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For Ricarda, Friedrich and Rafaela Echterdiek at Spang & Brands, material expertise, toolmaking and assembly skills are USPs in the manufacture of medical consumables.

Clear focus on medicine and pharmaceuticals

Special print

Plastics technology for medicine

How Spang & Brands is entering its fourth generation of business with material know-how, toolmaking, development and assembly expertise

For more than 40 years, Spang & Brands in Friedrichsdorf has focused exclusively on the development and production of high-precision consumables for medical, pharmaceutical and laboratory use. The one-stop supplier supports customers from the product idea to article development, prototype construction, injection moulding production and assembly in the clean room to the ready-to-use packaged assembly. In addition to comprehensive material know-how, the company's unique selling points are its own toolmaking and assembly expertise in a clean and sterile environment. Currently, the family-owned company is undergoing an exciting transition as responsibility is passed on to the fourth generation.

Text: Dipl.-Ing. Markus Lüling, Editor-in-Chief K-PROFI

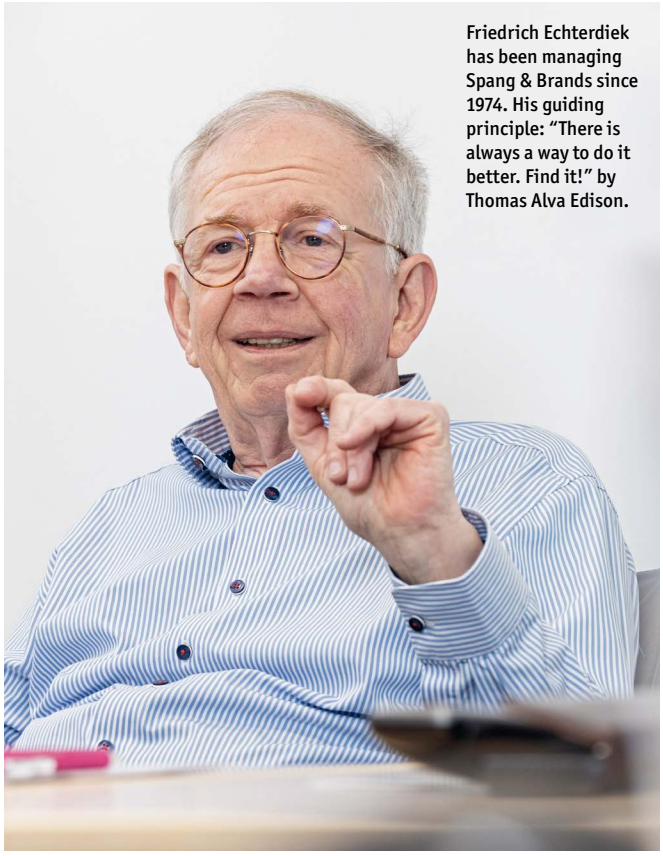
Rafaela Echterdiek, Head of Business Development (left), and her twin sister Ricarda Echterdiek, Head of Customer Relations, are gradually taking over the responsibilities of their father Friedrich Echterdiek, who has been managing Spang & Brands for 50 years.

All photos: K-PROFI/Manuel Hauptmannl

Spang & Brands was founded in 1909 by Aureus Spang and Jakob Brands as a factory for shoe machines that connected the upper leather material to the soles by sewing or metal staples. When gluing technology replaced sewing and stapling in the early 1950s, the company changed its focus with the technological arc of stapling technology to packaging machines for fruit and vegetables, which were packed in nets and held together with staples. At the same time, the family found its way into the construction of injection moulding tools, which were then used to test the operation of injection moulding machines and thus became the extended workbench for the automotive and toy industries, among others.

In the 1970s, Spang & Brands in Oberursel came into contact with its then still medium-sized neighbouring company Fresenius. "We were able to build a tool for Fresenius and thus received our first order for a medical application in peritoneal dialysis," recalls Friedrich Echterdiek, who has been at the helm of the company since 1974. Before a necessary relocation in the early 1980s, he fundamentally questioned the future strategy. The result: Since 1982, Spang & Brands in Friedrichsdorf has been dedicated exclusively to plastics technology for the medical and pharmaceutical industries. "In this respect, we can confidently say that we know the requirements of the medical and pharmaceutical market and therefore also understand our customers."

With 180 permanent employees and 40 temporary employees, Spang & Brands generated a turnover of around 34.5 million euros in 2024. In addition to Friedrich Echterdiek, the grandson of one of the company's founders, who is the strategic and commercial head of the company, the technicians Jürgen Mader and Alexander März are managing directors. Friedrich Echterdiek and his three children Fabian, Rafaela and Ricarda are shareholders. While the son has pursued a medical career, the twin daughters have recently joined the company in order to gradually take over their father's operational tasks.



