



ABB Measurement & Analytics helps Northvolt produce the world's greenest battery

The global shift towards renewable energy and carbon neutrality has led to a growing demand for lithium-ion batteries, with total market value estimated to rise from \$41.1 billion to \$116.6 billion by 2030*. To meet the demand, leading Swedish battery manufacturer Northvolt has built Northvolt Ett, the world's most advanced, and one of Europe's largest, lithium-ion battery gigafactories.

Supporting the race for renewable energies

Employing state-of-the-art, advanced technology, Northvolt Ett will be a proving ground for large-scale sustainable battery production.

The facility will supply cutting-edge green batteries of the future to customers in Europe in automotive, portable transportation, energy storage and other industries.

Working alongside our Process Automation colleagues, ABB Measurement & Analytics is supporting the project with the delivery, installation supervision and commissioning of thousands of measurement devices.

Our extensive, digitally enabled product range is helping to ensure consistent quality, efficiency, safe operations and the flexibility a world-class battery manufacturing facility needs.

Facing an unusual set of challenges

Battery manufacturers are facing numerous challenges, often for the first time. The need for reliable, efficient, and competitive production processes that ensure sustainability, flexibility, and safety are essential for success.

Partnering with ABB helped Northvolt overcome these challenges. Early design involvement, where ABB Measurement & Analytics developed an instrumentation playbook, allowed flexibility in the design stages. This level of involvement ensured cooperation and standardization throughout the whole process.



Did you know?

Instrumentation, analyzers, and force measurement solutions are needed in all stages of the battery production process, following mining and refining.

“The world is moving quickly towards clean energy. ABB is at the forefront of supporting this rapidly growing industry with their ability to help fast-track projects with their integration offering. We are delighted to have them on board as a strategic partner.”

- Peter Carlsson, CEO of Northvolt



Adding end-to-end value in battery manufacturing

Battery production is a chemical process where accuracy and safety are critical components. With decades of experience ABB's instrumentation portfolio is exceptionally qualified to address these needs.

ABB's pressure, temperature, and level measurement portfolio offer an unmatched selection of transmitters and sensor solutions. Our transmitters feature a common HMI, maximizing ease of use and reducing training requirements. They feature modular, leading-edge electronics, making upgrades, replacements and communication as simple as plug and play. While our sensor solutions are some of the most durable on the market and come in a range of sizes. With a comprehensive line of contact and non-contact level technologies, repeatable sensor solutions offer reliable inventory and process control.

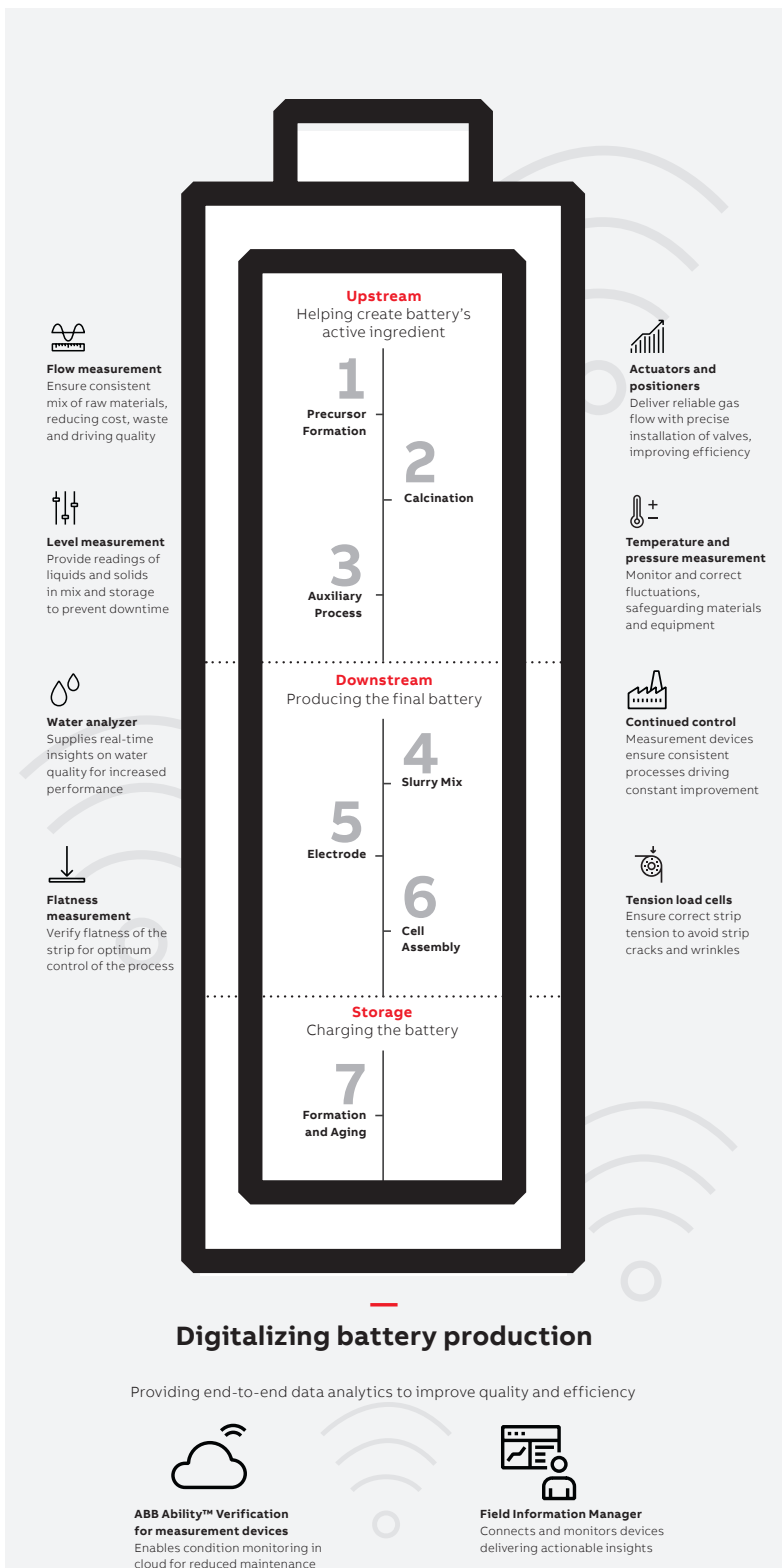
As batteries age, performance is reduced, particularly energy storage and power output. Battery cell aging can be affected by many influences, some unpredictable and hard to consider, such as driving behavior of end users and ambient temperature.

