

GRE-AFS Working Paper No. 6-1  
(6<sup>th</sup> session of the GRE Informal Group  
on AFS, 17-19 February 2004)

REPORT ON THE FIFTH SESSION OF THE INFORMAL GROUP  
ON ADAPTIVE FRONT-LIGHTING SYSTEMS (AFS)

(28 - 30 October 2003)

1. The GRE Informal Group on Adaptive Front-Lighting Systems (AFS) held its fifth session from 28-30 October 2003 in Bonn at the invitation of the German government, under the chairmanship of Mr. M. Lowe (United Kingdom). Experts from the following countries participated in the work: France; Germany; Italy; Japan; Netherlands; Poland; United Kingdom; United States of America. Experts from the following non-governmental organizations also participated: International Organization of Motor Vehicle Manufacturers (OICA); European Association of Automobile Suppliers (CLEPA); Working Party "Brussels 1952" (GTB), including experts from the AFS Group; International Electrotechnical Commission (IEC).

Mr. D. Meyer, Head of the Environmental Division, Road Traffic Section of the German Ministry of Transport, Building and Housing, welcomed the delegates and provided information on the structure of the Division which is responsible for Motor Vehicle Pollutant Emissions, Noise and Lighting.

ADOPTION OF THE AGENDA

Documentation: Working Paper No. 5-7/Rev.3

2. The Informal Group adopted the agenda. At the proposal of the Chairman it was agreed to discuss first the open issues concerning the draft Regulation on AFS and then proceed with the reading of the open issues and other amendments to Regulation No. 48 which had been commenced at the fourth session.

PROPOSAL FOR A NEW DRAFT REGULATION ON AFS

Documentation: WP No. 5-1 (GTB), WP No. 5-5 (GTB/AFS), WP No. 5-6 (United Kingdom), WP No. 5-9 and Corrigendum (GTB/AFS), WP No. 5-10 (GTB/AFS), WP No. 5-15 (Japan)

Safety Concept (WP No. 5-6, item 1.; WP No. 5-10, item A )

3. The Informal group agreed to the text of paragraph 2.2.2.1., as proposed in WP No. 5-10, with one amendment:

In sub-paragraph (iii), replace "power and virtue" by "performance".

As regards the reference to FMEA, the Chairman pointed out that FMEA could be considered as an established practice; he also mentioned the reference in Regulation No. 13, Annex 18, paragraph 3.4.4., as a precedent.

Failure provisions (WP No. 5-6, item 2.)

4. The Chairman noted that this item had been covered in the fourth session by amendments to paragraph 5.9.1., and that no further discussion was necessary.

Photometric values (WP No. 5-6, item 3.; WP No. 5-10, item B) )

5. The expert from GTB/AFS introduced the rationale in support of the value of 25 lx in Annex 3, Table 1, element No. 13 (point 50L); he pointed out that glare of oncoming traffic in this point occurred only during a short time and that recovery time was not a function of intensity. The experts from Netherlands and the United Kingdom mentioned the large number of complaints on glare and the situation on uneven roads; the expert from the United Kingdom noted the increase in actual illumination as compared to type approval values due to the voltage level in the vehicle. The expert from Germany recommended that such considerations should be based on Regulation No. 98, as AFS would use mainly gas-discharge light sources; he proposed to insert the compromise value of 20 lx provisionally agreed at the fourth session. This proposal was supported by the experts from France, Italy, Japan and Poland, whereas the experts from Netherlands and United Kingdom maintained their preference for 15 lx. The Informal Group agreed to insert a value of 20 lx in square brackets for Class C and Class V.

As a consequence, the value of 35 lx was inserted in square brackets for Class W.

As regards element No. 17 (Segment 10) the expert from the United Kingdom stated that he could accept the values as originally proposed, i.e. 14 lx for Class C, V and E, and 18 lx if the system is designed to provide also a Class W passing beam. This was agreed by the Informal Group.

The Informal Group also accepted the proposal to amend the designation of elements, as set out in WP No. 5-10, item B).

Provisions for unapproved light sources (WP No. 5-6, item 4.)

6. The Chairman noted that, at its fourth session, the Informal Group had agreed to insert paragraphs 5.3. to 5.11. and to review Annex 8.

The expert from Germany, supported by the expert from the Netherlands, proposed to delete all references to light sources which are not approved according to Regulations No.s 37 and 99. In his view, this would enable a speedy acceptance of the draft Regulation in GRE and in WP.29/AC.1; provisions regarding non-replaceable and non-approved light sources could be introduced by a later amendment.