Friedrich Echterdiek has been managing Spang & Brands since 1974. His guiding principle: "There is always a way to do it better. Find it!" by Thomas Alva Edison.

Early involvement in product development

"Right from the start, we have tried to be involved in the development of the articles as a one-stop supplier, so to speak, in order to be able to influence the design from a production point of view," says Echterdiek, highlighting what he sees as a key success factor: "Ultimately, we try to offer our customers a complete service," which ranges from product development to series production and ready-to-use packaged assemblies. "The second focus of our DNA, so to speak, is material expertise," he emphasises, highlighting the criteria of suitability, compatibility, processability and sterilizability.

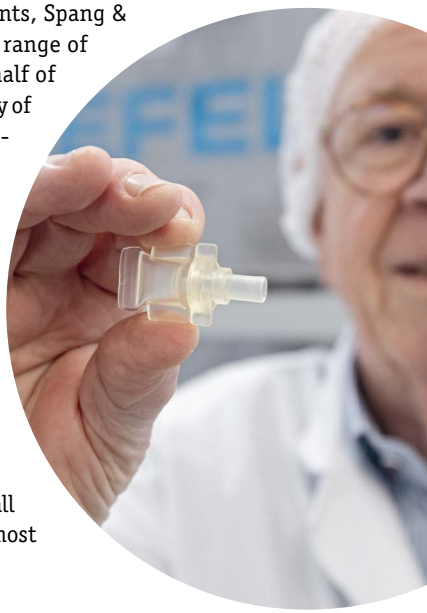
"All of our customers' parts are approved and registered. Any changes, even if only for visual reasons, have many consequences. Our tools must still meet the quality standards of the first day even after 20 years. As you can see, this requires a special way of thinking and an exceptional understanding of our customers. This is another reason why we focus only on medical and pharmaceutical products." For Friedrich Echterdiek, the second important aspect of this strategy is the employees: "They also need a focus on cleanliness, precision and durability."

Alexander März, as technical managing director, relies on sensor technology in the injection moulding tool, direct injection with needle valve systems and 3D-printed sintered inserts.

Products and systems with high precision and functionality requirements

In addition to individual components, Spang & Brands also manufactures a whole range of application-ready products on behalf of its customers. These include a variety of functional parts and systems for diagnostics, pharmaceutical applications or medication. A bone cement mixing and dosing system assembled from various injection-moulded parts came to the company via a customer sketch and now integrates numerous functions and application aids. After only nine months of intensive development work with the customer, the manufacture and assembly of these systems began in 2007 – initially in small quantities, in 2024 the figure was almost 500,000 systems.

The Friedrichsdorf-based company is an expert in the processing of soft PVC, which is used, among other things, in the production of blood bags. The trick is to take into account the shrinkage of the PVC after sterilisation, which can be around 8 %, and to keep it under control.



PVC twist-off ports for blood bag systems have a pierceable membrane and can withstand the shrinkage that occurs after sterilisation without any loss of function.

For a world market leader in the field of eye laser surgery, the Friedrichsdorf-based company manufactures so-called contact glass holders. Doctors place these on the eyeball before laser surgery. A vacuum is applied through high-precision, small holes to fix the eye in place. Precision and the absence of burrs are important criteria. Here, too, unit volumes have increased from a few thousand in the early years to around 5 million in 2024.

"Of course, we are pleased when solutions that we have developed together with customers develop positively over time and unit volumes increase. Nevertheless, niche products with small quantities are also of interest to us. New customer enquiries and their requirements have ultimately brought us to where we are today," says Friedrich Echterdiek, "for example, our development team is currently working intensively on sheathing a steel wire with soft PEEK material."

To close the chest again after heart surgery, the sternum is pulled together with steel wire. To reduce the risk of cutting and to protect patients with osteoporosis, for example, Spang & Brands is looking for solutions to coat the wire with soft PEEK. The product is currently in the approval process and should be on the market by 2026 at the latest. "We developed the injection moulding process with a process engineering influence on the application properties in our own technical centre. At a congress, doctors would have liked to take our samples with them, that's how well they were received," reports Jürgen Mader.

Rafaela Echterdiek,
Head of Business Development

Digitalisation creates new control loops

Rafaela Echterdiek worked for the global brewery market leader Anheuser Busch Inbev for eight years, six of which she spent in IT, and was most recently responsible for the digitalisation of 32 breweries in Europe. She joined Spang & Brands in the summer of 2024 and is driving the digitalisation of the family business as Head of Business Development.

