Consistent manufacturing quality worldwide

In the medical heartland of Tuttlingen in southern Germany, Aesculap AG, the surgical division of medical technology company B. Braun, manufactures surgical and medical technology products. Marc Laufer is Vice President of Engineering at the site: "We manufacture three different product groups here – surgical instruments and implants for the orthopaedic sector." The third plant produces sterile containers for storage an reprocessing of surgical instruments, as well as motor systems for battery-powered machines used in operating theatres. The range of products that Marc Laufer and his team manage daily is correspondingly extensive.
This holds true not only for Tuttlingen but for all global locations, including the company's Chinese plant in Suzhou. Charlie Zhu oversees laser applications at the China Instrument Plant: "We produce one million surgical instruments annually here. We make bone punches, as well as over 600 different standard instruments, including forceps, scissors and sterile containers."

Aesculap AG

www.aesculap.de

"We protect and improve the health of people all over the world" – this is the vision of B. Braun, one of the world's leading medical technology companies. Aesculap AG has been part of the B. Braun Group since 1976, delivering solutions for core surgical and interventional processes, including surgical instruments, sterile container systems, orthopaedic joint replacement and products for interventional vascular therapy, neurosurgery and spinal surgery. The company currently employs some 3,500 people at its headquarters in Tuttlingen and also has manufacturing facilities in China, France and Malaysia.

INDUSTRY	NUMBER OF EMPLOYEES	LOCATION
Medical technology	Approx. 12,400 (Aesculap division worldwide)	Tuttlingen (headquarters)

TRUMPF PRODUCTS

- TruMark 7050 in TruMark Station 7000
- TruMicro Mark 2030 in TruMark Station 7000
- TruDisk 2000 in TruLaser Station 7000

APPLICATIONS

- Laser marking
- Laser cleaning
- Laser welding
- Laser cutting

Challenges

As Head of Systems & Security, Production Digitalisation at Aesculap in Tuttlingen, Felix Schmidt is responsible for a large number of applications. "We have a high vertical range of manufacture. We weld,

clean, bend, punch and cut the sheet metal parts for our products." One of the main applications is laser marking. "Our global marking database contains around 30,000 items. The spectrum is broad – across a wide range of product groups, but also in terms of the different materials." In the realm of surgical instruments, this involves various steel alloys, while aluminium is used for sterile containers, and titanium or plastics are utilised for implants. "But there are also many niche products with coatings made from specialised materials." Marc Laufer adds, "We currently stock 18,000 finished products and 29,000 semi-finished products. The lot sizes for finished goods range between 1 and 1,800 units. The average lot size is 40 units. Therefore, the process must be efficient, and transitioning between different jobs needs to be straightforward." Marking is performed in Tuttlingen using 15 TruMark lasers and 10 TruMicro Mark lasers.

At the Chinese plant, the enormous volume of one million products in the surgical instruments sector is also divided into small batches of 10 to 200 units. Four marking lasers and a laser welding system are available for this purpose. Alex Xu is the production manager. He says: "High-quality and reliable laser systems are crucial for us. This is the only way we can ensure fast production while maintaining consistently high quality."

"Microstructuring enables us to create more robust and durable marks with our TruMicro Mark lasers."

FELIX SCHMIDT

HEAD OF SYSTEMS & SECURITY, PRODUCTION DIGITALIZATION AT AESCULAP AG IN TUTTLINGEN

Solutions

Aesculap adopts a unified approach to validating processes across the company's global plants. The Tuttlingen team does the preliminary work before transferring the processes and parameters to the other sites. Marc Laufer explains: "We are leading the way technologically, advancing processes, and implementing them globally." For 30 years, Aesculap has depended on lasers and machine tools from TRUMPF to ensure standardised operations worldwide. "Procuring all systems from a single source is a significant advantage for us. It is the only way we can work to the same standards in all our plants."