The experts from France, GTB/AFS and OICA proposed to retain the provisions agreed at the fourth session in order to cover future front lighting and AFS designs, such as LED. The expert from Italy drew attention to the amendments to Regulation No. 98 (TRANS/WP.29/2003/62) which will introduce provisions for distributed lighting systems and permit non-replaceable gas-discharge light sources not approved under Regulation No. 99 for this purpose if they comply with certain requirements. The expert from France suggested to permit light source modules if they are not part of the passing beam in its neutral state.

7. Responding to a question by the Chairman, the majority of government experts agreed to delete paragraphs 5.3.3. and 5.3.4. as well as Annex 8, and to amend paragraph 5.3.2. to read:

“5.3.2. one or more non-replaceable light sources, if not being part of a lighting unit which provides the passing beam in the neutral state;  
only light sources approved according to Regulations No. 37 or 99 are allowed.”

Following a suggestion by the Chairman, the Informal Group agreed to consider this issue as settled and not to be discussed again at future sessions; the related provisions in the draft Regulation will be deleted and paragraphs re-numbered, if necessary.

Cut-off provisions in Annex 9 (WP No. 5-6, item 5.; WP No. 5-9 and Corrigendum)

8. The expert from GTB/AFS noted that the special meeting of experts agreed at the fourth session had been held on 22 September, 2003 in Darmstadt. The results have been consolidated in WP No. 5-9 and its Corrigendum. He also recalled the discussion at the fifty-first GRE session where it had been agreed to postpone final decisions regarding cut-off provisions in Regulations No.'s 98 and 112 until a revised proposal by GTB, covering also horizontal aim, is available.

9. In view of this situation the Informal Group decided that, for the time being, paragraphs 1.2., 3. and 4., as well as Figure A. 9-2 would be removed from Annex 9. It was also agreed to introduce the amendments set out in the Corrigendum in the draft Regulation, taking into account the decision mentioned in paragraph 8 above.

Editorial amendments (WP No. 5-10, item C )

10. The expert from GTB/AFS introduced the proposal which is a consequence of decisions taken at the fourth session. The Informal Group agreed to the proposal with the following modifications:

- Paragraph 1.4. Delete the word “relevant” and insert a reference to paragraphs 6.1. (for the main beam) and 6.2. (for the passing beam)
- Paragraph 2.1.6.1. retain the text in WP No. 5-5

Annex 1 – Communication (WP 5-10, item D )

11. The expert from GTB/AFS introduced the proposal which is a consequence of the amendments to paragraphs 4.1.6. and 4.1.7. agreed at the fourth session.

The expert from Germany noted that the issue of systems intended for sale to be installed in vehicles in service (aftermarket systems) had not been completely resolved, the requirements in paragraph 4.1.7. being not sufficient to cover this case. He stated that either additional provisions would have to be prepared or the Regulation would not be applicable to aftermarket systems.

12. The expert from CLEPA expressed a strong preference for a Regulation which would enable the approval of aftermarket systems. The Chairman therefore invited the experts from Germany, GTB/AFS and CLEPA to prepare, in time for the next session, a draft of provisions regarding aftermarket systems, taking into account the proposals which were put forward during the discussion and which can be summarized as follows:

Add a new paragraph 2.2.3.bis to read:

- “2.2.3.bis In the case of a system according to paragraph 4.1.7. below, a vehicle representative of the vehicle types for which the system is intended.”

Add a new paragraph 4.1.7.3. to read:

- “4.1.7.3. the system shall be accompanied by
  - (a) a copy of the form according to paragraph 4.1.4. above;
  - (b) instructions to enable its installation according to the provisions of Regulation No. 48.”

Annex 2 – Examples of arrangements of approval marks (WP No. 5-15)

13. The Informal Group agreed the proposals in WP No. 5-15. The expert from GTB/AFS pointed out that the amendments to paragraphs 1.4. and 6.1.1., as mentioned in paragraph 10 above, would require further amendments to Annex 2, which would be included in the revised version of the draft Regulation, to be prepared for the next session.

14. The expert from CLEPA mentioned the extent and complexity of approval markings which, in his view, were of little practical use, e.g. in police road checks or in Periodical Technical Inspection. The expert from the Netherlands noted that in his country police officers used the approval markings as information. The expert from Germany suggested that information on AFS characteristics should be provided in the owner’s manual; objections were raised to this proposal by the experts from Italy and OICA, who pointed out that the owner’s manual was hardly used in everyday practice. The expert from Italy proposed to refer to the official approval documentation, which incorporates complete information.

