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Working Party on Lighting and Light-Signalling (GRE)
(Forty-eighth session, 9-12 April 2002,
agenda item 1.2.)

PROPOSAL FOR DRAFT AMENDMENTS TO REGULATION No. 48

(Installation of lighting and light-signalling devices)

Transmitted by the Expert from the Working Party "Brussels 1952" (GTB)

Note: At the forty-third session of GRE the expert from GTB presented the Adaptive front-lighting Systems (AFS) project (TRANS/WP.29/GRE/43, paras. 104-106).

At the forty-fourth session of GRE a demonstration was given in the premises of the Palais des Nations of a number of configurations of AFS installed on ten passenger cars (TRANS/WP.29/GRE/44, paras. 67 and 68). At that time it was noted that:

- the introduction of AFS would require action regarding the existing and new ECE Regulations;
- work was in progress to prepare draft amendments to Regulation No.48 and a new draft Regulation;
- the proposals would first be transmitted for consideration to GTB and later to GRE.

In the meantime the proposals have been discussed in a series of special GTB sessions with AFS experts; they were approved by GTB at its ninety-second session.

The present document incorporates the draft amendments to Regulation No.48 and the necessary explanatory notes and it is submitted to GRE for consideration. The proposal for a new draft Regulation concerning AFS is set out in document TRANS/WP.29/GRE/2002/18, with explanations in TRANS/WP.29/GRE/2002/19.

Note: This document is distributed to the Experts on Lighting and Light-Signalling only.

A. PROPOSAL

Insert new paragraph 2.1.1., to read:

- "2.1.1. "Type approval mark", as used in paragraph 3.2.2. below, means the approval mark indicating compliance to the Regulation annexed to the 1958 Agreement which is applicable to the particular device."

Insert new paragraphs 2.6.1. and 2.6.2., to read:

- "2.6.1. "Lighting function" means the light emitted by a device to illuminate the road and objects in the direction of vehicle movement, as defined in paragraphs 2.7.9., 2.7.10., 2.7.18. and 2.7.25;
- 2.6.2. "Light-signalling function" means the light emitted or reflected by a device to give to other road users visual information on the presence and/or the change of movement of the vehicle, as defined in paragraphs 2.7.11. to 2.7.17. and paragraphs 2.7.19. to 2.7.24.;

Insert new paragraphs 2.7.25. to 2.7.25.7., to read (including a new footnote 3/):

- "2.7.25. "Adaptive front lighting system" (AFS) means a lighting device, providing two or more differing modes for automatic adaptation of the beam characteristics to varying conditions of use of the dipped-beam and, if it applies, the main-beam and/or the daytime running light; such systems consist of the system control, one or more supply and operating device(s), if any, and the installation units of the right and of the left side of the vehicle;
- 2.7.25.1. "Lighting unit" means a light-emitting component designed to provide or contribute to one or more front lighting or light-signalling function(s) provided by the AFS;
- 2.7.25.2. "Installation unit" means an indivisible housing (lamp body) with one or more lighting unit(s) being contained;
- 2.7.25.3. "Lighting mode" means a state of a front lighting function provided by the system, as specified by the manufacturer and intended for adaptation to specific vehicle and ambient conditions;
- 2.7.25.4. "System control" means that part(s) of the AFS receiving the AFS control signals from the vehicle and controlling the operation of the lighting units automatically;
- 2.7.25.5. "AFS control signal" (V-signal, W-signal, E-signal, T-signal) means the input to control the system in accordance with the relevant paragraphs of this Regulation;
- 2.7.25.6. "Neutral state" means the state of the AFS when no AFS signal is applied, specified by the manufacturer for adjustment of the AFS or parts thereof;

- 2.7.25.7. "two symmetrically placed lighting units" means two lighting units 3/, each one intended to be mounted on either side of the vehicle, substantially at the same height and at the same distance from the vehicle's longitudinal median plane;

3/ The two symmetrically placed lighting units may differ with respect to their light emitting surface, their illuminating surface, and their light output (photometric values); however, height and distance from the vehicle's longitudinal median plane of the centres of gravity of their apparent surfaces shall each differ by not more than 50 mm."

