SURFACEVISION

Solid State
Battery Inspection
DATASHEET

Surface Inspection Of Solid State Batteries

DELIVERED THROUGH

SMART VIEW® Online detection, classification and visualization of surface defects

SMART ADVISOR® Synchronized real-time process monitoring and inspection

AMETEK Surface Vision delivers trusted highly accurate solutions for solid-state battery production processes, rapidly detecting defects on a variety of materials and components.

Improve your quality, reliability, and speeds:
ameteksurfacevision.com or contact us at:
surfacevision.info@ametek.com

AMETEK®
SURFACE VISION

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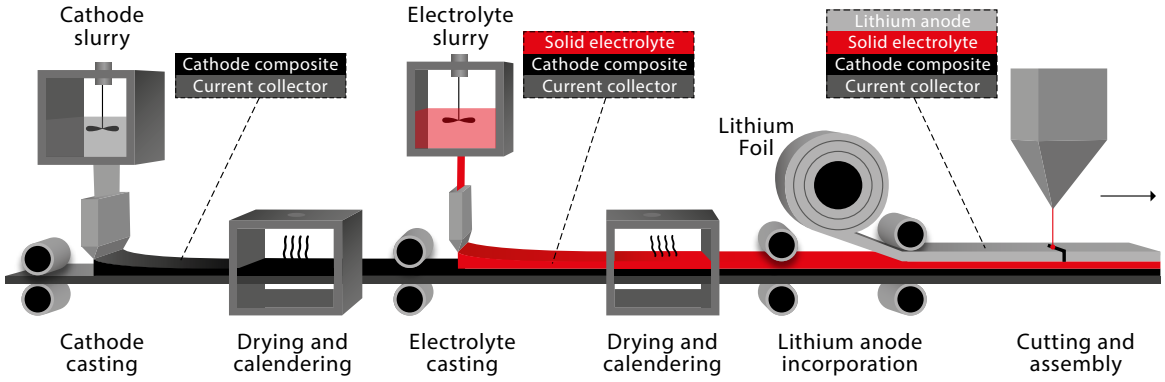
There are a variety of solid-state battery concepts available, and each is based on different classes of solid electrolytes. Each technology faces challenges including the scale-up of material production, component compatibility and production issues.

Unlike established lithium-ion battery designs, solid-state batteries use a solid electrolyte rather than a liquid one. The main components of the battery cell are the anode and cathode active materials and the solid electrolytes.

To inspect cathode and anode composition, the electrolyte, and the current collector, surface inspection systems are installed across the production process. Typical defects identified include lamination errors, blisters, holes, wrinkles, particles, and coating defects.

TYPICAL INSPECTION LOCATION



EXAMPLES OF DEFECT TYPES

Battery Electrode roll to roll

- 100% defect detection and classification
- Modular camera option in HDR mode and adapted illumination concepts
- Typical System Resolution = 10µm - 50µm
- Web speed 30 – 100 m/min
- Web width 100 – 1600mm
- Selectable inspection zone/coating layer, substrate layer, multi-layer
- Defect features include in-layer information
- Dimensional control of coating pattern
- Position control of coating pattern
- Multi Layer position check after solid electrolyte lamination process and/or in the Stacker process
- Repeating defect detection
- Real time output for marker/labeler etc.
- Data communication to customer

