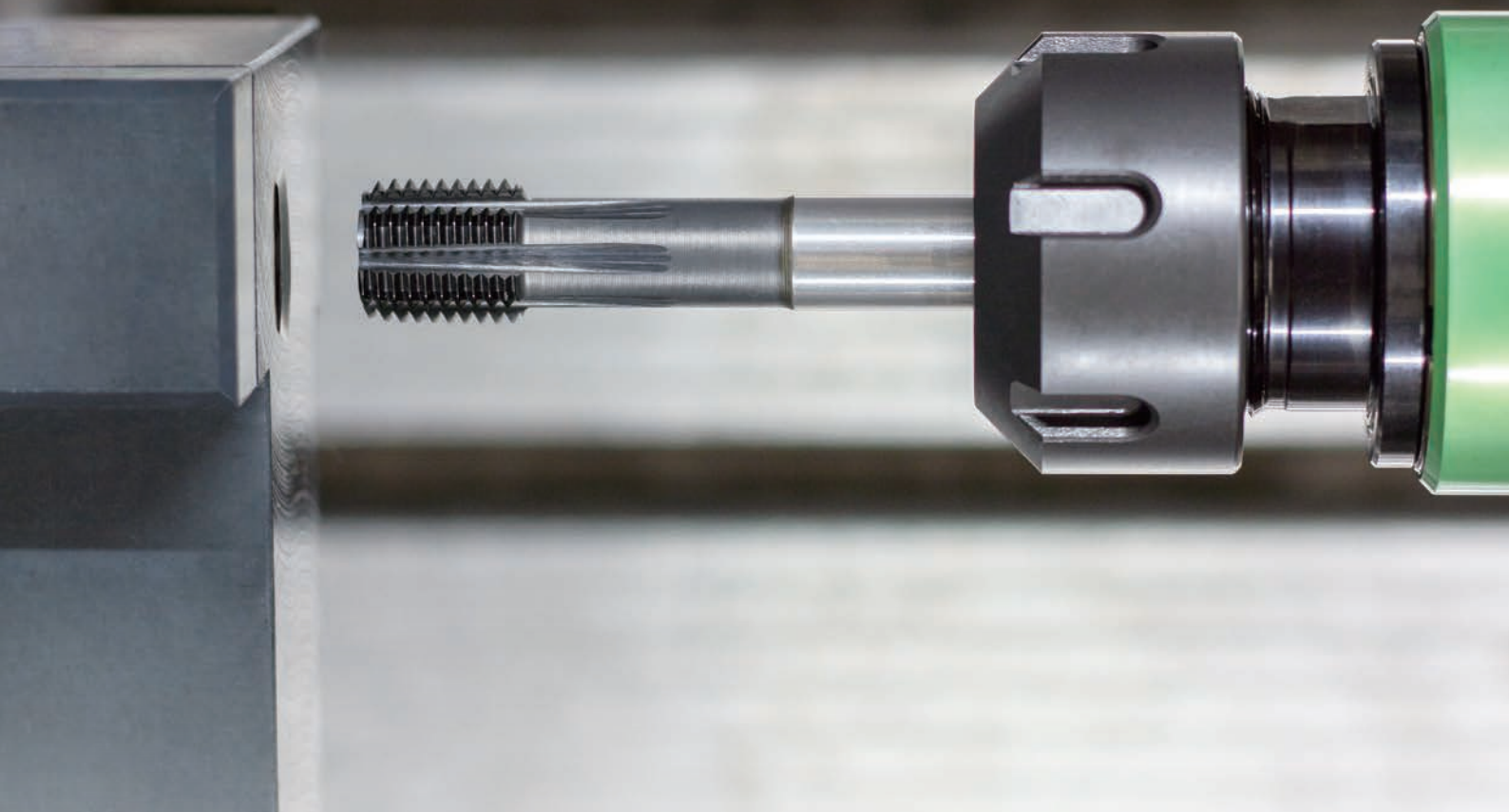


SHAPE IT

OSG Global Tooling Magazine | WINTER 2022



A Clean Solution

Thread forming with
multi-groove

Technical Insight

**AT-2 Carbide Thread
Mill with End-cutting
Edge**

Customer Report

Pumped for Success

OSG Phoenix PD indexable drill provides needed solution to manufacturer of large cast pumps

Meet OSG

**Employee Interview
in Belgium**

Achieving carbon neutrality in the “with COVID-19” era

A Message from the President

Almost two years have passed since the coronavirus (COVID-19) pandemic has taken center stage, making the world revolve around this unprecedented crisis. Rapid government responses and economic flexibility have enabled Europe and the United States to recover faster from disruptions caused by the pandemic than many other regions. As a global company, OSG is also confronted by many new challenges. Face-to-face service has always been one of OSG’s greatest strengths, which can no longer be easily provided during COVID-19. As OSG continues to navigate the ever-changing saga of the coronavirus crisis, flexibility has become a key to driving the company forward. Our world today is filled with data. It is crucial to detect, resist and counter the flood of misinformation. By fact-checking and always challenging the status quo, OSG will strive to continuously evolve to stay ahead of change.

The COVID-19 pandemic has impacted people’s transport behaviors dramatically. In addition, the importance of carbon-neutral efforts has increased, and OSG is in the midst of this great surge of change. By establishing and committing to a deadline, Europe and the United States took the lead in promoting electric vehicles (EVs) at once. The sense of speed toward EV is clear and has made the transition become more real and impending.

OSG has grown alongside the automotive industry for over 80 years, which continues to be the company’s largest business domain. OSG strives to serve as the number one cutting tool manufacturer for our customers by providing high-performance cutting tools that meet new demand while responding to this industry’s ever-changing needs. Regardless of the supply chain reforms that accompany the EV shift, OSG will aim to maintain its top global market share and position as the manufacturer of choice.

OSG has been manufacturing taps since its founding, and currently holds the world’s largest market share. OSG taps are not only used heavily in the automotive industry, but are also favored by manufacturers from various sectors. BASS, one of Germany’s top cutting tool brands introduced in this publication, has recently joined the OSG Group, helping us further secure our position as the top tap market share holder.

As we continue to live in a VUCA world with volatility, uncertainty, complexity and ambiguity, OSG will further reinforce its global organization with an emphasis on taps, which are the company’s greatest strengths and our origin, to make the year 2022 a starting point toward the realization of carbon neutrality.



A handwritten signature in black ink, appearing to read 'N. Osawa', written in a cursive style.

Nobuaki Osawa
President & COO of OSG Corporation

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BASS' manufacturing plant is located in the city of Niederstetten, Germany, with an estimated production floor of 6,500-square-meter.

A Clean Solution

Thread forming with multi-groove

Thomas Deschle, BASS GmbH & Co. KG
Magnus Hoyer, OSG GmbH

By nature, roll tapping forms screw threads through plastic deformation of the work material. Because no cutting chips are created, thread forming stands out as a clean machining method. As opposed to cutting taps, thread forming tools can offer advantages such as long tool life and high process reliability even in large thread depth applications. However, when using minimum quantity lubrication (MQL) during thread forming,

a negative effect may occur – the contamination of part and tool during machining. This condition is especially apparent in MQL processing, whereas most contaminants are removed by the cooling lubricant in wet processing. In addition to requiring subsequent component cleaning, the contaminants may also increase abrasive wear of the tool and reduce its service life.



the ridges of the furrow. At the same time, it also increases the cleansing effect of the cooling medium, whether it is MQL or cooling lubricant, allowing the unwanted material particles to be removed from the grooves and thus from the tool and part, enabling both to come “clean” from the machining process.

An important factor during MQL-machining is to evacuate the air from the blind hole. In this case, traditional roll taps have a crucial disadvantage. The air contained in the blind hole of the conventional straight groove can only escape with a delay during thread forming. While the tool is entering the hole and forming the thread, the air within the bore hole is displaced and compressed to the bottom, with the cooling lubricant being pressed against a “wall” of air. Due to this “counterpressure,” the coolant is unable to wet the machining area sufficiently to maximize its lubricating effect. This is where the multi-groove comes in.

The cause for this contamination is small material particles moving out of the ridges of the furrow of the tapped thread during processing. These particles accumulate in the grooves of the roll tap and will gradually contaminate both the tool and the part. To reduce this contamination, BASS has taken extensive series of tests. Several years of development work have resulted in the internationally patented multi-groove as shown in figure 1. Due to the special geometry of this new groove shape, contamination of the threading tool used under MQL conditions can be eliminated almost completely.