Paragraph 2.8., amend to read:

- "2.8. "Light emitting surface" of a "lighting device", "light-signalling device" or a retro-reflector means all or part of the exterior surface of the transparent material, as declared in the request for approval by the manufacturer of the device on the drawing, see annex 3.

Where a lighting function is produced by two or more simultaneously operated lighting units on a given side of the vehicle, the sum of their individual light emitting surfaces is the light emitting surface to be considered."

Paragraph 2.9.1., amend to read:

- "2.9.1. "Illuminating surface of a lighting device" (paragraphs 2.7.9., 2.7.10., 2.7.18. and 2.7.20.) means the orthogonal projection of the full aperture of the reflector, or in the case of headlamps with an ellipsoidal reflector of the "projection lens" on a transverse plane. If the is taken into account.

In the case of a dipped-beam headlamp the mean adjustment should be used.

Where a lighting function is produced by two or more simultaneously operated lighting units on a given side of the vehicle, the sum of their individual illuminating surfaces is the illuminating surface to be considered."

Paragraph 2.16., amend to read:

- "2.16. For light-signalling devices, the following shall be deemed to be:"

Paragraph 2.16.1., delete the last sentence reading: "This possible combination does not apply to main-beam headlamps, dipped-beam headlamps and front fog lamps."

Insert new paragraphs 3.2.6. to 3.2.6.7., to read:

- "3.2.6. where an AFS is fitted on the vehicle, the applicant shall submit a detailed description providing the following information:
- 3.2.6.1. the lighting functions and modes for which the AFS has been approved;

- 3.2.6.2. the related AFS control signals and their technical characteristics as defined according to annex 11 of Regulation No. xxx;
- 3.2.6.3. the provisions being applied to adapt automatically the front lighting functions and modes according to paragraph 6.20.7.2. of this Regulation;
- 3.2.6.4. the fail-safe provisions adopted according to paragraph 6.20.9.2.1.2. of this Regulation and/or according to paragraph 5.9.1.2. of Regulation No. xxx;
- 3.2.6.5. the documents according to paragraph 6.20.9.3. of this Regulation;
- 3.2.6.6. the lamps that are grouped or combined with or reciprocally incorporated in the AFS;
- 3.2.6.7. lighting units which are designed to comply with the requirements of paragraph 6.20.5. of this Regulation."

Paragraph 4.4.1., the reference to footnote 3/ and footnote 3/, renumber as footnote 4/.

Paragraph 5.4., amend to read:

- "5.4. In the absence of specific instructions, the height and orientation of the lamps shall be verified with the vehicle unladen and placed on a flat, horizontal surface, in the condition defined in paragraphs 2.24., 2.24.1. and 2.24.2. and, in case an AFS is installed, in its neutral state."

Insert new paragraph 5.24., to read:

- "5.24. Where an AFS is fitted, it shall be considered equivalent to a pair of dipped-beam headlamps and, if it provides main-beam and/or daytime running light function(s), it shall be considered equivalent to a pair of main-beam headlamps and/or to a pair of daytime running lamps."

Insert new paragraphs 6.3.6.1. and 6.3.6.2., to read:

- "6.3.6.1. Horizontal orientation

The horizontal alignment of the front fog lamps must not vary according to the angle of lock of the steering.
However, where an AFS is fitted, the axis of the beam on one side or simultaneously on both sides of the vehicle may be automatically oriented sideways when the front fog lamps are activated as part of another lighting function operating in its bend lighting mode.

- 6.3.6.2. Vertical orientation

The downward inclination of the cut-off of the front fog lamps, to be set in the unladen state of the vehicle with one person in the driver's seat, shall be specified by the manufacturer. It shall, depending on the height h in meters of the lower edge of the apparent surface of the front fog lamp (in direction of the

reference axis), not be less than 2 per cent if h does not exceed 0,65 m, or 3 per cent if h exceeds 0,65 m.

When the front fog lamps are reciprocally incorporated with the dipped-beam lamps and/or equipped with an automatic levelling device according to paragraph 6.2.6.2.1. of this Regulation, the requirements for vertical orientation of the dipped-beam lamps according to paragraph 6.2.6.1.1. apply to the front fog lamps, too."

