

Swiss type machining

With ARNO you benefit from reliable processes, long tool life, a revolutionary tool changing system and more productivity in your Swiss type machining production shop.

OUTSTANDING

OUTSTANDING FOR MORE PRODUCTIVITY IN YOUR PRODUCTION.

Do you have challenging machining tasks? We have outstanding solutions. For three generations, we have been developing tool systems which have outstanding quality, long tool life and process reliability. As an ARNO customer you benefit from a combination of experience and pioneering spirit. Besides these values we are also influenced by the typical Swabian talent for inventiveness. We are proud to assist our customers to secure that extra competitive advantage with clever new developments and advancements and we will continue along this path in the future.

SWISS TYPE MACHINING WITH ARNO.

04	The ARNO added value
10	Swiss type machining highlights
22	ARNO systems for Swiss type machining
24	Overview
26	SA and SE grooving systems Parting off and grooving, copy turning
28	AMS – ARNO Mini-System Internal machining
30	ISO turning External and internal machining
32	DECO-CUT Groove turning system
34	SHARK-CUT Multi purpose tool
36	Overview of applications
38	Success story
42	ARNO Services

MASSIVE BENEFITS.

Fast tool changes

Fast, simple, safe, precise: ARNO Fast Change, in short AFC, with two-part tool holder – for speed and convenience when changing tools.

Cool sliding head

An end to jumbled hoses – thanks to the AWL sliding head with integrated coolant supply for perfect set-ups.

Patented cooling system

ACS – ARNO Cooling System: the original from ARNO Werkzeuge – coolant is supplied through the insert seat and goes under the swarf.

300% longer tool life

Even with deep, narrow part-off and grooving operations, the ACS – ARNO Cooling System achieves outstanding increases in tool life of 300% and more.



Extremely high-precision

Precise fit for any application: The largest portfolio of high-precision indexable inserts in the world is the solution for thin-walled parts and materials that are difficult to machine.

Multi purpose

Turning and drilling with only 1 tool: SHARK-CUT is the solution for the lack of tool positions on the machine.

70 to 90% potential savings

Tests at customer sites show that the high-performance SA and SE grooving systems from ARNO achieve very high cost savings.

Perfectly centred

The ARNO Mini-System permits perfect positioning at tip height straight away.

Loads of PS for Swiss type machines

Perfect for long thin-walled workpieces: PS indexable insert geometry is specially designed for Swiss type machines.

All-inclusive package

We make your work easier all the way down the line by personal consulting, fast delivery and comprehensive documentation.



IF YOU HAVE A SWISS TYPE MACHINE, YOU SHOULD GET TO KNOW ARNO.

Interview with: Klaus-Dieter Krüger, Sales Manager North at ARNO Werkzeuge on clever ARNO solutions for Swiss type machining.

Why should customers opt for ARNO when they require Swiss type machining applications?

I can think of many reasons why. For example, Swiss type machines are almost always used in mass production. That's where our SA and SE grooving systems achieve extremely long tool life. Most applications deal with the production of filigree shapes – and our inserts with the PS-geometry are perfectly designed for this task. We score with our high-positive indexable inserts when it comes to materials that are difficult to machine – in fact we have the greatest diversity world-wide. And as tool changing and adjusting coolant supply is always an inconvenient error-prone issue due to the limited space inside machines, we developed the AFC holder and the AWL sliding head. Together they form a genuine revolutionary system for Swiss type machines.

A revolutionary system for Swiss type machines – that sounds exciting. What's behind all this?

AFC stands for ARNO Fast Change. And that's exactly what it is: a two-part tool holder for extremely fast, simple and reliable tool changes. The special features of the AWL sliding head is the integrated coolant supply. Of course, the AFC holder and AWL sliding head can be used separately – but when they're combined, they achieve maximum results – it's so simple and convenient.

A sliding head with internal cooling – that means internal cooling doesn't need a separate set-up for each tool? No complex hose assemblies any more?

Exactly. That's what so brilliant about it. Coolant supply can be connected on five sides, depending on the machine. Cooling can also be cut off, even partially. And everything is leak-proof and totally without a jumble of hoses. Another clever thing is the clamping claws with side screws on the head. They're extremely compact, in fact they're only 5.5 mm high and their clamping force is superb.





“Companies who use AFC never want to give it up!”

What's so special about AFC holders?

The two-part holders make tool changing a sure thing – anybody can do it. Only the front part needs to be removed to replace the insert. When the two holder parts are plugged back together, they are immediately connected by an O-ring to prevent the tool from falling into the machine accidentally. The floating mount makes the parts fit together perfectly. It compensates for the offset angle so we achieve a high level of repeatability. Customers who already use AFC holders really appreciate them. They wouldn't replace them for the world!

Is it worth while switching over to ARNO even if it wasn't for AFC holders or AWL sliding heads?

Of course it is! Our SA and SE grooving systems can take on any competitors' product – we are genuine grooving specialists and our patented ACS cooling system offers benefits which nobody else can. On average, we achieve a longer tool life of 300%. And when it comes to difficult shapes and materials that are difficult to machine, our range of inserts with the PS-geometry and high-positive indexable inserts is unbeatable. Summarizing, if you have a Swiss type machine, you should get to know ARNO.

THE TURBO COMBINATION FOR SWISS TYPE MACHINES.

The challenge

Swiss type machines pose special problems to users due to their limited space. In many cases, installing and adjusting coolant supply and replacing inserts is a difficult and time-consuming operation. This causes unnecessarily long machine downtimes and, in the worst case, even production errors.

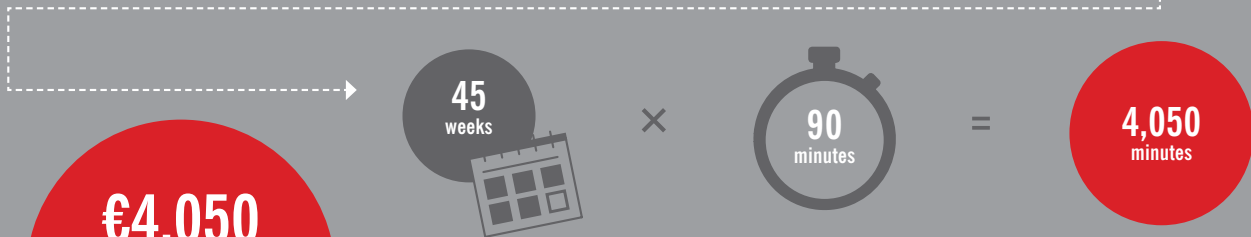
The solution

A combination of AFC tool holders and AWL sliding heads:

