

# SHAPE IT

OSG Global Tooling Magazine

First Edition 2016

## TOPICS

### The A Brand

*OSG's latest high performance tooling innovations*

- Global Customer Reports
- Product Pickup
- 2016 Exhibition Schedule
- Employee Interview





## Shaping a New OSG with **The A Brand**

*I am most pleased to announce the publication of SHAPE IT – OSG's first global industry magazine created to bring forth some of the company's most innovative and reliable tooling solutions for the manufacturing industry worldwide. This first issue of SHAPE IT explores common machining problems in stainless steels and the types of drilling solutions available for maintaining ideal cost performance. This publication also shares customer reports from around the world, highlighting the importance of choosing the right tool. Snapshots of exciting upcoming events in 2016 are also included in this magazine.*

*OSG is growing steadily even after the first global recession of the 21st century. The driving force behind our performance is a well-integrated business model that links sales, R&D and manufacturing together to consistently deliver the best possible results for our clients. However, we must not stop here. OSG will continue to evolve and shape its destiny through the new A Brand, which is the company's premium brand comprised of the latest cutting tool products for threading, drilling and milling applications. The A Brand will challenge the current sales structure to better deliver cutting solutions to the world. Specifically how much of an upgrade the A Brand will bring and how we can further transform each and every one of our customers' ideas into reality? – that is my next challenge.*

*I hope you enjoy reading our first issue of SHAPE IT.*



Norio Ishikawa  
President of OSG Corporation

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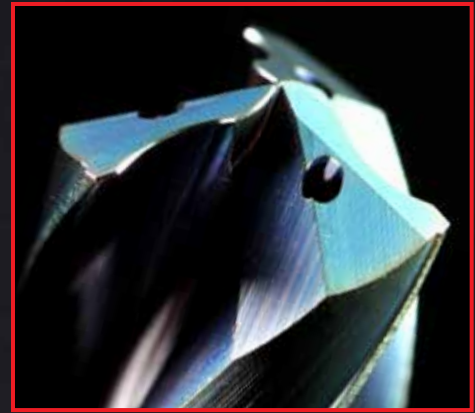
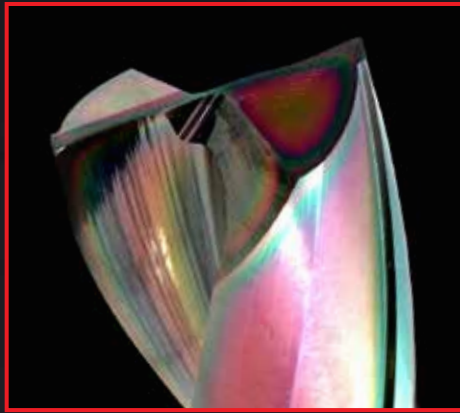
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# A Brand

Today's manufacturing industry is evolving with each day bringing new challenges. The rapid introduction of new materials and machining techniques has redefined the norm of cutting tools. In order to meet the diverse needs of our clients, OSG has established a new product brand, the "A Brand," which is comprised of our latest high performance tooling innovations.

The A Brand aims to provide manufacturers with versatile cutting tools that excel in a wide variety of work materials and machining conditions to simplify tool management. The A Brand will continue to expand with greater variations and offerings to anticipate new market requirements. With over 77 years of experience and a proven record of success, OSG's A Brand lineup will give you the confidence and peace of mind to shape your dreams into reality.





# WDO-SUS Coolant-Through Carbide Drills

Redefining Reliability in Stainless Steels and Titanium Alloys

Kazuteru Takai, OSG Corporation Product Development Engineer



With stainless steel being a durable and corrosion resistant material, it is used in a wide variety of applications and industries. Stainless steel's excellent wear resistance property, however, makes it a challenging material to machine. In order to improve the workability of this valuable material, OSG has developed a new coolant-through carbide drill series – the EXOCARB® WDO-SUS, to help manufacturers maximize their shops' potential and performance. Titanium alloy, which shares many similar characteristics as stainless steel, can also be effectively machined with the new WDO-SUS.

## Why is Stainless Steel so Difficult to Machine?

Four problems commonly associated with the machining of stainless steel include work hardening, poor thermal conductivity, welding, and the elongation of cut chips. The WDO-SUS was developed with specific features in response to these challenges (see figure 1).

## Work Hardening

Work hardening is a phenomenon where the strengthening of a metal occurs due to plastic deformation. Such strengthening is caused by the dislocation movements within the crystal structure of the material. Non-brittle metals with high melting points, such as stainless steel and titanium alloy, are prone to this condition. The key to reducing plastic deformation is by minimizing cutting force against the workpiece. To do so, maintaining a sharp cutting edge is of utmost importance. Taking note of this key feature, OSG's WDO-SUS has employed a sharp cutting edge with a minimum chamfer width to suppress cutting forces.



