

Component solutions

Automotive

Crankshaft excellence

# Expertise for challenging production

Sandvik Coromant has helped customers from all over the world to design tools and solutions for crankshaft machining. We have a global operating competence center with the hub in Germany and specialists in all key markets, where we continuously develop cutting edge solutions together with customers and machine tool makers. Throughout the years, we've built a reference library of more than 1,800 customized disc tools with diameters ranging from 450 to 1,400 millimeter.

Our customers bring us crankshafts in a variety of shapes and sizes, but common to all is the asymmetrical, long and relatively slender design, that is prone to vibration. The instability, along with high tolerance demands and challenging material machinability call for truly optimized tools and methods to succeed. We've presented a complete offer of crankshaft tools and solutions that call for extra attention.


Best regards,



Stefan Knecht  
ECC and Global Solutions  
Manager, Crankshaft

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## Customer case

Chongqing Changan Automobile ordered four new crankshaft production lines, with a total of 32 machines including the supply of tools for production of 600,000 crankshafts at the starting stage of the production line construction.

Sandvik Coromant was sole tools supplier and thus responsible for the total tooling and engineering solutions. And it's a large project that gets supports from both China and other organizations within Sandvik Coromant across the world.

The huge challenges of the project include the large variety of different methods and operations of manufacturing and the tight schedule.

In addition to general applications such as turn-turn broaching of flange ends, post-end and main bearings, the customer also needed special tooling and external milling of pin bearings, specific tapping operations and deep-hole drilling.

The timing of this project was also very strict, with only seven weeks between receipt of the order and the first delivery.

SANDVIK Coromant

## Main and pin journals

For roughing and semi finishing operations we recommend an internal or external milling concept for the pin journals and a turn-turn-broaching or milling solution for the main journals depending on the stock situation.

## Internal milling

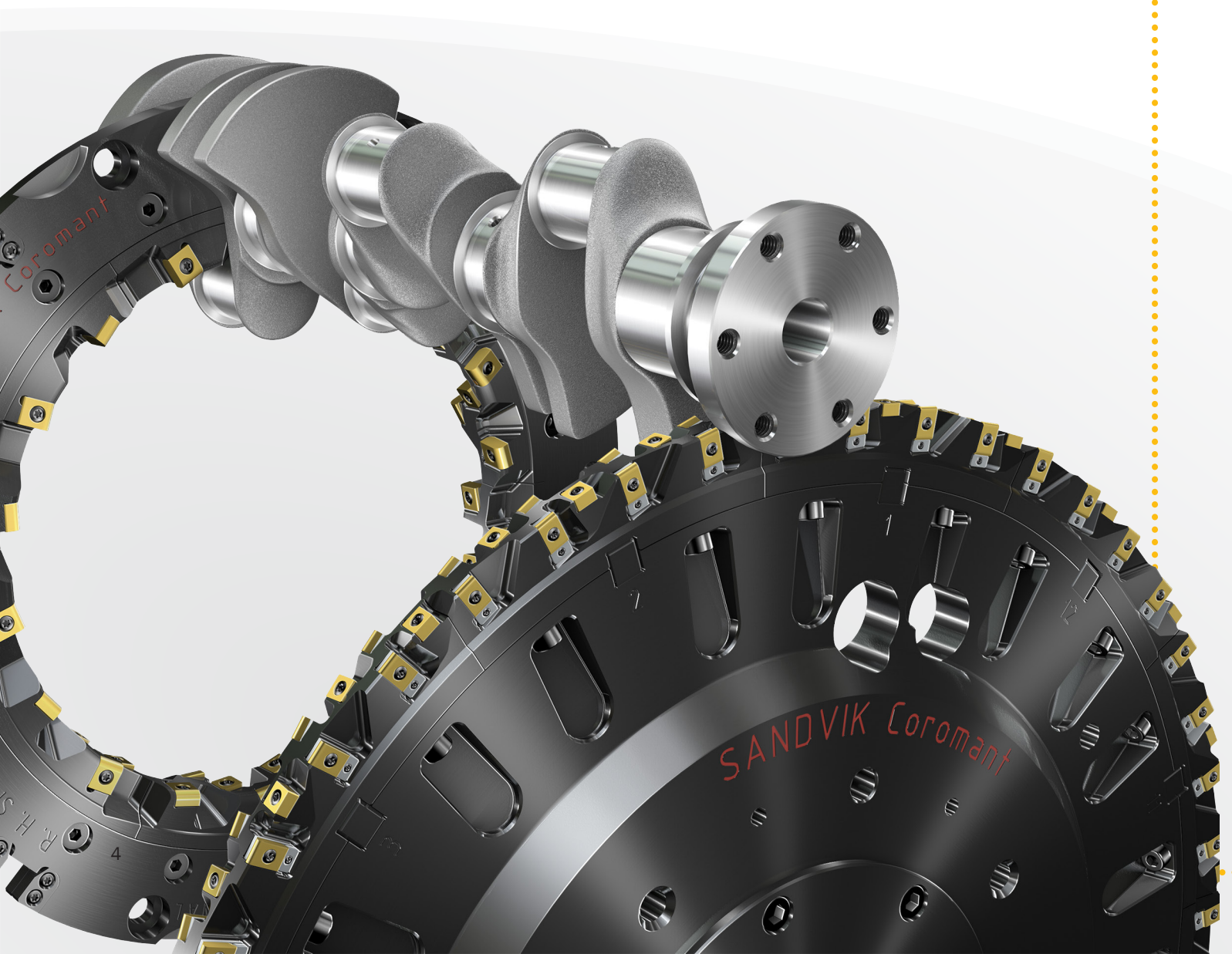
The Sandvik Coromant internal milling solution is a stable, exchangeable segment system with a high process security. There are several benefits compared to external milling. Firstly, the process stability enables low cost per part. The high tool life also improves the cost efficiency of this method.