15. The Chairman noted that this was a question of principle, covered by the 1958 Agreement, which would have to be discussed in GRE/WP.29; this was supported by the Informal Group.

PROPOSAL FOR AMENDMENTS TO REGULATION No. 48

Documentation: WP No. 5-1 (GTB), WP No. 5-2 (GTB/AFS), WP No. 5-4 (United Kingdom), WP No. 5-8 (United Kingdom), WP No. 5-11 (GTB/AFS), WP No. 5-12 (United Kingdom), WP No. 5-13 (GTB/AFS), WP No. 5-14 (Japan)

16. The Informal Group agreed to first discuss the open issues as set out in WP No. 5-4., taking into account the proposals in the other Working Papers.

Conditions for activation of Class C mode (WP No. 5-11)

17. The Informal Group agreed the proposal for paragraph 6.20.7.4.1. in WP No. 5-11, with the deletion of the sentence in square brackets.

Conditions for activation of Class V (town) mode (WP No. 5-4, item 1.; WP No. 5-11)

18. The proposal in WP No. 5-11 was accepted in principle by the Informal Group. As to possible negative optical effects caused by the automatic switching between the Class V mode and the Class C mode (or between modes in general), attention was drawn to the provisions in paragraph 6.20.7.4.

Following comments by the experts from Italy, Netherlands, IEC and OICA, the Informal Group agreed on the text set out below.

“6.20.7.4.2. The Class V mode(s) of the passing beam shall not operate unless one or more of the following condition(s) is/are automatically detected (V signal applies):

- (a) roads in built-up areas and the vehicle's speed not exceeding 80 km/h;
- (b) roads equipped with a permanent road illumination and the vehicle's speed not exceeding 80 km/h;
- (c) a road surface luminance of  $1 \text{ cd/m}^2$  and/or a horizontal road illumination of 10 lx being exceeded continuously,
- (d) the vehicle's speed not exceeding 50 km/h.

Conditions for activation of Class E (motorway) mode (WP No. 5-4, item 1.; WP No. 5-11; WP No. 5-14)

19. The expert from Japan introduced WP No. 5-14 which refers to the design of expressways in Japan with an antiglare fence in place of a dividing strip. The expert from GTB/AFS noted that the presence of an antiglare fence could be used as a signal for Class E mode activation. He also pointed out that, as regards glare, road geometry is the main factor; an additional lateral distance of 1 m between adjacent opposite directions of traffic would permit the glare values proposed for the Class E modes.

Concerning the proposal in WP No. 5-11 the experts from Italy and Netherlands questioned the need for a Class E mode; other experts considered this mode to be useful, taking into account the photometric provisions. Different opinions also were expressed regarding the need for footnote 8/. The expert from Germany suggested to use detection of oncoming traffic, which would automatically de-activate the Class E mode, as an additional condition and to increase the reference speed to 100 km/h.

20. The Informal Group did not take a final decision and agreed to continue discussion at its next session on the basis of the two proposals set out below.

### Proposal A

- “6.20.7.4.3. The Class E mode(s) of the passing beam shall not operate unless one or more of the following condition(s) is/are automatically detected (E signal applies):
- (a) the vehicle’s speed is not less than [100] km/h;
  - (b) the road characteristics correspond to motorway conditions 8/; this condition shall be deemed to be satisfied if...(as in WP No. 5-11);
  - (c) there is a sufficient lateral separation to oncoming traffic.”

### Proposal B

- “6.20.7.4.3. The Class E mode(s) of the passing beam shall not operate unless one or more of the following conditions is/are automatically detected (E signal applies):
- (a) the vehicle’s speed is not less than [100] km/h;
  - (b) a continuous evaluation of two or more sets of information indicates a roadway designed for higher speed and having separated carriageways for the two directions of traffic, e.g.
    - (i) the vehicle’s speed being essentially steady;
    - (ii) minimal steering parameters;
    - (iii) the width of the road lane;
    - (iv) the course of the road lanes
    - (v) oncoming traffic detection.”

