

# Luminance Measurement of Laser Labelled Symbols

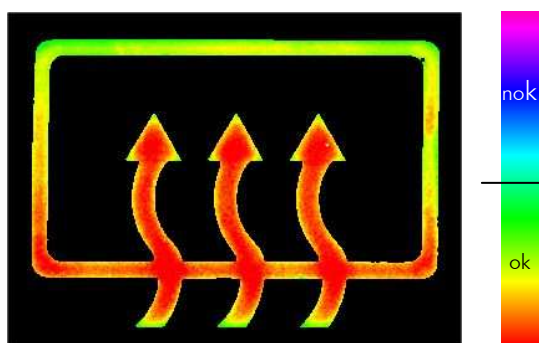
## Benefits of Luminance Measurement

In the production of day and night design parts like keys and buttons, labelling lasers remove layers of lacquer on three dimensional formed surfaces. The disengaged symbols in their final assembly positions will be illuminated for example by optical fibres or directly from behind.



Day and night design parts are manufactured from lacquered plastic parts with the help of labelling lasers. Their quality must be inspected.

Due to the high quality demands of the customers, especially in the automobile industry, manufactured parts must be inspected mostly by 100% for correct luminance. Where often a luminance ratio of  $L_{min}/L_{max} > 0.8$  is required. Manual inspection without technical tools such as this vision system is not possible.



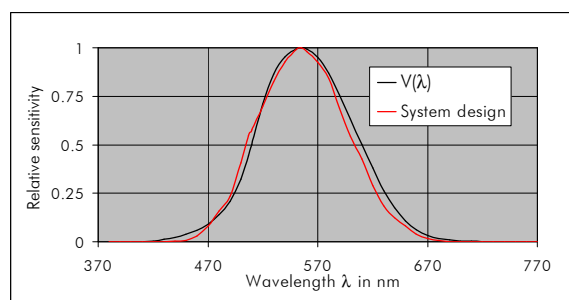
Colour presentation of the luminance distribution (increasing from red to green up to violet).

## Conditions of Application

Since the luminance measurement requires an illumination of the symbols from behind, the jigs have to afford this. If the preferable original illumination is not available, a controllable standard illumination (similar to D65) is positioned behind the parts.

## Technical Details

The camera unit is adapted by a prefix filter to the spectral sensitivity of the human eye  $V(\lambda)$ . As a result the entire optical system achieves an accuracy of  $f_1' < 9\%$ .



Comparison between the system design and the human sensitivity  $V(\lambda)$ .

## Integration in Vision System TOPAS

The luminance measurement can be integrated as an extension to the inspection system TOPAS from Intego. It is also possible to upgrade an existing system.

The inspection system TOPAS from Intego automatically detects so far the following fault categories:

- Positioning faults of the symbols
- Labelling defects of the symbols
- Surface faults in the lacquer

In addition, the optional extension increases the range of detected faults by the category:

### + Luminance of the symbols

Of course the inspection of all fault types is carried out within the cycle time of the labelling laser.

Any detected fault results in the generation of a control signal, used to single out the faulty part, similar to the basic system TOPAS. Additionally, a statistical summary of detected faults provides useful information for the process optimization.

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