Submitted by the expert from China

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agenda item 8)

Additional justifications for E/TRANS/WP.29/GRE/2012/30

Regulation No. 48 has no prohibition of reciprocal incorporation of front position lamps with front fog lamps and of rear position lamps with rear fog lamps, and actually manufacturers have needs to design as that.

Similar to condition of front position lamps reciprocally incorporate with headlamps, the photometric performance requirement should be the same as for front position lamps reciprocally incorporated with front fog lamps, and the maximum intensity of the photometric performance of rear position lamps reciprocally incorporated with rear fog lamps should be increased.

The proposed maximum value for rear position lamps incorporated in rear fog lamps is calculated based on the ratio of luminous flux of filament lamps of P21/5W, P21W and W5W.

When filament lamp of category of P21/5W with nominal luminous flux of 35/440 is used for stop lamp and rear position lamp reciprocally incorporated together, the maximum intensity of rear position lamp calculated based on the ratio of luminous flux is 20.7cd respect to the maximum value of 260cd specified for stop lamp. But for minor filament, the light output will decrease by about 12 percent because it is not on the focus point as the major filament, and normally, the designed maximum value will be less than the specified maximum value, and if we take a factor of 0.9, then the maximum value will be the specified maximum value of 17cd for rear position lamp. Accordingly, for rear position lamp reciprocally incorporated with rear fog lamp, the calculated maximum intensity of it is about 19cd.

Concerning on filaments P21W and W5W, by the same way, the calculated maximum intensity is about 25cd.

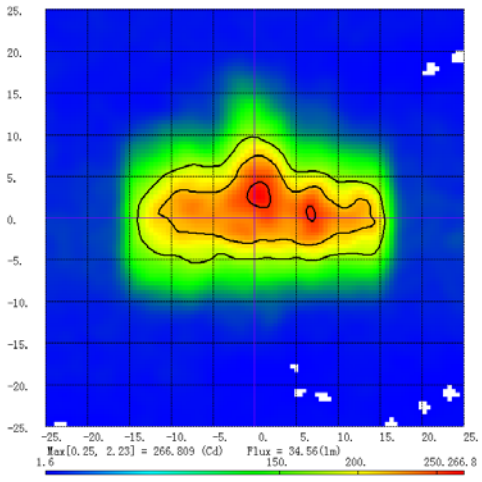
These two cases are more likely found in design, and use of other light sources will be easier to comply with regulation requirements.

In the case of a lamp with variable luminous intensity, the maximum value is calculated by the ratio of steady and variable luminous intensity of a single rear position lamp.

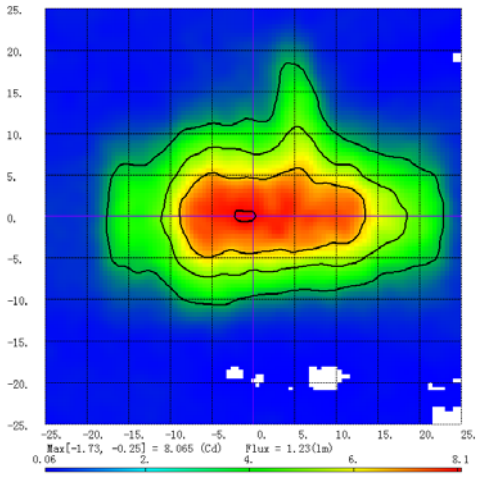
Simulations were made for two categories filament lamps P21/4W and P21/5W and test actual products with respective light sources mentioned above. The respective results are as follows:

The result of simulation for light source P21/4W by software:

Rear fog lamp (440lm)



Rear position lamp (15lm)

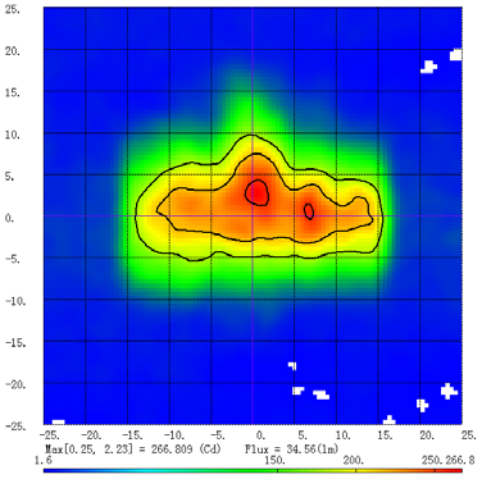


The simulation indicates that rear fog lamp has a maximum intensity of 266.8cd and rear position lamp has a maximum intensity of 8.1cd. According to the ratio of luminous flux of the two filaments, the maximum intensity of rear position lamp should be 9.1, but it is simulated to be 8.1. The reason is that the mail filament positioned and the second filament is not positioned on the focus of the reflector.

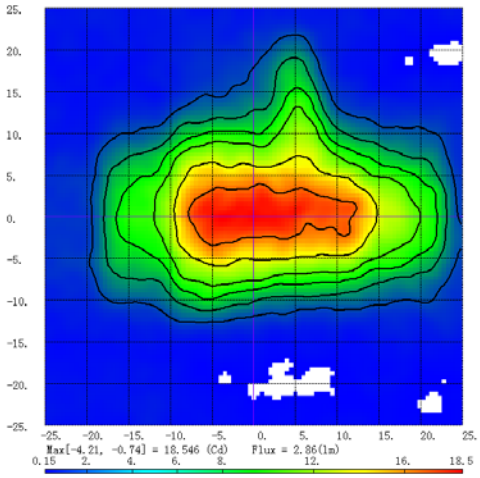
Test results of some actual samples with P21/4W light source: rear fog lamp measured a maximum intensity of 268.0cd, and rear position of measured a maximum intensity 10.2cd.

The result of simulation for light source P21/5W by software:

Rear fog lamp (440lm)



Rear position lamp (35lm)



The simulation indicates that rear fog lamp has a maximum intensity of 266.8cd and rear position lamp has a maximum intensity of 18.5cd.

Test results of some actual samples with P21/5W light source: rear fog lamp measured a maximum intensity of 275.2cd, and rear position of measured a maximum intensity 16.8cd.

The following table shows the calculation procedure:

Filament category	Luminous flux		Calculation						
	Rear position lamp	rear fog lamp	limit value for stop and rear fog lamp			calculated value for rear position		corrected value	
			minimum	maximum	*0.9	Corr. to maximum	*0.9	Corr. to maximum	*0.9
P21/4W	15	440	60	260	234	8.9	8.0	7.8	7.0
	15	440	150	300	270	10.2	9.2	9.0	8.1
P21/5W	35	440	60	260	234	20.7	18.6	18.2	16.4
	35	440	150	300	270	23.9	21.5	21.0	18.9
W5W & P21W	50	460	150	300	270	32.6	29.3	28.7	25.8