**AMB 2018 / Intec 2019**

**Whirling taken to the next level**

At the AMB 2018 and IMTS, Paul Horn GmbH will be presenting two new developments in the area of whirling processes. The JET-Whirling system is the first whirling tool to feature an internal coolant supply. This whirling system offers optimised cooling directly at the cutting edge and was developed by Horn in conjunction with W&F Werkzeugtechnik. Another innovation is High-Speed-Whirling technology, which delivers raised levels of productivity. In this process, the speeds have been specially adapted so that pre-turning and thread whirling can be carried out in parallel in a single process.

Through the **JET-Whirling** process, Horn is demonstrating its expertise in the area of thread whirling. As part of a collaboration with W&F Werkzeugtechnik in Großbettlingen, experts from both companies have jointly developed a whirling system with an internal coolant supply. By cooling the cutting edges directly, this system enables long tool life to be achieved. What’s more, when used in conjunction with the stable whirling unit, the system achieves better surface quality on the workpiece. Thanks to the patented W&F interface with its face-and-taper contact system the whirling head boasts high changeover accuracy and is easy to change with just three screws. The internal coolant supply reduces the risk of chip build-up between the cutting inserts.

It takes less than a minute to change the whirling head on the whirling unit interface, which offers radial and axial run-out of 0.003 mm  (0.0001"). The maximum speed is 8,000 rpm. The whirling heads are available with type S302 triple-edged indexable inserts or with type 271 double-edged inserts. The cutting edges are available with diameters of 6 mm (0.246"), 9 mm (0.354") and 12 mm (0.472"). The interfaces for adapting the whirling unit are available for all standard Swiss-type lathes.

**High-Speed-Whirling**

Horn is proud to present another new technique in the form of High-Speed-(HS)-Whirling. This technology is being exhibited in collaboration with machine manufacturer Index-Traub. HS-Whirling boosts productivity significantly by performing the turning and whirling operations in parallel. With this technique, the speed is high enough for turning to be carried out prior to whirling. The turning tool, which is located upstream of the whirling tool, reduces the volume of material that would otherwise have to be removed by the whirling tool. This enables longer tool life to be achieved and improves surface quality. The whirling heads are very similar to conventional ones. The only difference lies in the geometry of the cutting inserts. Single-start and multi-start threads can be produced using just one cutter unit.

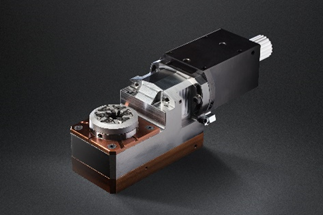
Highly productive technique

Thread whirling is generally used in the production of bone screws. In this application, the whirling head rotates at high speed as it travels over the slowly rotating workpiece. The whirling head is set for the required lead angle of the screw. The workpiece is fed axially and as this happens the whirling tool cuts the thread. Due to the high level of screw quality required, special attention must be paid to precision and surface quality when it comes to whirling tools. In addition, special materials are used for bone screws to ensure that the body is able to tolerate them when they are implanted. These include stainless steels, titanium or cobalt-chromium alloys, although the disadvantage of these materials is that they are difficult to machine. Therefore, expertise and experience are required if these materials are to be machined productively. For instance, the carbide substrates, coatings and cutting edge geometries all have to be tailored to the  application.

Horn offers further whirling technologies in addition to its JET and High-Speed-Whirling solutions. Of these, the most universal technology is the standard whirling method. The whirling head can be connected to any whirling unit. For faster whirling head and cutting insert changing away from the machine, Horn has developed a modular whirling system. Thanks to the precision interface, there is no need to readjust the whirling head once it has been removed from the machine. In addition, spacer rings make it possible to adapt the whirling tool to different interfaces. With Horn turbo whirling, high productivity is a sure thing. The cutting division between the roughing, pre-cutting and finishing cutters reduces the load on the whirling tool’s inserts. As a result, the system offers faster process times and lower tool costs.

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**Image captions:**

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**Image 1:** JET-Whirling enables longer tool life and prevents chip build-up.



**Image 2:** High-Speed-Whirling is the key to significantly faster process times.

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