GTB Task Force Conformity of Production TF CoP

Report for GRE-75

G T B

*The International Automotive Lighting
and Light Signalling Expert Group*

Groupe de Travail "Bruxelles 1952"

Motivation for TF CoP on AFS

- to set R123 in line with other headlamp CoP procedures to have common CoP procedures for work of **IWG-SLR**

- to show R123 CoP compliance up to **80** photometric measurements are necessary compared to only **8** measurements for HID (R98) or Halogen (R112) headlamps with bendlight

R123

Initial Position

Bend max.Left

R112/R98

Bend max.Right

High Beam
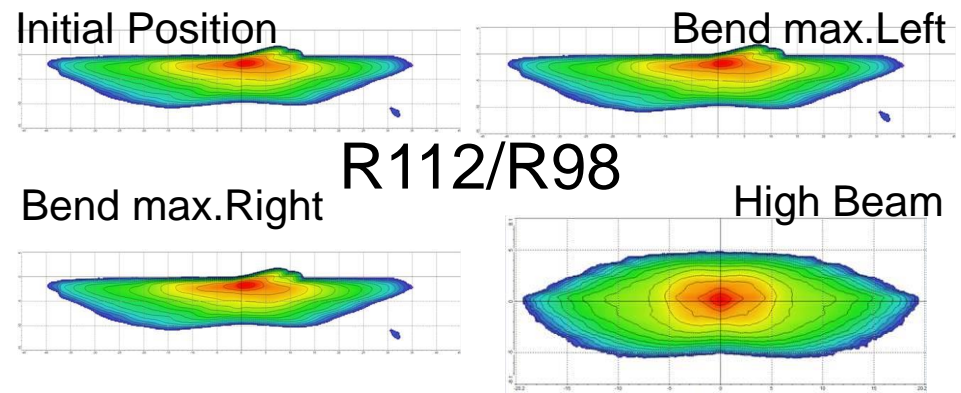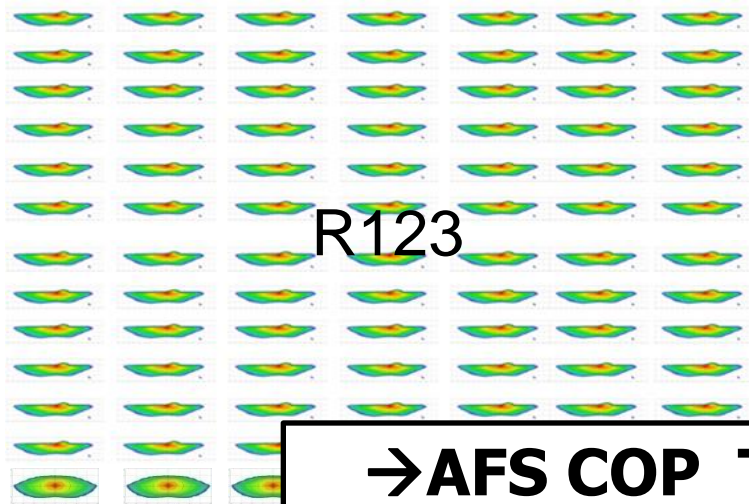
→AFS COP TESTING HAS TO BE SIMPLIFIED

GTB TF CoP

- in average 15 experts from Industry and Testhouses participated since 2012

Outcome:

- **Work on ECE Reg. 123 to simplify AFS tests for serial production**

GRE Reporting

Regular Progress Report to GRE

69th session(GRE-72-29)

72nd session(GRE-69-40)

Work items of TF:

- ➤ include in Reg.123 the new CoP procedure similiar to Reg.112 change adopted at 69th GRE session (ECE/TRANS/WP.29/GRE/2013/37)

- ➤ clarify which tests are necessary for CoP testing compared to type approval testing, clarify that tests apply only for the entire system *(Annex 5, Appendix 1 , paragraph 1.)*

- ➤ create simplified photometric CoP tables for each class (C,V,W,E,R,R_{ADB}) with applicable tolerances *(Annex 5, Appendix 1 ,Tables 1 to 16)*

Work items:

> ➢ reduce&simplifiy the measurements

- if there is more than one mode in a Class then only the basic mode for CoP to be measured*(paragraph 2 of Annex 5, Appendix 1)*