Paragraph 6.3.7., amend to read:

"6.3.7. Electrical connections

It must be possible to switch the front fog lamps ON and OFF independently of the main-beam headlamps, the dipped-beam headlamps or any combination of main- and dipped-beam headlamps, unless the front fog lamps are used as part of another lighting function in an AFS; however, the switching ON of the front fog lamps function must have the priority on the function of which the front fog lamps are used as a part."

Paragraph 6.5.3., amend to read:

".....on all vehicles in categories O₂ O₃ and O₄.

Where an AFS is fitted, the distance to be considered for the choice of the category is the distance between the front direction indicator lamp and the closest lighting unit in its closest position contributing to or performing a dipped-beam mode.

Paragraph 6.9.9., amend to read:

"6.9.9. Other requirements

In case an AFS is installed providing a bend lighting mode, the front position lamp may be swivelled together with a lighting unit to which it is reciprocally incorporated."

Paragraph 6.2.9., the reference to footnote 4/ and footnote 4/, renumber as footnote 5/.

Paragraph 6.19., the reference to footnote 5/ and footnote 5/, renumber as footnote 6/.

Insert new paragraphs 6.20. to 6.20.9.4., to read:

"6.20. ADAPTIVE FRONT LIGHTING SYSTEM (AFS)

Where not otherwise specified below, the requirements for main-beam headlamps (paragraph 6.1.), for dipped-beam headlamps (paragraph 6.2.) and/or for daytime running lamps (paragraph 6.19.) apply to the relevant part of the AFS.

6.20.1. Presence

Optional on motor vehicles. Prohibited on trailers.

6.20.2. Number

One.

6.20.3. Arrangement

No special requirements.

6.20.4. Position

The AFS shall, prior to the subsequent test procedures, be set to the neutral state, emitting the basic dipped-beam;

6.20.4.1. In width and height:

for a given lighting function or mode the requirements indicated in the paragraphs 6.20.4.1.1. through 6.20.4.1.4. below shall be fulfilled by those lighting units which are energized simultaneously for that lighting function or mode of a function, according to the applicant's description.

6.20.4.1.1. Two symmetrically placed lighting units shall be positioned at a height in compliance with the requirements of the relevant paragraphs 6.1.4., 6.2.4. or 6.19.4.;

6.20.4.1.2. Additional lighting units, if any, on either side of the vehicle shall be positioned at a distance not exceeding 140 mm ^{7/} in horizontal direction (E in the figure) and 400 mm in vertical direction above or below (D in the figure) from the nearest lighting unit;

6.20.4.1.3. None of the additional lighting units described in paragraph 6.20.4.1.2. above shall be positioned lower than 250 mm (F in the figure) nor higher than 1,500 mm (G in the figure) above the ground;