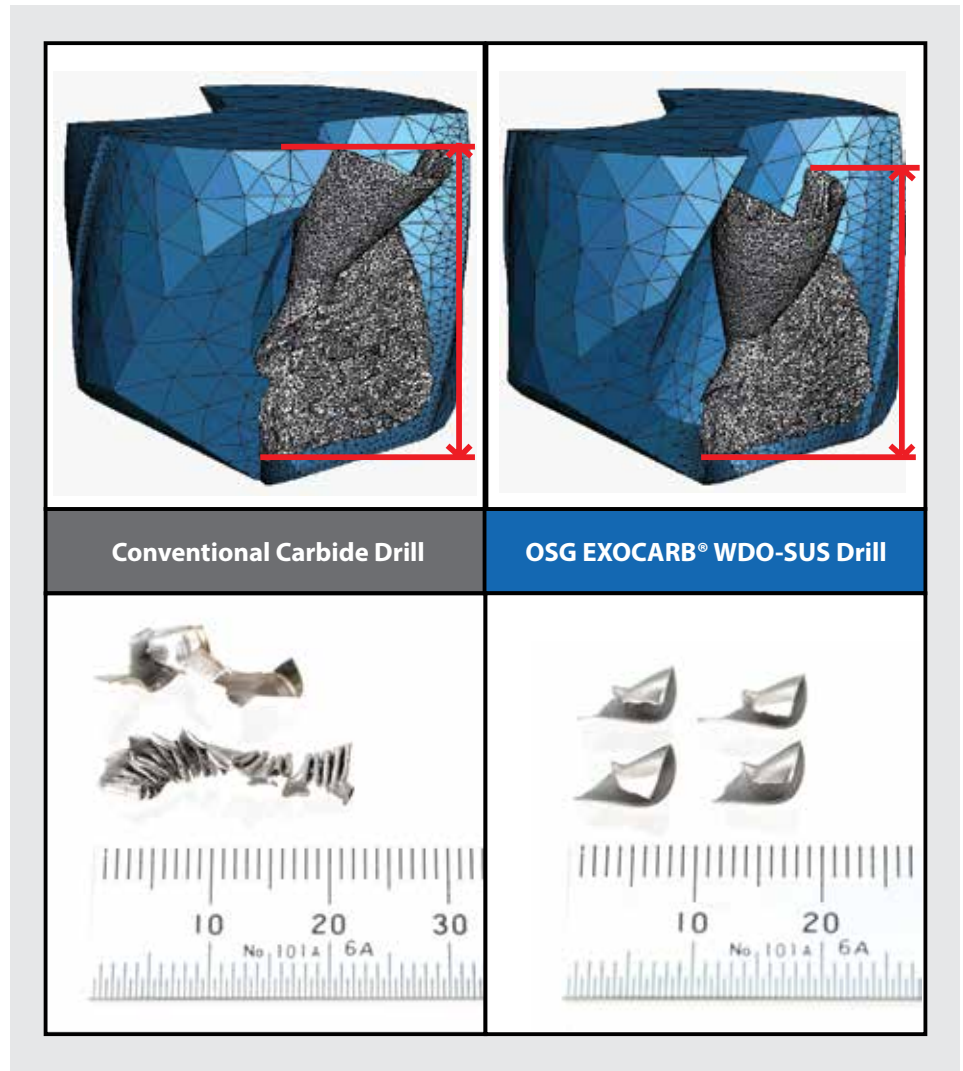
Figure 1. Features of OSG's EXOCARB® WDO-SUS Drill

