Dr. Schenk TCO Tester: Quality and Process Control for Bare & TCO Coated Solar Glass

Dr. Schenk’s TCO Tester is an option available under the SolarMeasure product family. It is designed to help manufacturers of bare solar glass and TCO coated solar glass to quickly identify process deviations.

Early detection of process deviations is key to producing solar glass economically. It prevents waste of material and valuable processing time and ensures optimum quality of the finished solar glass.

The TCO Tester assists manufacturers in keeping the process within the defined process parameters by measuring haze, layer thickness and layer resistivity - either in line, combined with Dr. Schenk’s SolarInspect, or off-line as a stand-alone solution.

Making coating tool matching and cost reduction possible

Today’s coating layers must be as transparent (= thin) as possible, while displaying optimum quality to ensure the function of the final product. As the thickness of the layers decreases, the importance of a homogeneous distribution of the coating becomes more important and unnecessarily thick coating wastes expensive coating material. Measuring coating properties consistently and early in the production process helps to reduce costs.

**KEY BENEFITS - REALIZE COST SAVINGS NOW**

- Increase the average module power / measurement cost
  
  **Example:** 30 s tact time  
  Average system price / (amortisation time * modules/year ) = 0.04 €/W  
  1 W increase or stabilizing at 70 Ct / Wp market price, 121 Wp module  
  Benefit: + 0.8 % = +70 Ct / module

- Reduce maintenance costs through predictable maintenance intervals
  
  **Example:** Monitor & measurement cost 0.04 Ct / W = 4.7 Ct / module  
  Extend monitor & maintenance interval by 2 days (60 -> 62)  
  Monitor & maintenance cost reduction 2/60 = -3.3 % for each coating tool
Smaller feature sizes on large areas, high process speeds and flexible base materials challenge standard inspection systems

Standard automated optical inspection and measurement systems monitor coating properties by measuring only a few spots on the material. This is generally done after its production and with a significant time delay - an unacceptable situation in part time production environments.

Dr. Schenk’s cutting-edge automatic optical inspection & measurement systems combine evaluation of small local irregularities, e.g. pinholes, scratches, particles, with monitoring of the homogeneity of layer properties (e.g. haze, thickness, layer resistivity) for the full width of the material.

The TCO head consists of a multi-functional sensor head that traverses on a linear drive for a detailed analysis of TCO coatings. Depending on the size of the panels and on the conveyor speed, approximately 9 scans per substrate are typically performed in-line.

**KEY FEATURES**

- **Flexibility through modular design**
  In-line or off-line, adaptable to any substrate size

- **Maintenance-free operation**
  LED illumination units with light power control
  No re-calibration: Intelligent closed loop & self-monitoring functions for all sensors

- **Ease of use**
  Grayscale images of local defects for easy analysis
  Drag & Drop Defect Library: Automated, fast and easy adaptation of Qualifier and Classifier

**About Dr. Schenk**

Dr. Schenk GmbH, established in 1985, is a globally active, innovative high-tech company based in Munich, Germany. For the third decade now Dr. Schenk offers comprehensive solutions for automated quality assurance and process monitoring for the solar, flat glass, film and foil, converting, optical media and semiconductor industries.

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