

ref.: Draft R.xxx

Submitted by the Expert from GTB-AFS

Draft regulation R.xxx (working paper 4-1) amend to read:

PROPOSAL (new text displayed in **bold**)

A) CONCERNING THE SCOPE AND DEFINITIONS

Amend the scope, the paragraphs 1. through 1.3. and paragraph 1.5. to read:

" SCOPE

This Regulation applies to *adaptive frontlighting systems (AFS) for motor vehicles, which may incorporate lenses of glass or plastic material and which may incorporate distributed lighting system(s).*

1. DEFINITIONS

For the purpose of this Regulation:

1.1. *the definitions given in Regulation No. 48 and its series of amendments in force at the time of application for type approval shall apply;*

1.2. *"Adaptive front lighting system" (or "system") means a lighting device, [type-approved according to this Regulation] providing two or more differing modes for automatic adaptation of the beam characteristics to varying conditions of use of the dipped-beam (passing beam) and, if it applies, the main-beam (driving-beam); 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;*

1.3. **"Class" of a passing beam (C, V, E or W) means the designation of a passing beam, identified by particular photometric provisions according to annex 3 of this Regulation;"**

"1.5. **"Lighting unit" means a light emitting part of the system, which may consist of optical, mechanical and electrical components, designed to provide or contribute to the beam of one or more front-lighting or ~~light signalling~~ function(s) provided by the system; "**

Rationale:

to actualize this definition after the deletion of light signalling function(s) from the draft and to make clear, that a lighting unit contributes to the beam of a lighting function and contains at least all necessary optical elements.

Re-number paragraph 1.5.1. and 1.5.2. into 1.6. and 1.7., and re-number the following paragraphs accordingly

B) CONCERNING THE TRAFFIC CHANGE PROVISIONS

Amend paragraph 3.4. (front lens design) to read :

" 3.4. *In the case of a system designed to meet the requirements set out in the paragraph 5.4.1.2. below by means of, or using additionally an area on the front lens(es) of the installation unit(s) which can be occulted, this area must be outlined indelibly. This marking is not necessary, however, where the area is clearly apparent ~~from the design.~~* "

Amend paragraph 5.1. (photometry requirements traffic direction dependent):

" 5.1. *Each sample, when its approval is sought for right-hand traffic only, shall conform to the specifications set forth in paragraphs 6. to 7. below; if however its approval is sought for left-hand traffic, the provisions of paragraphs 6. to 7. below, including the relevant annexes to this Regulation, apply with the inversion of right to left and vice versa.*

~~5.1.1. *Systems shall provide means allowing them to be used temporarily in a territory with the opposite direction of driving than that for which approval is sought, without causing undue dazzle to the oncoming traffic, according to the provisions set out in paragraph 5.4. below.*~~ "

Amend paragraph 5.4. (approval sought /design for both traffic directions):

" 5.4. *System(s) or part(s) thereof, designed to satisfy the requirements both of right-hand and of left-hand traffic may be adapted for traffic on a given side of the road either by an appropriate initial setting when fitted on the vehicle or by selective setting by the user. **In any case, only two different and clearly distinct settings, one for right-hand and one for left-hand traffic, shall be possible, and the design shall preclude inadvertent shifting from one setting to the other or setting in an intermediate state.*** "

Insert a new Paragraph 5.10. (traffic-change ability required) reading:

" **5.10.** *Systems shall provide means allowing them to be used temporarily in a territory with the opposite direction of driving than that for which approval is sought, without causing undue dazzle to the oncoming traffic. For these purposes the system(s) or part(s) thereof shall:*

5.10.1. *be capable of providing a selective setting by the user according to paragraph 5.4. above, without special tools; or*

5.10.2. *provide **means to achieve** a traffic-change mode, producing not more than **[1.5]** lx in zone IIIb for the opposite direction of traffic and not less than 6 lx in 50V when tested according to paragraph 6.2. below with the adjustment left unchanged compared to that for the original traffic direction; **where***

5.10.2.1. ***the occultation of a respective lens area according to paragraph 3.4. above may be such means or part of it.*** "

C) CONCERNING FAILURE PROVISIONS OTHER THAN THOSE FOR CONVENTIONAL HEADLAMPS

C-1) PROPOSAL OF A "CORE PART" OF THE SYSTEM AND ITS MONITORING

Amend paragraph 2.2.2. to read:

" 2.2.2. a concise technical description of the system specifying:

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(g) which lighting units are designed to provide the minimum illumination **of the passing beam in its neutral state** according to the paragraph 6.2.9.1. of this Regulation; "

Amend paragraph 5.9.1. to read:

" 5.9.1. The system shall be so made that:
if a light source of any lighting unit specified in paragraph 2.2.2. (g) fails, a signal for the activation of a tell tale shall be provided."