6.20.4.1.4. Additionally, in width:

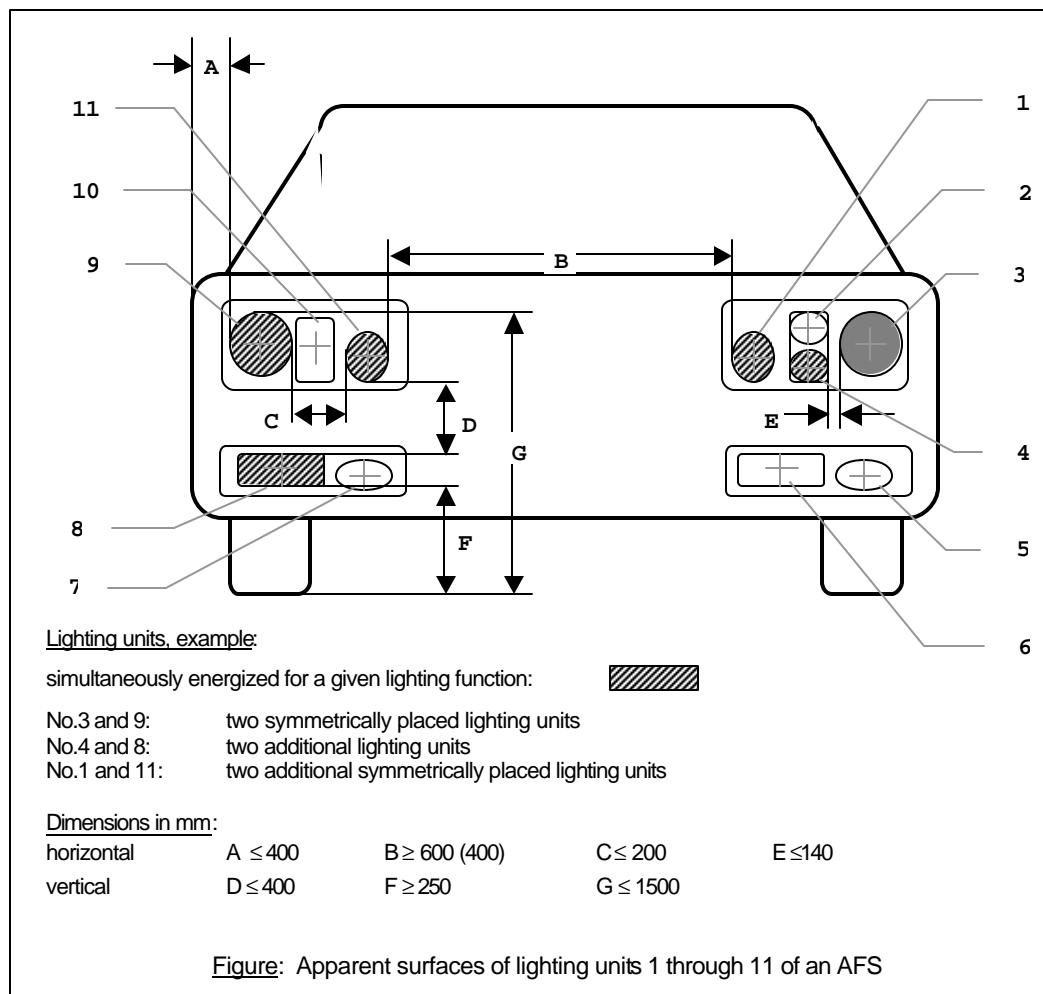
for each mode of the dipped-beam lighting and of the daytime running light, when measured in direction of the reference axis:

the outer edge of the apparent surface of at least one lighting unit on each side of the vehicle shall not be more than 400 mm from the extreme outer edge of the vehicle (A in the figure); and,

the distance between the inner edges of the apparent surfaces of the lighting units on the right and left hand side of the vehicle

^{7/} In case of additional "two symmetrically placed lighting units" the horizontal distance may be 200 mm (CC in the figure).

(B in the figure) shall be not less than 600 mm, or, except for category M₁ and N₁ vehicles not less than 400 mm when the overall width of the vehicle is less than 1,300 mm.



6.20.4.2. In length:

all lighting units of an AFS shall be mounted at the front. This requirement is deemed to be satisfied if the light emitted does not cause discomfort to the driver either directly, or indirectly through the rear-view mirrors and/or other reflecting surfaces of the vehicle.

6.20.5. Geometric visibility

On each side of the vehicle, for each lighting function and mode provided:

the angles of geometric visibility prescribed for the respective lighting and light-signalling functions in paragraphs 6.1.5., 6.2.5. and 6.19.5. of this Regulation, shall be met by one lighting unit or by the assembly of the lighting units that are simultaneously energized to perform said function and mode(s), according to the description of the applicant.

6.20.6. Orientation

Towards the front.

The AFS shall, prior to the subsequent test procedures, be set to the neutral state, emitting the basic dipped-beam; the beam or part(s) of shall be projected on a flat vertical screen at a distance of not less than 10 m.

6.20.6.1. Vertical orientation:

6.20.6.1.1. The initial downward inclination of the cut-off of the basic dipped-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.

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 dipped-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.

6.20.6.1.2. The downward inclination of the cut-off of the dipped-beam or, when applicable the downward inclinations of all the different lighting units that provide or contribute to the cut-off of the basic dipped-beam, shall remain between the limits indicated in paragraph 6.2.6.1.2. of this Regulation under all the static loading conditions of the vehicle of annex 5 of this Regulation.

