

# DENTAL IMPLANTS FOR THE WHOLE WORLD

**A specialist manufacturer from Hagen has developed market-leading technology for high-quality solutions in the medical sector.**

**At the age of 55 most people are already thinking about retirement, so at that age it takes courage to set up your own company. Not only that, but setting up a company in the medical technology sector, one of the most difficult and demanding, certainly demonstrates more than a little bravery. Building the company up into a leading dental implant manufacturer in a short space of time demonstrates not just courage but also a large degree of knowledge and expertise. The success story of Hagen-based AK-tek GmbH is closely linked with the Swiss lathe manufacturer Tornos, whose machines have provided the basis for high quality and technologically advanced solutions with trademark German quality.**



AK-tek GmbH was started in Hagen, Westphalia, in 2003 by Michael Arndt and Stefan Klaus, at that time both 55 years old. Michael Arndt has decades of experience designing and manufacturing medical technology products, while Stefan Klaus is a skilled CAD design engineer. Their shared goal is to develop and produce high-quality dental implants, as this is a market segment which offers great potential for growth. Working closely with the pioneers in this field, AK-tek developed and produced innovative implant systems on the basis of verbal specifications, sketches and also their own ideas.

Modern dental implants consist of several parts, which are made almost exclusively by machining

titanium, stainless steel, precious metals or ceramics on lathes and milling machines. A dental implant normally consists of a screw-shaped piece that is screwed into the jawbone and an abutment. Both parts are held together by means of a screw. The abutment serves as the base for the dental replacement to be produced by the dental technician. One-piece screw implants are also produced and can be coated according to the customer's wishes.

Implants are in product families, which are available in various sizes and designs. The abutment, and then later the tooth on the implant can be individually designed using various technical solutions. The basic aim is for the abutment to the implant to resemble



the basic shape of the human tooth, in order to provide the dental technician with optimum conditions for carrying out the work. The demands of customers in the German market are very high indeed.

Whilst implants used to consist almost only of rotationally symmetrical parts that could be made using lathes, modern implants increasingly require complex free-form surfaces to be developed and produced. AK-tek has acquired considerable expertise in this field as the recognised development partner of highly-reputed universities in Germany and abroad. The company's particular strengths are its flexibility and its ability to fulfil all the technological demands of customers in relation to development, design and production.

This is very much reflected in the employees' and owners' following achievements: Development, design, production, consultation with customers, precise testing of and documentation of the finished products, surface finishing, cleaning and clean room technology, packaging of the parts. 3D animations can be made available for use in staff, customer and user training. Completion of the annual audit in order to maintain medical technology certification. In addition, developing and implementing new production procedures and much more. The company's expertise is employed right through from the first idea right up to the product in its packaging with registration and documentation. In this context it is interesting that the implants in some countries are different owing to the patients' different jaw shapes, a factor that AK-tek takes into account when devel-

oping implants for the Asian and American markets as well as in the development and production processes.

#### **A development partnership with a long tradition**

Michael Arndt has known about Tornos machines since 1980, so it was an obvious choice for him, as they were best suited to his company and its requirements. And so, AK-tek 2003 began with two Tornos TOP 100 sliding head automatic lathes and four highly-qualified employees. As with all Tornos machines, the TOP 100 models are distinguished by their rigidity and the resulting concentricity. With the firm machining titanium 95% of the time using internal with external thread whirling, angled post milling, transverse holes, etc. and a tolerance field of plus/minus one hundredth of a millimetre, the machines are really being put to the test. It speaks volumes about the quality of Tornos machines that even the oldest machines still work without machine-dependent tolerance errors. Over the years, the machinery has been steadily added to and now AK-tek, in addition to the two first lathes, has eight further Tornos Deco 13s and a CNC 5-axis horizontal bar milling and turning centre.

Michael Arndt values how Tornos works together with AK-tek in partnership and provides equipment packages suited to its requirements. The machines are configured and set-up in accordance with customers' needs by technicians working for Tornos in Moutier and Pforzheim. Most of the machines

