

Drilling Tools

Complete and powerful

Moser-Ingold in Thüringen produces complex precision turned parts ranging in diameter from 3 to 200 mm on well-equipped multifunction turning centres and Swiss-type lathes. The company relies on solid carbide tools from Sphinx for drilling up to 30 x d.



1 Predestined for economical complete machining: Solid carbide high-performance drill Phoenix-TC2 from Sphinx Werkzeuge AG (Photo: Sphinx)

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→ “Using tools supplied by Sphinx Werkzeuge AG, we generally run with the suggested cutting data, as this is where the Phoenix-TC2 high-performance drill operates at its optimum”, reports Rolf Ochsenbein, Head of Production in the management team at contract producer Moser-Ingold AG in Thüringen, Switzerland. Founded in 1954, the family firm produces turned and milled parts in line with customer specifications and drawings made of different materials such as structural steel, stainless steel, aluminium, brass, copper and plastic. Depending on the order in hand, the components can also be ground, heat treated, hard turned and coated.

With complete machining more efficient and flexible

The specialists in the Thüringen-based firm advise their customers on workpiece design, with the focus on achieving economical and process-reliable production. They also offer optional assembly of previously produced turned

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2 Using the solid carbide tools supplemented by a pilot step drill, contract producer Moser-Ingold achieves drilling depths of up to $30 \times d$ with the utmost process reliability on its turning centres (Photo: Mücke)

optical, electrical, medical and machine engineering industry.

To allow this type of complex workpiece to be machined economically and in as rapid a sequence as possible, the company is able to draw on an array of multiple-axis CNC turning centres, including several Miyano ABX-64SY machines. These highly stable machines with their 65 mm bar capacity are equipped with a high-pressure coolant system. The main spindle achieves speeds of up to 4000 rpm and the powered spindle up to 6000, making this turning centre ideal for the economical complete machining of large components from bar stock.

To allow complex workpieces to be economically produced with the maximum productivity, the company has recently upgraded its machine outfit to include two Star-SR32J Swiss-type lathes. These machines are capable of turning workpieces up to 500 mm in length with diameters of up to 32 mm from bar stock, as well as axial and radial drilling and milling with up to eight powered tools at any optional angle. »

and milled components to produce ready-to-install modules.

The contract producer offers complete manufacturing of economical, flexible precision turned parts with diameters ranging from 3 to 200 mm in

batch sizes of between 250 and 30,000 components annually in multiple shift operation. Products include complex bolts, shafts, axles and flanges with gearing. One of the contract producer's specialities are complex turned parts for the

These comprehensively equipped CNC machine tools ensure the high levels of accuracy currently demanded by the customers in the marketplace, as they are capable of finish machining complex workpieces in a single sequence. What's more, these highly productive lathes also permit the contract producer to manufacture components in small and medium-sized series economically, even in a cost-intensive producing location like Switzerland.

Pilot testing and rapid drilling

However, economical and highly productive complete machining is only possible using suitable tools. At Moser-Ingold these include solid carbide tools from the company Sphinx, based in neighbouring Derendingen. Jeton Rama, Head of Décolletage at the Thüringen-based contract producer, explains: "We value particularly the expert advice we receive, either by phone or face to face in our company. Working closely with tool specialist Sphinx, we are able to evaluate the most suitable tool at short notice for practically any machining operation. Non-standard tools are manufactured precisely on schedule and in line with our specific needs and requirements."



3 Radial drilling without centering: Optimum selection of technology parameters makes this possible using these high-performance drills (Photo: Mücke)

One of Moser-Ingold's specialist fields is deep drilling of boreholes up to 30 x d with a 3 mm diameter. These are required for instance where profile shafts need to be drilled through centrically. In conjunction with the high-pressure coolant plant which produces a pressure of up to 140 bar, it's possible to achieve

deep-hole drilling on the Swiss-type automatic lathe without problems in series production. "Particularly when it comes to deep hole drilling, the solid carbide high-performance drills of the Phoenix-TC2 series from Sphinx have been shown to provide outstanding process reliability", reports Head of Department Jeton Rama.

Initially a 3 mm diameter pilot step drill is used for centering and pilot drilling. The point angle, diameter and steps of the solid carbide pilot step drill are precisely coordinated in line with the Phoenix TC2 high-performance drill, which allows rapid subsequent drilling through to 30 x d without the need for chip removal.

In the Sphinx tooling system, in the event of drilling depths greater than 9 x d, pilot step drills are always used. Even in tough, hard materials, these and the Phoenix TC2 high-performance drill always achieve an extremely long tool service life. Jeton Rama emphasizes: "The long service life means that we can work with the utmost process reliability. The cutting step of the pilot drill saves the need to use an additional tool, so freeing up an important tool slot in the machine." Particular economic benefits appreciated by the Head of Production



4 Successfully integrated high-performance drilling into complete machining operations on turning centres (left to right): Rolf Ochsenbein, Head of Production at Moser-Ingold, Marcel Loosli, Sphinx, and Jeton Rama, Head of Décolletage at Moser-Ingold (Photo: Mücke)



Ochsenbein are the short throughput times and greater flexibility. “Using the Phoenix TC2 high-precision drill on the turning centres does away with the need for laborious, time-consuming extra machining operations on separate machines”, he adds. This has meant a significant reduction in costs, and is also the reason why investing in the high-pressure coolant system has paid dividends.

By using high-performance tools from Sphinx, the contract producer has been achieved far more flexible, productive and economical manufacturing and so been able to land additional orders. Ochsenbein describes his strategy:

“High-performance tools require a high-performance machine. By creating the perfect conditions, you can expect to achieve perfect results.” Looking at investment going forward, high-pressure coolant systems will definitely be inte-

grated into any future turning centres, as this will enable the benefits of the Phoenix-TC2 high-performance drill to be leveraged without any limitations.

Process-reliable machining with solid carbide drills

For radial drilling operations on cylindrical workpieces too, the Phoenix TC2 solid carbide high-performance drills from Derendingen have proven particularly beneficial. They enable contract producer in Thöringen to achieve radial through drilling processes on shafts with powered tools on their multiple CNC turning centres without previous pilot and spot drilling. This is achieved with outstanding process reliability using the 5.05 mm solid carbide drills for drilling depths up to 6 x d. Following drilling through, the boreholes are chamfered with a short NC chamfering drill.

Marcel Loosli of the Application Engineering Department at Sphinx Tools explains this drilling strategy: “We work very closely with our customers in each individual case. Due to our extensive project experience, we are very well acquainted with the special requirements arising from a lot of different production processes in the industry. This allows us to suggest and jointly optimize suitable technology data such as cutting and feed rates. No matter how difficult the manufacturing conditions may be, it’s possible for us to find the optimum parameters, and we can work together with the user to implement the most process-reliable solution possible.” ■

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