K-PROFI: Large-scale brewing and injection moulding for the medical industry – the contrast couldn't be greater, could it?
Rafaela Echterdiek: You'd be surprised how many parallels there are. The brewery is all about liquids, but at the end of the day, the same difficult questions arise: document management, quality assurance, data requirements and the like. And then there's the digitalisation of employees, i.e. how everyone can access the information that is relevant to them. It's not that different.

Which specific projects did you tackle after your orientation?
Here I am mainly concerned with the digitised automation of our production and efficiency. Digitisation is extremely important for Spang & Brands, and we have to continuously develop it. That's where I'm starting – we will replace our current ERP system with a new one in January 2026, which will also bring us new digital possibilities. But beyond that, we also need our own software. I see huge potential there.

Can you give us an example?
We have 70 injection moulding machines and last year we produced 430 different items in batches. I don't want to say that anyone can produce endurance runs. But the challenge is to realise each product and to produce and document it in every shift in the injection moulding shop with its own requirements and specific quality criteria. Nowadays, you can only master this complexity with data.

What is important with the large amount of data obtained?
The question is how we can provide the data to the right employees at the right time in a well-structured way. Ideally, we also help to interpret the data. I think we are already good at building understanding, but we also have to make use of new, additional possibilities. Artificial intelligence and the question of which algorithms we can work with are crucial for us to continue to be among the top medical suppliers.

And that can't be done with the ERP system.
We are working on various concepts and with various tools, for example with Arburg on the integrated simulations in the Gestica control system and with tools from ArburgXworld. We are testing and want to tease out: What is relevant for us?

How do employees feel about your digitisation activities?
One crucial point is that employees develop in the direction of digitalised methods in their way of thinking. In the past, the superstar in toolmaking was the person who could grind out mini-contours on the grinding machine. Today, it is young people who programme on the computer. In toolmaking as in injection moulding, we have to ask ourselves together with the people: What do I gain in terms of data, and even more so, in terms of information? Because I can't do anything with numbers alone.

But what?
We need a combination of information about the material, the tool and the production process in order to manufacture components with a high degree of consistency, product safety and production reliability. Basically, we need a combination of everything, because control loops are created in the machine and beyond – from injection and switching to demoulding and subsequent automatic assembly. The future will be all about using these.

Jürgen Mader shows a steel wire coated with soft PEEK for closing the sternum after heart surgery, which is expected to come onto the market no later than 2026 after approval.

Rejection of own products: service provider instead of distributor

"But we don't go to the hospital with our own products," emphasises Friedrich Echterdiek, citing two reasons: "Firstly, there is the huge effort involved in registration – not only in Germany, but often in 25 or 30 countries. And secondly, we don't want to compete with our customers. We see ourselves as a service provider, as a supplier, but not as a distributor. Our customer relationships are long-term relationships. Over more than 40 years, we have built up a relationship of trust, including a technical one, with many well-known global players, so that we can really discuss systems and solutions."

Jürgen Mader, who has risen from toolmaking to injection moulding, development and production management at Spang & Brands to become technical managing director, is still clearly enjoying his work after 45 years. According to Friedrich Echterdiek, Mader is the "technical brain of the company" and has been involved in many products from the ground up. "On the customer side, we are seeing more and more changes," says Mader, regretting the loss of long-standing contacts. "Sometimes we tell our customers the story of their products." Alexander März has been working in medical technology for 25 years. The trained toolmaker, master craftsman and business graduate has been with Spang & Brands for ten years and has been responsible for toolmaking and injection moulding production as technical managing director for seven years.

The importance of material properties and in-house material development

Spang & Brands processes many thermoplastics, from PVC to PP and PEEK to polylactides, as well as temperature-free silicones and TPU for sealing functions. Friedrich Echterdiek: "A great deal of material expertise is required to ensure that parts made of materials approved for medical use survive sterilisation, for example steam or gamma sterilisation, without distortion or destruction." Spang & Brands itself drives the development and production of plastic types for medical products with several compounders in different countries. "We use approved materials to create our own formulations – we now have 30 different ones, often with special functions that our partners compound just for us. For some plastics, certain tests do not exist because the quantities in the medical sector are too small," says Jürgen Mader, "so we have to do it ourselves, and that's another area in which we specialise." The materials, of which special types cost up to several thousand euros per kilogram, are a constant issue for Mader: "Catalyst changes, the switch to phthalate-free types, nitrosamide contamination, new requirements are constantly coming up."