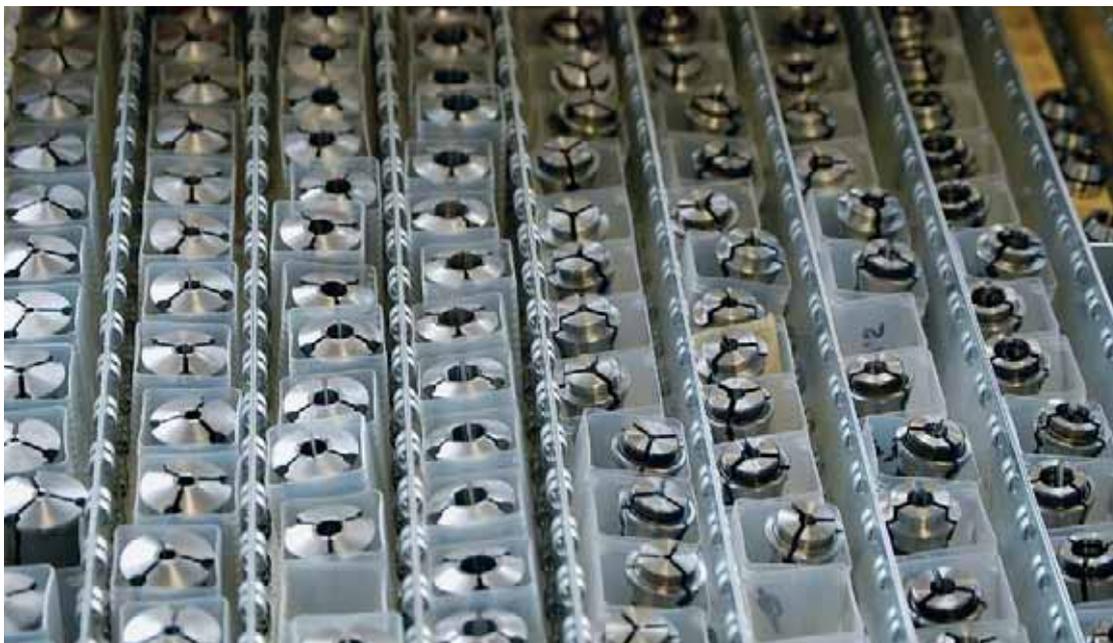
feature high-speed spindles, oil filters and high-pressure systems as well as deep hole drilling equipment and other pieces of advanced technology that are indispensable for the complex process of manufacturing implants. The production is documented every two hours. The quality of the workpiece is manually and electronically measured and visually monitored at each stage of the production process. As the equipment runs overnight fully automatically and unmanned to increase profitability, AK-tek invest heavily in process reliability. This is where the quality Swiss engineering in Tornos machines comes to the fore and is supported by a telephone hotline and automatic CO<sub>2</sub> fire extinguishing systems.

### Top quality is the minimum standard

The whole of the AK-tek team would not be where they are today if it was not for their permanent search for ways to improve their manufacturing processes. The production process is always being analysed and the company invests in new procedures. During the production of implants, only special tools made of natural diamonds, polycrystalline diamonds or hard metal with a special coating are used. Some machines would be pushed right to the limit in these procedures, but not the Tornos Deco 13a. In terms of quality and durability, particularly when angled post milling, this machine is on a par with a machining centre, but it is considerably more cost-effective. Deco 13a machines are also pretty much unbeatable when it comes to energy efficiency. Michael Arndt recorded some astonishing results



calculating energy efficiency on a specified test piece. A Deco 13a is 15% more productive than a Top 100, and consumes 53% less energy. This is yet another argument for him to replace the two machines with two more Deco 13a machines. This should ensure that the success of the previous years will be continued into the future. The company has doubled



## Dossier



Tornos sales advisor, Werner Kleine (pictured centre), along with AK-tek specialists. To his right is the company founder, Michael Arndt.

in size in the past few years, and plans to expand further in all areas. Since it was founded, the company has purchased a new, fully equipped machine every year. Michael Arndt values how each machine is able to work right from the word go and be integrated straight into his production process. This is in no small part due to the good relationship he has with Tornos employees in Pforzheim, who provide committed support for everything from advice on machine configurations through to installation and commissioning.

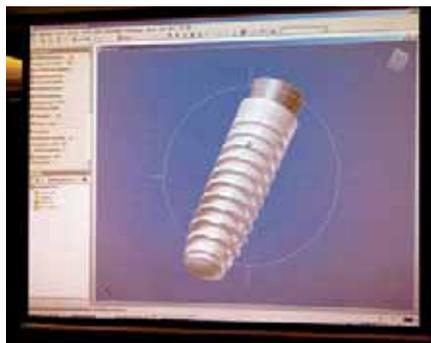
### On course for further growth

The worldwide dental implant market is currently growing at around 10% per year and is set to grow even further. Providers in the Czech Republic, Israel, Eastern Europe and China are looking to benefit by bringing low-cost, mass-produced implants onto the market. Because of the higher wage costs, manufacturers in Germany cannot compete, therefore AK-tek specifically concentrates on the top 5% of the market, who demand hi-tech products. Working closely with leading universities, new prototypes are being developed and tested. With new materials and inno-

vative geometries, the breaking strength is increased whilst the size is reduced. AK-tek sees itself really as a "hi-tech blacksmith's". The company's real strengths lie in everything from its CAD designing and simulation through to prototype production. This is best demonstrated by the training the employees receive and the structure of the machinery. The small but effective team consists solely of highly qualified experts and technicians who revel in the challenges they face and enjoy experimenting with new ideas. With the help of the flexibility of Tornos machines, ideas are being put into practice that will later be mass-produced and profitably brought onto the market. This is how AK-tek, despite the competition from 'cheap countries', provides implants mostly to Germany and Europe as well as USA and Asia. The company has all the relevant registrations and test certificates. Their success story and their partnership with Tornos, currently in its seventh year, will surely continue, and it will be interesting to see which dental implant developments AK-tek and Tornos will be bringing onto the market in the years to come.



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