

PROPOSAL FOR DRAFT AMENDMENTS TO REGULATION No. 48
(Operating voltage for lighting and light-signalling devices)

Note: The text reproduced below describes the results from discussions involving the experts from Germany and the Netherlands supported by the experts from CLEPA and IEC. The objective is to define new provisions in order to clarify the discrepancies between electrical supply conditions during the type approval test and the electrical supply conditions on the vehicles in service.

This document is a revised proposal from Germany. The modifications to TRANS/WP.29/GRE/2003/20/Rev.2 are marked in **bold** characters.

A. PROPOSAL FOR DRAFT AMENDMENTS TO REGULATION No. 48

Add a new paragraph 5.25., to read:

"5.25. The applicant shall demonstrate with a concise description or other means 1/ to the satisfaction of the Technical Service and to the Authority, that the range of voltage on the vehicle shall not exceed the range of input voltage for which the installed lighting and light-signalling devices are type-approved.

1/ Voltage measurements on the vehicle, could be carried out for example on the base of ISO 3559-DATE 1976 "Road Vehicles – Working Voltages for Lights Fitted to Motor Vehicles and their Trailers"

B. PROPOSAL FOR DRAFT AMENDMENTS TO REGULATION No. 112

As a consequence of the above mentioned proposal for Regulation No. 48, an example of necessary amendments to the lamp regulations follows:

1. DEFINITIONS

1.3. Headlamps of different "types" mean headlamps which differ in such essential respects as:

Add a new paragraph 1.3.8., to read:

1.3.8. The electronic light source control gear.

2. APPLICATION FOR APPROVAL OF A HEADLAMP

2.1.5. the category of the filament lamp(s) used, as listed in Regulation N°37;

Add a new paragraph 2.1.6. to read:

2.1.6. the range of input voltage to the electronic light source control gear;

3. MARKINGS 2/

3.1. Headlamps submitted for approval shall bear the trade name or mark of the applicant.

Paragraph 3.2 amend to read:

3.2. They shall comprise,

3.2.1 on the lens and on the main body, 3/ spaces of sufficient size for the approval mark and the additional symbols referred to in paragraph 4; these spaces shall be indicated on the drawings referred to in paragraph 2.2.1. above;

3.2.2 the range of input voltage on the main body, (see Annex 9).

4. APPROVAL

Question of use of 24V filament lamps?

4.2.3. In every case the relevant operating mode used during the test procedure according to paragraph 1.1.1.1. of annex 4 and the permitted voltage(s) according to paragraph 1.1.1.2. of annex 4 shall be stipulated on the approval forms and on the communication forms transmitted to the countries which are Contracting Parties to the Agreement and which apply this Regulation.

Headlamps meeting the requirements of this Regulation which are so designed that the filament of the passing beam shall not be lit simultaneously with that of any other lighting function with which it may be reciprocally incorporated: an oblique stroke (/) shall be placed behind the passing lamp symbol in the approval mark.

Delete paragraph 4.2.3.2.

~~4.2.3.2. on headlamps meeting the requirements of annex 4 to this Regulation only when supplied with a voltage of 6 V or 12 V, a symbol consisting of the number 24 crossed out by an oblique cross (x), shall be placed near the filament lamp holder.~~

Because no 24V light sources not more necessary.

Consequence could be removal of 24V filament lamps!

5. TECHNICAL REQUIREMENTS FOR HEADLAMPS 5/

Add a new paragraph, to read:

5.10 After one minute and after 60 minutes of operation, it shall be verified that the RMS voltage at the terminals of each removable light source falls into the range of $13.2V \pm 2\%$ Volts for the full voltage range defined in 2.1.6 above.

For voltage measurements, measuring instruments of a quality category at least equal to 0,5 shall be used. Internal resistance shall be not less than 1 000 Ω per volt. With pointer instruments the measuring range shall be such that all readings are made in the upper third of the measuring scale.

With digital instruments, the uncertainty of measurement shall not exceed $\pm 0,5\%$ of the value indicated.