- if bending modes use same functional unit, then only worst case bending mode to be measured *(paragraph 2 of Annex 5, Appendix 1)*

- if ADB has same functional unit, then only the worst case situation for CoP to be measured (in most cases this will be Line 1 and Line 4 ("50m case") in *Table 16 Part A of Annex 5, Appendix 1*)

- substitute zone scans by line scans and line-scans by point measurements (Table 1 to 16 *of Annex 5, Appendix 1*)

Work items:

- ➢ reduce&simplifiy the measurements

- - instead of Imax scan usage of characteristic points *(Annex 5, Appendix 1, Table 1, 75R,50V,50R instead of Imax)*

- - allowance of an automatic 0.25° re-aim for CoP tests instead of a re-alignment of the unit without re-testing all other modes for CoP *(Annex 5&7 Paragraph 1.22 and Annex 5, Appendix 1 Paragraph 1)*

Work in Detail:

➢ update paragraph 9 and Annex 7 with new CoP procedure as adopted by GRE **(GRE 69: ECE/TRANS/WP.29/GRE/2013/37)**

➢ define which tests are applicable for CoP

  ➢ Photometry according to new CoP Tables in Annex 5

  ➢ Colour

  ➢ Stability of Cut-Off (Annex 4)

➢ include simplified CoP Tables for Photometry in Annex 5 for each Class/Mode

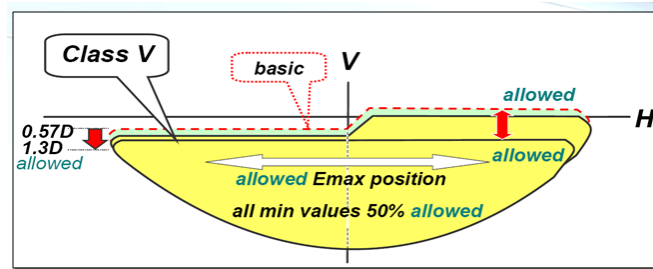 ➢ Class C / Class E / Class V / Class W / Class R /R_{ADB}

  Overview of AFS see GRE-48-28 or GRE-48-30

Simplify Classes to most important key test points

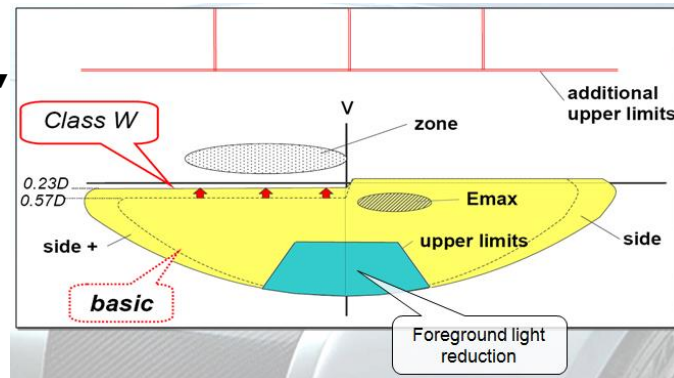- **Simplify classes/modes (C,V,W,E,R, R$_{ADB}$)to most important key test points**

  e.g.