Amend paragraph 6.2.9. and 6.2.9.1. to read:

" 6.2.9. The system shall be so made that:
6.2.9.1. **a part, to be indicated in paragraph 2.2.2. (g), provides, if the passing beam is turned on, and the system is in its neutral state: not less than 6 lx at point 50V and 1 lx at a segment at 1.72D, extending from 5R to 5L; any specified passing beam mode provides at least 3 lx at point 50V from each side of the system; [the Class V (town) passing beam is exempted.] "**

Annex 10

Amend paragraph 1.8.1. to read:

" 1.8.1. however in those cases where a provision is specified for one side only, the division by the factor of 2 does not apply. [These cases are: paragraphs ~~5.2.1.~~, **6.2.9.1.**, 6.3.2.1.2. and 6.3.2.1.3., ~~6.4.1.~~ and ~~6.4.2.~~, ~~6.5.6.~~, note 4 of Table 1, Annex 3, and **section 3.2.** of Annex 9.] "

Rationale:

Paragraph 5.9.1. is confined to light source failures in the "core part" of the system, according to the provisions of para. 6.2.9.1..

Paragraph 6.2.9.1. has been amended to ensure an increased level of safety through the inclusion of the minimum requirement of 1 lx per side along the segment at 1.72 deg down and 5 deg left to 5 deg right;

The requirement for a zone III maximum value has been removed as any issues relating to mechanical failures are addressed in paragraphs 5.7. and 6.2.6.5..

Reg.48 amendment on AFS (Working Paper 4-5) covers the case of a failure according to paragraph 5.9.1. by requiring a respective tell tale.

C-2) ALTERNATIVE PROPOSAL FOR ALL SYSTEM LIGHT SOURCE MONITORING

Amend paragraph 5.9.1. to read:

" 5.9.1. *The system shall be so made, that in case one light source or one lighting unit not pertaining to 5.7. or 6.2.6.5. has failed, a permanent signal is automatically generated for the activation of a tell tale according to the respective provisions of Regulation No.48.*"

C-3) PROPOSAL FOR A TYPE-APPROVED "SUBSTITUTE FUNCTION" OF THE SYSTEM

After paragraph 2.1.7 add the following new paragraph 2.1.8:

" 2.1.8. *whether the system or part thereof is intended to provide also the "substitute function"; "*

Amend paragraph 6.4. to read:

" 6.4. Provisions concerning substitute function
The system shall provide:
- not less than 3 lx at point 50V; and
- not less than 0.5 lx at a segment at 1.72D, extending from 5R to 5L;
- not more than 1.5 lx in the zone IIIb as defined in annex 3 of this Regulation. "

In Annex 1 add at the end of paragraph 9:

...
" Lighting substituting functionyes/no 2/ "

D) CONCERNING PROVISIONS FOR ALLOWED LIGHT SOURCES

Rationale

Mainly due to aerodynamic requirements the space available on vehicles for lighting installation is restricted. Long life light sources are more readily available. These factors lead to desirability of allowing for a lighting unit with integrated light sources, where the re-placement in case of a failure is done by replacing the respective unit.

Evolving light source technologies (such as light source modules or the light generator technique) should not be precluded from AFS. The use of certain light source techniques could rather be restricted/ allowed in a respective provision in the Regulation No.48. The AFS Regulation should be drafted rather independently, according to its intentions concerning a general basic approach.

The light properties (colour, run-up etc.) must be maintained. Thus re-institution of annex 8 is required. Time/heat dependent effects should be covered by a second testing.

The lighting distribution must be sufficiently assured in case of light source module replacement; this is covered by the introduced "light source modules for front lighting purposes (F-LSM)" and related provisions.

In addition:

The requirement to mark the module with the name of the manufacturer (see para. 3.6. of R.xxx/ WD 4-1) will oblige the manufacturer to control the production of the light source module to satisfy the technical authorities that COP requirements can be maintained.

