evaluate additionally with the Driving System active if installed.**
- 2.10. The engineers conducting the tests shall evaluate additionally in the case of an imminent danger if the Driving System is active that the hazard warning signal will be activated."**

II. Justification

1. This proposal to amend UN Regulation No. 48 (Installation of lighting and light-signalling devices) is submitted by the expert from Germany with the aim to introduce vehicles with a driving system, which controls its operation or may be operated by driver support features or automated driving features or by an Automated Driving System (ADS). It is based on the discussions at the Task Force on Autonomous Vehicle Signalling Requirements (TF AVSR) meeting on 15 June 2022 in Stockholm.
2. Two definitions for the purpose of this Regulation are added for clarification. The "Driving system" is the description for the parts of the vehicle that enable automated or autonomous driving. The operational mode, regardless of whether the vehicle is operated manually or automatically is defined as the "Driving mode" and taken from the key definitions in the standard SAE-J3016. That can be specified, e.g. as an autonomous driving mode, in the meaning that it is currently required in this Regulation. These two definitions make it possible to define the lighting requirements without having to go into detail about the different levels of automated or autonomous driving.
3. The requirements in 6.11.7.3.2. need only an amendment in case there is no driver's door. There is in general a need for a warning, at least an audible signal, additional to the mandatory tell-tale if the ignition is switched OFF or the ignition key is withdrawn and the driver's door is opened, because this is independent from the driving mode a relevant information for the driver and prevents from unintentional actions.

4. In Annex 12 the evaluation of the Driver Assistance Projection and the driving system, if installed, is additionally included.

Background supporting information

5. On 2 December 2021, the Federal Motor Transport Authority (KBA) granted the world's first type approval in the field of automated driving for an Automated Lane Keeping System (ALKS) for a model of the manufacturer Mercedes-Benz.

6. The basis is UN Regulation No. 157, which defines internationally harmonised safety requirements for automated lane-keeping systems. This type approval for automated driving granted by KBA is an important first step on the road to automation, as Mr. Richard Damm, President of KBA said on the occasion of the granting. KBA sets national, European and international standards for road safety on the road to autonomous driving. This is the key point, because it requires consumer confidence in the safety of the new technologies. In order to create this trust, we have applied a strict standard, which we, as pioneers in this field, will also adhere to further down the road, Mr. Richard Damm continued.

7. The automatic lane-keeping system - ALKS - is classified as "Level 3" automation. This is an automated mode in which the driver does not have to constantly monitor the system. UN Regulation No. 157 still limits the use of ALKS in its current form on motorway-like roads up to a speed of 60 km/h. The use of ALKS on motorway-like roads is not permitted. Under this condition, the driver can perform non-driving activities with the ALKS function switched on. However, the driver must be prepared at all times to resume driving after being requested to do so.

8. The number of type approvals for automated and autonomous driving vehicles will increase rapidly. Without rapid adaptation of UN Regulation No. 48, the entire Regulation may become less relevant in the long run as alternative regulations are developed somewhere else.

9. One example for that is "ANNEXES to the Commission Delegated Regulation (EU) 2022/... amending Annexes I, II, IV and V to Regulation (EU) 2018/858 of the European Parliament and of the Council as regards the technical requirements for vehicles produced in unlimited series, vehicles produced in small series, *fully automated vehicles produced in small series* and special purpose vehicles, and as regards software updates" which was expected to come into force on 6 July 2022¹.

10. This includes "Annex II, Part I, Appendix 1 to Regulation (EU) 2018/858, containing the requirements for EU type-approval of vehicles produced in small series is amended and complemented to take into account Regulation (EU) 2019/2144 and the delegated acts and implementing acts adopted pursuant to it. In addition, the requirements for the EU whole vehicle type-approval of fully automated vehicles produced in small series are set out in a new Table 2 to that Appendix."

11. The above Table 2 contains the requirements as follows:

"D15 Installation of light signalling, road illumination and retro-reflective devices Regulation (EU) 2019/2144 A (*which refers in general to UN Regulation No. 48*)

Definition of: X (for manual driving mode) // A (for fully automated driving mode)

Additional requirements: The requirements shall remain the same, but in case of malfunctioning, the information shall be sent to ADS and the remote intervention operator (if applicable).

The activation of the lights is managed by the ADS.

For bidirectional vehicles, requirements shall be met in both directions unless it is incompatible with the use in agreement with the type-approval authority."

12. Therefore, Germany proposes to adapt the regulation 48 as soon as possible.

¹ [https://eur-lex.europa.eu/legal-content/NL/TXT/?uri=PI_COM:Ares\(2022\)2077610](https://eur-lex.europa.eu/legal-content/NL/TXT/?uri=PI_COM:Ares(2022)2077610)