## Poor Thermal Conductivity

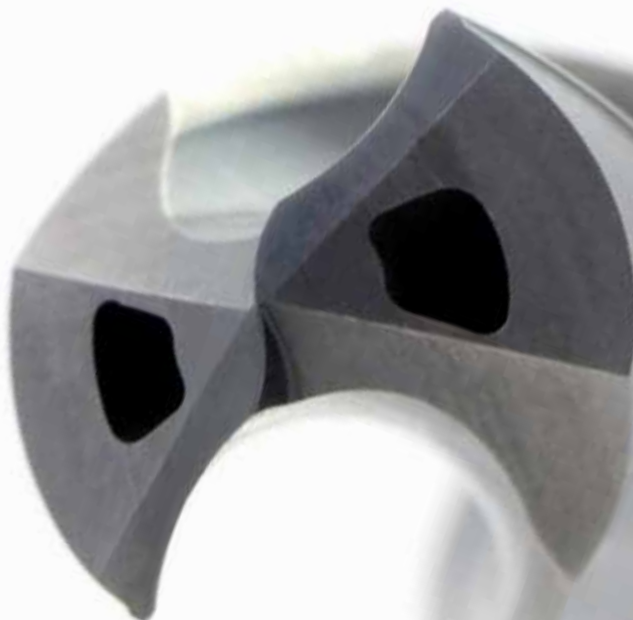
Materials with poor thermal conductivity have difficulties dispersing heat generated by machining. The rise in overall cutting heat temperature can cause the tool material and the coating on it to oxidize, accelerating tool wear. In order to suppress heat generation, the sharpness of the WDO-SUS' cutting edge has been enhanced, and the margin area was reduced to a minimum. Furthermore, in order to quickly disperse machining heat, the WDO-SUS has employed a new oil hole shape to facilitate three times the coolant flow velocity in comparison to other conventional oil hole shapes. With the new coolant hole design, the total flow volume has been increased by 1.3 times versus conventional products, which can drastically improve chip evacuation.

## Welding

Stainless steel has a high affinity with carbide materials, making it highly susceptible to welding which can damage the cutting tool. To prevent this condition from occurring, the WDO-SUS drill has adopted OSG's patented WXL coating, which has high adhesive strength to the tool material and a low coefficient of friction.



**Figure 2. Chip Shape Comparison**  
Left: Chips produced by a conventional carbide drill.  
Right: Chips produced by OSG's EXOCARB® WDO-SUS.



## Elongation of Cut Chips

A unique characteristic of stainless steel is its high tensile strength. Therefore, when machining stainless steel, the chips emitted have a high tendency to elongate, causing them to clog during evacuation. With drilling, it is very difficult to analyze the actual machining condition within the hole. To overcome this challenge, OSG has turned to computer aided engineering (CAE) technology, which is commonly used for simulation, validation and optimization of products and manufacturing. With CAE, OSG was able to more accurately examine the environment within the hole in order to develop the ideal tool geometry tailored for creating compact chips in stainless steel (see figure 2).

## Cutting Data

Figure 3 illustrates the tool life difference between OSG's WDO-SUS drill and a conventional product when machining SUS 304. The WDO-SUS drill outperformed the competitor drill with twice the durability.

Figure 4 is a comparison of margin wear. The WDO-SUS emitted little heat during machining thus suffering much less margin wear than the competitor tool.

Moreover, the WDO-SUS was able to excel in titanium alloy in addition to stainless steel, as shown in figure 5. The WDO-SUS was able to machine over 2,000 holes in titanium alloy while the competitor tool chipped and failed during the initial stage.