For PWM – voltages (Puls Width Modulated Voltages) the instrument shall be capable to measure such voltages in a proper way e.g. by sampling method etc.(if possible a Standard should be referenced

6. ILLUMINATION

6.1. General provisions

6.1.3. The headlamps shall be checked by means of an uncoloured standard (*étalon*) filament lamp, designed for a rated voltage of 12 V. During the checking of the headlamp, the voltage at the terminals of the filament lamp shall be regulated so as to obtain the reference luminous flux as indicated at the relevant data sheet of Regulation No. 37.

After introduction of an objective luminous flux at 13.2V in the relevant data sheet of Regulation No. 37. the following text should be applied:

During the checking of the headlamp, the voltage at the terminals of the filament lamp(s) shall be regulated so as to obtain the reference luminous flux at 13.2V as indicated at the relevant data sheet of Regulation No. 37.

For the measurements, the flux of this filament lamp may differ from the reference luminous flux at 13.2V specified in Regulation No. 37. In this case, the luminous intensity shall be corrected accordingly by the individual factor of the standard (*étalon*) filament lamp ($F = \Phi_{obj.} / \Phi(\text{Voltage})$).

6.1.4. The headlamp shall be considered acceptable if it meets the requirements of this paragraph 6 with at least one standard (*étalon*) filament lamp, which may be submitted with the headlamp.

Paragraph 6.2.5., the values in the table shall be recalculated to a reference luminous flux at 13.2V.:

6.2.5. The illumination produced on the screen by the passing beam shall meet the following requirements:

Point on measuring screen		Required illumination in lux	
Headlamps for right-hand traffic	Headlamps for left-hand traffic	Class A headlamp	Class B headlamp
Point B 50 L Point 75 R Point 75 L Point 50 L Point 50 R Point 50 V Point 25 L Point 25 R	Point B 50 R Point 75 L Point 75 R Point 50 R Point 50 L Point 50 V Point 25 R Point 25 L	Has to be recalculated to a reference luminous flux at 13.2V	Has to be recalculated to a reference luminous flux at 13.2V
Any point in zone III Any point in zone IV Any point in zone I			
*/ E is the actually measured value in points 50R respectively 50L			

Also the paragraphs 6.2.6 to 6.4. has to be amended to values measured at a reference luminous flux at $13.2V \pm xV$

Annex 1
COMMUNICATION

(maximum format: A4 (210 x 297 mm))

9. Brief description:

Category as described by the relevant marking: 3/

Number and category(ies) of filament lamp(s):

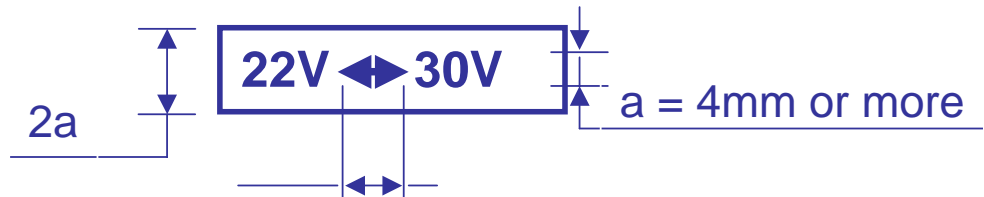
Add a further line:

Range of entry voltage:

Add a new Annex 9, to read:

Annex 9

MARKING OF THE RANGE OF ENTRY VOLTAGES



This headlamp was designed for root mean square entry voltages ranging from 22 Volts to 30 Volts

C. JUSTIFICATION

Following discussion during the fifty-fifth GRE session, it was concluded that the experts from Germany, CLEPA and IEC should collaborate to develop a new proposal to address the problem of control of the supply voltage on vehicles in service. This group has started working with the support of the expert from the Netherlands.

With respect to "Normal condition of use of a vehicle" the main concerns were defined as:

- An increase of the failure rate of lighting functions (light source lifetime problem);
- An increase in the glare from headlamps produced by excessive operating voltage.