6.20.6.1.3. Dipped-beam levelling device

In the case where a levelling device is necessary to satisfy the requirements of paragraph 6.20.6.1.2. above, the device shall act automatically. However, for distinct lighting units no levelling device or a manually adjustable levelling device according to paragraph 6.2.6.2.2. of this Regulation is allowed, when it is specified in accordance with the provisions of the Regulation No. xxx in the type approval documents of the AFS.

6.20.6.2. Horizontal orientation:

For each lighting unit the kink of the elbow of the cut-off line, if any, when projected on the screen, shall coincide with the vertical line through the reference axis of said lighting unit. A tolerance of 0.5 degrees to that side which is the side of the traffic direction shall be allowed. Other lighting units shall be adjusted according to the applicant's specification, as defined according to annex 11 of Regulation No. xxx.

6.20.6.3. Measuring procedure:

After adjustment of the initial setting of beam orientation, the vertical inclination of the dipped-beam or, when applicable, the downward inclinations of all the different lighting units that provide or contribute to the cut-off of the basic dipped-beam, shall be verified for all loading conditions of the vehicle in accordance with the specifications in paragraphs 6.2.6.3.1. and 6.2.6.3.2. of this Regulation.

6.20.7. Electrical connections

6.20.7.1. The provisions of paragraphs 6.1.7. (for the main-beam headlamp), 6.2.7. (for the dipped-beam headlamp) and 6.19.7. (for the daytime running lamp) apply to the respective parts of an AFS.

In addition:

6.20.7.2. Switching ON and OFF the provided functions may be automatic as part of the system control; however, in all cases the switching shall comply with the requirements for "Electrical connection" in paragraphs 5.11. and 5.12. of this Regulation.

6.20.7.3. Where, for the purpose of adjusting the beam orientation according to paragraph 6.20.6. above, the AFS cannot set itself automatically in the neutral state, means shall be provided to set the AFS to its neutral state.

6.20.7.4. Automatic operation of the AFS lighting functions and modes

The changes within and between the provided modes of the AFS lighting functions as specified below, shall be performed automatically, without any possibility of intervention by the driver, with exception of the provision in paragraph. 6.20.7.3. above.

These automatic changes shall be such that no discomfort neither for the driver nor for other road users is caused.

The following conditions apply for the activation of the modes of the dipped-beam and, where applicable, of the main-beam and daytime running light functions.

6.20.7.4.1 The basic modes of the lighting functions provided by the AFS shall be emitted when the AFS is in its neutral state and/or

when the conditions according to paragraphs 6.20.7.4.2. to 6.20.7.4.5. below do not apply or are not provided.

- 6.20.7.4.2. The V-mode(s), (V signal / V in the Approval Mark) is/are allowed only at low speed; this condition shall be deemed to be satisfied if the vehicle's speed does not exceed 60 km/h.
- 6.20.7.4.3. The E-mode(s) (E signal / E in the Approval Mark) is/are allowed only when the road characteristics correspond to motorway conditions 8/ and the vehicle's speed is not less than 60 km/h.
- 6.20.7.4.4. The W-mode(s) (W signal / W in the Approval Mark) is/are allowed only
- (a) when the front fog lamps, if any, are switched OFF and,
 - (b) on wet roads and/or during rain or snow fall; this condition shall be deemed to be satisfied if:
 - (i) the windshield wiper is switched ON and its operation (either continuously or automatically intermittent) has occurred for a period of at least 2 minutes and/or
 - (ii) the wetness of the road has been automatically detected.
- 6.20.7.4.5. The T-mode(s) (T signal / T in the Approval Mark) is/are allowed in combination with any of the above dipped-beam modes according to paragraphs 6.20.7.4.2. to 6.20.7.4.4., however, only in/for curves or during/for cornering at intersections; this condition shall be deemed to be satisfied if:
- (a) it is activated according to the angle of lock of the steering and/or to the road curvature, and,
- in addition the following provisions apply:
- (b) one or more lighting units may be additionally energized only when the horizontal radius of curvature of the trajectory of the centre of gravity of the vehicle is 500 m or less;