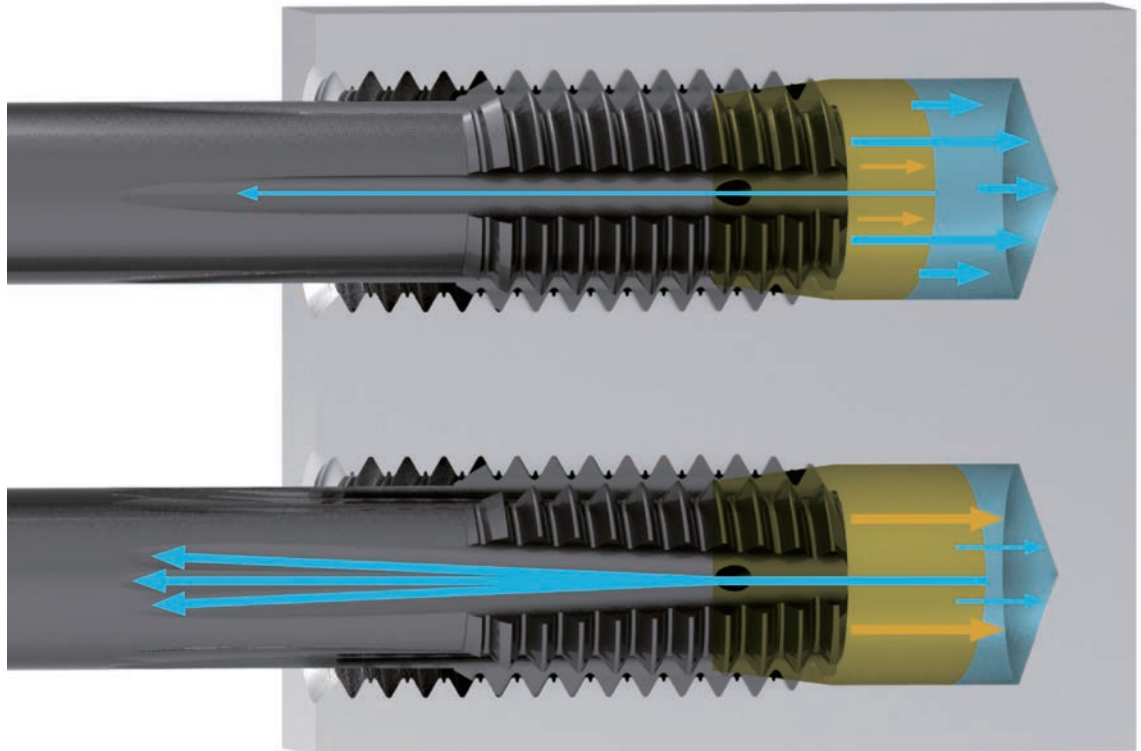
The special form of the multi-groove absorbs dispersed material particles from



Figure 1.
BASS' internationally patented multi-groove tool geometry for longer tool life and clean parts.

Figure 2. The multi-groove's functional principle:

With the traditional groove form as depicted on the upper half of figure 2, air within the bore hole (highlighted in blue) is compressed to the bottom. Whereas the multiple groove configuration allows more air to escape and for the MQL-aerosol (highlighted in yellow) to sufficiently wet the bore hole wall. The result is an improved washing effect of the multiple groove, where the outgoing air immediately removes material particles from the part during machining.



The larger volume of the multi-groove allows for the enclosed air to escape more quickly and for the bore hole surface to be better wetted as depicted in figure 2. The result: up to 30 percent longer tool life and a drastically enhanced process reliability.

The logical conclusion: the deeper the blind hole ($> 2xD$), the greater amount of air has to escape - and thus the greater the effect of the multi-groove.



BASS has developed an internationally patented multi-groove geometry to control contamination during roll tapping. The multiple groove configuration increases the cleansing effect of the cooling medium, allowing unwanted material particles to be removed from the grooves and thus from the tool and part.



A core competency of BASS' manufacturing in Niederstetten is its salt bath heat treatment, where toughness and hardness are optimized for every batch in order to maximize tool life at the highest quality.

Another factor influencing the effectiveness of the multi-groove is the pressure in which the aerosol is blown to the processing point. The usual ambient air pressure is 1 bar. Through compression within the blind hole, the aerosol thus pushes against the "wall" of air with more than 1 bar. If the pressure of the aerosol is just slightly higher, a sufficient wetting of the bore hole wall by the aerosol cannot be ensured. Thus, the tool life drastically decreases and contamination increases. Particular for this reason, the multi-groove offers great potential especially under poor processing conditions.



Watch how the
Multi-Groove works



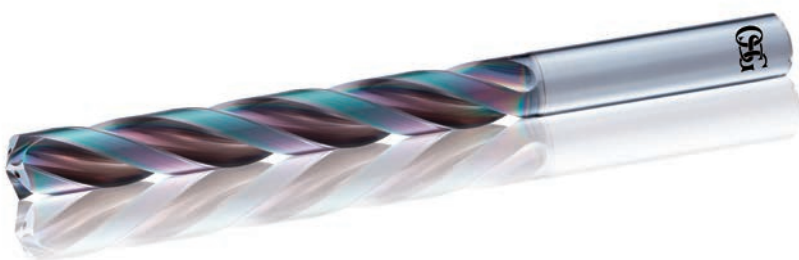
JUSTAR – a cutting tool grinding machine that BASS has developed together with machine builder Junker. BASS uses four JUSTAR cutting tool grinding machines in its production. The JUSTAR is capable of handling a wide range of cutting tools in HSS and carbide with a single machine. This is possible by its fully automatic grinding wheel changer. Each machine has a magazine for 30 grinding wheels, which are automatically exchanged via a grinding wheel changer in the sequence of coordinated operations – thus enabling the most complex geometries to be perfectly realized. The JUSTAR technology allows to grind finished tools from round bar stock in a single clamping setup. Consequently, small batches – even of complex geometries – can be manufactured economically in a short period of time.

Combination with OSG's ADO-TRS 'Triple Revolution' 3-flute coolant-through carbide drill to achieve flawless holes for perfect threading

The ADO-TRS is one of OSG's latest drilling innovations for ultra-machining efficiency in a wide range of materials. This 3-flute coolant-through carbide drill series is highly recommended to be used in combination with BASS' multi-groove forming taps. The ADO-TRS' 3-flute specification offers greater balance than 2-flute drills, which are more prone to chattering. Moreover, the ADO-TRS enables superior roundness and improved positioning in terms of hole precision. With capability

to excel under high-feed condition, the ADO-TRS is able to minimize contact time with the workpiece material, which reduces the probability of work hardening.

The ADO-TRS is available from diameter 3 mm up to 20 mm, in processing depth of 3xD and 5xD, and is suitable for applications in carbon steels, alloy steels, mild steels, cast iron and hardened steels.



The ADO-TRS 'Triple Revolution' is one of OSG's latest drilling innovations for ultra-machining efficiency in a wide range of materials. Its unique R gash geometry enables high thrust resistance and exceptional chip control, which are common challenges of 3-flute drills.



BASS GmbH & Co. KG's headquarters in Niederstetten, Germany. Since its founding in 1947, BASS has focused on the development, production and sales of powerful threading tools. In 2019, BASS was acquired by OSG Corporation to reinforce its strength in the European market, global affiliated companies and OEMs.

About BASS

BASS GmbH & Co. KG is a dynamic, medium-sized family manufacturer based in Niederstetten, a German town located near the medieval tourist site Rothenburg ob der Tauber. Ever since the company's founding by the toolmaker Kurt Bass in 1947, BASS has focused on the development, production and sales of powerful threading tools. In 2019, BASS was acquired by OSG Corporation to reinforce its strength in the European market and global affiliated companies.

BASS is renowned worldwide for its high-quality taps, especially for its roll taps and special tools. A commitment to exceed customer expectation in products, services and delivery time is the core philosophy of BASS' 150 employees. Driven by innovation, BASS serves clients from all fields – ranging from automotive, mechanical engineering and medical applications up to the machining of nuts, and manufacturers of windmill turbines.



AT-2 Carbide Thread Mill with End-cutting Edge

Drilling and threading combo tool for high-hardness steel applications

Tomonori Yoda

OSG Corporation Applications Engineer (Tap Development Division)

Thread milling cutters are considered to be the optimum tooling choice for the threading of difficult-to-machine materials such as high-hardness steel. With thread mills, the tool load on the cutting edge can be drastically reduced in the processing of high-hardness steel versus cutting taps. Furthermore, thread mills are able to divide cutting chips into small and manageable pieces even in difficult-to-machine materials with a tendency to form unstable chip shape. Although thread mills are highly reliable due to their low risk of breakage and long tool life characteristics, tooling choice will vary depending on the actual machining environment and specific needs of the manufacturer.