Another major project with the laser experts from Ditzingen is underway. Over the next few years, all marking lasers will be gradually replaced with the ultrashort pulse lasers from the TruMicro Mark series. For Felix Schmidt, the benefits of the technology are clear: "Microstructuring enables us to create more robust and durable marks. This is because, unlike engraving, there is no oxide layer that gradually deteriorates over multiple washing cycles." Additionally, the production process generates less combustion residue. This eliminates the need for additional manual cleaning afterwards. Schmidt says: "The ultrashort pulse lasers enable us to work even more efficiently, and also provide constant laser power."

Implementation

Marc Laufer and Felix Schmidt started 2020 with a test system for ultrashort pulse lasers in Tuttlingen. They then tested the processes under production conditions for six months, using the results to develop standards. Laufer adds: "The main challenge was to reconcile the various requirements. On one hand, we had to address the needs of a special product that is produced infrequently and in small quantities, while on the other hand, we had to cater to products that are frequently needed in large quantities. All of this must function on one machine, regardless of which plant it is located in around the world."

The software integration was also a challenge, as Aesculap uses its own UDI management system for all order processing. Working with TRUMPF, the team developed a connector that enables integration into the TruTops Mark interface. The TRUMPF VisionLine software uses Aesculap to position the markings. In future, it will also help to improve the qualification of data matrix codes. "Previously, inspection was performed using an external scanner in a subsequent process step," explains Marc Laufer. "In future, we plan to integrate this step directly into the marking process in order to increase production speed."

Their hard work has paid off, as Felix Schmidt reports: "We have created a machine standard and can make these parameters available to our other plants." Several TruMark Station 7000s with TruMicro Mark 2030 lasers are already in use. One of them has been in operation in China since January, where Alex Xu is impressed by the stability of the laser output: "There have always been fluctuations with systems from other manufacturers, but this has never been a problem with the new ultrashort pulse lasers." The Chinese team was also able to put the new laser into operation very quickly. Installed in January, it has been running in series production since February.

Forecast

Until now, many production steps at Aesculap were performed manually. However, Marc Laufer and Felix Schmidt in Tuttlingen are now turning their attention to automation. "Given our extensive range of products and varying series sizes, it's crucial to carefully assess where automation is truly beneficial," Laufer notes. "And it’s not enough to simply automate the marking process; the upstream and downstream production steps must also be adapted." However, the team is making progress – a cobot is already fitted on a TruMark Station 7000, where a TruMicro Mark laser is used to mark saw blades.

Both are confident that TRUMPF is the ideal partner for the next steps in the process. Schmidt says, "The technology is impressive, and TRUMPF's high level of support sets it apart. No matter where we are in the world, we always receive prompt assistance in the respective country if an issue arises."

Find out more about our products

TruMicro Mark 2030

The TruMicro Mark 2030 delivers exceptional process reliability and precision with its ultrashort pulses. With multi-stage power regulation and pulse energy monitoring for each individual pulse, it operates with utmost precision, meeting the stringent demands of medical technology. For instance, it quickly and reliably applies UDI-compliant marks using black marking.

Zum Produkt

TruMark 7050

The TruMark 7050 is a true all-rounder. Whether for welding, engraving, structuring, or cleaning, this powerful laser consistently delivers exceptional performance. With an average power of 200 watts and a peak power of more than 10 kilowatts, it achieves the highest processing speeds and short cycle times. It is also easy to integrate and operate.

Zum Produkt

TruMark Station 7000

As a complete solution with marking laser and software, the TruMark Station 7000 offers decisive advantages. It is immediately ready for use, fulfils all safety standards and offers superior precision as well as adaptability to different workpieces. Integrated software makes operation and maintenance easier – which is extremely beneficial when it comes to medical technology.

Zum Produkt

TruDisk 2000

The TruDisk 2000 high-power solid-state laser is a robust partner for welding, cutting and surface processing applications. The integrated active laser power control guarantees consistent power at 100%. Thanks to its special resonator design, the TruDisk 2000 is extremely robust against back-reflections and can also process highly reflective materials.

Zum Produkt

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