8/ As defined in Chapter I, Article 1 of the Convention on Road Traffic (Vienna 1968):

"(j) "Motorway" means a road specially designed and built for motor traffic, which does not serve properties bordering on it, and which:

- (i) Is provided, except at special points or temporarily, with separate carriageways for the two directions of traffic, separated from each other either by a dividing strip not intended for traffic or, exceptionally, by other means;
- (ii) Does not cross at level with any road, railway or tramway track, or footpath; and
- (iii) Is specially signposted as a motorway;"

- (c) a horizontal movement of the asymmetric cut-off sideways from the longitudinal axis of the vehicle, if any, is allowed only when the vehicle is in forward motion 9/ and shall be such that the longitudinal vertical plane through the kink of the elbow of the cut-off does not intersect the line of the trajectory of the centre of gravity of the vehicle at distances from the front of the vehicle which are larger than 100 times the mounting height of the respective lighting unit.

6.20.8. Tell-tale:

The provisions of paragraphs 6.1.8. (for the main-beam headlamp), 6.2.8. (for the dipped-beam headlamp) and 6.19.8. (for the daytime running lamp) of this Regulation apply to the respective parts of an AFS.

In addition, an operating tell-tale is mandatory, in accordance with the fail-safe provisions of paragraph 6.20.9.2. of this Regulation.

6.20.9. Other requirements

- 6.20.9.1. Lighting units which need, according to the provisions of paragraph 6.20.6.1.3. of this Regulation, an automatic levelling device, shall only be permitted in conjunction with the installation of headlamp cleaning device(s) according to Regulation No.45 10/.

6.20.9.2. Provisions in the case of failure

- 6.20.9.2.1. At system failure conditions, as notified in the type approval documents of the AFS in application of paragraph 2.2.2.1. in Regulation No. xxx, the fail-safe provisions specified below shall be put in operation.

- 6.20.9.2.1.1. a tell-tale shall inform the driver on failure occurrence and need for repair; and

- 6.20.9.2.1.2. where the AFS does not meet the requirements of paragraph 5.9.2. in Regulation No. xxx, any such failure shall be compensated temporarily by means of:

- (a) automatic setting of the AFS in its neutral state or in a state specified by the Applicant, which may depend on the type of failure which has occurred, and/or

9/ This provision does not apply for passing beam lighting when bend lighting is produced for a right turn in right hand traffic (left turn in left-hand traffic).

10/ Contracting Parties to the respective Regulations can still prohibit the use of mechanical cleaning systems when headlamps with plastic lenses, marked 'PL', are installed.

- (b) automatic substitution of the defective lighting function or mode by one of the following functions:
- (i) daytime running lamps, or
 - (ii) main-beam headlamps with reduced luminous intensity 11/, or
 - (iii) front fog lamps,

being part or not of the AFS and under the condition that the substituting device(s)/lighting unit(s) shall also remain operational in the original function.

6.20.9.3. Verification of compliance with AFS automatic operating requirements

Compliance with the requirements indicated in paragraphs 6.20.9.3.1. through 6.20.9.3.3. below, shall be demonstrated by the manufacturer with suitable test reports and descriptions or by other means accepted by the Authority responsible for type approval and, at the discretion of the technical service responsible for the type approval tests, practical testing could be carried out:

6.20.9.3.1. the AFS control signals correspondence to the description required in paragraph 3.2.6. of this Regulation and with the respective AFS control signals and to the suitable tolerances, if any, that were applied / specified for type approval of the AFS as listed in the AFS type approval documents;

6.20.9.3.2. type and value of the relevant environmental conditions of use for which the transitions between the AFS lighting modes according to paragraph 6.20.7.4. of this Regulation have been designed and verified by tests, including, if applicable, information such as threshold hysteresis and/or delay values specified; where a specification requires a dynamic test, verification on the basis of the Applicants documentation of such testing shall be sufficient;

6.20.9.3.3. the fail-safe provisions according to paragraph 6.20.9.2. of this Regulation

6.20.9.4. The aggregate maximum intensity of the lighting units that can be energized simultaneously to provide the main-beam lighting or its modes, if any, shall not exceed 225,000 cd, which corresponds to a reference value of 75.

