BST
an ELEXIS company

The BST Value Ladder:

Maximize your output – minimize your scrap!

Four steps to scrap less battery cell production.

The global demand for batteries is surging. Emission-free electric vehicles are replacing combustion-powered mobility everywhere.
With this trend, the production of battery cells is in the limelight: manufacturers worldwide are ramping up their production to meet the growing demand while looking for ways to reduce cost and valuable resources. New plants in Europe and North America are being built and new battery technologies are emerging. To keep step with these rapid developments, companies need to find means to improve their processes – means they are often unaware already exist.

In the production of battery cells from web-based materials, the coating, calendaring, slitting, separating, and assembling processes offer great leverage.
Production line speed is instrumental for the overall productivity, but it can easily turn out to be detrimental to the quality of your product.

We condense this into a simple formula:

SPEED IS NOTHING WITHOUT CONTROL

Read on to find out how to climb BST's value ladder to optimize your battery cell production. Our four-step optimization approach improves quality, reduces scrap, and optimizes the overall productivity of your web-shaped material handling lines. So, your battery production can meet the demand of a new generation of mobility!

Improving battery cell production with BST

As an expert in web handling processes, BST offers technology that enhances the cell production processes of the battery industry in particular.

Regardless of the materials involved, BST can guide web-shaped substrate seamlessly through your machinery, laying the foundation for high-quality production outcomes.

By additionally leveraging our cross-industry knowledge, BST offers a “4-step solution” that proactively prevents quality deviations and lets you achieve the overarching goals of:

- Maximizing production yield
- Ensuring the availability of production resources
- Effecting high efficiency
- Guaranteeing high-quality products

BST technology leverages added value — even for the latest generation of batteries!

BST’s **four steps** for proactive reduction of the scrap rate

Our four-step approach is a modular concept designed to minimize your production’s scrap rate and optimize your production processes.

When looking at production vertically, the three initial steps are integrated into different production steps. They include the following modules

- High-performance Web Guiding
- Optical Inspection, including geometrical measurement
- Closed-loop Control as a link between the web guiding and vision systems form the for the automatic correction of the web run
- Step 4 follows a “horizontal” approach which introduces bilateral, cross-process data communication. By way of this, the system provides position-accurate process data for all production steps. It enables operators to remove material at an early stage in the cell assembling process, for example, or protects a calendar roller from an incoming agglomerate by lifting it.

Step 1 BST FRAMEGuide Pro: High-performance Web Guiding

Coating, calendaring, slitting, separation, and cell assembly are vital processes on the production of high-quality batteries.

To combine high-quality output with high-speed production and the prevent scrap at the same time, high precision web-guiding is of the essence, because: **SPEED IS NOTHING WITHOUT CONTROL!**

The bottom line is that web materials need to run precisely straight: when it comes to the position of the web absolutely no deviations from perfect are permissible. And the longer the web you run, the graver the consequences even the slightest inaccuracy has.

BST FRAMEGuide Pro is dedicated to high-performance applications in the battery industry. As such it represents today's benchmark in the battery industry, combining

- the lowest available footprint,
- the highest possible precision,
- the reliability BST is renowned for.

The complete system includes highly performant controllers with the relevant standard fieldbus interfaces and a selection of edge sensors. Based on ultrasonic and infrared technology, they are compatible with most common substrates.

Alternatively, we have several line cameras for a robust detection of the coating edges available.

Step 2 iPQ-SurfaceENERGY: Optical inline quality assurance by the pros

Optical inline quality systems control quality in real-time. The system inspects products as they move along the production line using optical sensors (line chip, matrix cameras or CIS technology) and imaging technology. By way of this, it is able to assess various attributes and characteristics of the items that are being manufactured. The captured visual data can be used to detect defects, irregularities, or deviations from the desired quality standards.

BST's proprietary surface inspection system iPQ-Surface^{ENERGY} is geared to all these requirements in the battery cell production. In addition to ensuring flawless coating, the system simultaneously takes geometrical measurements which serve as the foundation for further automation.

If you would like to find out how iPQ-Surface can be a next level asset for your workshop, feel free to contact us at info@bst-elexis.com – we will be happy to present you all the details!

Step 3 BST COATINGControl®, BST SLITTINGControl®, SMARTData: Your key to optimizing single processes

When dealing with the optimization of individual processes, the overall idea is to prevent quality issues before they arise. An error avoidance strategy ideally reacts before problems arise. Because once the red light of the inline quality system starts flashing, it's too late – and scrap mounts with each meter of web running through the machine!

Hence, the aim must be to prevent this from happening in the first place. As an example: If the coating process runs out to the edge of material after coating, this information can be passed on to the web guiding system which is located before of the nozzle unit. Thanks to this, the system can provide a correction value at a very early stage, preventing serious and costly repercussions.

In order to achieve this, the coating position after application has to be pinpointed through an optical measuring system. To this end, BST offers COATINGControl®: The system measures the coating position after the application and sends necessary correction values to the web guiding control system positioned in front of the application. In this way, it works like a classic closed-loop control system, increasing your production performance.

BST applies this principle in the slitting (BST SLITTINGControl®), separating, and cell assembly (vertical approach) processes as well.

Simultaneously, digital quality data precisely associated with the web is available thanks to SMARTData.

Step 4 Connecting the processes

Thanks to the data compiled in the individual steps of the electrode production (continuous processes), we have position accurate data of each individual step (vertical) at hand.
So, why not use them bi-directionally and connect all processes?

This is where SMARTData comes into play again: SMARTData ensures that all individual steps work synchronously across the horizontal processes and safeguard the overall outcome, e.g., by lifting of the calender to avoid agglomerates.

What's most important here is that SMART Data is a system with open interfaces. This means that data can be synchronized regardless of the data source, be it machine speed, temperature, etc. This also applies to the interfaces to the ERP and (discrete) upstream and downstream processes.

In summary, SMARTData provides process-specific, position-accurate data and allows us to accurately track quality characteristics and process parameters in cell manufacturing.

Do you want to find out more about our VALUE LADDER and how BST's systems can take your battery cell production to the next level with the help of SPEED AND CONTROL?

Feel free to contact us at info@bst-elexis.com!

BST GmbH
Remusweg 1
33729 Bielefeld
Germany

T +49 521 400 70-0
www.bst.elexis.group
info@bst.group

Your personal contact:

Klaus Hamacher
+49 521 400 70 665
Klaus.Hamacher@bst.group