OSG's latest AT-2 carbide thread mill is developed specifically to combine the drilling of a drill hole and threading into a single procedure even in difficult-to-machine materials such as high-hardness steel.

Threading by Cutting Taps

A thread is formed mainly by the chamfer section of a tap. In the machining of difficult-to-machine materials such as high-hardness steel, heavy tool load is concentrated on the cutting edge, which can lead to tool damage. By increasing the number of chamfers, the tool load on the cutting edge can be dispersed. Specifically, it is possible to disperse the tool load by lengthening the chamfer and increasing the number of flutes in cutting taps. However, this method has limitations. The more flutes, the smaller the individual flute will become. With a limited flute width, chip evacuation, cutting oil lubricity and cooling performance are reduced. Furthermore, the chamfer length is particularly critical for the processing of blind holes, since the length is limited by the drill hole allowance. These effects and correlations must be taken into consideration in the product development process.

In tapping, a tap can only advance one pitch per revolution. Therefore, the feed per revolution is fixed by the processing pitch. Only the cutting speed can be adjusted, and chip shape varies depending on the difference in cutting speed. Due to these limitations, threading by cutting taps is considered to be a difficult process.

Threading by Thread Mills

Thread mill, in contrast, forms threads by intermittent cutting. Not only can the cutting speed be adjusted, but also the feed amount, making it possible to reduce the tool load on the cutting edge by cutting condition and offer numerous qualities that can resolve common tapping obstacles.

A thread mill's cutting mechanism is similar to the side milling of an end mill. Even large-diameter threads can be processed in machines with a small horsepower compared to cutting taps. However, up until now, thread mills are not capable of handling work material with a hardness of around 60 HRC. With the release of the AT-2 carbide thread mill – a drilling and threading combo tool, more options are now available for effective thread milling of difficult-to-machine materials such as high-hardness steel.

Features & Benefits of the AT-2 Carbide Thread Mill with End-cutting Edge

The greatest feature of the AT-2 carbide thread mill is its ability to process high-hardness steel materials of approximately 60 HRC without having to prepare a drill hole.

Figure 1. Left-hand cut configuration

Long tool life is achieved by climb milling. Utilization of left-hand cut configuration to enable climb milling of right-hand threads.

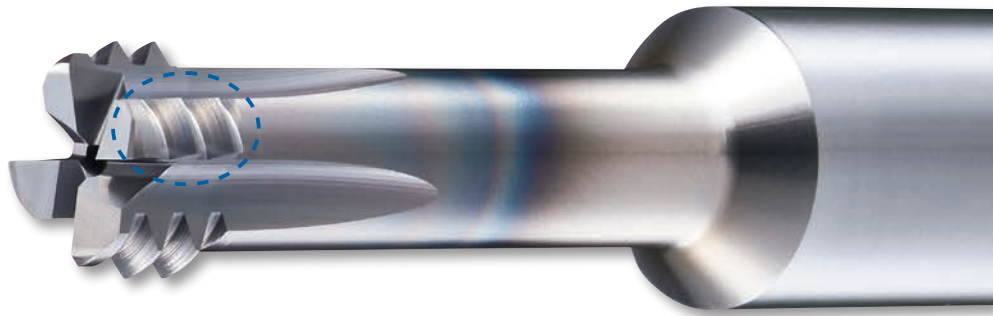


Figure 2. Roughing Teeth

Distributes tool load.



Figure 3. High-strength cutting edge shape (pat. in Japan)

Suppresses bending of the tool.

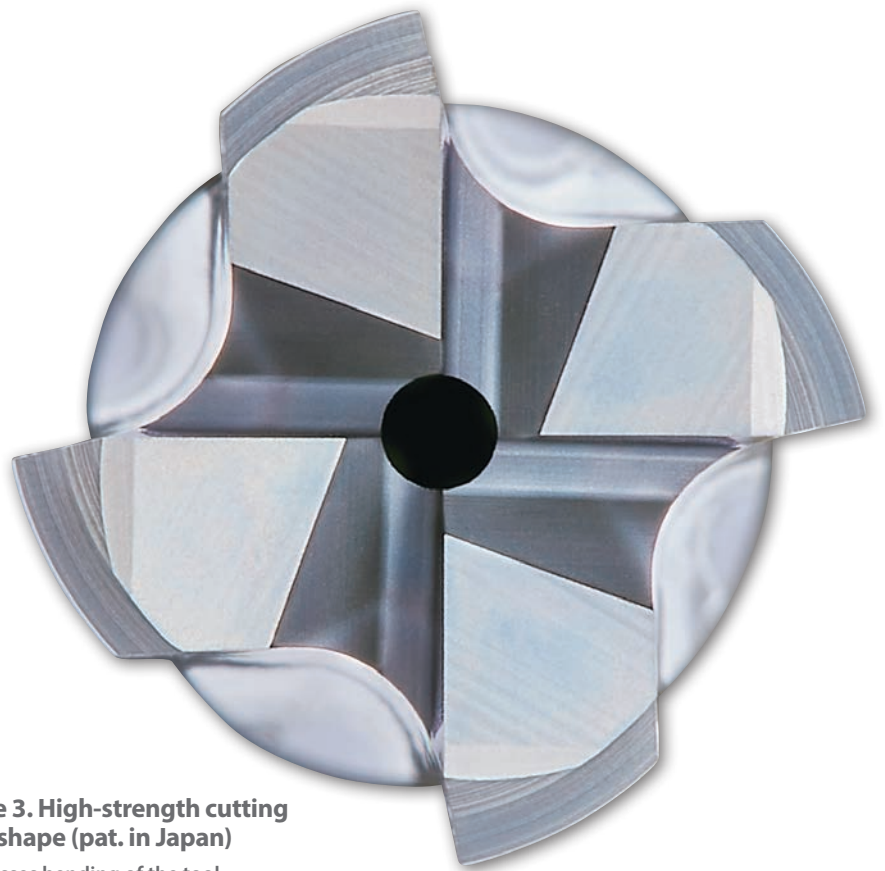
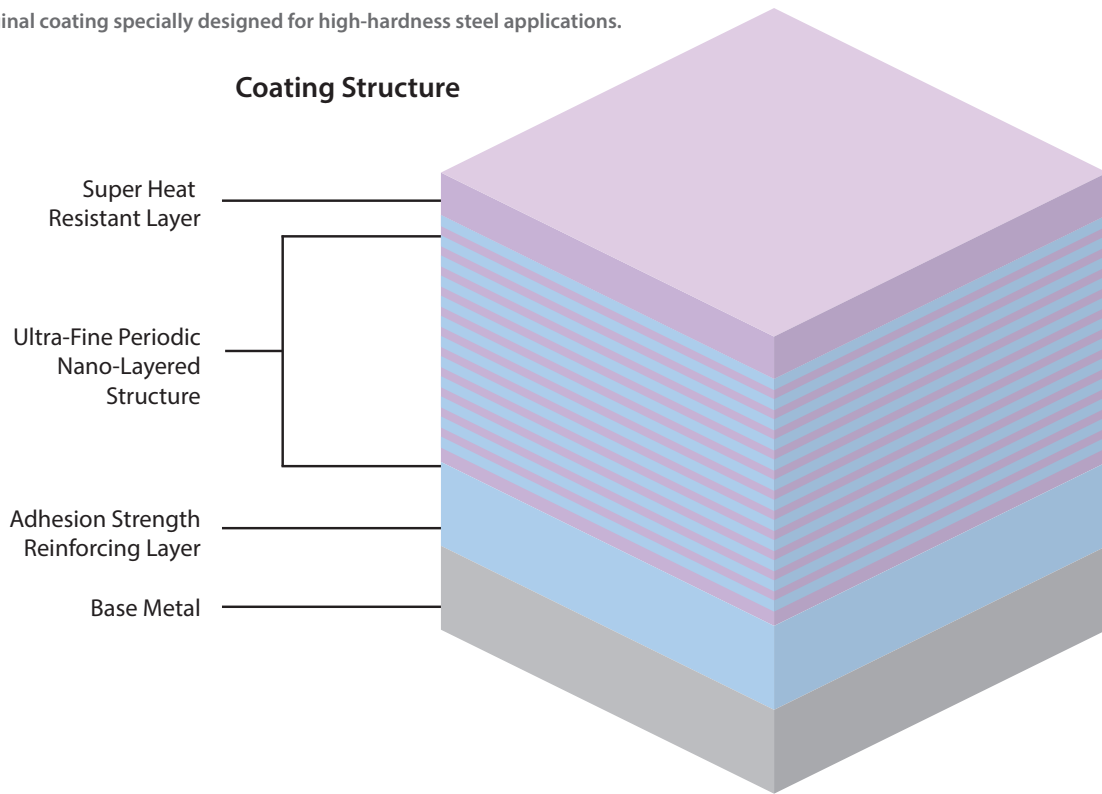