- **AFC for fast and easy tool changes – thanks to the two-part tool holder where only the front part needs to be removed to carry out the change; available with ACS cooling system**
- **AWL for efficient cooling without complex connection of the internal cooling system – thanks to sliding heads with integrated coolant supply**
- **It gets even better with the ACS – ARNO Cooling System which offers effective cooling – besides the AFC tool holders, all existing ARNO monoblock holders can be fitted with ACS1 and ACS2 cooling**

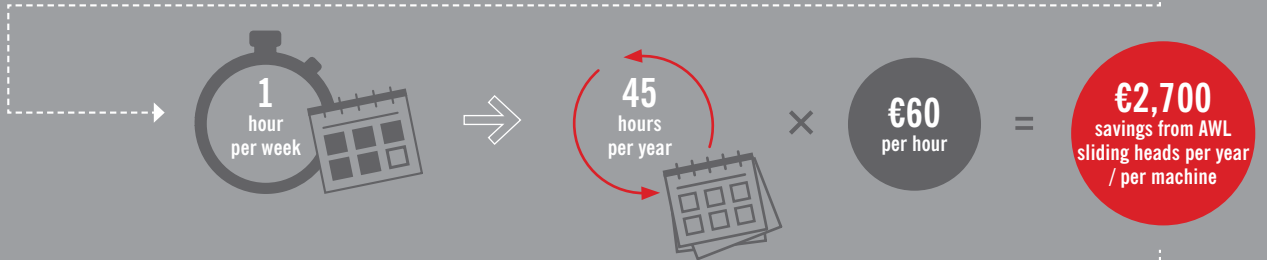
The result

By combining AFC tool holders with AWL sliding heads, tool changes and adjusting the coolant supply become simple, fast and reliable. In addition, the ACS – ARNO Cooling System achieves very long tool life. As a result processes run smoothly, quality is outstanding and downtimes are reduced.



€4,050
savings with
AFC holders per year /
per machine

Costs = 67.5 hours x €60



Savings = €2,700 + €4,050 = €6,750 per year / per machine

€168,750
total savings
per year
with 25 machines

INNOVATIVE HIGHLIGHTS FOR MORE PRODUCTIVITY.

When the application involves the mass production of long narrow parts made of bar material, Swiss type machines are unbeatable. They work even better with precise, long-lasting tools, effective cooling and easy tool changing. That's exactly what we offer:

PACEMAKER

AFC tool holders

Perfect for simple, reliable and fast tool changes: the two-part AFC holder makes tool changes so easy and lightning fast. See page 12 for more details on AFC holders.

SIMPLY COOL

AWL sliding heads

Efficient coolant supply is so easy. With AWL sliding heads and integrated coolant connection, efficient internal cooling was never so easy, clean and neat. See page 14 for more details on AWL sliding heads.

ENORMOUS DIVERSITY

High-positive indexable inserts

Perfect for high-precision machining with demanding materials and thin-walled components: ARNO offers the largest standard portfolio of high-positive indexable inserts in the world, including intermediate sizes and edge-honed executions. So there is a best possible solution for every complex challenge. See page 16 for more details.

3X LONGER TOOL LIFE

ACS – ARNO Cooling System

The patented cooling system from ARNO for grooving systems: only the ACS feeds the coolant hole directly along the insert seat. For optimum cooling of the insert and reliable chip evacuation. ACS2 also has a second coolant hole to cool the tool flank from the bottom. That's because in machining, double the cooling makes for longer tool life. See page 20 for more details.

“With AFC and AWL we make things easier for the customer.”

Swiss type machines are great and also easy to operate – the only thing is that tool changes are complicated. There is simply too little space. That is why machine operators need more time and easily make mistakes. That was the reason for developing the AFC. The two-part shank system and the floating mount make tool changes much simpler, faster and above all more precise than before.

Besides this, we also took a good look at cooling. AWL sliding heads do not have anymore jumble of hoses. Everything is leak-proof and coolant supply can even be partially cut off if not everything needs to be cooled.

But honestly, it's difficult to put in words. It's much easier to see it in real life – then you realise how much simpler everything is.

Marco Staiger, Application Engineer at ARNO Werkzeuge, talking about AFC tool holders and AWL sliding heads.



For more about outstanding ARNO innovations, go to auto-lathes.arno.de

SWISS TYPE MACHINING, FAST CHANGES.

AFC tool holders: the revolution in fast tool changes – patent applied.

Your solution for easy tool changes despite limited space in Swiss type machines: the two-part AFC holder – even untrained staff can replace tools fast and reliably.

This is how it works: The rear part of the tool holder (AHA fixed stop) is first fixed in place. Only the front part is removed to replace the tool. This eliminates the need to restart and recalibrate the zero point since the length to the insert tip is always the same – whether the grooving system or the turning system is used. When the two holder parts are plugged back together, they are immediately connected by an O-ring to prevent the tool from falling into the machine accidentally. At the same time, the floating mount provides enough clearance to compensate for angle offset. The two parts then fit together perfectly. Now you benefit from a high level of precisions when changing tools and a leak-proof coolant hole.



IMMEDIATE BENEFITS of the two-part AFC tool holder

Simple – only the front part of the holder is removed to change the tool

Precise – the floating mount compensates angle offset

Fast – starting and calibrating the zero point are eliminated, that is why the tool is changed in no time

Flexibly combinable

- The right sizes to fit all sliding heads

Simple tool changes

- Only the front part of the holder needs to be removed
- It is easy to use. Even untrained staff can change tools easily.



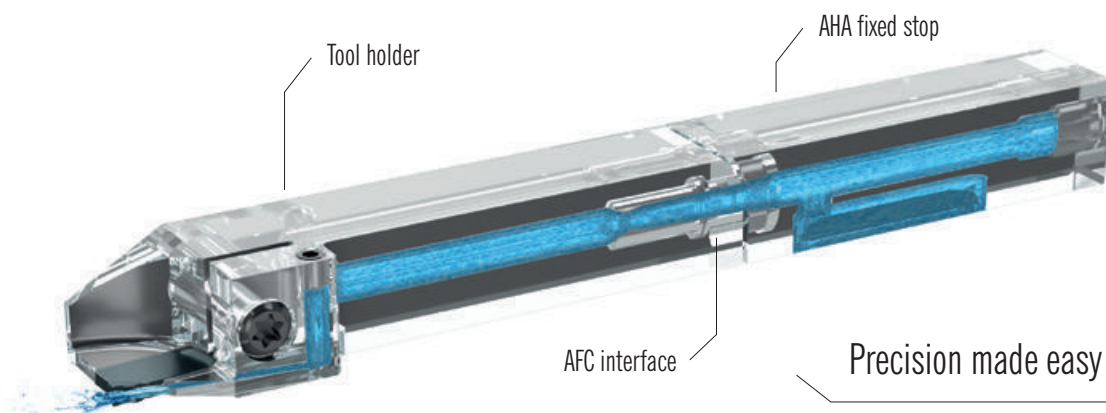
ARNO DIGITAL // For all details on the AFC system, go to auto-lathes.arno.de

