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Support milling with the right tools and know how

When outsourced manufacturing processes such as milling are brought back in-house due to the uncertainty of supply chains, up-to-date engineering skills and fresh know how are often required. The general trend to increase productivity and improve profitability may be timeless. However, when it comes to current trends, it is easy to lose sight of the big picture. The selection and use of the right tools and tool holders are critical as they determine the quality and efficiency of the end result. So, wouldn't it make more sense to consult a cutting tool manufacturer?

ARNO Werkzeuge is known for turning and parting-off tools. What is less well known are the company's equally innovative milling tools

If the crises of the past few years have made one thing clear, it is how fragile our supply chains are and how quickly they can be disrupted. The result is that business is done by those who can deliver. Manufacturers and production companies are therefore bringing back in-house manufacturing processes that they outsourced overseas years ago for cost reasons. The trend has been evident for some time. However, a problem arises if the knowledge and expertise have also migrated with the processes.

BRINGING BACK MANUFACTURING PROCESSES

In general, the successful machining of steel and, in particular, the precise and efficient milling of steel are impacted by a multitude of factors and their complexity can quickly become overwhelming. Tool manufacturers who can think in terms of the application are therefore a necessity – especially when they are also willing to provide advice on complex production processes.

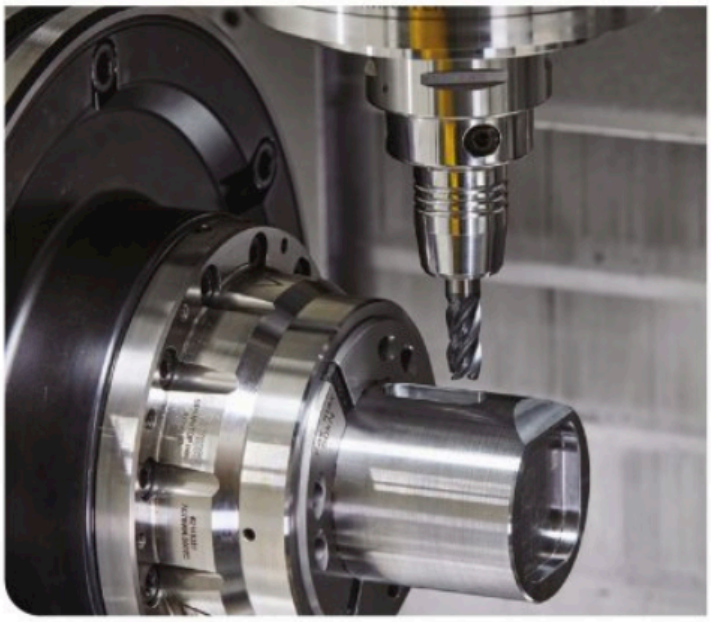
The Swabian medium-sized company of Karl-Heinz Arnold GmbH with its brand name of ARNO Werkzeuge is known for its first-class turning and parting-off tools. It has been a constant player in these processes for many years. What is less well known is that the family-run company also develops innovative milling tools that are manufactured in Germany. "With a high level of vertical integration, our development expertise and global sales structures, we manufacture high-performance milling tools that are deployed worldwide for efficient milling," says ARNO marketing team leader Christian Kimmich.

Support often incorporates systems such as a tool holder for corner milling and HFC indexable inserts, a multi-functional system for HFC and corner milling, a face milling system and solid carbide cutters. In particular, a new system for face milling has been introduced and it incorporates a recent new development. "One trend among users is towards smaller machining allowances for workpieces that run faster and at higher feed rates," says Marco Staiger, Application Engineer at ARNO Werkzeuge.

This is precisely why ARNO has developed the new, stable FT face milling system 09, a system that focuses on the application. The FT system is very stable and features a smooth cut and very quiet running. This provides the spindle with maximum protection and is the result of a large flat face on the holders, a positive rake angle despite the negative mounting position and a differential pitch of the flutes.

More teeth and smaller double-sided indexable inserts

The new FT 09 milling system consists of two variants of stable tool holders covering a diameter range of 20 to 125mm and it



With solid carbide cutters, ARNO Werkzeuge has tools in its portfolio to achieve optimised production processes

is equipped with eight flutes and matching smaller indexable inserts. The differential pitch of the tool holders ensures a quiet and low-vibration milling process. Especially with small allowances, ARNO promises a higher chip removal rate due to the higher feed rates.

"Since we managed to achieve a narrower pitch in the tool holder, even though it has a small diameter, we can now place more teeth on the tool," Staiger explains. This means that up to nine indexable inserts can be fitted, where only six were possible before. Despite the narrower dimensions, users do not have to dispense with cooling.

Staiger adds: "Through the internal channels for cooling media, cooling lubricant or air for dry machining are fed directly to the cutting zone and ensure significantly longer tool life and optimum chip removal." A particularly convincing feature is the optimal utilisation of the flute with smaller in-feeds up to a maximum of four millimetres. This means users no longer need to discard half-used indexable inserts.

THE LARGE POOL OF APPLICATIONS DEMONSTRATE ENGINEERING COMPETENCE

Those who do not want to opt for 'fast' or 'fine' machining are best advised to use Arno's FD milling system. The nickel-plated long-life basic holders for corner milling and the HFC indexable inserts with four efficient cutting edges per insert can combine to achieve a high feed rate. These tool holders also have a differential pitch that reduces vibration and results in smooth surfaces. The system ensures a long service life and is easy to handle.

Most users set their machining priorities with indexable inserts in sizes 10 and 15. The smaller insert achieves high surface finish credit to its large wiper geometry. By contrast, the 15mm inserts are ideal for roughing since they are extremely stable. ARNO offers different geometries and grades to flexibly adapt machining to the application in question. This is precisely where ARNO excels. It draws on the experience gained from a huge pool of applications and can advise on the most suitable tooling system for each case. The precision-manufactured positive chip breakers on the indexable inserts ensure a soft cut. Since they are also peripherally ground and polished, the PMA geometry can cut both aluminium and non-ferrous metals.

With solid carbide cutters, ARNO also has tools in its portfolio that achieve optimum production processes with reduced downtimes thanks to fewer tool changes. The solid carbide metal cutters are made of an extremely fine grain carbide grade between 0.1 and 0.5µm. The consistent material properties are impressive and depending on the design, they are TiAlN, TiCN or AlCrN coated.

ARNO's FE milling system is an alternative to solid carbide metal cutters. Manufacturers can opt for efficient shoulders or high speed during HFC milling. "In both cases, users benefit from high feed rates, extremely smooth running and excellent cutting ability," promises Staiger. This is due to the highly positive mounting position of the indexable inserts and the spiral shape of the flutes, ensuring smooth material cutting.

It is also an ideal situation if the tool supplier can adapt to the needs of its customers with special product lines. With the Basic Series, ARNO Werkzeuge offers efficient, rock-solid tools with many grades and geometries that are suitable for a wide range of machining tasks. On the other hand, the tools in the 'Major' series are used when surfaces need to be outstanding. Every minute counts when it comes to tool life and difficult-to-machine materials or large production runs. The tools can be individually adapted with a selection of coatings or tool holders.

CONCLUSION: MILLING TOOLS BENEFIT FROM TURNING EXPERIENCE

With its carefully designed and well-engineered milling tools, ARNO Werkzeuge has no reason to hide its light under a bushel. This is because it also benefits from the turning and parting-off expertise as well as from its application experience. We were impressed by how the milling systems are precisely developed for different applications and yet offer the greatest possible flexibility. With its extensive portfolio, ARNO serves the trends in milling.