



Manz hits the gas: Highspeed for the production of wound batteries

- **State-of-the-art production facilities with highest throughput for wound lithium-ion battery cells**
- **High productivity and quality through high-precision roll-to-roll processes**
- **Cylindrical battery cells with great potential for the automotive industry**

Reutlingen, 20. July 2021. With electromobility as a driver and at the same time increasing cost pressure in production, the need for complex, even more powerful concepts and flexibility for battery systems is growing. As a provider of turnkey production solutions in the field of energy storage, Manz AG, a globally active high-tech engineering company with a comprehensive technology portfolio, provides the complete production process for manufacturing wound and stacked lithium-ion battery cells and modules together with strong partners. The manufacturing solutions meet the growing demands for quality and speed in battery production and are part of Manz's Turnkey Solutions.

Automated and flexible production solutions for wound cells

Decades of experience in the development and design of winding and stacking systems form the basis for a roll-to-roll (R2R) platform developed specifically for these processes. This platform provides the optimal basis for precise, stable and, above all, very fast processes in cell assembly. Production equipment from Manz stands for efficiency and reliability in manufacturing - is modular and flexible. With an overall efficiency (OEE) of nearly 100%, Manz equipment offers customers the highest productivity while reducing space requirements.



Performance features of Manz equipment for wound battery cells

- **High-speed manufacturing:** Manz equipment allows customers to manufacture high volumes at the highest material speeds. The efficient processes deliver throughput rates from 25 to as high as 40 ppm (pieces per minute), the speed depending on the cell type.
- **Maximum flexibility on one machine:** All common formats of a coiled cell can be produced on just one production line by quickly and flexibly adapting the equipment to different sizes.
- **Autosplicing for anode, cathode and separator:** The automatic roll change for continuous operation of the line without stopping production significantly increases process efficiency.

All wound cell types – from the common 18650 battery cell with a diameter of 18 mm at a length of 650 mm to the more compact 48650 or 481400 cells with a diameter of 48 mm and a length of 65 or 140 mm – can be produced on Manz equipment. Currently, round cells are used mainly outside the automotive industry – i.e. for consumer electronics, power tools and e-bikes, etc. In the automotive sector, only a few suppliers of electric vehicles have used round cells so far. According to Andreas Schaal, Sales Manager Energy Storage at the high-tech engineering company Manz, there is enormous potential here: "All battery cell types are currently experiencing high demand. But it is precisely the most powerful round cells that have the potential to significantly advance electromobility. More manufacturers of electric vehicles will seize this opportunity. We are in an excellent position to provide individual production solutions quickly."

Even more speed with just one system for all process steps

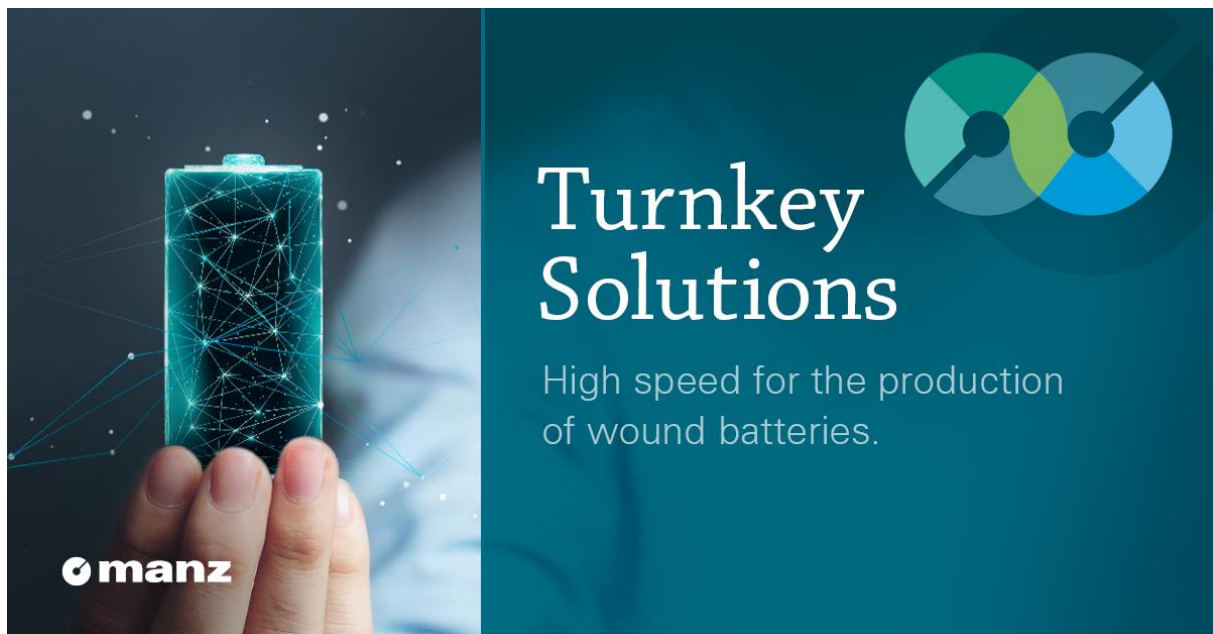
Manz equipment integrates a wide variety of customer-specific processes, such as laser notching, tab welding, bending, loading, and unloading processes, as well as optimally coordinated inspection processes. By combining different processes in one system, process steps can be saved, and the space required can be significantly reduced. In addition, control, monitoring and adjustment of the process parameters during production ensure significant optimization in terms of battery cell quality and safety. As a result, the comprehensive process



know-how significantly increases the performance parameters and cost efficiency of the battery cell.