  – **Class V: "Village"**

  → **check reduced kink/ light at crossing**

  – **Class W: "Wet Road"**

  →**check reduced foreground illumination, extended range...**

Simplifed photometric tables for CoP

- **Proposal for a simplified Class C Table for CoP:**

| Class C - Neutral State | | Position/deg | | | | | Column A | | Column B | | Column C | |
| Tabled requirements expressed in cd | | horizontal | | | vertical | | $\hat{=}$ 0% CoP | | $\hat{=}$ 20% CoP | | $\hat{=}$ 30% CoP | |
No	Element	at/	from	to		at		min	max	min	max	min	max
1	B50L	L	3.43			U	0.57	50	350	25	520	10	605
3	BR	R	2.5			U	1	50	1750	25	2100	10	2275
4	**Point** BRR	R	8			U	0.57	50	3550	25	4260	10	4615
5	**Point** BLL	L	8			U	0.57	50	625	25	880	10	1005
7	**Line** III	L	4	V	V	H			625		880		1005
8a	S50+S50LL+S50RR[3]					U	4	190[2]	1875	95[2]	2250	45[2]	2440
9a	S100+S100LL+S100RR[3]					U	2	375[2]	1875	185[2]	2250	90[2]	2440
10	50 R	R	1.72			D	0.86		44100		52920		57330
11	75 R	R	1.15			D	0.57	10100	44100	8080	52920	7070	57330
12	50 V	V				D	0.86	5100	44100	4080	52920	3570	57330
13	50 L	L	3.43			D	0.86	3550	13200[4]	2840	15840[4]	2485	17160[4]
14	25 LL	L	16			D	1.72	1180	44100	944	52920	826	57330
15	25 RR	R	11			D	1.72	1180	44100	944	52920	826	57330
17	**Line** 10	L	4.5	R	2.0	D	4		12300[1]		14760[1]		15990[1]

→ instead of Line-scan- only a Point-measurement (e.g. Line BRR/BLL -> Point BRR/BLL)

→ instead of Zone-scan- only Line-measurement (e.g. ZoneIII -> LineIII)

→ instead of Imax scan use characteristic points (75R)

Reduced CoP Tables and Tests

- ## e.g. Simplified Class V Table for CoP:

Class V - Neutral State		Position/deg					Column A		Column B		Column C	
Tabled requirements expressed in cd		horizontal			vertical		$\triangleq$0% CoP		$\triangleq$20% CoP		$\triangleq$30% CoP	
No	Element	at/	from	to		at		min	max	min	max	min	max
1	B50L	L	3.43			U	0.57		350		520		605
3	BR	R	2.5			U	1		880		1135		1260
4	**Point** BRR	R	8			U	0.57		880		1135		1260
5	**Point** BLL	L	8			U	0.57		880		1135		1260
7	**Line** III	L	4	V	V	H			625		880		1005
10	50 R	R	1.72			D	0.86	5100	44100	4080	52920	3570	57330
13	50 L	L	3.43			D	0.86	3550	13200[1]	2840	15840[1]	2485	17160[1]

⟶ e.g. reduction to key test points

➤ new definition of „functional unit"

"1.22.   "Functional unit" means a part of a lighting unit providing a specific light distribution which may be used for different modes or classes. If used for the bending mode its light distribution may vary as a function of the T-signal(turn-radius); however, the light distribution shall be identical for a given T-signal(turn-radius) in all modes or classes.

some examples for such a „functional unit" for the bending:

for Cat.1 Bendlight:(bending mode with horizontal movement of the kink of the cut-off)
- the swivelling of a complete projection module or only the optical lens
- the activation of static optical elements which produce moveable kink patterns by sequential activation (pixel/matrix light)
        etc....

for Cat 2 Bendlight: (bending mode without horizontal movement of the kink of the cut-off)
- the activation of static optical elements (e.g. cornering lamp reflector, pixel/matrix light) below cut off line
- the swivelling of optical elements below cut off line
        etc....

➢ Reduce the measurements according to the following decision table:

- reduction of ADB measurements to worst case condition if same functional unit is used

- reduction to measurements of only the basic mode if more than one mode in a Class exists

- reduction of bend light test if same „functional unit" is used.

(details see next slide)

	"Multiple Modes" - Condition * if more than one mode of the applicable Class exist only the basic mode has to be tested in non-bending mode according to	"Bending Modes" -Condition if the system uses the same functional units to obtain bending modes for more than one class:	
		YES	NO
Class C	Table 1 *		
Category 1 bending mode	→	** the bending modes shall only be tested in the Class which represents the worst condition	Table 2
Category 2 bending mode		Test category 2 bending mode according to Table 3	
Class V	Table 4 *		
Category 1 bending mode	→	see **	Table 5
Category 2 bending mode			Table 6
Class W	Table 7 *		
Category 1 bending mode	→	see **	Table 8
Category 2 bending mode			Table 9
Class E	if more than one mode of Class E exist only the mode Class E which relates to the highest cut-off position has to be tested in non-bending mode according to corresponding table 10 to table 13	No additional testing of Category 1 and/or Category 2 is necessary	

Target:

> formal document to be sent to 76th GRE session for adoption

THANK YOU!