Floating mount

- Angle offset compensation when clamped
- Secure hold when fitted together – nothing drops into the machine

2-part tool holder

- Rear part (AHA fixed stop) to fix the zero point
- Front part for fast, convenient tool change
- Available with or without internal cooling



Precision made easy

- Precise tool change by angle offset compensation
- Excellent clamping in connection with the AFC sliding head

COOL RIGHT FROM THE START.

AWL sliding head*: with integrated coolant supply – patent applied.

Practical to achieve reliable efficient cooling: the integrated coolant feed on the AWL sliding head redudantise complex installations with coolant hoses and space-consuming set-ups. Thanks to two separate coolant channels, you can cut off coolant supply completely or partially at any time – even at 130 bar everything stays absolutely leak-proof.

Another clever feature: the counter nuts on the clamping claw screws raise the wedges when turned. This makes it easier to remove the holder to facilitate tool changes. The clamping claws mounted on the side also enhance the clamping force and have a low height of only 5.5 mm.

* AWL sliding heads are currently available for selected Citizen machines. On request we manufacture AWL heads to fit your machine type. Simply talk to your ARNO contact person.



INTEGRATED ADVANTAGES of the AFC sliding head

Reliable cooling without hose assemblies – thanks to the integrated coolant supply in the sliding head

Flexible – the coolant supply can be completely or partially cut-off

Securely clamped, easy to release – side-mounted clamping claws provide excellent clamping, counter nuts in the screws make tool changing easy

Flexibly combinable

- All one and two-part tool holders are available in various sizes

Height of only 5.5 mm

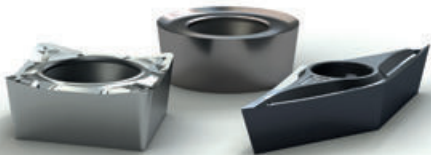
- Ideal for restricted spaces inside Swiss type machines

TOP FORM FOR SWISS TYPE MACHINES.

Your Swiss type machining specialists: indexable inserts with PS geometries and high-positive indexable inserts for high surface quality.

No-compromise quality is required for indexable inserts to machine long thin workpieces. Top surface quality can only be achieved straight away by a combination of an ultra-fine grain substrate, precision ground cutting edges and highly polished chip breakers.

This is why ARNO developed indexable inserts with the PS geometry especially for Swiss type machines. They achieve excellent results and long tool life. If the requirement is for particular precision and top surface quality, our extremely sharp high-positive ASF, ACB, AWI and ALU inserts are the ideal supplement. That is why you do not have to compromise on precision, you'll find we have a range of different corner radius, grades and both sharp and edge-honed inserts. In this way you can set up your Swiss type machine for any challenge.



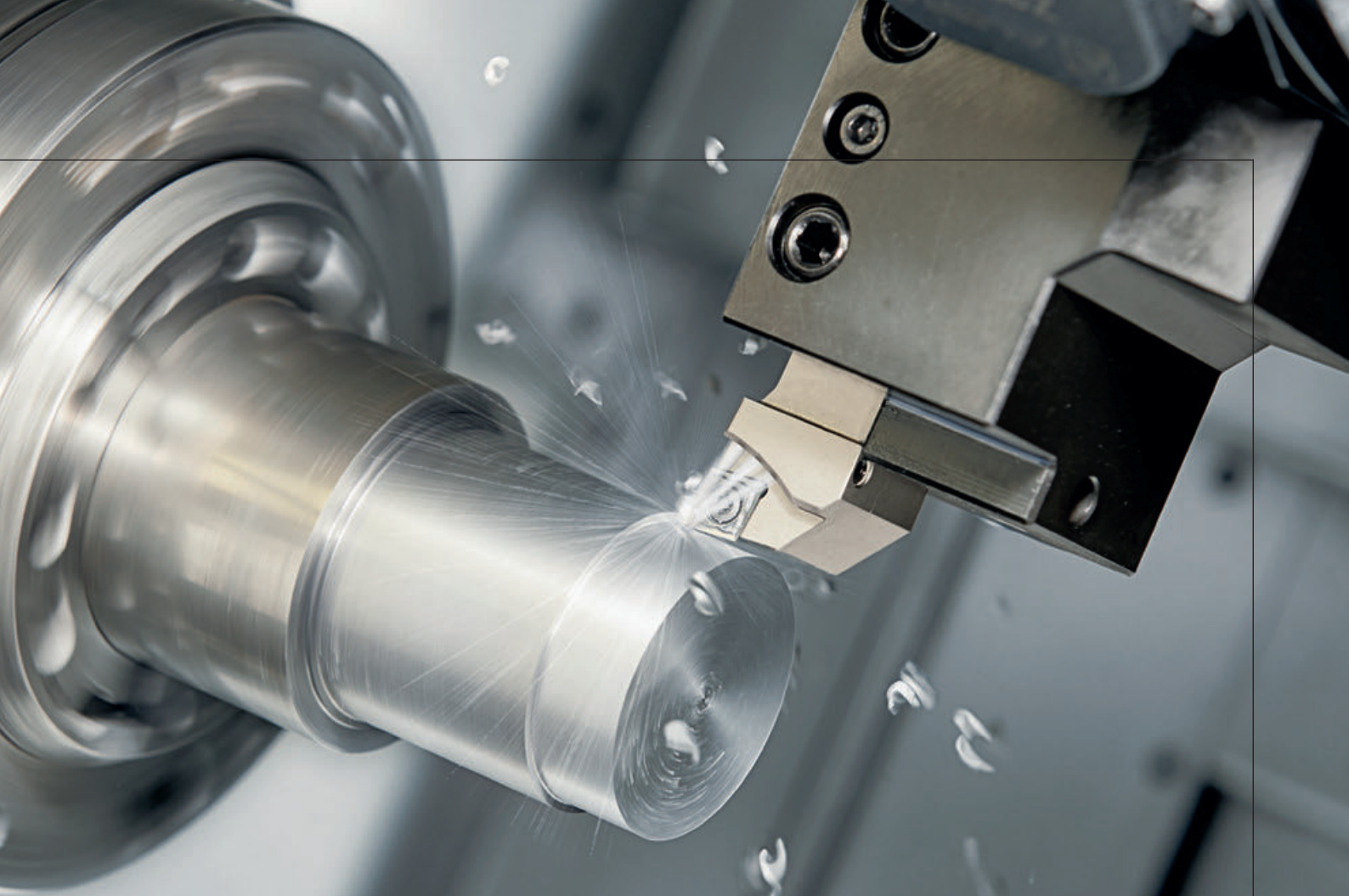
Precision ground indexable inserts

We precision grind over 2.5 million indexable inserts with complex geometries every year. So we can guarantee you the best quality.