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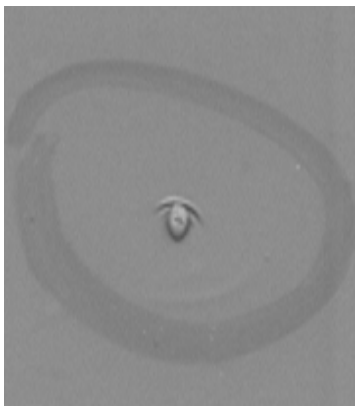
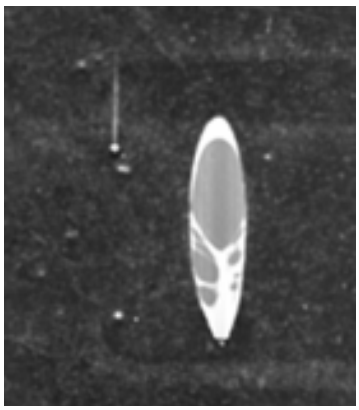
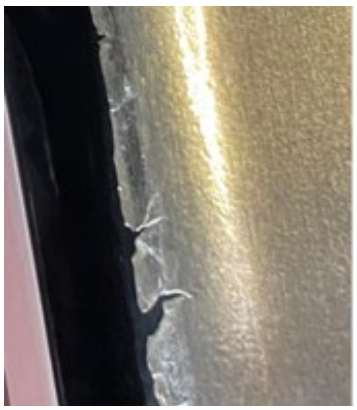
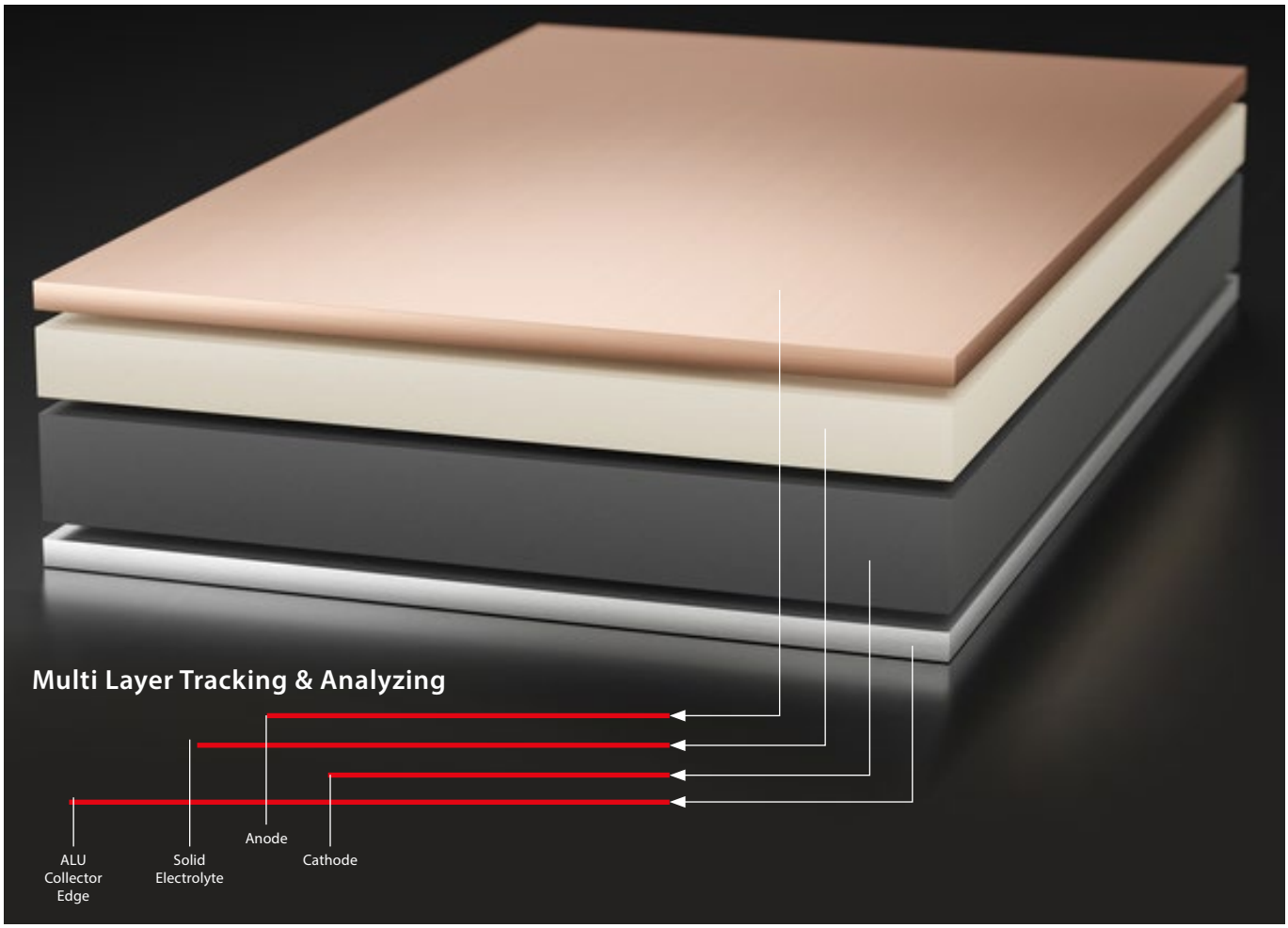
EXAMPLES OF DEFECT TYPES