Spang & Brands has been designing articles and tools and simulating tools for optimal injection and cooling for decades in-house, while structural analyses are carried out with partners. Many individual parts of the medical assemblies have very narrow tolerances – often because predetermined breaking points have to be precisely represented so that packaging or functional parts can be safely broken, torn or twisted off with

The precision and quality of the mass-produced goods is not only checked visually on the injection moulding machine, but also in the laboratory, by touch and by computer tomography.

defined forces during use. That is why critical parameters are monitored and many injection moulded parts are subjected to 100 % optical inspections.

First-class toolmaking for stable series production

Spang & Brands' philosophy also includes an in-house toolmaking department, which today employs 30 people in a 1,000-square-metre area. Friedrich Echterdiek: "If I have to produce millions of parts, then I need a first-class tool. Our expertise in in-house toolmaking gives us a decisive advantage: enormous precision and quality for our customers' products. Whether it's a small series or a million-piece production run, we stand for an absolute zero-defects strategy." If there is any doubt as to whether a process can be successfully transferred to a stable series production, he sees few alternatives: "Then we have to work with the customer to change the product design, use different materials or look for other alternatives. And when in doubt, we would rather turn down an order than say yes to everything."

Ricarda Echterdiek,
Head of Customer Relations

The right mix makes for good staff

Ricarda Echterdiek joined the commercial division of Spang & Brands in 2022 after seven years in various sales positions at the confectionery company Ferrero – most recently as a national key account manager. As Head of Customer Relations, she is primarily responsible for strategic customer management, sales, purchasing and human resources.

K-PROFI: You and your sister both come from the brewing and confectionery industries.
Ricarda Echterdiek: *(laughs)* We gave it our all to create patients.

Now you're coming into smaller, long-established structures.
Long-established structures often sound slow and entrenched. But the opposite is the case. We have the ability to make quick decisions and try things out. We can respond quickly to new requirements. In large corporations, politics and hierarchies often play a role that slows down processes. The dynamics in a medium-sized company cannot be compared to those in a large corporation. Of course, our structures are much smaller than those of a large corporation. Nevertheless, we have many long-standing employees at Spang & Brands who have often been with us for over 20, sometimes 30 years. We are very proud of that. It shows that our employees feel comfortable and believe in the company's vision. New employees and fresh minds are also joining us. I think it's this mix that makes us special.

Nevertheless, you have to make a great effort to find personnel.
Absolutely. Unfortunately, we are also affected by the "vexing" issue of the shortage of skilled workers. The effort required to find new or suitable personnel has increased dramatically in recent years. For us, there must ultimately be three matches when recruiting: professional, personal and the desire to be part of a family. Every single employee plays an important role for us. Only if everyone is willing to go the extra mile sometimes can the company continue to be successful.

Where are you experiencing particular difficulties?
Skilled workers who already have a certain level of expertise remain a bottleneck. We invest a great deal of time and energy in identifying interested young people who are keen to learn. It is becoming increasingly difficult to fill positions for toolmakers, which used to be the "gold standard" in technical training with opportunities in all directions.

How successful are you at recruiting employees with an immigrant background?
We have people from 30 different nations working for us. Everyone who accepts our values is warmly welcomed here. Our new apprentice in toolmaking is from Afghanistan, came to Germany two years ago, speaks good German and is doing his training here. I think that's impressive and great. We're happy to have anyone who wants to get involved, regardless of their nationality or skin colour. The main thing is that they want to make a difference.

What do you still miss?
The machine can be top. The tool can be a Ferrari. The whole system can be top. That someone brings expertise in the materials and in the application technology and also understands the digital possibilities and uses them in a suitable form – I have not yet found an applicant with this mix. Accordingly, the further development of our own employees is important.

What way out do you see?
For several years, we have been trying to work with interns and apprentices. Because young people ask questions differently. They question things that we may have been doing the same way for years. Why aren't we doing it differently? Why aren't we doing it more digitally? And often these are questions that lead to an "aha" effect or to which there are easy and quick answers. On the other hand, we have many experienced employees with expertise in materials, tools and processes. We need to provide better training in how these factors interact, allow new approaches and keep asking new questions. I firmly believe that it's all about getting the mix right.