Exactly what you need – no compromise

Besides standard sizes we also offer you intermediate sizes, edge-honed inserts and special coatings. You'll find tailor-made solutions at ARNO to meet every requirement.



Behind the scenes // Interview with Josef Storf, Managing Director ARNO Werkzeuge talks on the next page about indexable inserts specially developed for Swiss type machines >>>



PRECISE BENEFITS

from ARNO indexable inserts with the PS geometry and high-positive geometries

Top quality – the special indexable inserts for Swiss type machines are precision ground in-house at ARNO

Tailor-made solutions – besides standard sizes there are also many intermediate sizes and sharp and edge-honed inserts

Sharp cutting edges for demanding materials – ideal for thin-walled workpieces

WHATEVER WE DO, WE DO IT RIGHT!

Interview with: Josef Storf, Managing Director ARNO Werkzeuge,
talking about indexable inserts for Swiss type machining.



Since when has ARNO supplied indexable inserts specially for Swiss type machines?

It all began in the 1990s. At that time, we started to polish and grind high-positive indexable inserts to machine aluminium. The idea then occurred to us to also use the know-how we had gained for Swiss type machining. With materials that are difficult to machine and in the Swiss type machining sector, the general requirement is for tools with a clean sharp cutting edge. So we developed the PS chip-breaker for Swiss type machines with a ground cutting edge and polished chip breaker. It was unusual at that time. Up to 6 or 7 years ago, most Swiss type machine users ground their tools themselves since there was nobody else who could achieve the required precision.

What are the differences between an insert with the PS geometry and a high-positive indexable insert from ARNO?

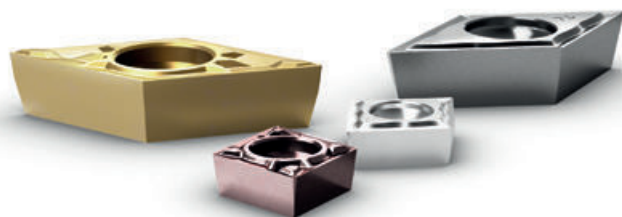
The main difference is the rake angle – our high-positive indexable inserts have angles ranging from 18 to 25 degrees. The PS has an angle of about 11 degrees. This rake angle is ideal for machining very small parts. The cutting edge on the PS is straight and this is again better for deeper cuts. Raised high-positive cutting edges could cause score marks. And of course straight cutting edges are more rigid. Otherwise high-positive and PS inserts are very similar: They all consist of a special ultra-fine grain substrate, they are periphery ground and have a sharp cutting edge combined with a polished chip-breaker. This makes the inserts so sharp that the workpiece is not displaced, no matter how long and narrow it is. Together with the optimised design of the chip-breakers, we achieve the perfect chip, i.e. shaped like the number six.

What has changed for indexable inserts for Swiss type machines since the 1990s?

Quite a lot. We have continuously expanded our portfolio. For example, all inserts come in a wide variety of corner radius. They start at 0.05 and go up to 3.0 mm. And there are also more combinations of grades and cutting edges. Meanwhile, we have FN inserts with extremely sharp cutting edges, both coated and uncoated. The latest product is an edge-honed insert for rough machining and it also comes with and without coating. The edge-honing has the advantage of prolonging tool life – and this is of course vital in view of steadily rising costs.

What can we expect in future?

When it comes to the topic of rough machining on Swiss type machines, we are in the process of developing something new in addition to edge-honed inserts: precision sintered inserts that can be pressed with such precision that they need no grinding. This makes their price attractive, but of course they can only be used in specific applications. Ground inserts will certainly continue to be needed for complex workpieces. And we are also expanding our range here. For example, at the AMB we presented inserts with undersize radius. And we are continuously expanding our grinding skills. Every year, we grind 2.5 million inserts, so naturally we have an enormous amount of experience here. When new requirements come up, we also test the geometries with different coatings until we find the best technology for a particular application. That is the way we do it at ARNO: whatever we do, we do it right.



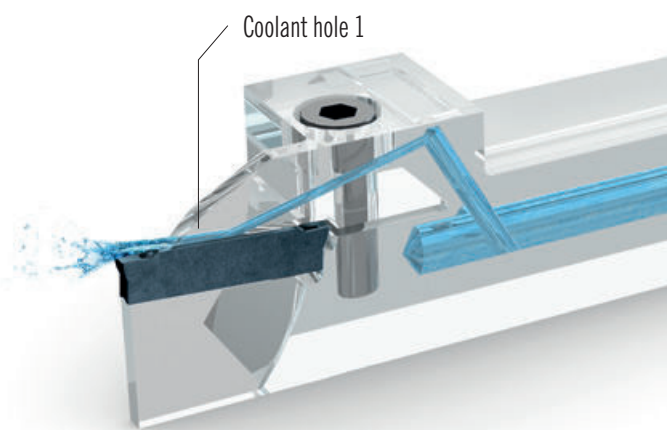
“We grind 2.5 million inserts every year.”

THE UNRIVALLED ORIGINAL.

The ACS – ARNO Cooling System: the patented cooling system for efficient parting off, grooving and groove turning with SA and SE grooving systems.

There's nothing cooler and more precise: with the ACS cooling technology developed and patented by ARNO, coolant is supplied directly along the insert seat. The insert is cooled, the coolant exits right in the cutting zone, goes under the swarf and evacuates the chips efficiently.

With the ACS2 the tool shank is additionally cooled from the bottom. This results in tool life which is longer by an average of 300 per cent; it achieves higher speeds and greater process reliability. Summarizing, the patented ACS cooling technology makes our outstanding SA and SE grooving systems into an outstanding productivity booster.