Figure 4. DUROREY coating

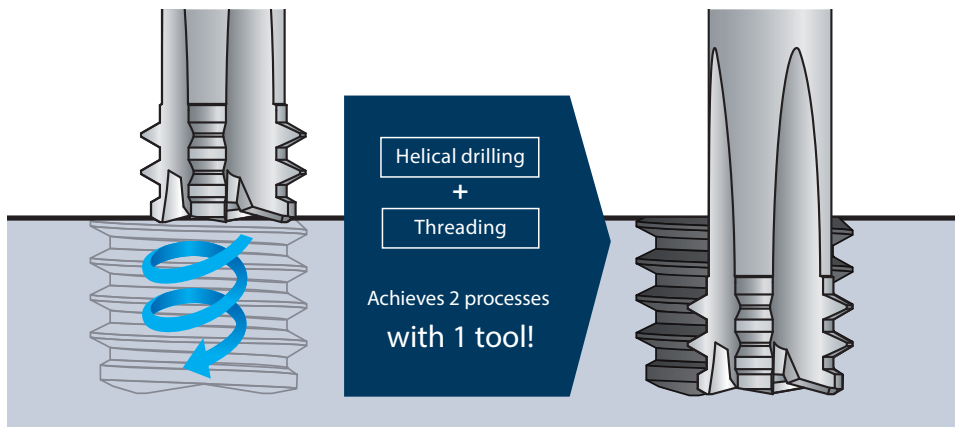
OSG original coating specially designed for high-hardness steel applications.



The tip of the tool incorporates an end mill's end-cutting edge configuration to allow it to perform helical drilling and threading simultaneously. By eliminating the need for a drill hole, sudden change in workpiece configuration can be accommodated since it is possible for the AT-2 thread mill to process an internal thread even after the workpiece has been quenched.

Figure 5. Helical drilling and threading simultaneously

No drill hole is required. The AT-2 thread mill enables stable machining without chip trouble.

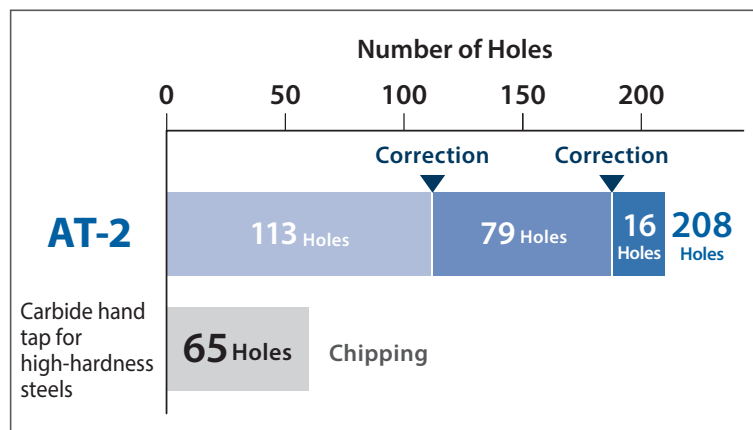


With the capability to achieve two processes with a single tool, machining efficiency is enhanced while the initial production cost can also be significantly reduced.

Figure 6. Long and stable tool life in high-hardness steel application

The AT-2 thread mill achieves higher thread quality compared to cutting taps.

Tool	AT-2 $\phi 6.2 \times 16$ P1.25	Carbide hand tap for high-hardness steels M8 $\times 1.25$ 3P
Work Material	SKD11 (60HRC)	
Cutting Speed	45 m/min (2,310 min ⁻¹)	2 m/min (80 min ⁻¹)
Feed	83 mm/min (0.04 mm/t)	100 mm/min
Drill Hole Size	None	$\phi 6.8 \times 23.5$ mm (Blind)
Internal Thread Size	M8 $\times 1.25$	
Threading Length	16 mm (2D)	
Coolant	Air blow	Non-water soluble
Machine	Horizontal Machining Center (BT40)	Vertical Machining Center (BT40)





As depicted in figure 6, the AT-2 thread mill exhibits significantly longer tool life in comparison to a carbide hand tap designed for high-hardness steel, thereby providing reduction in running costs.

The AT-2 thread mill incorporates a number of unique tooling geometries. One of the most prominent features is its left-hand cut configuration as depicted in figure 1. Because the AT-2 thread mill is used without having to create a drill hole, processing takes place one pitch at a time at hole

entry. When processing a right-hand thread by climb milling, a left-hand cut configuration is required. At the time of product development, the right-hand cut configuration is also tested with conventional milling. However, results have shown that climb milling exhibited 20 percent greater durability versus conventional milling. It is important to note that the spindle will rotate counterclockwise during use.

Figure 7. AT-1 one pass thread mill and AT-2 carbide thread mill

Suitable work materials and applications.

Hardened Steel	Steel, Stainless Steel	Non-ferrous Metal	Heat-resistant Alloy
	 <p>A The A Brand</p> <p>AT-1 One pass thread mill</p> <ul style="list-style-type: none"> ■ Thread milling in 1-pass ■ Compatible thread classification: M, U, Rc, Rp, NPT 		
	 <p>A The A Brand</p> <p>AT-2 With end-cutting edge</p> <ul style="list-style-type: none"> ■ Helical drilling + threading can be done simultaneously ■ Compatible with a wide range of work materials including high-hardness steels ■ Compatible thread classification: M, U, Rc, NPT 		

Compatible with a Wide Range of Materials

The AT-2 has been developed for the purpose of processing high-hardness steel of 60 HRC, but it is also suitable for other general steels. As illustrated in figure 7, the AT-2 offers a wider processing range than the AT-1 one pass thread mill. However, it is important to note that the AT-2 carbide thread mill is inferior to the AT-1 one pass thread mill and cutting taps in terms of tool life and machining time.

Cutting taps are the fastest as they are able to process one pitch per revolution. The AT-1 is able to achieve 1-pass threading, which the AT-2 is unable to accomplish. With the shorter processing time, it can be assumed that the AT-1 offers longer durability than the AT-2 thread mill.

Although thread milling is a more mature cutting process, it can offer greater reliability, surface finish and precision that outperform conventional tapping. With today's demand for low quantity and high variation production, the highly versatile AT-2 carbide thread mill provides a new and effective tooling solution that can accommodate a wide range of work materials and applications.



Scan for details



The OSG Phoenix PD indexable drill series is engineered for efficient and stable hole-making up to 5xD. The PD drill features a unique flute design with high precision finish and integrated chip breaker. This series offers a broad insert lineup to accommodate a wide range of work materials, such as steels, stainless steels, cast irons, aluminum alloys and non-ferrous metals.

Pumped for Success

OSG Phoenix PD indexable drill provides needed solution to manufacturer of large cast pumps

Scott Kemp

OSG USA

The mining and dredging industries are known for the harsh conditions that man and machine must endure. These industries require the extraction and transport of large volumes of materials from one site to another using large diameter slurry pumps. A slurry pump is a centrifugal pump that suspends solids in water, creating a mixture referred to as slurry. Slurry pumps are widely used to transport abrasive solids and are engineered to withstand extremely abrasive materials such as phosphate rock and tar sands. It is critical to have a dependable and well-designed pump that expels large quantities of corrosive materials in a safe manner.

GIW Industries, Inc. is a world leader in slurry and process pump solutions. Founded in 1891 in Augusta, Georgia, United States, GIW has been manufacturing slurry pumps for over 100 years. The company moved to

their current location in Grovetown, Georgia in 1964 and is currently undergoing a multi-million dollar expansion. In 1996, GIW became a full subsidiary of KSB Inc., one of the world's leading manufacturers of pumps and industrial valves. In 2014, the GIW® Minerals product brand was established aiming to provide the best and longest wearing slurry solutions in the industry.

GIW's Grovetown plant currently employs approximately 650 staff members and produces around 200 parts per week in batches of one to 10. GIW is continuously looking for ways to improve quality and productivity through their partnership with Fastenal, the company's onsite distributor. It was through this partnership that GIW began to look to OSG for solutions to their large diameter drilling issues.

GIW and Fastenal were experiencing problems with stock outages and discontinued competitor items that interrupted the manufacturing of GIW's slurry pumps. Because GIW is an existing user of OSG HY-PRO taps and has had positive experiences with OSG tooling, they were willing to test the OSG Phoenix P5D indexable drill on the pump bodies.

