The perfect mould is a work of art

Injection-moulded medical devices and components may look simple to the untrained eye. But, in fact, they can have extremely tight tolerances and require moulds built with the precision of a Swiss watch. Florian Beck, who heads the development team at **Tegra Medical/Stamm** in Hallau, Switzerland, discusses what is involved in mould making.

A moulded product is only as good as the mould it came out of. This is especially true (and critically important) when it comes to moulding components for the medical sector.

At Tegra Medical, designing and creating the ideal mould is a process that takes not only great expertise, but also patience, attention to detail, teamwork and a firm understanding that the process is an investment in the lifetime value of the product generated by the mould.

Deep roots

The technology of moulding isn't new – archaeologists discovered that, in 3,000 BC, humans were using stone moulds to make axes. In the 1800s, manufacturers made wooden foundry patterns from which moulds were made and used for casting iron parts for a huge variety of items, such as machinery parts, gears and tools. These interesting mould patterns are now highly prized by collectors and displayed as decorative items.

The first injection moulding machine was invented in 1872, but the technology gained steam in the 1940s when World War II created a demand for mass produced plastic products. It was at this time that the origins of Tegra Medical's injection moulding expertise first took root: Stamm was founded in 1947, and began making moulds and producing moulded components with small parts and tight tolerances.

Defining excellence

Tegra Medical takes full advantage of its people's deep experience. The entire team, including quality, production and toolmaking, must work closely together to analyse the design, make recommendations, and identify critical areas. Each person offers a different perspective. The company believes in teamwork with a mutual dedication to perfection. The entire team must agree before any steel is cut to make a mould and, if not, they keep working at it.

An investment in time

Mould making cannot be rushed. Patience truly pays off when the final result is a superior mould, which is good for millions of shots before needing refurbishment. With the end goal of a perfectly moulded product in mind, Tegra Medical only designs and builds moulds for the products it manufactures for its customers, ensuring that quality is inherent in the end-to-end process of moulding precise components.

The process works best with early collaboration with its customers. It incorporates the principles of design for manufacture (DFM) to ensure a smooth and efficient manufacturing process that results in the most precise products.

Complexity in the DNA

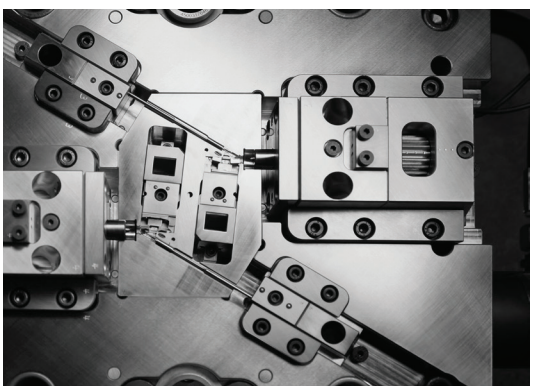
Medical components are inherently complicated, often needing to adhere to anatomical features. Tegra Medical specialises in complex projects that require the most intricate and precise moulds, perfectly suited to these needs.

With up to 500 individual components, its moulds include special features, very tight tolerances and complex, often extremely tiny geometries. One mould can be constructed of more than ten types of stainless steel, depending on its requirements. The mould design must take into account not just the geometry of the part, but also the characteristics (such as the temperature) of the plastic being used.

Future artwork

Certainly, making the best possible mould is science, but in many ways, it is also like making a piece of art. Manufacturers in the 1800s could never have imagined that the wood foundry moulds they used for casting iron parts would be sold and displayed as décor on walls and mantelpieces.

Perhaps, in 100 years, the intricate and precise injection moulds Tegra Medical/Stamm makes will be highly sought-after collectors' items, displayed proudly in people's homes. ●



Antique mould (left), modern injection mould built by Tegra Medical/Stamm (right).

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