ACS – coolant for chip flushing

On the ACS1 the coolant hole (1) runs along the insert seat and the coolant exits directly at the cutting zone. It goes under the chip and removes it efficiently. This reduces wear effectively and increases tool life. Monoblock holders are also available with ACS2 – they have a second coolant jet to cool the tool flank from the bottom.



ARNO DIGITAL // For more information on the ACS – ARNO Cooling System, go to auto-lathes.arno.de



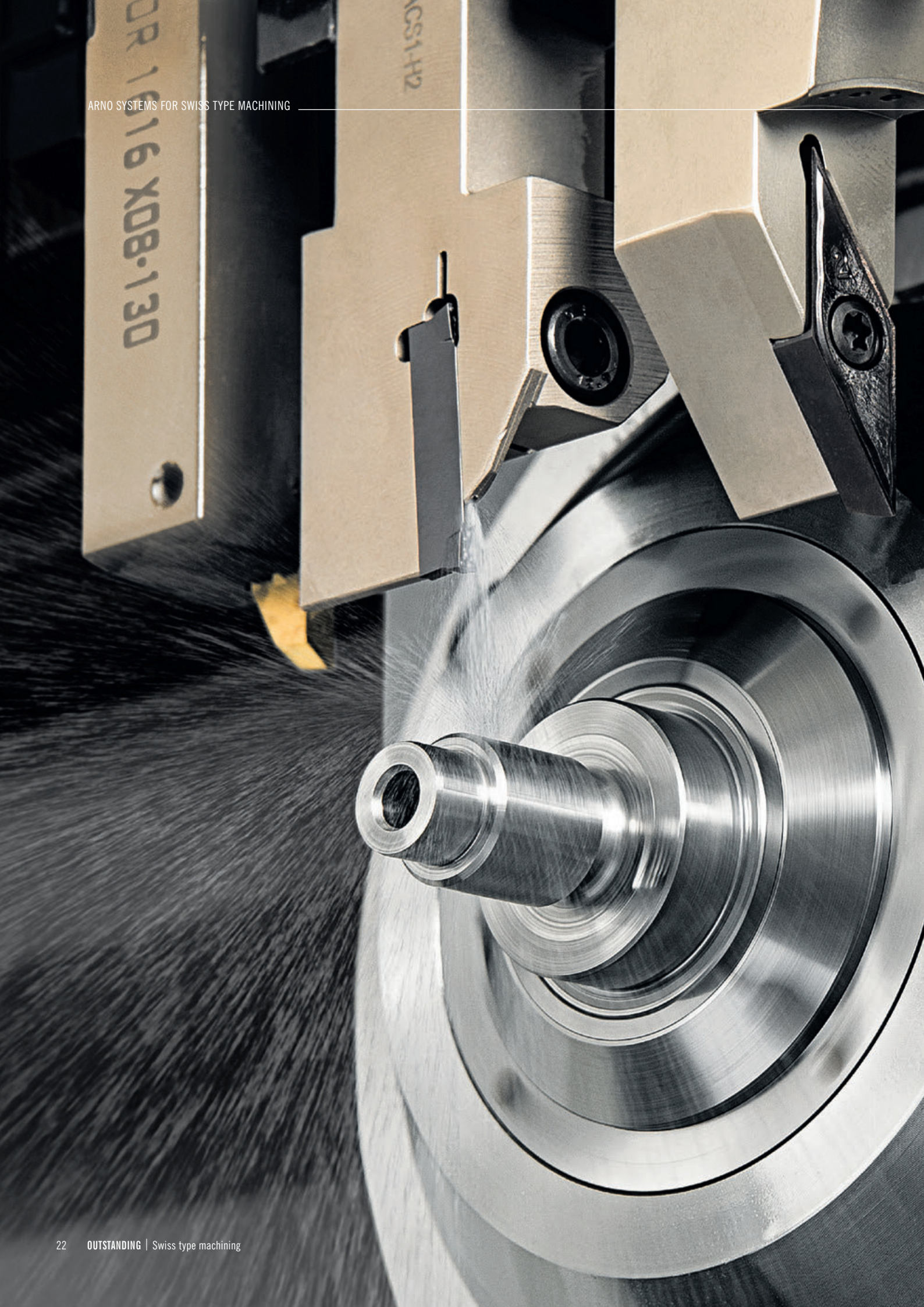
COOL BENEFITS

of the ACS – ARNO Cooling System

Guided coolant supply – requires no adjustment, eliminates errors

Average of 300% longer tool life – thanks to enormous reduction in wear

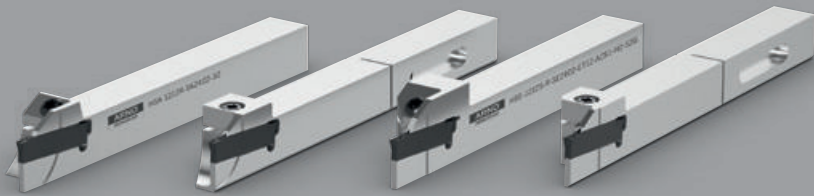
Optimised chip breakage and efficient chip evacuation



A close-up photograph of a Swiss type lathe. A dark, cylindrical cutting tool is positioned to machine a metal workpiece. The workpiece is rotating, creating a blurred, golden-brown surface. The machine's components are made of polished metal, with various bolts and adjustment screws visible. The lighting is dramatic, highlighting the textures and metallic surfaces.

**DEFINETELY PROFITABLE –
ARNO SYSTEMS FOR
SWISS TYPE MACHINING.**

OVERVIEW OF OUR SWISS TYPE MACHINING SPECIALISTS.



SA and SE grooving systems | Parting off and grooving, copy turning

Page 26



AMS – ARNO Mini-System | Internal machining

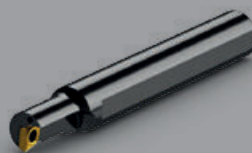
Page 28



ISO turning | External and internal machining
Page 30



DECO-CUT | Groove turning system
Page 32



SHARK CUT | Multi purpose tool
Page 34

CUT OUT THE COMPETITION WITH CERTAINTY.

**Extremely efficient and flexible for parting off and grooving diameters up to 65 mm:
the ARNO SA grooving systems.**

When it comes to efficiency, our SA system is almost unbeatable for parting off and grooving. The rigid insert clamping guarantees maximum process reliability. It's even better in combination with our patented ACS – ARNO Cooling System: it helps you to achieve an average of 300 per cent longer tool life in your grooving operations and can increase speed – even with narrow part-off operations or materials which are difficult to machine.