The range of different tools range from less than 15 kg tools up to large tools for ship diesel crankshafts. Tangential inserts with pressed geometries are available.

## External milling

External milling is a flexible and productive method used mainly for large-volume machining of small to medium-size automotive crankshafts.

The first adjustable cutters for external milling were based on a Sandvik Coromant patent, and we've continued to develop productive solutions. Our large discs with a high number of effective teeth are designed to secure excellent chip removal, high cutting speeds and process security. The latest innovation shortens tool change substantially as only segments with a weight of less than seven kilo are exchanged. This means that you will not need a crane in front of the machine.



## Turn milling for small batches

Turn milling is a productive and cost efficient method for small batches as there is a wide range of standard tools available. The longest crankshaft we've helped machine through turn milling so far was nine metres, but we haven't reached the limit yet.

## Cut to length and centering

Our standard product range contains face-milling cutters with up to 12 cutting edges per insert.

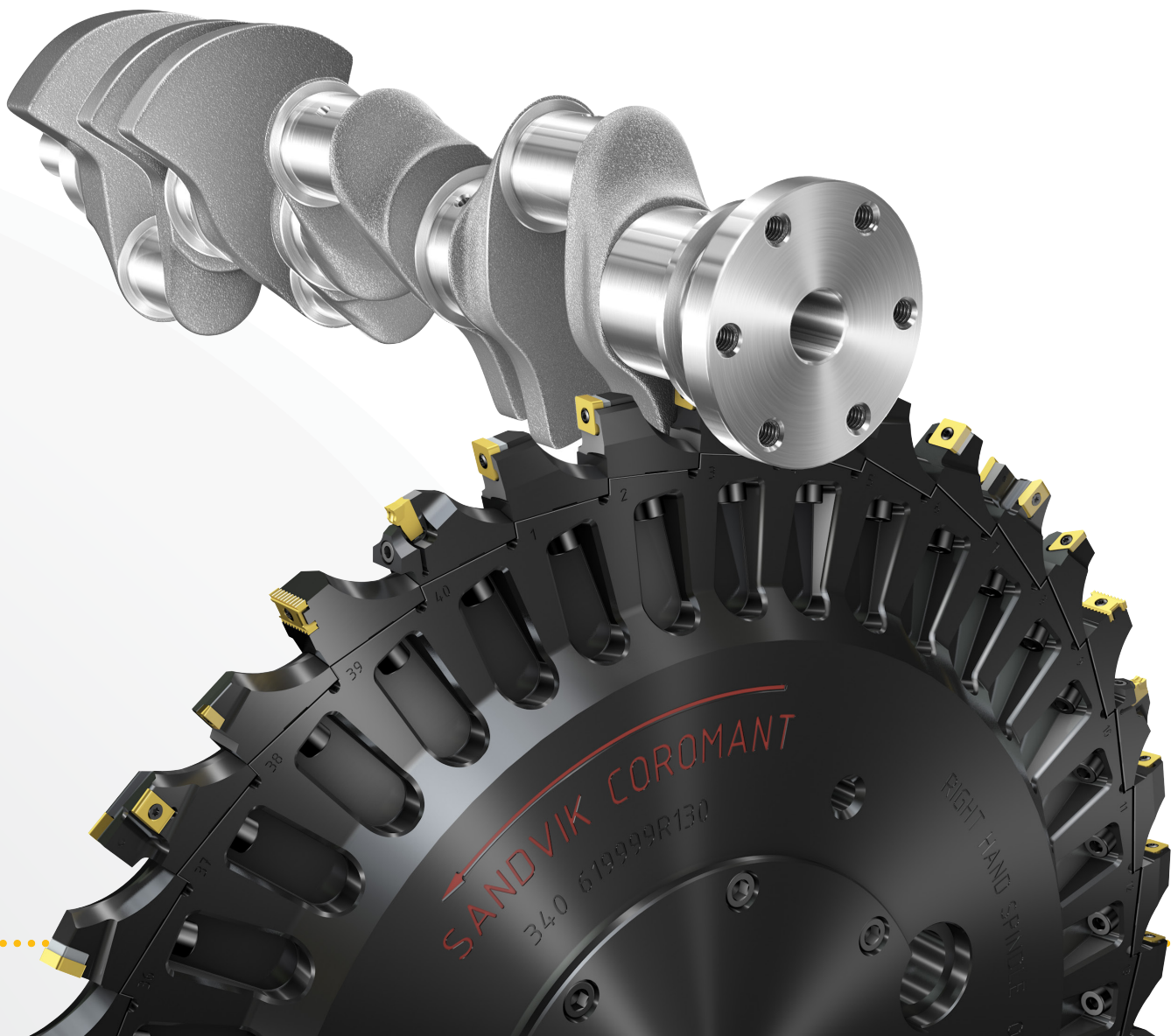
## Turn-turn broaching

Turn-turn broaching is a combination of turning and turn-broaching where the turning and turn-broaching tools are mounted radially on a disk turret that moves into the crankshaft and along the bearings, machining as the crankshaft rotates. It is a productive, cost effective and flexible method, capable of short cycle times, highest flexibility and fast tool-handling and tool-setting times.