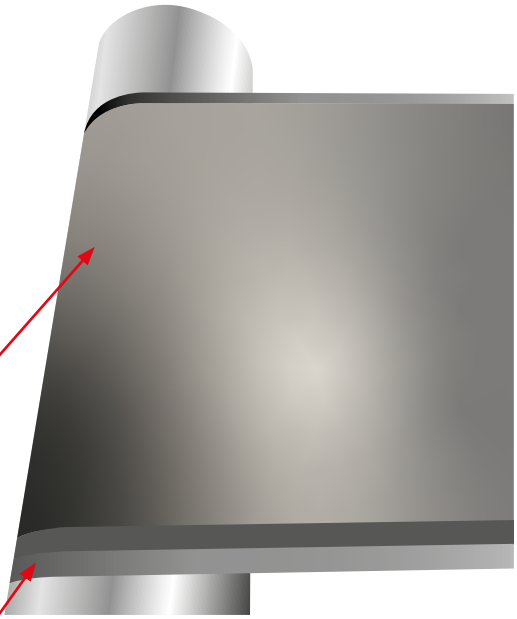
MULTI LAYER TRACKING & WARNING FUNCTION



Example of Solid Polymer Electrolyte (SE) lamination process

Line name: SE (solid electrolyte) Lamination Line

Smart View is typically installed on one side to inspect the entire material in two phases. Multi layer control is provided next to the inspection task.



Two pass process in SE lamination application. Multi edge tracking and layer control is one key function beside defect detection. Real time feedback form SmartView helps to optimize the process and the yield management

The SE lamination layer extrusion layer is applied after slitting.

Following the SE lamination process a further calendering process is typically in place. Unique lighting technology highlights the coating end below the SE layer for further tracking tasks.

Stacker Process

SmartView is inspected simultaneously on both sides in the Stacker Process. Final confirmation is needed to check the quality of the product before it gets stacked. As well as defect detection and layer control, real-time reject functions are activated to mark and/or label as a controlling reject gate for bad material areas.

This process control function is a big cost-saver at this process stage. If defective material enters the stack, the cost can easily increase up to 100 times in order to correct it later in the process.