### Conditions for activation of Class W (wet road) mode (WP No. 5-4, item 1.; WP No. 5-11)

21. The Informal Group agreed to align the text of paragraph 6.20.7.4.4. to that of the preceding paragraphs. As regards sub-paragraph (b) (ii), the expert from the Netherlands proposed its deletion, in order to define only a wet road as the parameter for Class W mode operation; the expert from Germany requested to maintain it, as this would encourage AFS providing also the Class W mode. The text agreed by the Informal Group is set out below.

- “6.20.7.4.4. The Class W mode(s) of the passing beam shall not operate unless the following conditions are automatically detected (W signal applies):
- (a) the front fog lamps, if any, are switched off, and
  - (b) at least one of the following conditions is met:
    - (i) the wetness of the road has been detected automatically;
    - (ii) the windshield wiper system is switched on and its continuous or automatically controlled operation has occurred for a period of at least two minutes.”

### Conditions for activation of T (bending) mode (WP No. 5-4, item 1.; WP No. 5-11)

22. The experts from Germany and the Netherlands referred to the existing provisions for bend lighting in Regulations No.s 48, 98 and 112 and noted their preference for deleting sub-paragraph (d), as the term “equivalent” was open to interpretation; this met with objections by the expert from Italy. The Chairman proposed to re-arrange the text for the time being and to re-consider this issue at the next session on the basis of more information to be provided by the experts.

The text provisionally agreed by the Informal Group is set out below.

- “6.20.7.4.5. A mode of a Class C, V, E or W passing beam shall not be modified to become a bending mode of said class (T signal applies in combination with the signal said passing beam class according to paragraphs 6.20.7.4.1. through 6.20.7.4.4. above), unless at least one of the following characteristics (or equivalent indications) are evaluated:
- (a) the angle of lock of the steering;
  - (b) the trajectory of the centre of gravity of the vehicle.

In addition....”

Traffic change mode (WP No. 5-4, item 2.)

23. The Chairman noted that the technical substance of this item had been discussed at the fourth session of the Informal Group and that any editorial matters should be resolved at a later date; this was agreed.

Tell-tale (WP No. 5-4, item 3.)

24. The Informal Group noted that a proposal for a failure tell-tale had been accepted at its fourth session. As the additional documents announced at that session were not available discussion was deferred to the next session.

Height of dipped-beam headlamps (WP No. 5-4, item 4.)

25. As no proposals had been submitted there was no discussion.

Verification of compliance with AFS automatic operating requirements (WP No. 5-4, item 5.; WP No. 5-13)

26. The expert from GTB/AFS introduced the proposal for paragraph 6.20.9.2. in WP No. 5-13 which indicates that the Technical Service may carry out practical testing at his discretion. The expert from Germany noted his preference for the obligation to carry out such practical tests. The expert from Italy pointed out that a general requirement could be inserted, referring to tests being carried out by the Technical Service, where necessary, possibly in cooperation with the Applicant; if the text implied the requirement for detailed tests, the conditions would have to be specified, eventually in an Annex, to ensure substantially harmonized application of the Regulation by Contracting Parties.

The Informal Group took no final decision on this item and agreed to put paragraph 6.20.9.2. in square brackets. The Chairman invited the expert from GTB/AFS to prepare a revised text for the next session, taking into account the comments made during the discussion.

Definitions

27. The expert from IEC pointed out that it would be necessary to review the definitions of light sources in Regulation No. 48 in order to include AFS lighting units.

Additional proposals by the expert from GTB/AFS (WP No. 5-11)

28. Due to lack of time, the proposals in WP No. 5-11 regarding paragraphs 2.7.26.6., 3.2.6.4., 6.20.4.1., 6.20.4.1.4., 6.20.5., 6.20.7.1.(d), 6.20.7.2.(d), 6.20.7.2.(e), and 6.20.7.4. were not discussed.

PROPOSAL FOR AMENDMENTS TO REGULATION No. 45

Documentation: WP No. 5-3

29. Due to lack of time, this item was not discussed.

## DOCUMENTS TO BE SUBMITTED TO THE FIFTY-SECOND GRE SESSION

30. The Informal Group agreed that an additional (sixth) session will be necessary to prepare and review the consolidated version of the AFS proposals. At the invitation of the German government, and pending approval by WP.29, this session will be held at the Ministry of Transport offices in Bonn, starting on 17 February 2004 at 9.30h and ending on 19 February 2004, at 12.30h. Delegates were requested to refer to the invitation for the fifth session for matters of organization. Working papers for the sixth session will carry the symbol "WP No. 6-.." and should be submitted to the ECE Secretariat not later than 30 January 2004.

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