NEW THREAD WHIRLING TOOL FOR THE MEDICAL SECTOR

The increasing need for special thread shapes for bone screws and other medical implants and small components used in surgery require technologies and tools that can produce high precision threads at high speeds with low costs.

To meet this new demand, Sandvik Coromant, a specialist in cutting tools and tooling systems, has introduced its new thread whirling tool with CoroMill® 325 indexed inserts. Whirling is a quick and precise method for producing threads on long and narrow parts made from materials that are difficult to machine. By combining the speed of thread whirling and the rigidity of the sliding headstock machines, it is possible to machine threads with precision in one single pass without using special supports.

Quick and efficient

The new thread whirling tool with the CoroMill® 325 indexed inserts by Sandvik Coromant can produce all types of medical screws and implants from bars at high speed. This technique offers several major advantages compared with the conventional thread milling method. Productivity is improved and assembly is quicker. There are no additional costs from the finishing treatments. Swarf control is excellent and the life span of the tool is longer than that of conventional tools.
Technical

THREAD WHIRLING BENEFITS

- Ideal for long, slender components: Inserts in a whirling ring apply even cutting pressure, creating high-precision threads without bending the component.
- Increased productivity: Single-pass machining from stock diameter reduces cycle time by minutes.
- Chip control: Chip control is superior to single-point threading, enabling more continuous and productive machining.
- Increased tool life: Thread whirling inserts have stronger cutting edges than single-point threading tools.
- Cost saving: Finishing treatment is not required after thread whirling, unlike for single-point threading.
- Deeper threads: Deeper thread forms (such as Acme) are achieved more easily.
- Faster set-up times: Downtime is reduced by eliminating the need to match rough and finish insert forms and special support devices.

To go further

To maximize performance in quality and long safe tool life it is important to provide the market a tool where all individual inserts are taking an equal part of the cutting process.

To guarantee this added value Sandvik Coromant is using a method of grinding that guarantee identically grinding which means if you are using insert from the same batch it generates a long safe tool life.

Typical components

- Bone screws
- Spinal screws
- Dental implants
- Other long, slender components

Typical materials

- Titanium
- Stainless steel

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RALPH GERBER: A QUICK INTERVIEW

To find out more about this new whirling offering, Deco Magazine met with Mr Ralph Gerber, technical sales consultant with Sandvik.

decomagazine: Mr Gerber, you mention test results that show a significantly increased service life of the inserts compared with the market standards, how have you achieved this result?
Ralph Gerber: There are several parameters that come into play, but I would primarily cite two reasons. Firstly, we are carbide specialists, so we can ensure perfect command of the tool from A to Z and secondly, we have relied heavily on the precision of the sharpening and machining of the insert housing.

dm: Is your carbide different then?
RG: We have developed carbide for class S materials used in medical applications, for example stainless, cobalt chrome or titanium. These inserts are therefore made from tailored carbide... and to meet the changes in the materials to be machined, we can also change our carbide if necessary.

dm: You speak of sharpening and positioning, you have elected to use a 6 blade head, is this to simplify positioning?
RG: In the whirling process, there is of course a race for blade numbers, but the greater the number of inserts, the more difficult it becomes to eject swarf, and so users quite often have to invest in high pressure units. This does not have to be the case with the Sandvik head, there is sufficient space for perfect swarf evacuation. As regards to the machining, we have been achieving perfect results with a 6 blade head, so why add any more blades that could cause clogging issues?

The inserts are machined using a rectification process that ensures that inserts from the same series are identical, so that during assembly one can be sure all the teeth will behave in the same manner.
The insert housing is also machined in such a way to ensure high levels of repeatability. When changing the inserts, we therefore guarantee that the positioning is perfect.

**dm:** What are the actual results of this machining quality and positioning?

**RG:** We undertook many comparative tests. When making a titanium screw (Ti-6Al-4V ELI), with identical cutting parameters, as well as identical cycle time and quality, we were able to produce 1100 parts whereas the reference series was 215 parts. This represents not only large potential savings for users, but also significant working comfort that is guaranteed by this high level of autonomy.

**dm:** I would like to try your whirling solution and make ISO approved medical screws, what are your lead times for delivery?

**RG:** These inserts are part of Sandvik’s standard program and are delivered from stock. Normally in Europe you would receive them the day after the order is placed. We are also able to make all insert requests with any type of thread profile as a special order. Working from the drawing of the part, we can provide inserts (and a head if necessary) within 3 to 4 weeks.

**dm:** How does this custom order service work?

**RG:** As a starting point, I would say that this ‘special’ service is in fact nothing out of the ordinary. Supplying tailor-made solutions to customers is what Sandvik does. If we take the example of a design you supply to us, this sets our well-oiled machinery into motion and our whirling partners and specialists work with the design, using the experience acquired from past projects of this type on a global scale. We therefore have extensive expertise at our disposal to meet the requirements of our customers.

**dm:** This method of operating presumes that I already know that whirling is the right method, but I am not certain on how to go about it?

**RG:** This is Sandvik’s greatest strength! We also offer a process and fabrication cost analysis service. Our specialists visit the users and record the currently used production method for various parts. Then based on these parameters, we make an analysis and offer a documented simulation to demonstrate the productivity gains that are possible. Sometimes we congratulate customers for their perfectly optimised process and sometimes we will be able to offer improvements that can yield as much as several hundred percent.

**dm:** What would such an operation cost?

**RG:** This provision is part of our service. If, with our advice and our tools, we are able to improve the production process for our customers, we are able to achieve a “win-win” situation, where both the customers and ourselves are better off.