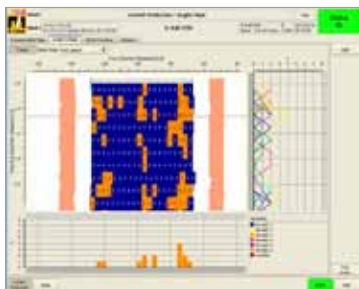


In-line Inspection for Battery Foil Materials Quality and Process Control for Higher Yields



The production of battery foil comprises of a number of different base components, like anode, cathode, battery separation foil and aluminum packaging film that go through a number of complex processing steps, from coatings, calendaring, sintering, to cleaning and slitting before the battery foil is finished. In order to guarantee safety products by highest quality for each value-added step and to prevent waste at any production stage, a powerful and versatile optical inspection system is required. The long time storage of data and statistical analysis are indispensable to fulfill the international standards of Li-Battery production. The MIDA (Multiple Image Defect Analysis) technology of Dr. Schenk is optimally suited to inspect the material at all production stages, and offer the optimal perspective for each defect at all times.

Battery Foil



YOUR BENEFITS

Cost Savings with Superior Technology

- Next level of comprehensive classification of yield-relevant defects through Multiple Image Defect Analysis (MIDA)
- Optimal setup for all kind and qualities of battery foils

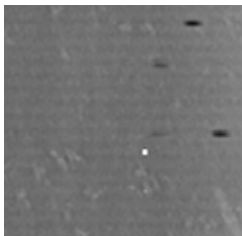
100% Material Monitoring

- Full width quality monitoring for porosity, coating thickness, base material thickness, and more in sub- μm resolution

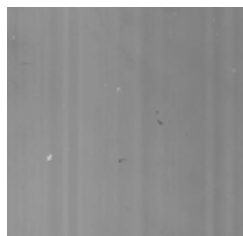
Unparalleled User-Friendliness

- Easy and automatic creation of classification rules with the Auto-Classifier
- Configurable reports with the Dr. Schenk Reporting Tool

White and black defects on BSF



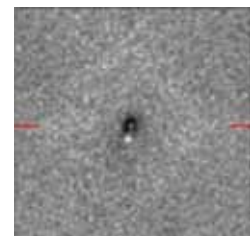
Particles and pinholes on BSF



Die-line on BSF

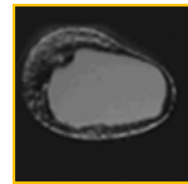
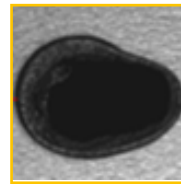


Particle on electrode

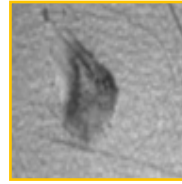


MIDA Inspection for Separator Foil

For separator foil, typically 1 or 2 inspection channels are required: Transmission Brightfield and Reflection Brightfield. In addition two more channels can be used for monitoring porosity, thickness or coating of the material. EasyInspect with its MIDA technology inspects battery separator foils with up to 4 optical channels simultaneously on one scan line. This makes defect classification and material qualification significantly more effective than conventional inspection systems. For example, oil stains can be easily differentiated from pin holes, so no pseudo-defects do lower the production yield needlessly.



Pinhole in Reflection and Transmission



Oil stain in Reflection and Transmission

Monitoring 100% of Battery Separator Foil Manufacturing

Porosity, material and coating thickness are the most important material properties for a battery separator foil component. Dr. Schenk's EasyMeasure offers the monitoring of trends in machine and cross-web direction (web buffer or die adjustment issues):

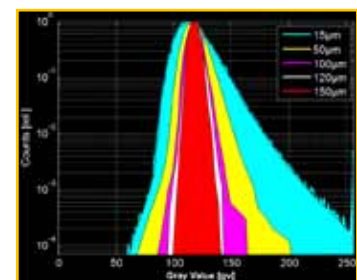
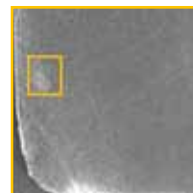
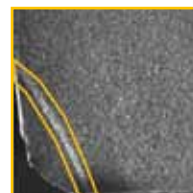
- with adaptable material tile size
- for the full material width
- without hazardous radiation
- ready to be calibrated with offline measurements

Thanks to an advanced Histogram function, Porosities can be resolved to up to 400 gray levels (e.g. for mono-directional stretching). Material thickness can be resolved with up to 1500 gray levels per 1 μm , and coating thickness even up to 2000 gray levels per 1 μm .

MIDA Inspection for Electrode Foil

Typical defects in the roll-to-roll and battery assembly process of electrode foil are coating defects, dye lines, coating voids, scratches, calendaring marks and edge defects. Only with the MIDA inspection setup of 4 inspection channels all of these defects can be caught.

A particular issue of inspecting electrode foils is the noise created by micro-crystalline coatings. Dr. Schenk's EasyInspect can solve this problem by modifying the resolution so that the noise is filtered out, but the defect is still detected. An advanced Histogram calculation provides optimal defect detection.



Histogram identifying a defect in different resolutions

About Dr. Schenk

Dr. Schenk GmbH offers inspection and measurement solutions for automated quality assurance and production process control - a key success factor in the making and converting of many materials, e.g. plastics, textile materials, nonwovens, paper, metal, or glass, for a multitude of markets like display glass, automotive, packaging, medical, renewable energy, and many more.

From modular standard units to highly customized systems – Dr. Schenk's solutions have precision in focus!

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