To overcome the above-mentioned concerns the following principles have been determined:

- The performance of lighting and light signaling functions installed on the vehicle shall be of the same level as that established during the type approval.

- The lamp manufacturer shall be responsible for the whole lighting performance. This will overcome the problem where the performance on the vehicle is modified by arbitrary voltage conditions.
- Voltage conditions on the vehicle, which are different from the conditions at which the lighting unit was approved, can be counterproductive to the safety needs on the road. Typical keywords are minimum perception or conspicuity of signaling functions, glare of headlamps, etc. Consequently, the required minimum and maximum values generated on the vehicle shall be within a range to be established in the Regulations.
- It shall be guaranteed, that lighting functions designed for a certain supply voltage (e.g. position light in Regulation No. 7) are operated on the vehicle within the same approved range of voltages. In this case, only the responsible part manufacturer can assure this.
- Certain supply conditions, which are helpful to increase the life time of light sources, shall be defined and established in the Regulations and entrusted to the arbitrary decision of the car manufacturer.

D. EXPLANATION

The new discussion was started based upon the principal that:

"The responsibility for the light output is exclusively that of the lamp manufacturer or the owner of the Type Approval for that lamp!"

The outcome of the initial discussions is as follows:

- 1) In the case of replaceable filament lamps, the measurements shall be carried out using the reference luminous flux as defined in Regulation No. 37 or Regulation No. 99.
- 2) In the case of non-replaceable light sources, the measurements will be carried out at the voltage conditions as defined in the relevant Regulation.
- 3) Any mechanical or optical part or electronic light source control gear, which has influence upon the light output, shall be part of the lamp and therefore also subject of the lamp type approval.
- 4) In the case, that no electronic light source control gear in the lamp is used, the vehicle shall provide a supply voltage within a narrow range.
- 5) In the case, that electronic light source control gear is used, the vehicle manufacturer may specify the range of the input voltage to the control gear.
- 6) The vehicle shall provide the signal for the activation of the specific function and may provide the signals for adaptive variations of the light output.
- 7) In the case, where the light output is controlled by an electronic light source control gear, it shall be demonstrated, that the required voltage range at the terminals of the replaceable filament lamps will be $[13.3 \pm 0.3V, 6.75 \pm 0.15V, 28.0 \pm 0.5V]$ over the whole specified input voltage range. This shall be verified during the type approval testing.
- 8) In the case, that the light output is not controlled by an electronic light source control gear, it shall be demonstrated, that the required voltage range at the input terminals of the lamp will be $[13.3 \pm 0.3V, 6.75 \pm 0.15V, 28.0 \pm 0.5V]$.

The question of the type approval of devices with replaceable filament lamps that are not operated at reference luminous flux will be discussed at the next step.

The new proposal for paragraph 5.25. offers two possibilities:

- a) If the vehicle provides a supply voltage over a relative large voltage range, the lamp shall be operated with an electronic light source control gear for controlling the light output in relation to the relevant requirements.
- b) If the lamps do not have an electronic light source control gear for controlling the light output, the vehicle shall provide a supply voltage over a specified narrow voltage range in relation to the relevant requirements.

In case a), the voltage requirements shall be specified by the Regulation No. 37 e.g.:

"Reference luminous flux: 1,500 lm at $13.2V \pm xV$ "

In case b), the voltage requirements shall be specified by the lamp Regulation, e.g. see the proposal for Regulation No. 112:

"5.10. After one minute and after 60 minutes of operation, it shall be verified that the RMS voltage at the terminals of each removable light source falls into the range of $13.2V \pm x\%$ Volts for the full voltage range defined in 2.1.6 above. "

In application of case a) or b) the photometric measurements shall be carried out with a standard (étalon) filament lamp, operated at its reference luminous flux.

Where there is the need for measuring the voltages on the vehicle, the ISO Standard 3559 / 1976 describes clearly the conditioning of the engine and the load conditions to carry out the voltage measurement. Nevertheless it may be necessary for industry to update this ISO – Standard to the state of the art.