Spang & Brands mainly supplies itself with tools. "We see our toolmaking not only as a profit centre," explains Alexander März, "but also as the basis for the quality of our precision injection moulded parts. Accordingly, the construction of a tool goes hand in hand with on-site production at our company." Spang & Brands would like to take on more toolmaking projects, but the challenge is finding enough staff. Continuously training toolmakers has proven to be a good solution. According to Alexander März, current technical topics here include, in addition to the cavity pressure and temperature sensors that have been installed in the standard for almost 20 years, direct gating with needle valve systems, 3D-printed sintered inserts or cores made of thin-walled stainless steel and curved cores with cooling right up to the tip.

The potential of 3D printing in tool technology and fixture construction

Years ago, it was only used for samples. Today, Spang & Brands relies on generative manufacturing not only for tool elements but also for fixtures, holders and models. Alexander März: "We print components to test processes in automation before we go into steel. The injection moulding shop prints grippers and handling systems, including those made of carbon-fibre-reinforced material." He is also keeping an eye on 3D printing for the production of small series: "With annual requirements of only 1,000 units, we are wondering whether we will need an expensive tool in the future or whether we will be able to print the products at some point. Either way, we always want to be able to offer our customers state-of-the-art products."

Jürgen Mader reports that customers are still looking for experience: "Experience and understanding of customer requirements are important success factors because more and more companies are pushing into the stable pharmaceutical and medical industry. It usually takes three years for the investment-intensive process before the first part actually comes out of the mould. The advance performance is very high." That is why test projects are running in different directions in the in-house technical centre with three injection moulding machines. "We have our own technical centre so that we don't have to rely on others. We want to be able to carry out our own tests."

Fully electric injection moulding machines with integrated simulation software

"In addition to development, complete-system supply, materials expertise and tool-making skills, we also need the latest injection moulding technology in-house," says Friedrich Echterdiek with conviction. 70 injection moulding machines with clamping forces of 350 to 3,500 kN and a focus on 1,000 kN, including several for 2K applications and for moulds with up to 128 cavities, are available in the clean room. Consistent automation of removal with integrated test routines, as well as storage and packaging sorted by cavity, facilitate traceability. More than 20 assembly machines put large-scale series parts together, while small quantities are completed semi-automatically or manually and packed ready for use. The entire injection moulding halls are clean rooms according to clean room class ISO 8. The assembly of components and completely packed medical devices also takes place in the clean room.

In production, Friedrich Echterdiek relies exclusively on all-electric machines, and has done so since 2000. "We had conventional hydraulic machines from Arburg for a long time, but then we bought Fanuc machines because there were no electric ones available elsewhere, until we became the first customer for electric machines at Arburg." The main reason for Spang & Brands has always been the

In several clean rooms, 70 injection moulding machines are in operation with automated moulded part removal and integrated test routines.

The cavity-sorted storage and packaging of the injection-moulded parts ensures that the effects of defects are minimised and that traceability is maintained right back to the production stage.

precision of the electric machines. The company has taken a further step with the integrated configuration based on Cadmould simulations in injection moulding machines. Friedrich Echterdiek: "We initially tested two new Arburg machines with the Gestica control system. Simcon's integrated simulation software makes it easier for us to find the right process parameters and to precisely monitor the filling process when commissioning the mould. This speeds up the validation process. We have now ordered five more machines from Arburg in this configuration because it gives us a boost in injection moulding production. There is no way around digitalisation and automation if we want to remain competitive in the long term."

Strategic partnerships and the status as sole supplier

The Friedrichsdorf site has grown organically and through the acquisition of neighbouring existing buildings since 1982. "For a production facility that displays the material flow from A to Z, the location is certainly no longer optimal," admits Rafaela Echterdiek, "nevertheless, we also see possibilities for expanding production here at the site. For example, we will gradually expand our production to 24/7 by the end of 2025 in order to make the injection moulding process more efficient and expand capacities," says Echterdiek. "Even small green spaces are still available at the site for further expansion."

"We already have two completely separate production halls and thus some security in terms of production capacities. For some of our long-term customers, we are not only a strategic partner, but the only supplier of certain products. It is therefore important to be in close contact with customers regarding production reliability, safety stocks and possibly additional locations," explains Ricarda Echterdiek.

"As in the past, we want to remain open to new technologies, new materials, new challenges and opportunities in toolmaking and injection moulding in the future, in order to remain the competent partner for our customers in the field of plastics technology in medicine," says Ricarda Echterdiek. "For years, our guiding principle has been: 'There is always a way to do it better. Find it!' by Thomas Alva Edison. This motto will continue to drive us in the years to come to find solutions for our customers that may not yet exist today."

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The automatic, semi-automatic or manual assembly of components and medical devices, as well as ready-to-use packaging, takes place in ISO Class 8 clean rooms.