Half Cell Assembly

SE Lamination
Cathode coating
Collector substrate

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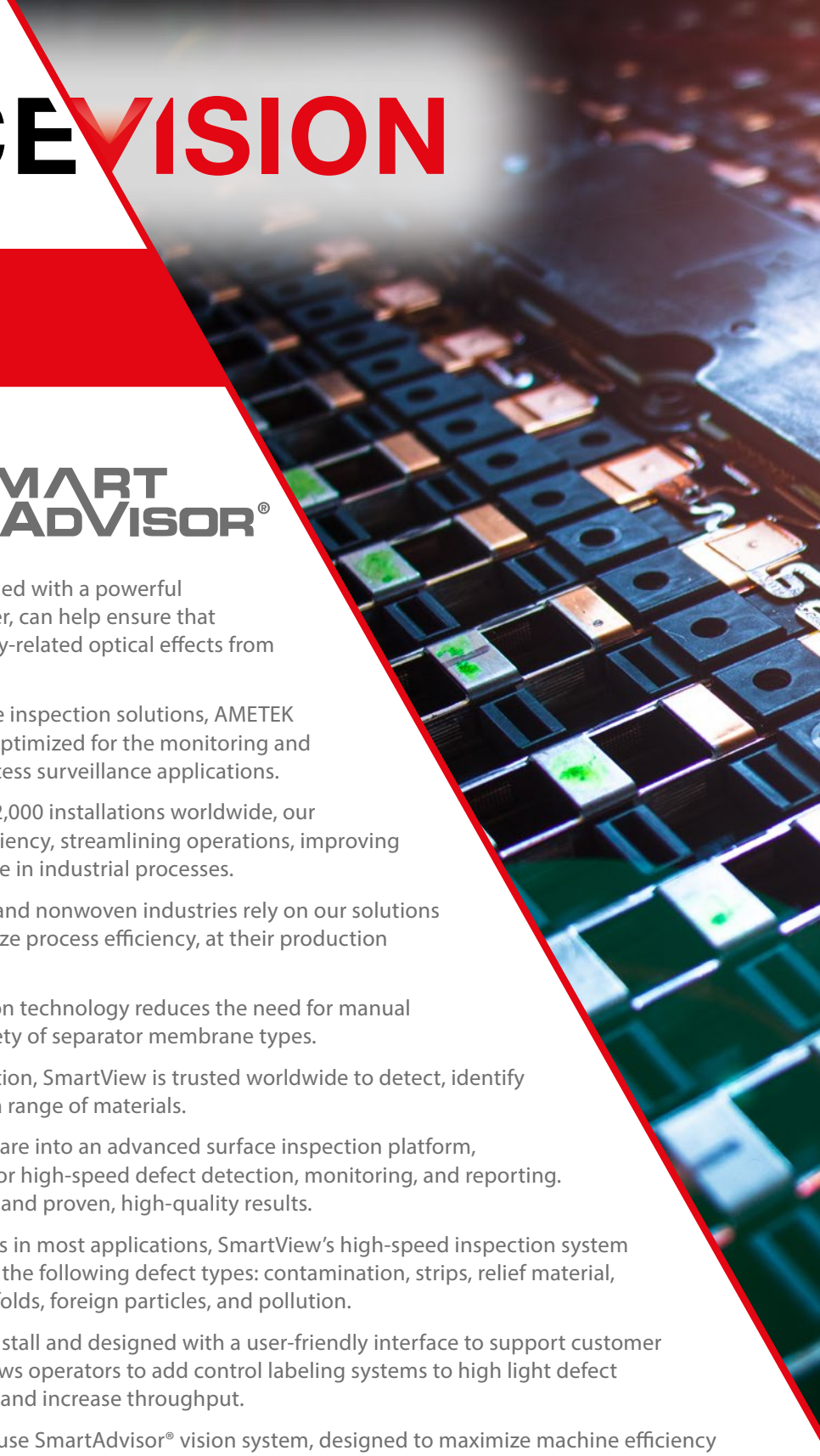

THE AMETEK SURFACE VISION SOLUTION

SMARTVIEW® | SMART ADVISOR®

A highly sophisticated optical set-up, combined with a powerful detection algorithm and a multi-step classifier, can help ensure that battery producers can distinguish non-quality-related optical effects from defects in battery production.

The world leader in automated online surface inspection solutions, AMETEK Surface Vision offers a broad product range optimized for the monitoring and inspection of webs and surfaces, and for process surveillance applications.

With hundreds of customers and more than 2,000 installations worldwide, our systems have become vital to increasing efficiency, streamlining operations, improving product quality, and reducing costs and waste in industrial processes.

Manufacturers in the metals, paper, plastics, and nonwoven industries rely on our solutions to detect surface flaws or defects, and optimize process efficiency, at their production facilities across the globe.

AMETEK Surface Vision's SmartView® detection technology reduces the need for manual intervention, and can adapt to the huge variety of separator membrane types.

The industry-leading surface inspection solution, SmartView is trusted worldwide to detect, identify and visualize surface defects in real time for a range of materials.

Merging state-of-the-art software and hardware into an advanced surface inspection platform, SmartView provides total vision integration for high-speed defect detection, monitoring, and reporting. It delivers robust features, flexible operation, and proven, high-quality results.

Installed on the coating and slitting processes in most applications, SmartView's high-speed inspection system delivers high-resolution image acquisition of the following defect types: contamination, strips, relief material, cutaways, coating defects, insects, pinholes, folds, foreign particles, and pollution.

SmartView technology is quick and easy to install and designed with a user-friendly interface to support customer needs. Real-time notification technology allows operators to add control labeling systems to high light defect positions which optimize yield management and increase throughput.

It can be supported by our versatile, easy-to-use SmartAdvisor® vision system, designed to maximize machine efficiency and yield rates. This provides high-speed, multi-dimensional video monitoring and process analysis, helping to optimize processes, find defects, and detects process upsets.

Using the inspection and monitoring solution provided by AMETEK Surface Vision, battery cell manufacturers can be assured of adaptable defect detection that supports quality and reduces the need for manual intervention.

Improve your quality, reliability, and speeds:
ameteksurfacevision.com or contact us at:
surfacevision.info@ametek.com

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