Thanks to its extensive experience in the entire value chain of lithium-ion battery production, Manz AG can make a significant contribution to the future of energy storage systems with its production technology and thus also significantly advance the expansion of electromobility. Funded by the European Commission, Manz has set itself the ambitious goal of developing new technologies and processes that go far beyond the current state of the art and enable major improvements in terms of performance, safety, and environmental protection with the recently launched European Battery Innovation (EuBatIn) sub-project "Lithium Battery Factory of the Future".

Picture 1: Keyvisual Turnkey Solutions – Winding of cylindrical battery cells

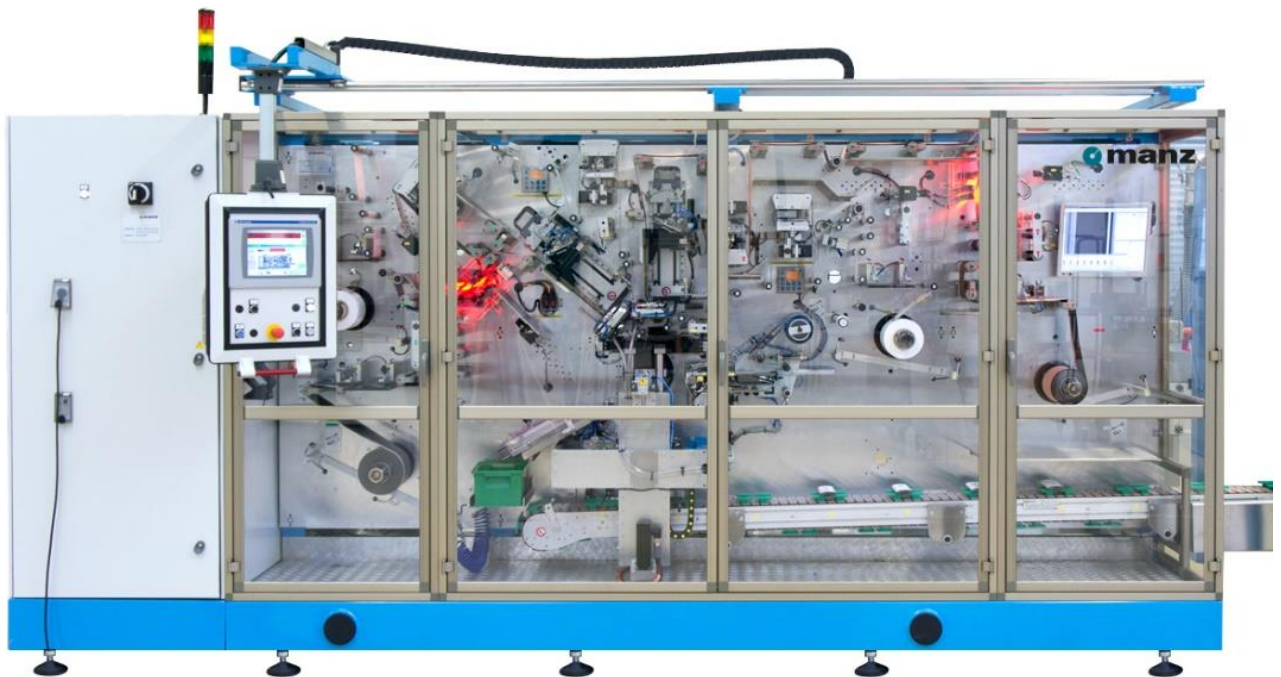




Picture 2: Cylindrical battery cells



Picture 3: Winding machine





Company profile:

Manz AG – passion for efficiency

Founded in 1987, Manz AG is a globally active high-tech engineering company. Its business activities comprise the Solar, Electronics, Energy Storage, Contract Manufacturing and Service segments.

With many years of expertise in automation, laser processing, image processing and metrology, wet chemistry and roll-to-roll processes, the company offers innovative production solutions in the fields of photovoltaics, electronics and lithium-ion battery technology. The product portfolio includes both customer-specific developments and standardized individual machines and modules that can be interlinked to form complete, individual systems. Above all, by involving Manz AG in customer projects at an early stage, the company makes a significant contribution to its customers' success with high-quality, demand-oriented solutions.

The group of companies, which has been listed in Germany since 2006, develops and produces in Germany, Slovakia, Hungary, Italy, China and Taiwan. There are also sales and service subsidiaries in the USA and India. Manz AG currently employs around 1,400 people worldwide, around half of whom work in Asia, the key region for the company's target industries. The Manz Group's revenues amounted to around 237 million euros in the 2020 fiscal year.

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