



Color measurement of liquid paint

Measuring the color of liquid paint is extremely complex. To date, paints have been typically applied on a test area first and then measured only after the drying process in order to achieve reliable measurement results. If the measurement results reveal that the paints are faulty, the paint containers must be mixed again or even disposed of which partly involves long waiting times until a new measurement process can be started.

In order to accelerate this process, Micro-Epsilon has developed a system that enables the measurement of liquid paint during the production process. In color measurement technology, the spectral distribution of the reflected light depends on the distance. Therefore, even changing distances larger than 0.05mm will influence the measurement results. However, the accuracy with which paints can be filled into the sample container is limited to $\pm 2\text{mm}$, which means distance measurements and controls are required to achieve high precision and reproducible measurement results.

This application therefore includes the colorCONTROL ACS7000 color spectrometer for color measurements and the optoNCDT 1420-50 laser triangulation sensor for distance measurements. The latter is ideally suited to this application due to its compact size and excellent performance. A linear unit offers automatic readjustments.

This system structure enables high precision, non-contact inline color measurement of liquid paint during the production process. Due to the ACS circular sensor, the measurement process is independent of the direction of view. Combined with the compact laser sensor, Micro-Epsilon offers an integrated and space-saving solution.

Requirements for the measurement system:

- Minimum color distance $\Delta E < 0.3$
- Shiny and liquid targets
- Different filling levels
- Semi-automatic, non-contact measurements
- Reproducible positioning of the sensor head $\pm 50\mu\text{m}$

Ambient conditions:

- Inspection and quality laboratories
- During the production process (inline)

Advantages

- Time savings as the paint doesn't need to dry
- Cost savings due to waste reduction
- Measurement regardless of direction of view
- Real-time capable, high precision color measurement
- Sensor technology from a single source

System design

- colorCONTROL ACS7000
- Circular sensor ACS2-R45/0
- Optical displacement sensor optoNCDT 1420-50
- Adapter plate ACS2/ILD1420