The OSG Phoenix PD indexable drill series is engineered for efficient and stable hole-making up to 5xD. The PD drill features a unique flute design with high precision finish and integrated chip breaker. This series offers a broad insert lineup to accommodate a wide range of work materials, such as steels, stainless steels, cast irons, aluminum alloys and non-ferrous metals.

GIW's pump bodies are made of cast steel or ductile iron. The parts are machined on very large vertical and horizontal boring mills, such as its newest Giddings & Lewis floor type horizontal boring mill, using CAT50 tool holders. The number of holes and the depth varies dependent on the application of the pump. The competitor drill requires two different grades of inserts, whereas the OSG Phoenix P5D indexable drill (EDP# 7802794) utilizes the same insert inboard and outboard, which has the potential to reduce insert inventory by 50 percent. Moreover, the competitor tool was drilling +0.006" oversize. Tool life was measured at 30 to 40 holes at a speed of 1,500 rpm and 0.005 ipr using CIMTECH 285 coolant.



The OSG Phoenix P5D indexable drill is used to drill holes in GIW's production of slurry pumps made of cast steel and ductile iron.



By utilizing the OSG Phoenix P5D with the insert grade XP1010 optimal for cast iron, the hole diameter is improved to less than 0.006" oversize, which is within GIW's tolerance. The hole finish also improved, all while maintaining identical speeds, feeds and tool life as the previous tooling.

By utilizing the OSG Phoenix P5D with the insert grade XP1010 optimal for cast iron, the hole diameter was improved to less than 0.006" oversize, which is within GIW's tolerance. The hole finish also improved, all while maintaining identical speeds, feeds and tool life as the previous tool. The insert grades, speeds and feeds can be adjusted to further optimize the performance of the Phoenix PD drill. Through the strong partnership between GIW, Fastenal and OSG, insert inventory and the number of vendors required can be reduced, thereby greatly minimizing GIW's overall costs. GIW currently spends over \$400,000 USD on tool bodies, inserts and hardware. Savings in inventory reduction alone is estimated around \$1,200 USD per month. With a strong partnership, innovative tooling solutions and a model to excel by continuous process improvements, GIW is pumped for success for years to come.



From left to right, Stickel Production Manager Thomas Birkenmaier, OSG GmbH Technical Sales Representative Sven Clement and Stickel Owner Matthias Stickel pose for a photograph at Stickel's manufacturing facility in Löchgau, Germany.

Triple Benefits

OSG Phoenix PFB high precision indexable ball end mill boosts performance in metal mold application with faster cycle, longer tool life and much improved surface quality

Magnus Hoyer OSG GmbH

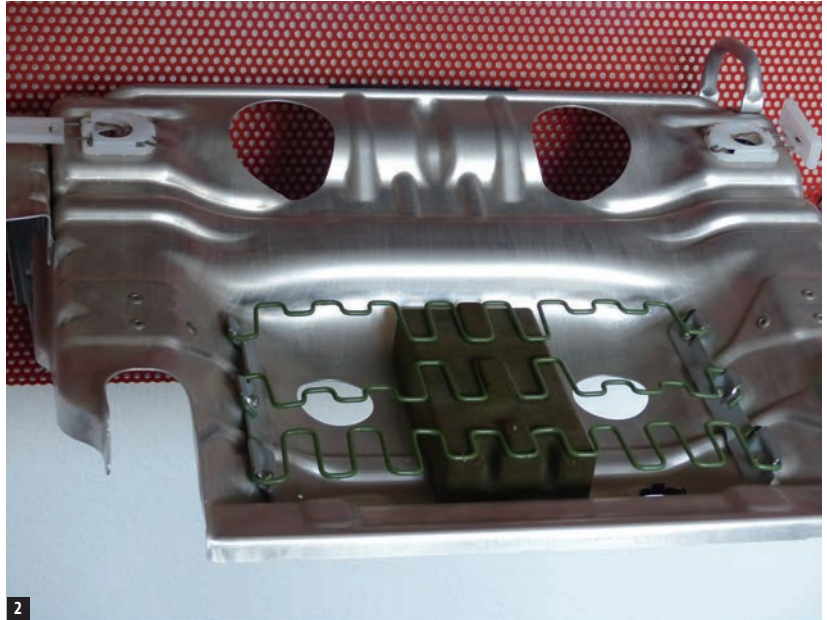
Located in Löchgau, Germany, Stickel GmbH is a manufacturer of sophisticated sheet metal parts and assemblies made of steel, aluminum and stainless steel for prototypes, test construction and serial production. Employing nearly 100 staff, Stickel is equipped with some of the latest machines and facilities servicing major international automotive manufacturers in Europe. Stickel's core competence is the production of small and medium-sized structural components up to 1,200 mm in length in areas such as the body, engine, chassis, no longer available spare parts for expired series, and assemblies.

Stickel manufactures sheet metal forming parts in small quantity. The company also produces the molds for these workpieces. Due to the small lot

size, the molds do not have to be hardened and can be made from cast iron or low carbon steel materials such as ST52. Although ST52 is easy to machine, the tolerance of ingredients is very large. Due to this nature, the work material can vary greatly lot by lot, making it a major challenge for Stickel to reach good surface quality at high feed rates. The sheet metal parts are up to 1,200 mm in length. The molds are measured at similar sizes and are made of steel and cast iron.

The OSG Phoenix PFB is a high precision indexable ball end mill engineered for superior surface finish and tool life. This indexable ball end mill series is most ideal for 3-D finishing operations where precision and surface finish are critical. The PFB offers an array of inserts suitable for steel, stainless steel, cast iron, high hardened steel and non-ferrous metal applications.





1. The OSG Phoenix PFB indexable ball end mill nearly tripled cycle time and doubled tool life while significantly improved surface quality in Stickel's metal mold application.

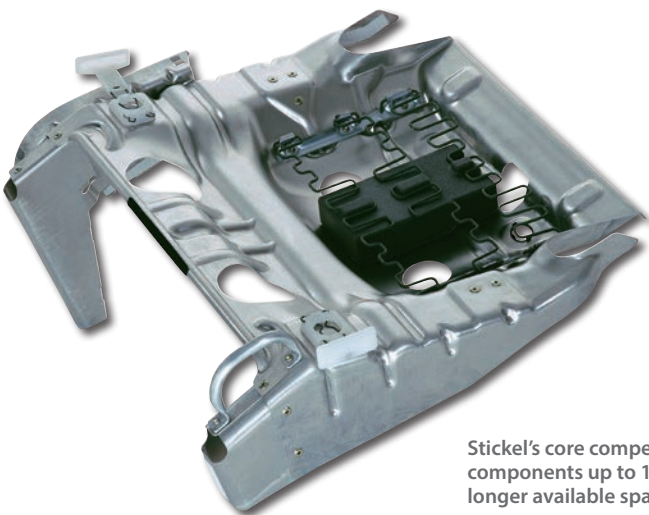
2. A completed metal mold by Stickel.

Stickel is an existing OSG tool user. During a recent visit to the company's manufacturing facility, OSG GmbH Technical Sales Representative Sven Clement wanted to help Stickel tackle the challenge of processing improvement. Upon a detail evaluation of the application, Clement recommended the dia. 16 mm PFB indexable ball end mill from the OSG Phoenix indexable series.

The OSG Phoenix PFB is a high precision indexable ball end mill engineered for superior surface finish and tool life. Its spiral cutting edge enables excellent cutting edge strength and sharpness. The PFB's steel and carbide tool shanks help reduce chattering and provide favorable milling surface when machining at short or long overhangs. This indexable ball end mill series is most ideal for 3-D finishing operations where precision

and surface finish are critical. The PFB offers an array of inserts suitable for steel, stainless steel, cast iron, high hardened steel and non-ferrous metal applications.

Stickel's molds are processed using a Hermle machining center. The tolerance requirement for accuracy is approximately 0.02 mm. The previous cutting tool was used at a maximum feed rate of 1,500 mm/min. The PFB, on the other hand, is capable of running at a maximum feed rate up to 4,000 mm/min. By switching to the PFB indexable ball end mill, Stickel is able to nearly triple cycle time. Moreover, the durability of the PFB almost doubled that of the competitor tool. Last but not least, the surface quality has significantly improved to the point that some polishing processes can be eliminated, enabling Stickel to reach greater efficiency in their manufacturing process.



Stickel's core competence is the production of small and medium-sized structural components up to 1,200 mm in length in areas such as the body, engine, chassis, no longer available spare parts for expired series, and assemblies. Images courtesy of Stickel.