11/ This is deemed to be the case if the Applicant demonstrates to the satisfaction of the Technical Service responsible for the Approval tests, that the maximum intensity above the horizon does not exceed 1,500 candelas from either side of the vehicle.

This maximum intensity shall be obtained by adding together the individual reference marks indicated on the several installation units that are simultaneously used to provide the main-beam."

Annex 1,

Insert new item 9.22., to read:

"9.22. Adaptive front lighting system (AFS): yes/no2/"

Items 9.22. (former) and 9.23., renumber as items 9.23. and 9.24.

Insert new item 10.4., to read:

"10.4. Comments concerning AFS (according to paragraphs 3.2.6. and 6.20.7.4. of the Regulation):
....."

Annex 6, insert new paragraph 5.1.1., to read:

"5.1.1. Where an AFS is fitted, the measurements shall be carried out with the AFS in its neutral state."

* * *

B. JUSTIFICATION

Explanatory notes

The transformation of the technical specifications for AFS into the system of ECE Regulations has been carefully considered by the AFS Group and GTB. The conclusion was to prepare a new draft Regulation No. xxx, which is submitted as a separate document, and amendments to Regulation No.48.

These amendments cover the aspects of installation of AFS and the interaction between the AFS and the vehicle. They have been drafted in line with the general structure of ECE Regulations on lighting and light-signalling. Therefore the following principal items have been included:

- A new set of definitions;
- Additional requirements regarding type approval;
- A new paragraph 6.20. which covers AFS as a separate system/device and incorporates the necessary requirements for installation; particular attention has been devoted to provisions regarding
 - position of lighting units and symmetrical appearance of the vehicle;
 - activation of the modes of lighting functions;
 - system failure.

Remarks to individual paragraphs

Paragraph 2.1.1.

Regulation No.48 does not require that lighting and light-signalling devices covered by the Regulation must be approved or must be approved to a Regulation

annexed to the 1958 Agreement. On the other hand, it is understood that application of the requirements is linked to compliance of devices with such Regulations. Examples are references to marking of main-beam headlamps in paragraph 6.1.9., categories of direction indicators in paragraph. 6.5., and categories of stop lamps in paragraph 6.7.

In the case of AFS it is important to ensure that approval of a vehicle is granted only if the AFS has been approved to the applicable Regulation annexed to the 1958 Agreement.

As this is a matter of principle, a general provision is proposed. If however the requirement is to be restricted to AFS, paragraph 2.7.25. could be amended to read: " 'Adaptive front lighting system' means a lighting/light signalling device approved according to Regulation No. xxx and providing ..."

Paragraph 2.16.

Further amendments would have to be introduced later, depending on the discussion in GRE.

Paragraph 6.3.6.1.

The requirements of the second sentence of this paragraph could be, as an alternative, inserted in a more general way under paragraph 5. "General requirements".

A possible text could be: "5.xx Where an AFS is fitted, a lamp performing a lighting or light-signalling function and also used as part of another function/mode is subjected to the requirements applicable to the functions/modes it is actually performing or contributing to perform.
" A possible addition could be: "However, when it is switched on in its original function the conformity to the requirements applicable to the original function has the priority on the conformity to the requirements applicable to the functions /modes it is (additionally) performing or is contributing to perform."

Paragraph 6.3.6.2.

This new requirement could later be aligned to the provisions regarding front fog lamp aiming presently under discussion in GTB.

Paragraph 6.3.7.

A requirement giving priority to the front fog lamp function where the front fog lamps are used as part of another function is deemed necessary; this could be made by modifying paragraph 6.3.7. for electrical connection or, as an alternative, adding in paragraph 6.3.9. a specific sentence.

A further alternative applicable to all lamps used as part of another function is given in the note to paragraph 6.3.6.1. above.

Paragraph 6.20.6.1.3.

Automatic levelling is generally foreseen for lighting units with light sources providing a luminous flux corresponding to that of a gas discharge light source according to Regulation No. 99, or similar aggregate values, if

provided by more than one light source on either side and, if their cut-off projects into a defined central zone. As an additional criterion the aggregate output of the respective lighting units is introduced.

