

LUMINANCE HOMOGENEITY EVALUATION ON AUTOMOTIVE REAR LAMPS: DEVELOPMENT AND VALIDATION OF AN ANALYTICAL METHOD BASED ON EYE PERCEPTION

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Luminance homogeneity has become an important feature in Rear Lamps design, therefore its evaluation needs special attention during development phases; the paper shows a route to the definition of objective analytical criterium, eye-perception based.

Keywords: luminance homogeneity evaluation, eye perception.

1. Introduction

Luminance homogeneity has become a more and more important feature in Rear Lamps design, therefore its evaluation needs special attention during development phases. Several car-makers introduced their own analytical criteria, at the beginning focused on Tail light function. The aim of these methods is to fix some objective rules that can overcome the subjective human eye evaluation.

This paper wants to present a route dedicated to awareness of these criteria, which took place in 3 main steps.

The first one was focused on the comparison of all the criteria, applied to simulated and measured luminance maps, in order to compare the effectiveness of the principles, and consequently the link with the real human perception of the final customer (perceived quality).

The second step highlights the necessity to overcome some evidences of inconsistency of step 1, giving us the opportunity to develop a new own criterium, based on human eye perception, moving on *vision sensitivity*, *contrast detection* and the *visual acuity*.

The third step shows the validation of the analytical criterion defined in step 2, thanks to technical survey that took in consideration the experimental estimation of the JND (just noticeable difference) the achieved datasets allow to define an acceptance threshold, finalizing the evaluation method.

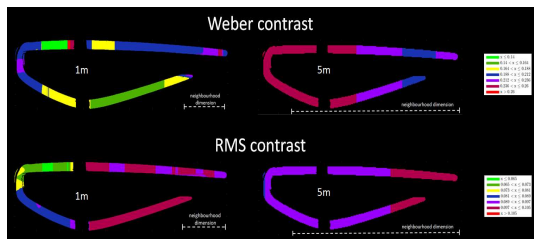


Figure 1: method application at 1m (left) and 5m (right) with Weber contrast (first row) and RMS contrast (second row).

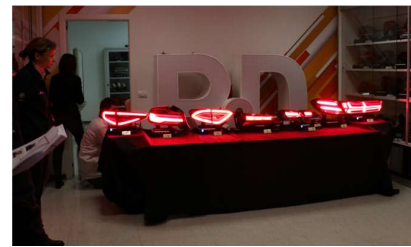


Figure 2: AL rear lamps shown during the market test

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