1. From left, Kanagata Factory Manager Kittipong Sonsai and OSG Thai Sales Representative Tantip Luangthongsri.
 2. Kanagata Factory Manager Kittipong Sonsai.
 3. Kanagata's operator prepares for the machining of a mold.
 4. OSG's AE-BD-H carbide ball end mill and a high-hardness steel mold.

Superior Milling Solutions for High-hardness Steel

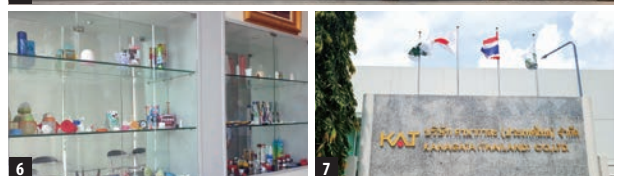
AE-BD-H and AE-LNBD-H carbide ball end mills enhance performance and consolidate tooling in injection mold production

Tantip Luangthongsri

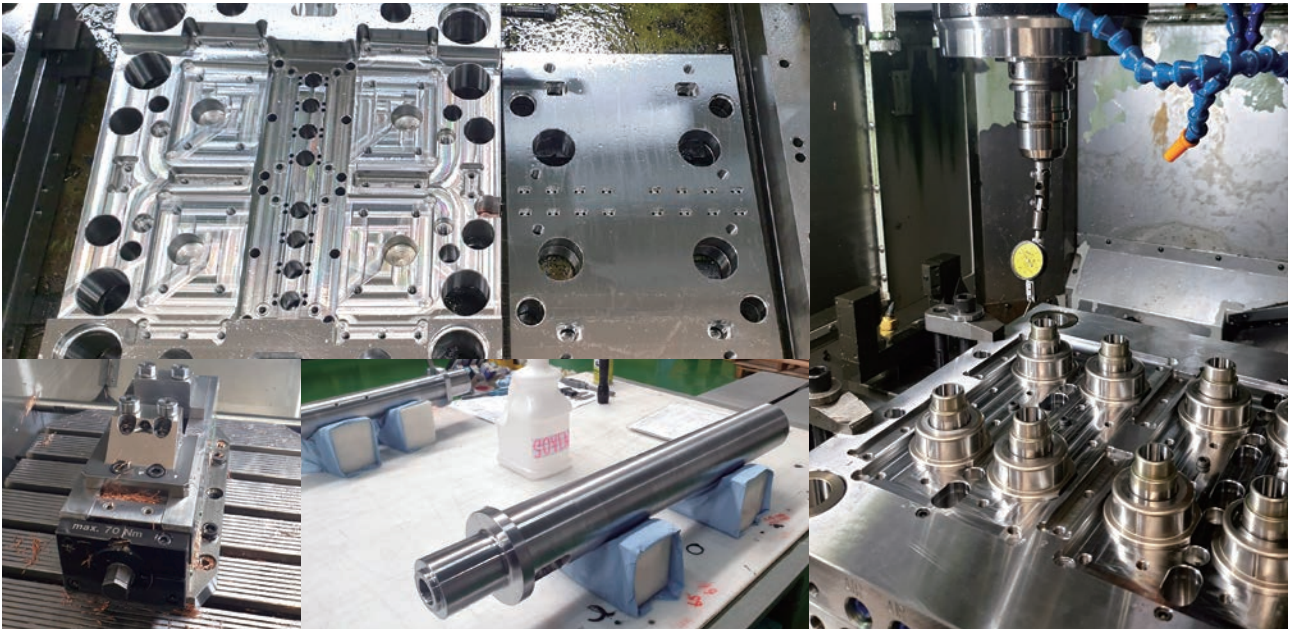
OSG Thai

Founded in 1989, Kanagata (Thailand) Co., Ltd. is a manufacturer of injection molding, injection molding machines and cylinders for the plastic injection industry. A majority of Kanagata's products are associated to the Lion Group, a Japanese manufacturer of detergent, soap, medications, oral hygiene products and other toiletries. Kanagata is responsible for designing and producing molds for the mass production of these products. Kanagata is well-known in Thailand by kitchen cleaning products in the name of the Lion Group and is regarded as one of the major mold-makers in the country.

Kanagata's manufacturing plant is located in the Bang Pakong district in the western part of Chachoengsao Province in central Thailand. The company has over 50 employees and operates in a 6,400-square-meter facility. Kanagata has been manufacturing molds since the company's founding more than 30 years ago. On average, Kanagata makes approximately 70 molds that are exported to Japan annually. Kanagata utilizes a number of CNC machining centers in its production, including Makino's V33, V56 and V77 models, DMG MORI's NVX 5100, and Mazak's Integrex 300-III.



5. Kanagata's manufacturing plant is located in the Bang Pakong district in the western part of Chachoengsao Province in central Thailand. The company has over 50 employees and operates in a 6,400-square-meter facility.
 6. A majority of Kanagata's products are associated to the Lion Group, a Japanese manufacturer of detergent, soap, medications, oral hygiene products and other toiletries. Kanagata is responsible for designing and producing molds for the mass production of these products.
 7. Founded in 1989, Kanagata (Thailand) Co., Ltd. is a manufacturer of injection molding, injection molding machines and cylinders for the plastic injection industry.



Most of Kanagata's applications involve high-hardness steel such as STAVAX (plastic mold steel), M300, NAK80, etc., with superior wear resistance and lifespan. However, the machining of these molds requires high quality tools to ensure precision, efficiency and overall cost performance.

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Kanagata was originally using milling tools from Taiwan and South Korea. However, the end mills were easily broken and had short tool life. As a result, Kanagata had to use many of the same tools in order to complete a part, making the production very costly and time consuming.

Later on, Kanagata decided to test milling cutters from various Japanese cutting tool manufacturers. The cutting trial involved the machining of STAVAX using a DMG MORI machining center running at a cutting speed of 8,500 rpm and a feed rate of 1,550 mm/rev. The competitor tools had trouble entering the workpiece and required long machining time. OSG's AE-BD-H (EDP number: 3042010) and AE-LNBD-H (EDP number: 3056133) carbide end mills, on the other hand, dominated the trial result with superior accuracy and the best overall performance.

OSG's AE-BD-H and AE-LNBD-H carbide ball end mills are designed to accommodate a wide range of applications and milling methods in high-hardness steel with superior performance. The AE-BD-H is a 2-flute carbide ball end mill designed for high-precision finishing. It features a variable negative spiral gash for better chipping control. The AE-BD-H's superior ball R precision ensures a stable radius accuracy across 180 degrees. The AE-LNBD-H is a 2-flute long neck carbide ball end mill designed for high-precision finishing. Similar to the AE-BD-H, it also features a thick center core to help prevent deformation of the ball tip to improve chipping control. Its teardrop-shaped outer periphery strong back taper geometry enables milling by point, which prevents chattering and chipping, resulting in improvement of surface accuracy. This carbide ball end mill

series is coated with OSG's original DUREY coating with superior heat resistance and high toughness optimized for high-hardness steel.

Kanagata was especially surprised by the performance of OSG's DUREY coating, which enables the company to achieve higher cutting speed to save time. In addition to high accuracy, efficiency and reliability, the AE-BD-H and AE-LNBD-H carbide end mills offer superior versatility that Kanagata has not experienced before. Kanagata used to separate tooling based on the type of work and material, having to use many sizes of tooling in order to complete a mold. By switching to the AE-BD-H and AE-LNBD-H, Kanagata is able to consolidate tooling as they are able to excel in mixed tasks together. The end mills are also applicable to various materials, which further reduces processing time, enhances quality and performance of a mold.

Last but not least, the OSG Thai factory is in close proximity to Kanagata, locating in the same Bang Pakong district. When machining trouble arises, OSG's applications engineers and sales representatives can quickly provide assistance and troubleshoot.

"There are many tooling brands in the field, but not all can offer the same quality assurance as OSG," said Kanagata Factory Manager Kittipong Sonsai. "When a single tool is able to do it all, it is the right answer."

The AE-BD-H and AE-LNBD-H 2-flute type carbide end mills are ideal for high-precision finishing of high-hardness steel with emphasis on machined surface accuracy. By adopting OSG's latest "DUREY" coating ideal for high-hardness steel, high chipping resistance is made possible even for work materials exceeding 60 HRC, enabling longer tool life.