Amend paragraph 5.3. through 5.3.4. to read:

- " 5.3. *The system shall be equipped with light sources as defined in paragraph 5.3.1. through 5.3.4. below, or any combination of them;*
- 5.3.1. *one or more **replaceable** light sources approved according to Regulation No. 37 or 99, where the lamp holder shall conform to the dimensional characteristics given on the data sheet of IEC Publication No. 60061-2, as referred to in the relevant light source Regulation;*
- 5.3.2. *one or more **non-replaceable** light sources, being approved or not, where the respective lighting unit must be so designed that said light source(s) cannot be removed without destroying the unit or at least one essential optical element of it;*
- 5.3.3. *one or more **light source modules for frontlighting purposes (F-LSM)**,*
- 5.3.4. *one or more **light-generators**. "*

Amend paragraph 5.9.3. to read:

- " 5.9.3. *The system shall be so made, that a **light source module for frontlighting purposes (F-LSM)**, even after replacement, is secure and safe in position, orientation and fixation; this shall be verified with respect to compliance with the requirements for zone III and 50V of each passing beam mode(s), if it applies. "*

Insert new paragraphs 5.11. and 5.12. reading:

- " 5.11. *The component(s) to which a replaceable light source is assembled shall be so made that the light source fits easily and, even in darkness, it can be fitted in no position but the correct one;*
- 5.12. *The requirements of Annex 8 to this Regulation apply to lighting units containing non-approved light sources; "*

Annex 8: to be re-instated

Insert a new paragraph 6.5.7. to read:

- " 6.5.7. *Lighting units containing light sources other than filament or gas-discharge light sources shall be checked for compliance with the photometric provisions of this Regulation both after one minute and 30 minutes of operation. "*

Paragraph 2.1.5. to be re-instated

For clarity paragraph 2.7.27.1. of R.48 (Basis R48 TRANS/WP.29/GRE/2001/31/Rev.1) might be amended to read:

" 'Light-generator' means an optical device which is a component of a distributed lighting or light-signalling system **or an AFS** that collects the luminous flux emitted by the light source(s) and distributes it into one or more light-guides. A light-generator is to be considered a light transmitting component."

E) CONCERNING AMENDMENT OF THE COP PROVISIONS IN ANNEXES 5 AND 7

Rationale: absolute deviations should be specified where target values below 1lx are required.

annex 5 and annex 7:

Amend paragraph 1.2.1.1. to read:

" 1.2.1.1. For **the following** values ~~B50L (or R)⁴~~ and ~~zone III~~ of the passing beam and its modes, the maximum unfavourable deviation may be respectively:
maximum values at point B50L (or R) 0.2 lx equivalent 20 per cent and 0.3 lx equivalent 30 per cent;
maximum values at zone III, HV and segment BLL: 0.3 lx equivalent 20 per cent and 0.45 lx equivalent 30 per cent;
maximum values at segments E, F1, F2 and F3: 0.2 lx equivalent 20 per cent and 0.3 lx equivalent 30 per cent;
minimum values at BR, P, S, SL, SR, and those required by footnote 4/ of table 1 in annex 3 of this Regulation (B50L, HV, BR, BRR, BLL): half of the required value equivalent 20 per cent and three quarter of the required value equivalent 30 per cent; "

Delete the footnote 1/

Rationale: the transition between provisions for Right/Left Traffic are covered centrally by the paragraph 5.1.

F) CONCERNING BENDING MODE TESTING PROVISIONS IN ANNEX 10

Annex 10, amend paragraph 3.1.2. to read

" 3.1.2. *When testing a category 1 or category 2 bending mode, for a turn radius of the vehicle other than specified in paragraph 3.1.1. above: it shall be observed whether the light distribution is substantially uniform and no undue glare occurs. [; otherwise the compliance with the requirements laid down in part 2 of table 1 of annex 3 to this Regulation shall be checked.] "*

⁴ — Letters in parenthesis refer to headlamps intended for left hand traffic.

