

PROPOSAL TO SIMPLIFY “SURFACE” DEFINITION AND REDUCE AMBIGUITY CAUSED BY “DESIGN BASED” OLD DEFINITIONS AND REQUIREMENTS

Comment:

This proposal, if adopted, will require changes to many other detailed provisions.

Therefore, at this stage there is no justification for preparing proposals for all the detailed changes until a general decision is made to simplify the requirements and leave only one light emitting surface.

*It is proposed to remove concept for many different “surfaces” and replace it with only one “**Light emitting surface**”*

~~illuminating surface ...~~

~~apparent surface ...~~

2.8. ... 2.9. ... 2.10 replace by:

[2.8.] “Light emitting surface” means the luminance image observed visually or registered by luminance measuring camera from given angular position and distance greater than minimum photometering distance and generated by activating all light sources intended for the given function.

[2.8.1.] For retroreflecting devices [2.8.] above is used appropriately while whole retroreflecting device is illuminated by uniform light beam emitted from point [light source] situated so close to observation point while observation angle and entrance angle are the smallest angles as required in proper regulation.

2.8.2. Light emitting surface shall have sharp edges so that regardless of the measurement method and luminance discrimination thresholds required in this Regulations the measurement results shall meet the requirements of the relevant Regulation. Any ambiguities in the measurements of the edges of this surface will be interpreted to the detriment of the applicant.

Justification and explanations:

Any definition should be formulated objectively as much as possible and cannot be described by special “design based” cases because can be subject to unpredictable changes in the future and “exotic” interpretations.

“Image” – from its nature means “the orthogonal projection” of anything what is visible (emit the light - has a certain luminance) on the flat surface perpendicular to the axis of observation (eye retina or camera imaging sensor surface). The image reproduced on retina or imaging sensor surface is in fact positioned close to the lamp or even inside it – all visible parts. There are visible (emitting the light) elements of the light source, reflexes from the reflector surface, lightguide outputs, refraction or dispersion on the lens or its texture, etc. From the observer point of view there is no difference what element of lamp finally emit the light and this should be reflected in definitions and requirements.

Therefore should be only one definition of “light emitting surface” also in place of “apparent surface” and “illuminating surface”.

It is important that this surface is observed from appropriate long distance to obtain only one and the same repeatable “image” from given direction.

The angle of observation in relation to the longitudinal planes (horizontal and vertical) always should be parameter describing real lamp, because this image can significantly change with observation direction. It is especially important for contemporary technologies which allow to emit the light narrowly and directionally. Therefore when minimum (or maximum) requirements refer to the light emitting (presently also “illuminating” and “apparent”) surface they should be met for whole angular range of requirements. And this should be reflected in requirements where this definition(s) is used. This require appropriate measurements like lamp mounted on goniometer and luminance camera as detector. Any masking of lamp further possible by vehicle body should be included in such test because measurements on the vehicle could be difficult and time consuming even possible. Otherwise there is the risk that lamp can be not sufficiently visible for some solid angles even it will be visible for nominal or extreme angles required during the test of the lamp removed from the vehicle.

There is also need to properly understand and then define the edge of light emitting surface. It should be understand as place of minimum relative luminance (contrast). E.g. relation of minimum luminance to the average: “[The edge is where the local luminance obtain smallest acceptable fraction of the average luminance of whole lamp L_{min}/L_{ave}]”.

Alternatively derivative of logarithm of luminance can be used as in cut-off requirements. “[The edge is where the derivative of the logarithm of the luminance gradient perpendicular to the surface edge reaches an extremum]”.

It is important that the edges of this surface should be sharp enough to avoid different interpretations using different methods. At high contrast edge results will be very close and comparable. Therefore manufacturer should be obliged do describe edges with appropriate safety margin to avoid eventual doubts: “Any ambiguities in the measurements of the edges of this surface will be interpreted to the detriment of the applicant”

Therefore there is the need to redefine all requirements which presently refer to ambiguous variety of “example based” surfaces definitions like: “In the case of a dipped-beam headlamp, the illuminating surface is limited by the apparent trace of the cut-off on to the lens”. In such and similar example with use of the proposed definition of “light emitting surface” will be no need to add such “special” limitations.

However first, before any proposals for modification of the detailed requirements are made, a political decision to actually simplify the definition of “surface” is necessary.