AE-LNBD-N

DLC Coated Carbide End Mill for Copper Electrodes

The AE-LNBD-N is a 2-flute long neck carbide end mill designed for high-precision finishing of copper electrodes. Its unique ball specifications include an optimal cutting edge shape with excellent sharpness, high quality primary relief surface, and superior ball R precision that ensures a stable radius accuracy – all of which contribute to allowing high quality milling of copper electrodes

without burrs. The AE-LNBD-N is coated with OSG's DLC-IGUSS, a thick film type coating that suppresses wear on the cutting edge and achieves both high tool durability and good machining accuracy.



AE-MSS-H and AE-MS-H

Multi-flute Square Type and Radius Type Carbide End Mills for High-hardness Steels

The AE-MSS-H is a stub multi-flute carbide end mill available in square style with a 1.5 x D length of cut (neck length of 3 x D). The AE-MS-H is a short multi-flute carbide end mill available in square and radius styles with a 2.5 x D length of cut. The AE-MSS-H and AE-MS-H feature unequal spacing teeth geometry to suppress chattering during machining. Their optimal cutting edge specifications allow for stable milling of high-hardness steels.

With the addition of OSG's original DUOREY coating, the AE-MSS-H and AE-MS-H are able to exhibit outstanding performance in high-hardness steels due to the coating's excellent toughness, high heat resistance and abrasion resistance characteristics.





AM-HFC and PXHF-AM

High Feed Radius Type Carbide End Mill and Exchangeable Head End Mill

The AM-HFC and PXHF-AM are engineered to enable high feed milling of high-hardness additive manufacturing parts. The PXHF-AM is the exchangeable head version of the AM-HFC and shares identical tooling specifications. The AM-HFC and PXHF-AM feature a composite radius cutting edge optimized for flat surface milling. With a large arc and corner R configuration, the AM-HFC and PXHF-AM's robust cutting edge is able to withstand shapes with unstable depth of cut. Moreover, the AM-HFC

and PXHF-AM's flat cutting edge geometry suppresses chipping of the end cutting edge and enables good machined surface quality. The AM-HFC and PXHF-AM include a coolant hole to improve chip evacuation and prevent chips from getting tangled.



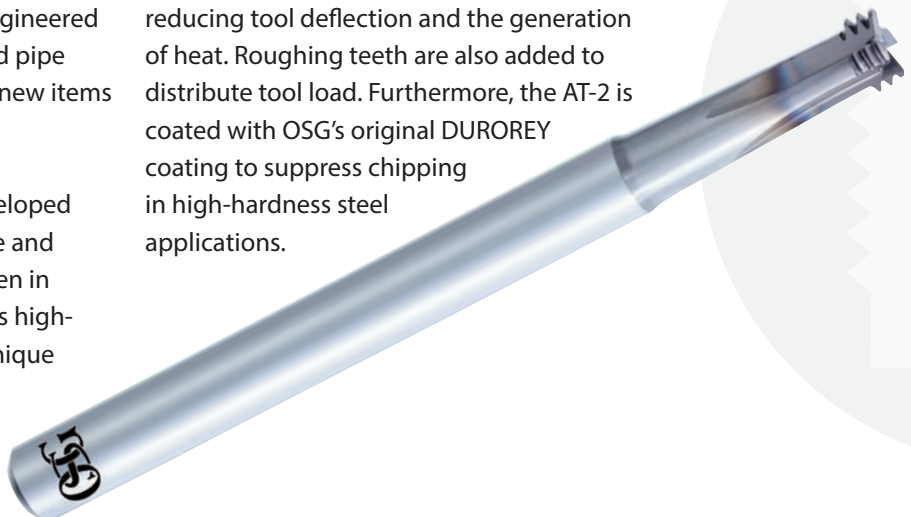
AT-2

New Carbide Thread Mill Lineup for Rc and NPT Tapered Pipe Threads

OSG Corporation has recently expanded its AT-2 carbide thread mill series for high-hardness steels with a new lineup engineered for thread milling Rc and NPT tapered pipe threads. Six new items for Rc and six new items for NPT have been added.

OSG's AT-2 carbide thread mill is developed to combine the drilling of a pilot hole and threading into a single procedure even in difficult-to-machine materials such as high-hardness steel. The AT-2 features a unique high strength cutting edge shape to control the bending of tool. It is

engineered with a left-hand cut configuration for climb milling to prolong tool life by reducing tool deflection and the generation of heat. Roughing teeth are also added to distribute tool load. Furthermore, the AT-2 is coated with OSG's original DUREOREY coating to suppress chipping in high-hardness steel applications.



OSG Corporation Hosts Die and Mold Web Exhibition

On April 1, 2021, OSG Corporation launched a special online event – “OSG Die & Mold Web Exhibition” on its web showroom. The Die & Mold Web Exhibition was held for a month from April 1 to April 30, 2021. The latest tooling innovations engineered for the die and mold industry were displayed virtually along with weekly webinars that were hosted in collaboration with partners from the manufacturing industry.

The OSG Web Showroom is OSG Corporation’s latest online exhibition website to provide customers with a digital trade show experience that is not tied to time or place.



A special area named the “OSG Quest Die & Mold Dungeon” was created to further engage visitors through game-based learning.

A special area named the “OSG Quest Die & Mold Dungeon” was created to further engage visitors through game-based learning. A new stage was released weekly with new contents throughout the event period. On the site, visitors could learn about die and mold applications, the latest tooling innovations, attend webinars and win prizes by correctly answering a quiz at the end of the event.

The OSG Web Showroom is OSG Corporation’s latest online exhibition website to provide customers with a digital trade show experience that is not tied to time or place. OSG offers a live chat feature (currently available in Japanese only) that allows its representatives to communicate with customers seamlessly. Visitors can discuss about tools and machining with ease just like they would physically at an exhibition booth. Live chat support is handled by OSG’s technical staff who are experts in the field.



Scan to visit the OSG Web Showroom

1. On the site, visitors could learn about die and mold applications, the latest tooling innovations, attend webinars and win prizes by correctly answering a quiz at the end of the event.
2. A new stage was released weekly with new contents throughout the event period.

CIMT 2021

OSG participates at the 17th China International Machine Tool Show

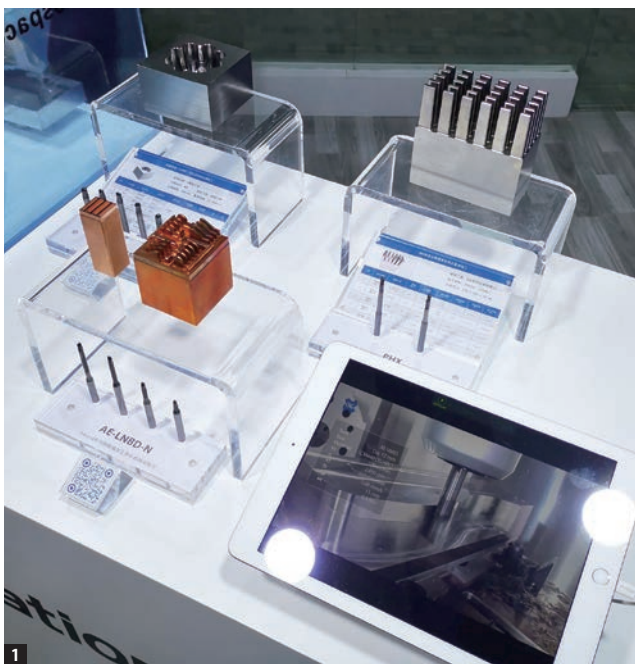
The China International Machine Tool Show (CIMT) is recognized as one of the four largest international machine tool shows in the world and is held in April biennially in Beijing. The 17th CIMT in 2021 took place at the China International Exhibition Center (CIEC) from April 12 to 17 with approximately 1,650 exhibitors from 27 countries and 125,500 visitors from 82 countries.

At CIMT 2021, OSG exhibited its tooling innovations in a different approach than before, shifting focus on application solutions by exhibiting workpiece and cutting tooling as a set. For new products, a QR code is included on all the displays to provide visitors with easy access to product information.

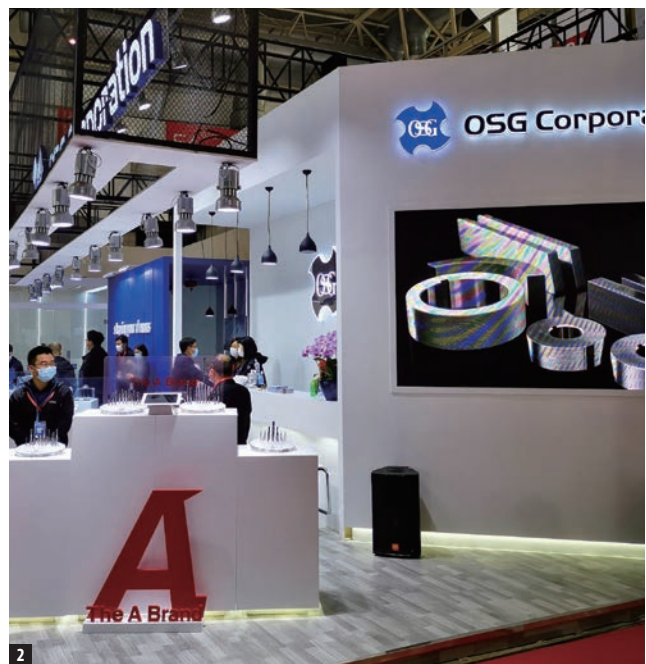
The 18th CIMT show is scheduled to take place in April 2023.