Manually operated levelling devices are proposed to be provided for lighting units providing a cut-off as specified in Annex 9 of the draft Regulation No. xxx on AFS, but the above conditions for automatic levelling do not apply. No levelling devices are foreseen for lighting units, which do not provide or contribute to a cut-off.

The respective criteria include photometric properties and can better be defined and tested within the approval procedure according to draft Regulation No. xxx on AFS, than directly in Regulation No. 48.

Paragraph 6.20.6.2.

Changes to the requirements of this new paragraph could be made in function of the final agreement on the "verification of the cut-off" requirements presently under discussion in the GTB - SVP WG.

The draft requirement "...tolerance of 0.5 degrees ..." is still under study.

Paragraph 6.20.7.4.3.

One major aspect of the motorway dipped-beam is a somewhat higher aiming of the cut-off, but it still remains a dipped-beam designed to be used with opposing or preceding traffic.

The higher aiming is the reason why the use of the motorway dipped-beam is restricted to roads where the dynamic influence is reduced or a separation of the different driving directions is given. Both requirements are expressed in the requirement of "motorway conditions" and guarantee that not only the speed criterion is used for switching on the motorway dipped-beam.

The general specification "motorway conditions" included in the draft for the automatic activation of the class E dipped-beam, implies by definition all major respective criteria for the design of that beam: a flat and less bended road of enlarged width, normally with a separation between the driving directions, without intersections and usually designed, constructed and maintained for motor traffic at enhanced speed even during night-time, and, excluding all non-motorized traffic such as cyclists and pedestrians.

The technical development of road identification systems as well as advanced sensor devices may allow in near future to distinguish clearly this type of road from others.

Paragraph 6.20.7.4.4.

The road areas intended to be illuminated when the wet road dipped-beam is emitted are essentially complementary to those illuminated by a front fog lamp according to ECE Regulation No. 19.

If a driver, due to an actual fog situation, decides to switch on the front fog lamps, the dipped-beam, when operated simultaneously, should not activate the wet road mode(s) (if any), even if the road is wet and/or the windshield

wiper is operated. This should be required notwithstanding the proposed amendments to paragraph 6.3.7.

Paragraph 6.20.9.1.

In relation to the introduction of the AFS it should be considered to amend Regulation No. 45 for clarification. This could be done as follows:
Paragraph 2.1. of Regulation No.45 amend by inserting new subparagraph 2.1.1., to read:

- "2.1.1. In case the lighting functions are provided by an adaptive front-lighting system (AFS) "Headlamp cleaner" means a complete device with which all or part of the light emitting surface of at least those parts of the AFS can be cleaned, which are, according to the provisions of paragraph 6.20.9.1. of Regulation No. 48, communicated in the type approval documents of the AFS;"

or, as an alternative:

- "2.1.1. In case the lighting functions are provided by an adaptive front-lighting system (AFS) those parts of the AFS shall be understood as the 'headlamp' or 'dipped-beam lamp' respectively, to be cleaned all or part of, which are, according to the provisions of paragraph 6.20.9.1. of Regulation No. 48, communicated in the type approval documents of the AFS;"

and paragraphs 7.3.1. and 7.3.2. of Regulation No. 45, amend to read:

- "7.3.1. Headlamps approved in respect of the dipped-beam only (marking /C or /HC or XC/V/E/W in the Approval Mark); Measuring points: 50 R(L)/and 50 V. /5/
- 7.3.2. Headlamps approved in respect of the dipped-beam and the main-beam (marking CR, HCR, C+R, C+HR, HC+R or HC+HR or XC/V/E/W+R in the Approval Mark); Measuring points: 50/R(L) (and 50/V if in the same headlamps, different optic systems for the driving lamp and the passing lamp are provided)."

Paragraph 6.20.9.2.

The requirements of this new paragraph could be moved to under paragraph 5. "General requirements", where a specific set of requirements on the "Provisions in case of failure" applicable to all lighting and light-signalling devices/functions would be implemented into Regulation No. 48.