**The versatile addition to parting off, grooving and copy turning:
the ARNO SE groove turning system.**

The SE groove turning system is your flexible solution for grooving operations and Swiss type turning. It offers absolute rigidity to withstand high shear loads. Workpieces with a big radius can also be machined. The SE system is also convincing as it is so simple to handle and it offers long tool life – especially when combined with ACS1 which gets the coolant underneath the swarf.



PROFITABLE ADVANTAGES

of ARNO SA and SE grooving systems

Tool life longer by an average of 300% –
with ACS – ARNO Cooling System

Average of three times more productivity

Reliable processes at maximum productivity

ACS – ARNO Cooling System

- Tool life longer by an average of 300%
- Simple – precise coolant hole feed without the need for manual adjustment
- ACS1 for SA and SE: Coolant under the swarf for maximum cooling effect
- ACS2 for SA: additional tool flank cooling to optimise chip breakage

AFC tool holders and SA and SE monoblock holders

- Simple fast tool changes with the AFC variants (for ARNO Fast Change)
- Rigid for reliable processes
- Easy application – only one replacement part on monoblock holders
- Precise insert positioning by active insert clamping with fixed stop
- Insert cannot be pulled out (SE)
- Holders from 8 x 8 to 20 x 20 mm



Inserts

- Efficient due to two cutting edges
- Precise fit and cost-efficient due to special directly pressed geometries or ground for extreme precision
- Equipped for any task by 5 geometries and 7 grades
- For groove widths from 1.5 to 3 mm

CENTRING MADE EASY.

Modular and precise: the ARNO Mini-System AMS for internal machining starts at a diameter of 0.7 mm and reaches drilling depths of up to 50 mm.

Rigid centring, guaranteed tip height and absolute dimensional accuracy – it's so easy with AMS for flexible operations in holes with small diameters.

This is how it works: The insert is clamped rigidly in central position by a ground chamfer on the shank and a tapered pin. A fixed stop guarantees repeatable positioning at tip height. Besides tool holders, there are also inserts with inner cooling to achieve optimised wear protection and precise coolant supply.

This results in reliable processes, maximum precision even at tight tolerances and an increase of one to four times in tool life.



Tool holders

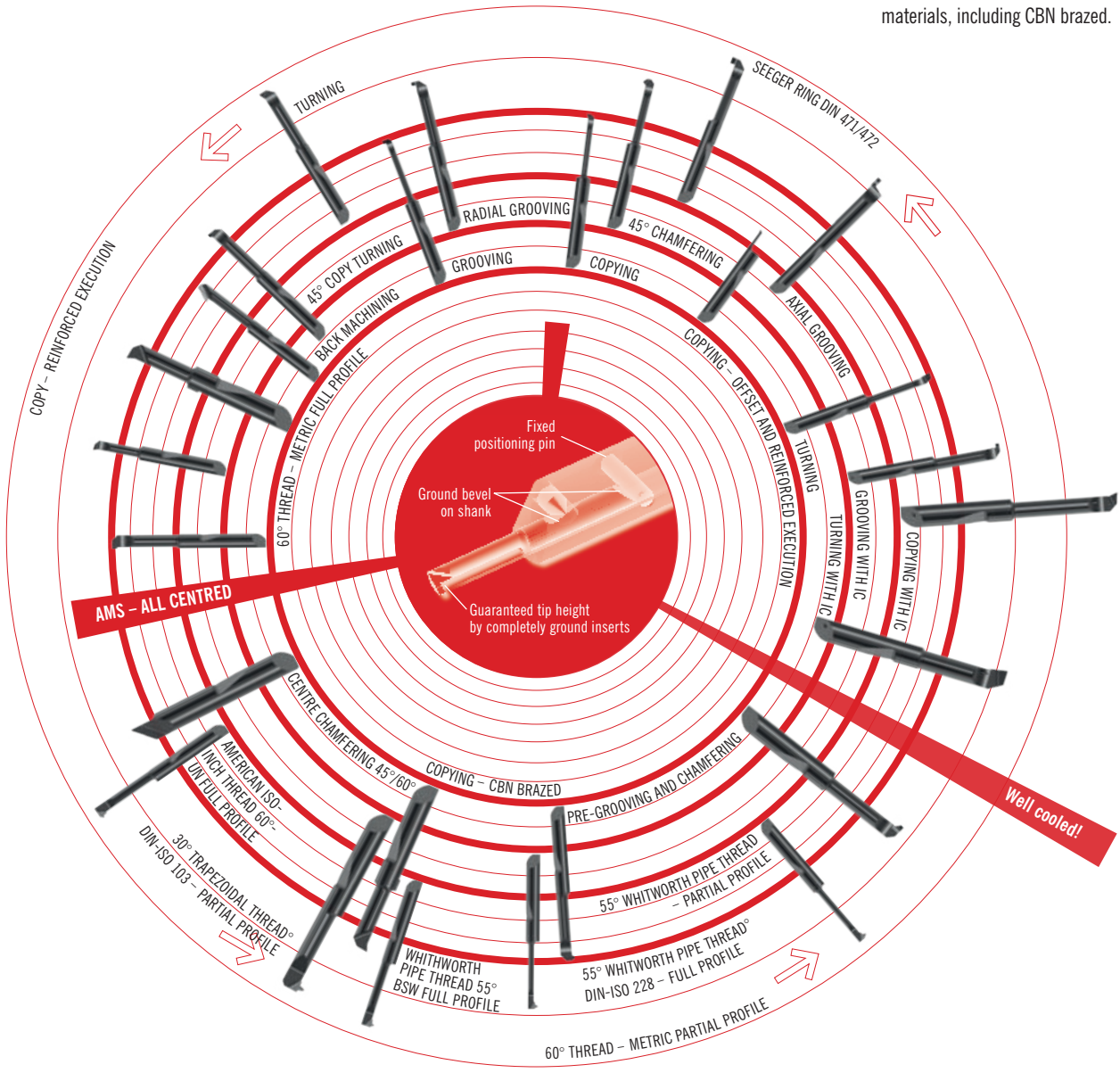
Every application is covered by 10 tool holders: standard or offset, hydraulic or polygon shank, for multi spindle or Swiss type machines. Available with coolant supply for longer tool life.

NEW: AMS boring bars with indexable inserts

All the benefits of the AMS system with even greater efficiency: with AMS boring bars and the right indexable inserts.

Inserts

Suitable for every application: from axial grooving to threading, for hardened materials, including CBN brazed.



NEW: Inserts with coolant hole

Precise coolant supply for maximum wear protection:
 Either with coolant supply from the top (IKO) - perfect for through hole boring or from the bottom (IKU) - perfect for blind hole boring.



