

INNOVATIVE TECHNOLOGIES

Innovative ideas make all the difference. Feintool impressed its customers again in 2022 with new and optimized processes and products. The main drivers for any Feintool innovation are advancements in automation and digitalization, which holds true for both drive component manufacturing and for services related to the company's core business functions. Packaging for the shipping of Feintool goods is an example of this.

SIX CUT DOWN TO TWO

New trays save time, money, and resources

Feintool is a powerhouse when it comes to using its expertise to meet new customer demands. Take, for instance, a project by a team in Obertshausen to create new trays for packing formed parts. Although the project took some time, the result was commendable, as it checks several boxes: functionality, cost, design, and recycling.

At first, it seemed like a routine project related to parts production for a long-time customer in Belgium. However, packaging plate carrier parts for shipping turned out to be an extensive project requiring some real innovation to meet the needs of multiple stakeholders. The project demanded technical expertise, ingenuity, and, most of all, perseverance. Even with these qualities, it took several months to reach the final solution for perfectly packaging parts for shipping. The result is impressive, and the customer is thrilled. The new shipping trays are perfect for use in both manual and automatic processes, and the bottom line is that Feintool will save nearly CHF 5 million over the next ten years. The cost saving in 2022 alone was CHF 285 000. How did we get there?

The Belgian company Punch Powertrain sources various plate carrier parts from Feintool for use in dual-clutch transmissions. Six of these parts required reusable packaging for multiple rounds of shipping between Feintool and the customer, plus one layer of disposable packaging. Six separate trays resembling large dishwasher baskets were required for shipping these parts. Other wish-list items from the customer were durability to last at least 30 deliveries, specific dimensions, water resistance, and marking identification capability. And that was just for the trays – more requirements were soon to follow.

Marcello Scacciotti, Project Leader, explains, “It was clear to us from the start that there was a more practical solution than using six different trays.” After all, management of individual pieces is cumbersome and demanding. Each tray circulates through several stations, from filling to washing, and then storage. The project team of six knew that this process could be optimized, which was all the impetus they needed. In the end, they took first place in the Innovation & Technology category of the 2022 Best Achievement Awards, Feintool’s annual internal competition – and rightly so.

After all, the team powered through numerous iterations leading up to implementation, all in collaboration with the customer and external experts. This level of coordination took time, but the solution is well thought out, making it worth the effort. Today, the plate carrier parts are shipped in just two types of trays – small masterpieces, one for four types of parts, another for two further types. What is such a plus in this solution is not just the reduction to two tray styles, though. Rather, the Feintool packaging yields a whole host of advantages. For example, their durability substantially surpasses requirements, enabling more than 30 rounds of shipping. They have a water drain and a new special inlay for rust protection. They can also be manually marked on two sides or outfitted with an RFID chip for automation, identification, and parts traceability. On top of all this, the design satisfies the Japanese poka-yoke principle. This means that it is impossible to place the parts improperly in a manual process. And, last but not least, the plastic in both packaging units comes from recycled material. The aspect of environmental protection was thus also considered.



More from the Best Achievements category: Innovation & Technology

New direct cleaning (Ohrdruf, DE)

Optimized turning process (Tianjin, CN)

Vertical integration/automated cutting speeds, reaming, and processing cells (US)

“Pushing the limits”: thin-walled part-in-part retaining plates (US)



AN INTELLIGENT TECHNIQUE FOR JOINING PARTS

Feintool sets the standard for stacking in electric motors

Rotors and stators are the be-all-and-end-all of electric drives in vehicles, wind turbines and other industrial applications. Both electrolamination components are true powerhouses that demand exceptional expertise and experience to manufacture to the required standards. A unique adhesive bonding technology used for the motors' electrolamination stacks is what sets Feintool apart in this fast-growing market.

Buyers usually go straight to the motor when looking to purchase an electric car. After all, this determines efficiency and performance, both for vehicles, and for industrial applications. Customer demands and regulatory requirements are also getting steeper in terms of efficiency values and electric drive performance. These factors are influenced, to a great extent, by the properties of rotors and stators. These components, which together form the motor core, comprise stacks of individual stamped electrolamination sheets that are joined together tightly after stacking. The more stable the stack, the smaller the tolerances, the higher the temperature resistance, and the tighter the bond, the better.

This aspect of added value is indeed one of the many strengths of Feintool, as the Group welcomes new technology and is well-versed in all common stacking systems.

This means that any customer request can be met. Furthermore, Feintool exploits patented processes for glue-bonding systems to – as the name implies – bond the laminations in an optimal manner.