Ambient temperature impact can be simulated by large cooling compressors pumping cooling liquid through the battery pack, with temperatures commonly at -40°C while testing. To reach reliable and reproducible data, ABB's CoriolisMaster FCB450, with a programmed concentration table, monitors the coolant concentration.

Our digital solutions are adding additional value to the Northvolt battery production. ABB Ability™ Field Information Manager (FIM) is a device management tool that fully embraces the Field Device Integration (FDI) Common host components. FIM makes the configuration, commissioning, diagnostics, and maintenance of fieldbus instruments easier and quicker than ever before. Typically, device connection takes 15-30 minutes, where FIM takes on average 3 minutes. While the automated device loop check supports bulk loop testing, reducing time from hours to minutes and provides full documentation for project management.

ABB Ability™ Verification for measurement devices enables fully automated, in situ verification with relevant diagnostic

information. Users can run a series of tests for test certificates proving the verification. Regular inspection and testing of measurement devices ensures maximum availability and performance while eliminating costly manual verification by only calibrating when necessary.





Where measurement devices are used in the battery production process

		 Upstream			 Downstream		
		Precursor formation	Calcination	Auxiliary process	Slurry mixing	Electrode manufacturing	Cell Assembly
Flow measurement	Swirl flowmeter						
	Variable Area flowmeter						
	Vortex flowmeter						
	Coriolis flowmeter						
	Electromagnetic flowmeter						
Level measurement							
Pressure measurement	Pressure gauge						
Temperature measurement	Temperature transmitters						
Actuators and positioners	Positioners						
Continuous water analyzers	Turbidity Sensor & Transmitter						
	Conductivity Sensor & Transmitter						
	pH Sensory & Transmitter						
Flatness measurement	Stressometer Flatness System						
Weighing	Weighing products						
Thickness measurement	Millmate Thickness Gauging Systems						
Tension measurement	Tension Load Cells						

The Lithium-ion battery:

A journey to a world without fossil fuels



1991

Lithium-ion battery first used in camcorders



2000s

Lithium-ion batteries begin to power broad range of electronic devices



2007

Smartphone using lithium-ion battery becomes #1 personal electronic device



2008

First electric car to use lithium-ion battery



2019

Lithium-ion battery wins Nobel Chemistry Prize for making fossil-fuel-free world possible



2021

Northvolt Ett creates first lithium-ion battery cell by a homegrown European battery



The future

Continuing trend towards electric vehicles using lithium-ion batteries to reduce global carbon emissions

Focused on the future

Our long-standing measurement solutions are built over many years, to not only provide the right solution today, but also for the future. With over 100 years experience across a range of industries globally, ABB has a proven track record of ground-breaking innovations. This expertise allows ABB to continuously increase customer productivity, quality, and safe operations.

ABB Measurement & Analytics launched the world's first power over Ethernet flowmeters, where no extra power or additional wires are needed. This increases security, flexibility, reliability, and performance while reducing costs.

Combining the power of industrial analytics and artificial intelligence, ABB Ability™ Genix offers data management to improve productivity and operational excellence. This digital platform brings together data management, domain knowledge, technology capabilities, and implementation expertise.

For efficient inventory management and service reporting, ABB's Auto-ID offers a bi-unique code for every installed product. Supporting new industry standard IEC61406, Auto-ID offers easy identification of manufacturer, type, and serial number without the need for a specific phone app or installed software.

ABB is removing limitations on safety to go beyond process and application specific requirements, and into cyber security. With a market leading automation position, ABB has used knowledge of connectivity and cybersecurity to include advanced safety features. Products are embedded with DSAC Testing, secure boot, password protection, and secure communication with OPC-UA.

Success that's only the beginning

So far, this game-changing technology and partnership led to the creation of the very first lithium-ion battery cell by a homegrown European battery company on 29 December 2021. This represents a landmark moment for European industry and it's only the beginning with production capacity continuing to expand.

Our early involvement in the project has proven to be hugely beneficial for Northvolt, providing the partnership needed to support design in its earliest stages. We have successfully demonstrated our broad portfolio of services and a commitment to offering customers better value, alongside a seamless and comprehensive package of support.

ABB Measurement & Analytics

For your local ABB contact, visit:
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For more product information, visit:
abb.com/measurement