PRECISE BENEFITS
 of the ARNO Mini-System

- Rigid centring and easy tool changes thanks to the clever system of a ground chamfer on the shank and tapered pin.
- Up to 400% longer tool life thanks to significant reduction in wear
- Precision and quality all inclusive – all inserts are fully ground with shank included

ALL AROUND GREAT PERFORMANCE.

Extremely versatile: the ARNO system for ISO turning for Swiss type machines offers tool holders, boring bars, AFC holders and indexable inserts for almost every application.

If you're looking for an all-round system for reliable and profitable machining work – here it is: At ARNO you'll find tool holders with different clamping systems, with or without internal cooling, and – absolutely new in the portfolio – AFC tool holders for fast, simple and convenient tool changes.

We offer the largest standard portfolio of high-positive indexable inserts in the world as well as PS chip breakers specially developed for Swiss type machining applications – perfect for materials that are difficult to machine.



MODULAR BENEFITS

of the ARNO system for ISO turning

Variety – the right solution
for almost every application

Precise fit – indexable inserts with PS geometries
and high-positive indexable inserts, also available
in intermediate sizes or with edge-honing

Durable – guaranteed long tool life with internal cooling

Tool holders, boring bars and AFC tool holders

- Rigid with screw clamping
- Fast convenient tool changes with two-part AFC holder
- Available with or without internal cooling
- Holders from 8 to 20 mm

PS geometry

- Special geometry for Swiss type machines
- Perfect for thin-walled workpieces
- Available in many sizes and grades
- Accurately ground and polished

Largest standard portfolio of high- positive indexable inserts in the world

- Perfect for demanding materials
- Suitable for every application thanks to intermediate sizes
- Precision ground in-house for top quality

Indexable inserts

- Large choice of both carbide and CERMET inserts
- Inserts for all materials suitable
- Constant high quality

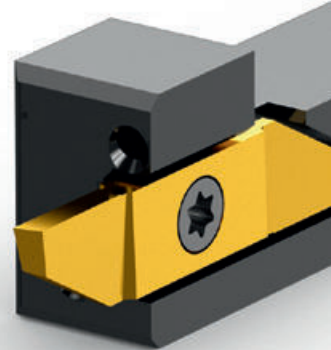


PRECISION AND VERSATILITY GUARANTEED.

Parting off, grooving, groove turning, thread milling: the modular DECO-CUT system from ARNO does it all and with absolute precision at the same time.

DECO-CUT was specially developed for Swiss type machining and impresses all along the line in this sector. For example, the vee-shaped insert seat with 3-point location for maximum rigidity and repeatability of length and tip height. Or the central clamping screw for extremely fast tool changes. The ground and polishing cutting edges to efficiently machine demanding materials even at low speeds and feeds – without build-ups.

It's obvious what the benefits are for you: smooth, efficient work flows and precision results right from the start. In addition, it's a system which is hard to beat when it comes to versatility starting at workpiece diameters of 2.5 mm.



PRECISE BENEFITS of ARNO DECO-CUT

Rigid and repeatable thanks to vee-shaped insert seat with 3-point location

Versatile applications for parting off, grooving, groove turning and thread milling

Simple fast tool change with central clamping screw

Turning holders with square and cylindrical shanks

- Shanks from 8 x 8 to 20 x 20 mm
Cylindrical shank Ø 10 mm
- For different mounting-positions and applications, e.g. for using on boring- or parting-off-positions next to the main spindle
- All tool shanks precision ground



Indexable inserts

- 2 cutting-edges and therefore efficient
- Very fine grain grades optionally with high-performance PVD coatings
- Special geometries for Swiss type machining

MULTI PURPOSE. MEGA PROFITABLE.

Turning and drilling with only one tool: SHARK-CUT.

Do you want to save space and money, manufacture fast and set up less? No problem with SHARK-CUT. This multi functional tool lets you carry out turning and drilling operations without changing tool. You need fewer tool positions on the machine and you save space in the store. You reduce programming work and presetting time. And you also achieve a flat bottom face and high surface quality.

You are equipped for every requirement with two variants: SHARK-CUT Mini as a solid-carbide tool starting at 4mm and SHARK-CUT Standard with indexable inserts in various geometries starting at 8 mm diameter.



VERSATILE BENEFITS

with SHARK-CUT

Economical – lower tool costs
and less needed machine positions

Fast – fewer tool changes and
less programming work

High quality – flat bottom surface
and high surface quality

2 variants for every diameter

- SHARK-CUT Mini – as a solid-carbide tool:
ø 4 to 8 mm, 2.25 x D and 4 x D
- SHARK-CUT Standard – tool holder for indexable inserts:
ø 8 to 32 mm, 1.5 x D, 2.25 x D and 3 x D



Inserts and indexable inserts

- Solid carbide execution: coated and uncoated
- Indexable inserts in 3 geometries: coated and uncoated, periphery ground and polished or sintered, simple tool change with only one screw

Multi purpose

- Drilling into solid with flat bottom face
- Facing operations
- Turning of internal profiles
- Turning of external profiles

EQUIPPED FOR EVERY CHALLENGE.



Swiss type machining systems	SA	SE	AMS
Application	Grooving system for parting off and grooving	Grooving system for parting off and grooving, Swiss type turning and copy turning	ARNO Mini-System
Machining application	External machining	External machining	Internal machining
Holder types	Monoblock holders	Monoblock holders	Tool holders
Executions	R/L/neutral	R/L	R/L
Cooling	without/ACS1/ACS2	without/ACS1	without/with internal cooling
Groove width	1.5 to 10 mm	2 to 6 mm	0.8 to 3.28 mm
Depth of cut (max)	up to 70 mm	up to 21 mm	up to 3.5 mm
Diameter (min)	-	-	0.7 to 11 mm
Diameter (max)	up to 140 mm	up to 42 mm	-
Inserts for	P/M/K/N/S	P/M/K/N/S	P/M/K/N/S/H
Square shank	8x8 to 20x20 mm	12x12 to 20x20 mm	12x12 mm
Boring bars \varnothing	-	-	\varnothing 12 to \varnothing 32 mm
Others	-	-	Polygon shank



ISO turning	DECO-CUT	SHARK-CUT
Turning holders and indexable inserts for Swiss type machining	Groove turning system for Swiss type machining	Multi purpose tool for turning and drilling
External and internal machining	External machining	External and internal machining
Monoblock holders, boring bars	Monoblock holders	Boring bars
R/L/neutral	R/L/neutral	R/L
without/with internal cooling	without/with internal cooling	with internal cooling
-	0.5 to 3 mm	-
-	up to 11 mm	up to 60 mm
-	-	4 mm
-	-	-
P/M/K/N/S/H	P/M/N/S	P/M/K/N/S
8x8 to 20x20 mm	8x8 to 20x20 mm	-
ø8 to ø12 mm	-	ø6 to ø25 mm
-	Turning holder with straight shank dA ø 10 mm	-

A GREAT SUCCESS: **ARNO** WERKZEUGE IN ACTION.