The results speak for themselves. The sophisticated technology, which is registered under the umbrella brand *glulock*[®], offers numerous economic and technical advantages. These factors mean, that when it comes to precision and quality, Feintool is a worldwide technology leader for electric motors and generators.

Björn Böker, Head of Research and Development (R&D), Tool Making, and Environmental Management at the Sachsenheim site in Germany, says "What we accomplish with *glulock*[®] is unique." This is where the first prototypes got off the ground as early as 2006, at that time under the umbrella

of Kienle + Spiess, which has since been acquired by Feintool. Since then, six patents surrounding the innovative glue-bonding system have been registered.

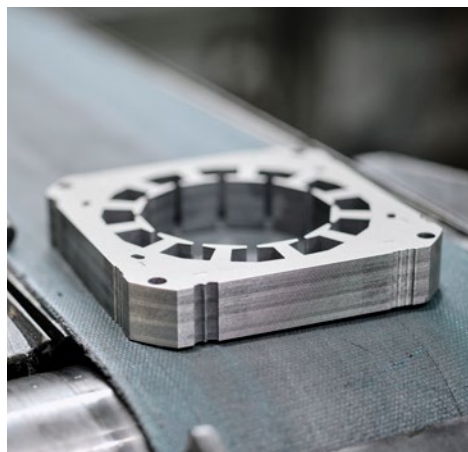
Not many companies have the deep understanding of bonding technology necessary to reach this level of quality, so what sets *glulock*[®] apart? “The lamination stack is created within the tool itself,” explains Böker. In other words, *glulock*[®] bonds the rotor and stator laminations already during the punching operation using dots of adhesive – in a single pass. The result is a high-quality, efficient stack with improved electrical properties, which substantially improves the motor’s performance.

The complete list of *glulock*[®] advantages (see box) is quite lengthy. Compared with conventional methods of glue-bonding, the process is economical, creates precise results, and improves stack tolerances (parallelism, shape accuracy, concentricity, and length tolerance) to a considerable degree. Increases in electrical capacity also enable a size reduction for the motor. However, there is yet another benefit which is highly significant.

“We can let the stacks cure at room temperature, meaning that no additional power is required for the process, which is a big plus in terms of sustainability,” says Böker. With all Feintool innovations, conservation of resources is one of many metrics considered. This has been applied, for instance, in further developing the proven bonding method for *glulock*[®] HT (High Temperature). This development improves product durability and increases temperature resistance to 180°C.

Feintool development teams are currently working on a number of additional application processes, including chemistry in adhesives and alternative and innovative baking processes. Prototypes of the latest member of the *glulock* family have been almost ready for high-volume production since 2022: *glulock*[®] MD (Multiple Dots). This product is Feintool’s answer to the trend of integrating cooling into the rotors and stators, rather than cooling motors, from the outside. Requirements here are surface bonding and an impermeable stack that is leak-tight to coolant, both of which are satisfied by *glulock*[®] MD.

The outlook is positive for the future. Increasing digitalization across all sectors, as well as global climate protection efforts, have markedly increased demand for electric motors of all types. Feintool produces components for the main drives of all-electric vehicles and for the accessory drives of hybrid vehicles. The Group has also cast a wide net in terms of building components for industrial applications, delivering a complete portfolio for electric motors in all dimensions with a high degree of vertical integration. “The market is growing, and on a global scale,” Böker concludes.



“Our glue-bonding system is unique.”

Björn Böker, Head of R&D, Tool Making, and Environmental Management at Feintool Sachsenheim in Germany



Contribution to UN Sustainable Development Goal 9

Feintool stands out through the spirit of innovation, which is ingrained in its culture. At the same time, the selective pursuit of development projects guarantees long-term competitiveness. The Group works with universities in these endeavors and has invested CHF 4.1 million into research and development in the current reporting year. Employees win “Best Achievements” each year in Sustainability, Innovation & Technology as well as Team Performance & Extra Mile.

Benefits at a glance

- ▶ Improved efficiency
- ▶ High process speed (up to 1 000 strokes per minute)
- ▶ Greater freedom of design
- ▶ Material thicknesses as low as 0.1 mm
- ▶ Improved stacking factor, over 95 %
- ▶ High stack stability
- ▶ Better shape accuracy
- ▶ Reduced stack tolerances, up to 50 %
- ▶ Noise reduction
- ▶ Improved flux density
- ▶ Increased torque
- ▶ Sustained temperature resistance up to 180°C (*glulock*[®] HT)
- ▶ Increased tensile strength (*glulock*[®] HT)
- ▶ Greater chemical resistance (*glulock*[®] HT)