G) CONCERNING THE SYSTEM FUNCTIONAL INDICATION PROVISIONS IN ANNEX 1

Re-place the table in annex 1 by two new paragraphs 17. and 18. reading:

17. *The system is designed to provide passing beam(s) of: 1/*

17.1. **Class C 9** Class V Ω Class E Ω Class W Ω

17.2. *with the following mode(s), identified by the designation(s), if it applies 3/*

No. C 1	No. V ...	No. E ...	No. W ...
No. C ...	No. V ...	No. E ...	No. W ...
No. C ...	No. V ...	No. E ...	No. W ...

17.3. *where the lighting units, indicated below are energized 1/, 2/, 3/ for the*

mode No.

a) if no bend lighting applies:

left side	No.1 Ω	No.3 Ω	No.5 Ω	No.7 Ω	No.9 Ω	No.11 Ω
right side	No.2 Ω	No.4 Ω	No.6 Ω	No.8 Ω	No.10 Ω	No.12 Ω

b) if bend lighting of category 1 applies:

l.s.	No.1 Ω	No.3 Ω	No.5 Ω	No.7 Ω	No.9 Ω	No.11 Ω
r.s.	No.2 Ω	No.4 Ω	No.6 Ω	No.8 Ω	No.10 Ω	No.12 Ω

c) if bend lighting of category 2 applies:

l.s.	No.1 Ω	No.3 Ω	No.5 Ω	No.7 Ω	No.9 Ω	No.11 Ω
r.s.	No.2 Ω	No.4 Ω	No.6 Ω	No.8 Ω	No.10 Ω	No.12 Ω

Indications according to paragraph 17.3. a) through 17.3. c) above are needed additionally for each further mode.

17.4. *The lighting units marked below with an X are energized, when the system is in its neutral state 1/, 2/*

l.s.	No.1 Ω	No.3 Ω	No.5 Ω	No.7 Ω	No.9 Ω	No.11 Ω
r.s.	No.2 Ω	No.4 Ω	No.6 Ω	No.8 Ω	No.10 Ω	No.12 Ω

17.5. *The lighting units marked below with an X are energized, when the system is in its traffic change mode 1/, 2/, 3/*

a) if no bend lighting applies:

l.s.	No.1 Ω	No.3 Ω	No.5 Ω	No.7 Ω	No.9 Ω	No.11 Ω
r.s.	No.2 Ω	No.4 Ω	No.6 Ω	No.8 Ω	No.10 Ω	No.12 Ω

b) if bend lighting of category 1 applies:

l.s.	No.1 Ω	No.3 Ω	No.5 Ω	No.7 Ω	No.9 Ω	No.11 Ω
r.s.	No.2 Ω	No.4 Ω	No.6 Ω	No.8 Ω	No.10 Ω	No.12 Ω

c) if bend lighting of category 2 applies:

l.s.	No.1 Ω	No.3 Ω	No.5 Ω	No.7 Ω	No.9 Ω	No.11 Ω
r.s.	No.2 Ω	No.4 Ω	No.6 Ω	No.8 Ω	No.10 Ω	No.12 Ω

18. The system is designed to provide a **main beam**: 1/, 2/, 3/

18.1. yes Ω no Ω

18.2. with the following mode(s), identified by the designation(s), if it applies:

main beam mode No. M 1

main beam mode No. M ...

main beam mode No. M ...

18.3. where the lighting units marked below with an X are energized, for mode No.

a) if no bend lighting applies:

l.s.	No.1 Ω	No.3 Ω	No.5 Ω	No.7 Ω	No.9 Ω	No.11 Ω
r.s.	No.2 Ω	No.4 Ω	No.6 Ω	No.8 Ω	No.10 Ω	No.12 Ω

b) if bend lighting applies:

l.s.	No.1 Ω	No.3 Ω	No.5 Ω	No.7 Ω	No.9 Ω	No.11 Ω
r.s.	No.2 Ω	No.4 Ω	No.6 Ω	No.8 Ω	No.10 Ω	No.12 Ω

Indications according to paragraph 18.3. a) and 18.3. b) above are needed additionally for each further mode.

18.4. The lighting units marked below with an X are energized, when the system is in its neutral state 1/, 2/

l.s.	No.1 Ω	No.3 Ω	No.5 Ω	No.7 Ω	No.9 Ω	No.11 Ω
r.s.	No.2 Ω	No.4 Ω	No.6 Ω	No.8 Ω	No.10 Ω	No.12 Ω

- 1/ mark with an X what applies
2/ to be extended if more units being provided
3/ to be continued if more modes being provided

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