The crankshaft-chasing insert is actually a Sandvik Coromant patented development as well as many other solutions as the tools weigh less than 15 kilos. You can use up to 48 cassettes on a 700-millimetre tool.

## Inserts for turn-turn broaching

Sandvik Coromant offers inserts for machining crankshafts in turn-turn broaching machines - for turning disc tools with up to 48 cassettes. The inserts various Taylor made are available in C, T, W and S insert styles and have screw clamping for best stability. The inserts enable to apply inserts with a maximum number of possible cutting edges in small cassettes with limited space. In 2014 we introduce a new standard program of TTB inserts in the most modern grades 4315 and 4325 with 23 variants of CNMU, WNMU, TNMU and SNMU types.



## Oil hole drilling

Needless to say, chip evacuation and precision are the main challenges when drilling the oil holes. We recommend producing both the pilot hole and the actual hole with a solid carbide deep hole drill such as CoroDrill 861. It gives accurate deep holes with hole tolerance IT8-IT9 to depths up to  $30 \times$  drill diameter, without pecking.

High speeds and feeds reduce the cost per hole. Additionally, fast and efficient chip evacuation reduces machine downtime and increases tool life. Clamp with high precision chucks only.

We have a standard product assortment for deep hole drills with lengths up to 30 times the diameter. They all promise reliable chip evacuation crankshaft oil hole drills are suitable for minimum quantity lubrication (MQL).

