

Headlight coating

INTRODUCTION

On most automobile models, the protective window of headlights is made of plastic. To protect the surface against scratches and yellowing by UV light, it is coated externally in the production process with a protective coating.

The coating is applied by spraying. Subsequently it is dried and cured by IR and UV irradiation. To keep the reject rate low, it is important to check the thickness of the coating in the production process.

If the coating is too thick, there is the risk of peeling and cracking. If the coating is too thin, it will not provide sufficient protection. The entire process can be fully automated.

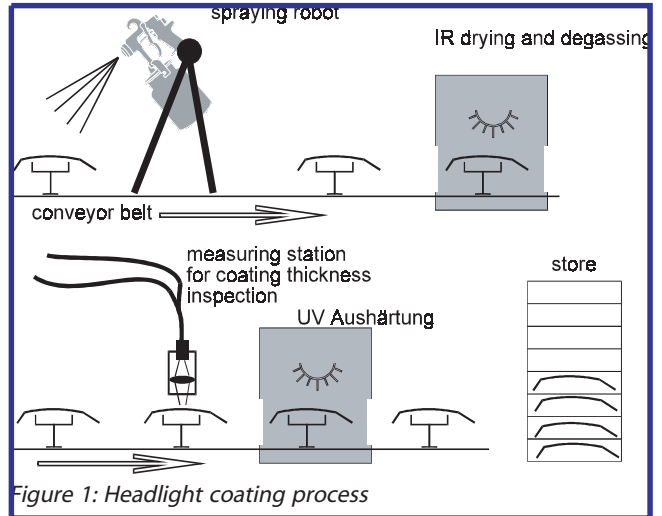


Figure 1: Headlight coating process

THE METHODE

The coating thickness measuring system determines the coating thickness and transfers the results to a process computer for evaluation. It is possible to select rejects and record the trend of the batch. In general, there are two decisive reasons for the in-line use of the measuring system:

- Optimisation and inspection of coating parameters, such as spraying density, curing time and UV illuminance
- Quality certification to ISO 9000 standards for automobile subsuppliers

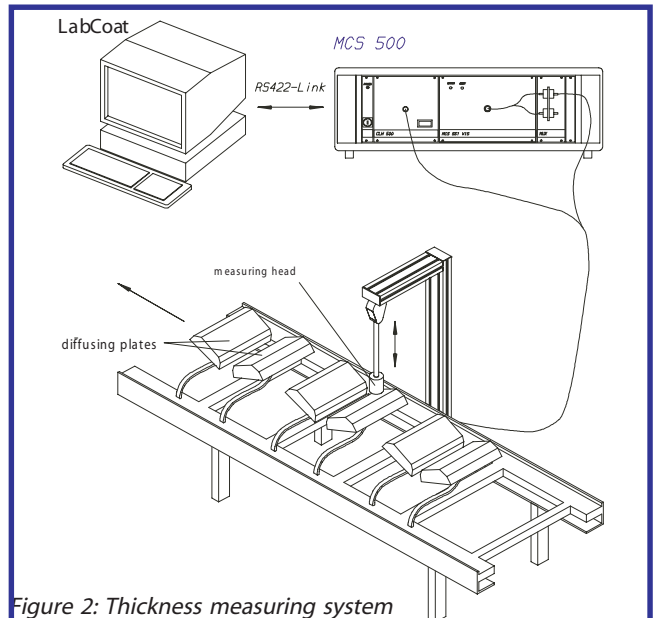


Figure 2: Thickness measuring system



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THE SYSTEM

Coating thickness measurement is based on the principle of white light interference.

A halogen lamp (CLH 500) illuminates the sample through optical fibres and subsequently arranged optical elements.

The light reflections from top and bottom side of the protective coating interfere with each other.

The interference spectrum is detected by a fast diode array spectrometer and evaluated. The method allow the measuring of double coatings.

The spectra are transmitted to the PC through a serial interface (RS 422). The PC calculates the coating thickness (FFT). Additionally, status data is transmitted informing of plausibility and current system parameters.

An open-end terminal program provides easy integration of the system in existing processes.

THE SOFTWARE

Manual measurement program

This program module serves for manual thickness measurement using the hand-held measuring head (reflection).

Integration time and averaging are selectable. The program measures dark current, reference and sample individually.

The interference curve is displayed. As result of measurement, the thickness appears along with information whether the result is in or outside the tolerance range.

Flat plate measurement

This program module measures one thickness per diffusing screen (reflection measurement). The measurement is released through a switching contact on the measuring head. Thickness, inrange status and measurement standby state are displayed and output through a port.

THE BENEFITS

- ◆ Analysis and response time greatly reduced
- ◆ Fast and continuous monitoring
- ◆ Established and proved system and method
- ◆ High reliability, low maintainance
- ◆ Easy to use software
- ◆ Fiber optics allow flexibility in installation and location of the system

SYSTEM SPECIFICATIONS

Spectral range	400 ... 1020 nm (optional changeable)
Measuring range	0.6 ... 80 µm (polymer coating)
Measuring reproducibility	< 0.1 µm
Measuring time/data point	< 300 ms
Size of measuring spot	approx. 3 mm