A winning team with profitable solutions (from left to right):
Martin Hager, Mechanical Engineer Design/Programming
and Alexander Stein, Turning foreman, both at K&M;
Thomas Ament, Application Engineer and Christoph Hipp,
Sales engineer, both at ARNO Werkzeuge.



“With the AFC system the operator needs only 1 or 2 minutes to change a tool.”

Alexander Stein, Turning foreman at K&M



FAST TOOL CHANGES ON SWISS TYPE MACHINES

Three minutes saved per tool change, 45 per cent longer tool life, increased process reliability and easier handling: K&M Präzisionstechnik benefits all along the line from the new two-part AFC tool holders for turning and grooving systems from ARNO Werkzeuge.

K&M Präzisionstechnik in Kunststoff und Metall GmbH (K&M), a company in the Müller Group, is located near Ravensburg in Germany. K&M manufactures complex turned parts for the electrical (sensors), mechanical and medical engineering industries and for the aerospace industry. Markus Müller, Executive Assistant at K&M, emphasises: “We see ourselves as systems supplier for finished assemblies, not only as a manufacturer of turned parts.” This ranges through to complex parts such as servos consisting of 150 to 200 individual parts for ICE high-speed trains.

Flexibility requires a wide range of tools

We design, manufacture and assemble parts which we machine by turning or milling, grinding, 3D printing, eroding and produce moulded parts in-house in 3-shift operation. Some of these parts are made of materials that are difficult to machine. Our everyday work often involves keeping to high accuracies and complex geometries with diameters ranging from 3 to 200 mm for turned parts. With batch sizes from one to 100,000 units, anything is possible. This flexibility demands a wide selection of tools. Luckily, the basis for many applications is already laid thanks to the comprehensive systems from ARNO Werkzeuge, a manufacturer of precision tools for grooving, turning, drilling and milling based near Stuttgart. “From the start, we’ve had our fingers on the pulse of time and we have kept up with a variety of technologies. This also applies to tools.” says Martin Hager, Mechanical Engineer Design/Programming at K&M. “What’s the degree of automation in our production? Actual automation takes place with bar ma-

terial on Swiss type machines. Once the machine is set up, all the operator has to do is check and make minor adjustments as necessary.” Process reliability is top priority. The machines run at a capacity utilisation of 90% and the tool has to keep up with this rate. So when we receive new tools, we test them to see whether they meet our expectations when it comes to tool life and simplicity.

The challenge: process reliability and simple handling

After we successfully introduced the ARNO SA system for parting off and grooving with ACS internal cooling in K&M at the end of 2017, the focus was on the complicated tool changes for Swiss type machines. Here, the tool holders in the sliding head are connected to the coolant feed system via several adapters, copper pipes and hoses. It means long set-up times and high costs for connecting the internal cooling system. Tool changes are complicated. Even loosening and tightening the screws is not easy in the limited space. Very often the tool holder has to be removed from the sliding head to change the tool and after the change, the tool length has to be recalibrated. This work step takes a long time and leads to relatively frequent errors. “As opposed to fixed head machines which can move the revolver into a convenient position to change the tool, machine operators have to change the tool on a Swiss type machine almost blind,” explains Christoph Hipp, sales engineer at ARNO Werkzeuge. Alexander Stein, Turning foreman at K&M, adds: “It’s just not good for process reliability and takes so much time. This urgently needs a solution!”

The solution: the ARNO Fast Change system

The ARNO team accepted the challenge, analysed the problem and found a solution that is simple and just as reliable in the application: the AFC system (short for ARNO Fast Change). This is a two-part tool holder for grooving and turning available with or without internal cooling. Thomas Ament, Application Engineer at ARNO Werkzeuge, explains: "The AFC system has a chamfer at the front of the tool holder and at the corresponding back part, the fixed stop. This is how we achieve the exact clamping effect. Coolant transfer is fitted with a flexible tube which is economical even when compared to the competition." But the special feature of the two-part tool holders is their easy handling. Due to the integrated O-ring, the front part does not drop into the chip tray after the screw is loosened. It stays safely in the head until it is removed. In addition, the O-ring in the tools provides an optimised seal and prevents any coolant loss or dirt from entering. After the front part is removed, either the insert is changed or replaced by a different insert. The front part can be easily changed by fixing the new part on the fixed stop which remains in the machine. It is safely merged and immediately connected to the internal coolant supply. The floating mount compensates for any misalignment when the tool holder is clamped and this achieves a high rate of repeatability. Accuracy during a change lies within a range of hundredths and saves the operator from carrying out correction work thanks to the identical length inside the tool system.

Impressive results: 3 minutes saved, tool life increased by 45%

We first tested the SA system for parting off and grooving with internal cooling in AFC variant for four weeks. Tool life was not only maintained but increased from 550 units to 800 units straight away. On top of this came the change times. "In the past, a trained machine operator needed 5 minutes to change a tool. Then the tool had to be recalibrated to 0. With the new AFC system, he only needs 1 to 2 minutes for everything," says Alexander Stein delighted. With a batch size of 40,000 parts, this is a very profitable time saving.

After about six months in use on the machine, the outstanding results more than impressed K&M GmbH. Besides improvements in change times and tool life, the easier handling is a blessing, simply because the machine operators are often untrained – the keyword here is the lack of skilled workers. Reliable internal cooling is also an enormous relief, as Christoph Hipp discovered: "To offer flexible production processes, internal cooling should be ensured right from the start. Flexible workpieces, flexible applications and materials make internal cooling an absolute necessity. With internal cooling, chip evacuation is assured right from the start and this minimises thermal stress on the cutting edge." This is all about risk minimisation and also about meeting all the customer's requirements – both at K&M and ARNO Werkzeuge.



Martin Hager, Mechanical Engineer at K&M, discusses the requirements with Christoph Hipp, sales engineer at ARNO Werkzeuge.



ARNO SUCCESS FACTORS

for K&M Präzisionstechnik

Faster, easier and safer tool changes
on Swiss type machines

Long tool life, more reliable processes

A partner with a wide range of solutions
for many applications

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