## CoroDrill® 861

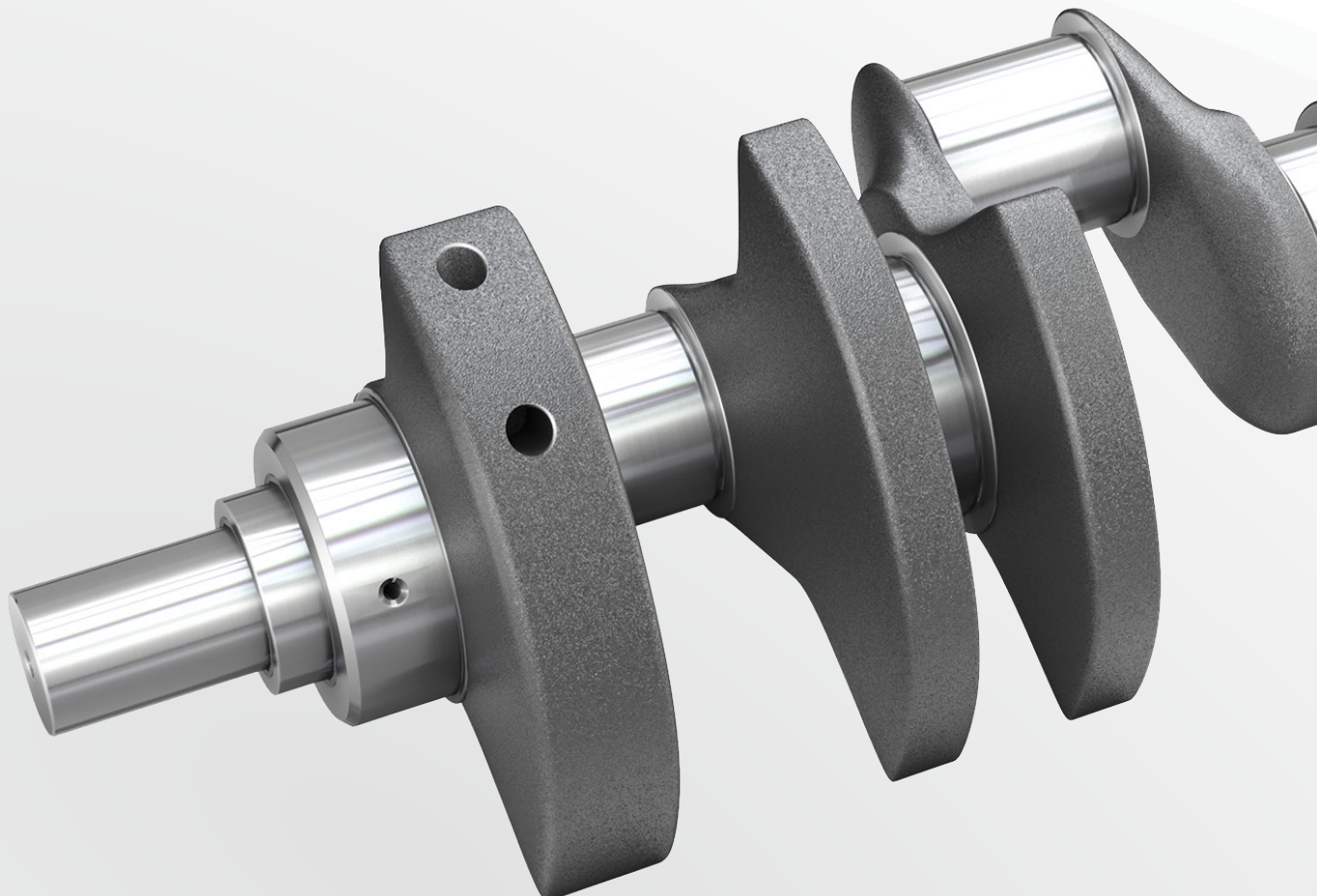
provides the high stability essential for drilling deep holes, with high speed and efficiency.