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1. A QR code is included on all the displays to provide visitors with easy access to product information.



2. OSG participates at the 17th China International Machine Tool Show in Beijing.

OSG Around the World

Employee Interview with

Corina Nichita



Corina Nichita

Location: Belgium

Position: Manager of Accounting at OSG Europe Logistics, OSG Belux, OSG France and Managing Director of Romsan (OSG Romania)

Joined OSG: 1990

Motto: "A valuable person is a sum of accuracy, reliability and simplicity."

gives employees the chance to prove that by dint of hard work, anything is possible. It happens when you believe, and you will persevere.

Tell us about your daily routine.

When I am at the Belgium office, I start my day by drinking a cup of tea prepared by one of my colleagues. It has become a ritual that I hold dear. Depending on the accounting deadlines (monthly, annual closing, consolidate reporting, budget plan, etc.), I share and bring my contribution to the work of my accounting colleagues. Their performance, attitude and way of work make this 'task' very easy and not time-consuming, which allows me to complete other actions, responsibilities and to attend miscellaneous meetings.

When I am at the Romsan office in Romania, I would start my day around a coffee meeting with the global team. I would review tasks revolving human resources, operation, supervision of the commercial and technical strategy, as well as budget management.

Tell us about your work and experience at OSG.

I joined OSG through the company's acquisition of AIMO Belgium in December 1990, more than 30 years ago. It was a few months after my arrival in Belgium from Romania, where I am originally from. My academic background is rooted in economics, with specialties in finance, business strategy, as well as organizational planning and development. I studied at West University of Timișoara in Romania, where I gained my graduate degree in economics. During my tenure at OSG, I have served multiple roles including bookkeeper, IT manager and general manager in addition to my current positions as accounting manager and managing director.

Accuracy, reliability and simplicity are the principles of my work ethic. An accountant must disclose to management, give them confidence in the accuracy and rightness of the figures provided. Moreover, being trustworthy and performing well regularly is the foundation of successful teamwork as no one achieves greatness on their own.

It is hard to imagine having a 30-year career in the same company with work remaining pleasant every day. At OSG, it is possible, and it is very gratifying. OSG



Front left, Nichita poses for a group photograph with her accounting team at OSG Europe Logistics in Belgium.



1. Center seated, Nichita poses for a group photograph with her colleagues at Romsan in Romania, where she serves as managing director.



2. Nichita visits a salt mine in Romania. Nichita is originally from Romania and moved to Belgium in 1990.

What is most challenging about your work?

It is challenging to encourage individuals to set goals; and to act as a source of encouragement to one another. I strive to share my experiences with multicultural teams, giving them the will to push further, to try something new and to improve themselves.

What is unique about OSG Europe?

Being the headquarters of the European region, working at OSG Europe offers the opportunity to work and collaborate with many representatives and top management from the OSG Group. It is a pleasure to be able to work with dedicated senior employees as well as the younger generations who are full of energy and new initiatives. Since we work very closely with the corporate headquarters in Japan, it is also very enjoyable to work together with our Japanese colleagues, exchange values and getting inspired.

What is your favorite OSG tool?

Skiving cutter is my favorite tool. It is a product that demonstrates the ability and vision of OSG to develop and create new manufacturing solutions. The first test and implementation were realized by OSG Romania, Romsan. Without the involvement and technical support of the company headquarters OSG Corporation, it would not have been possible. With support and trust from the parent company, new tooling concepts can continue to evolve and improve.

In addition to standard items, OSG also offers custom tooling such as skiving cutters, which are used for manufacturing internal gears. Gear shaping by skiving is a continuous cutting process that is highly efficient. With a single setup, skiving offers higher productivity, flexibility and improved quality than broaching.



How do you spend time on your day off?

I enjoy hiking on Sunday mornings with friends, taking care of my garden, and doing workouts. I especially appreciate spending time with good friends, raising a glass, sharing a nice meal and simply enjoying the moment.

Nichita taking a hike at the Machu Picchu in southern Peru. On her day off, Nichita enjoys hiking, gardening and working out.

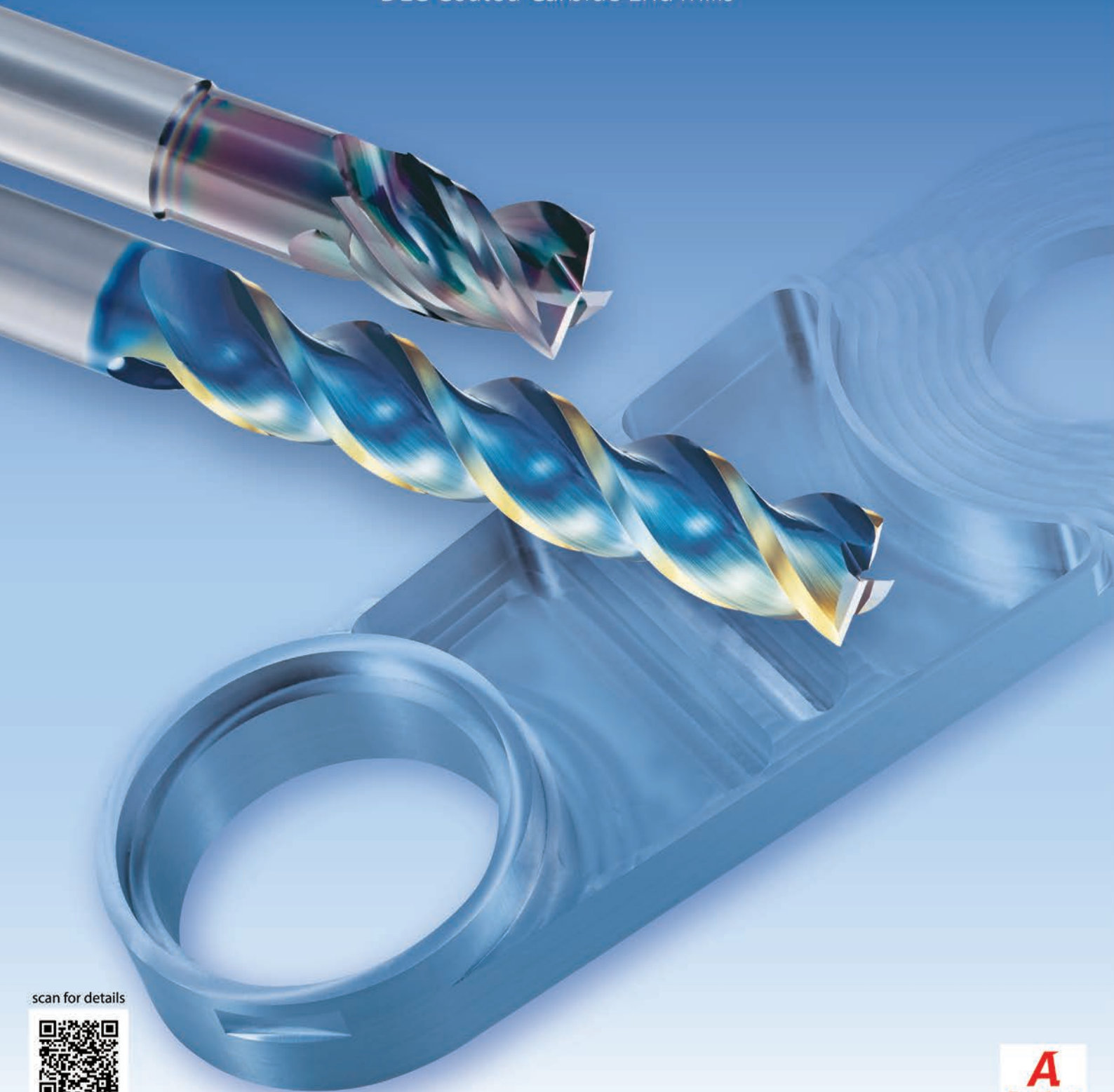


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DLC Coated Carbide End Mills



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