



Cost-efficient, wear-free and flexible

- **Manz develops a new laser welding process for use in lithium-ion battery cell production**
- **Laser tab welding with measurable advantages over previous ultrasonic welding**
- **Fewer process steps reduce total cost of ownership**
- **Maximum flexibility in cell design without changing tools**

Reutlingen, April 22, 2021. Manz AG, a global high-tech machine manufacturer with a comprehensive technology portfolio, is known as a leading supplier of production equipment for the manufacturing of powerful and efficient lithium-ion battery cells and modules. The product range extends from the single machine, for example for laboratory production, to turnkey production solutions - a concept that has become established under the term turnkey solutions.

Over 30 years of process experience, including in laser processing, form the basis for continuously developing the turnkey solutions and generating new competitive advantages with and for customers. In the Energy Storage segment, Manz is presenting a new laser process for the production of battery cells that optimizes the welding process for cell arresters, known as tabs. It is called: Laser Tab Welding. The new technology reduces the scope of the necessary processes by at least one process step and thus significantly reduces the overall costs per battery cell. In this way, Manz gives customers a clear lead in a market that is under enormous cost pressure.

Production optimization through laser know-how

The welding of the cell arresters in the production of lithium-ion battery cells with ultrasonic, the tab welding, is associated with a high mechanical load. Among other things, conventional ultrasonic welding requires pre-welding. This process step becomes unnecessary with the new, innovative laser technology. This reduces the complexity of production and increases the quality and safety of the battery cell as well as the process stability due to the reduced number of process steps. Research is currently being carried out into further process step reductions.

The new Laser Tab Welding process is the alternative to the ultrasonic technology that has been used up to now, the Ultrasonic Tab Welding, and represents a fully-fledged replacement. The new technology can also be integrated into existing production solutions.



Profitable Production through reduced Total Cost of Ownership

For customers, the new process means a significant increase in quality and efficiency in production and thus significant competitive advantages, especially in mass production. Initially, the acquisition costs for laser technology are higher than for the tried and tested ultrasonic method. As a result, however, the operating costs are steadily falling, since the new process is almost maintenance-free, achieves a significantly higher throughput per minute and overall better system availability is guaranteed through fewer failures. Fewer machines or modules mean that less space is required and thus smaller factories - this also lowers operating and production costs.

Overall, the advantages of Laser Tab Welding result in significantly reduced Total Cost of Ownership (TCO) and thus the prerequisite for profitable production. If you compare the new process with ultrasonic welding that has been common up to now, the investment is worthwhile after less than a year.

Flexibility for future markets

The customer benefits from the far-reaching flexibility of the technology in the production of battery cells, as different types and sizes of cells can be covered, the number of tabs to be welded is variable and new cell concepts can be optimally mapped. In the future, a wide variety of cell designs and even more powerful batteries can be produced with just one system module. A format change is even possible without changing tools. Another advantage lies in the wide range of configuration options, for example as a stand-alone or individual system or for integration into new and existing production lines.

Laser Tab Welding in the production process

With the help of the new laser technology, important parameters in the production of lithium-ion battery cells are improved: More power due to higher energy density and more safety of the battery modules due to optimized cell protection than with previous cells. When welding, metal foils and tabs fuse together completely and thus form a very strong, crack-free connection. The compact weld seam can fix up to 160 layers, with increased welding quality. It has an extremely low electrical resistance and is up to three to five times stronger than an ultrasonic weld. This simple and safe process is scalable to up to 200 tabs in one collector.

In addition, laser welding results in less abrasion due to contactless processing, which means reduced mechanical stress on the electrodes. The laser source itself has a very high mechanical strength and is therefore hardly prone to errors. The new laser tool is wear-free,



does not require readjustment and only needs to be replaced approx. Tvery 15 years. With Laser Tab Welding, Manz is once again supporting customers with an innovative technology for the production process of lithium-ion battery cells, thereby helping them to position themselves successfully in a highly competitive market, especially in the automotive industry.

You can find more information about the new technology and Turnkey Solutions for Energy Storage here: <https://www.manz.com/en/industries/battery-production/laser-tab-welding/>

Image 1



Imagetext: Laser Tab Welding – Part of the Turnkey Solutions by Manz.

Image 2

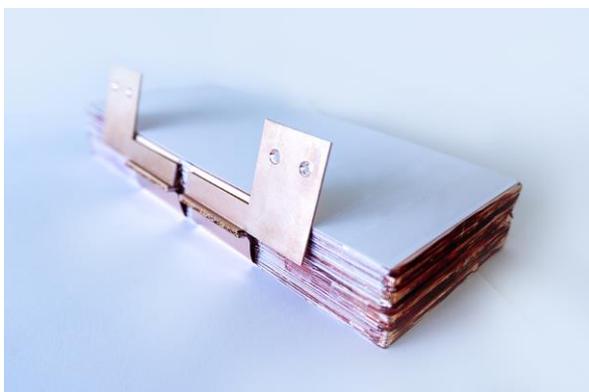


Image: Laser Tab Welding (Lithium-ion battery cell samples)



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.

Public Relations Contact

Manz AG

Axel Bartmann

Tel.: +49 (0)7121 - 9000-395

Fax: +49 (0)7121 - 9000-99

E-mail: abartmann@manz.com

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