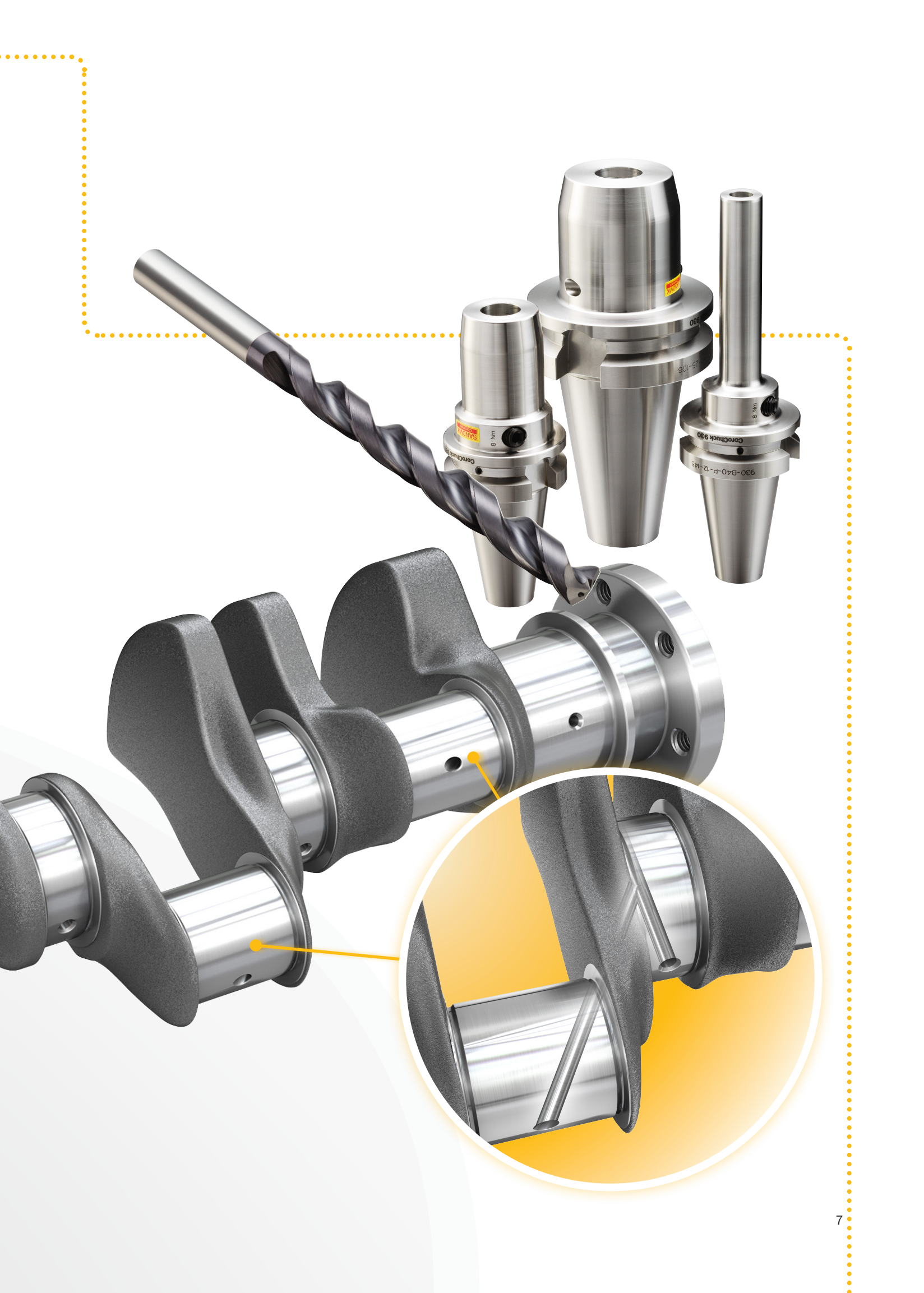
- Accurate deep holes to depths up to  $30 \times$  drill diameter, without pecking
- High speeds and feeds allow greater productivity to reduce cost per hole
- Fast and efficient chip evacuation reduces machine downtime and increases tool life

## CoroChuck™ 930

is designed to eliminate vibration for excellent stability and accessibility in all drilling operations and has the best pull-out security on the market. Covering all machine interfaces, CoroChuck™ 930 helps to maintain efficient production through quick and easy tool set-ups and changes.

- High metal removal rate provides increased productivity
- Secure processes and safe machining
- Enhanced surface finish and increased tool life
- Close hole tolerance







## Engineering Competence Center (ECC)

Düsseldorf is globally responsible for R&D, engineering, design and manufacturing in crank- and camshaft machining, as well as for linear broaching globally and turnmilling in EMEA.

The crankshaft area is dominated by OEM and MTM customer projects with Turn-Turnbroaching, ID Milling, OD Milling and oil hole drilling.

It all comes down to the total cost per component.