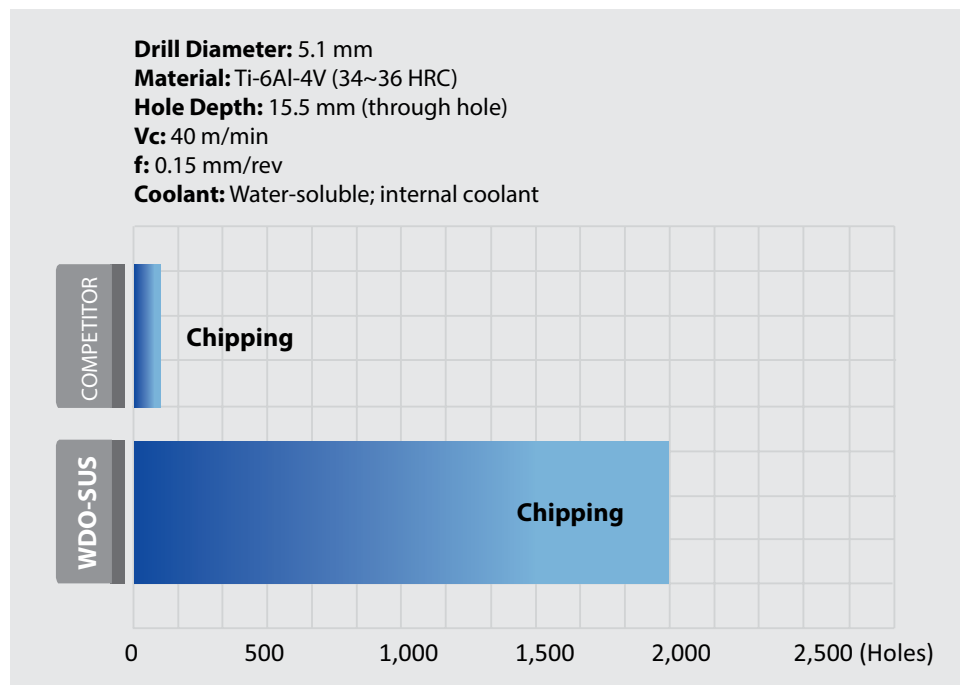
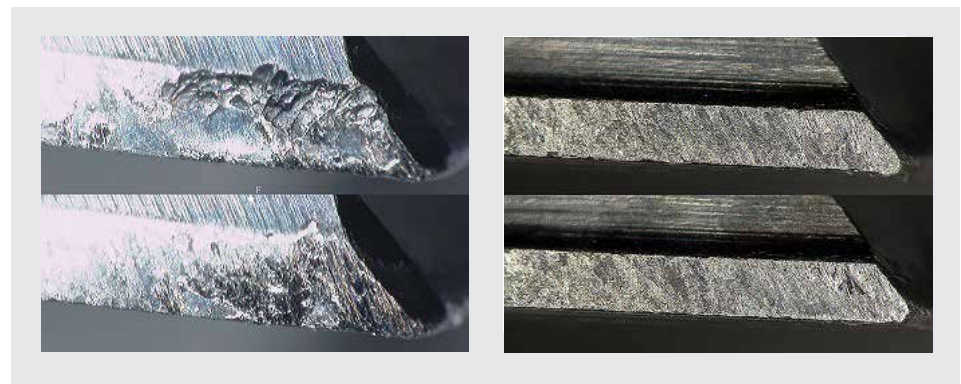
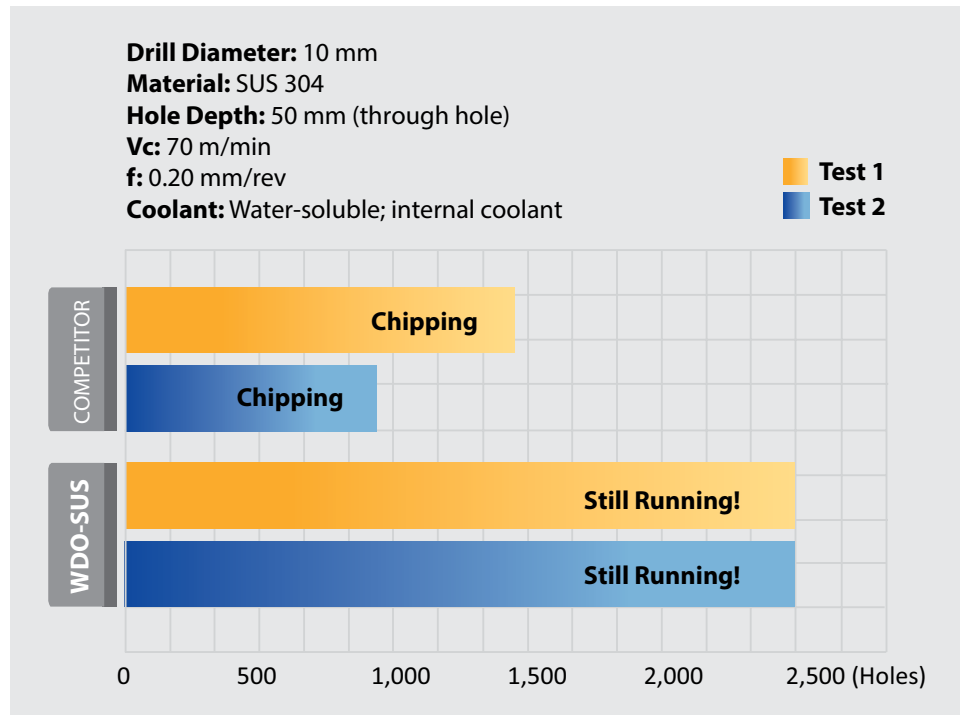


Figure 3. (Top)  
Stainless Steel Cutting Data

Figure 4. (Middle) Margin Wear  
Comparison After Machining SUS 304

Left: Margin wear of a competitor drill after 1,500 holes; Right: Margin wear of the EXOCARB® WDO-SUS after 2,500 holes.

Figure 5. (Bottom)  
Titanium Alloy Cutting Data



## Conclusion

OSG's new EXOCARB® WDO-SUS series has adopted a tool geometry that emphasizes sharpness to reduce work hardening, thereby prolonging tool life for post-processing including reaming and tapping. Its new flute form encourages the creation of small cutting chips, which is essential for trouble-free chip evacuation. Furthermore, the WDO-SUS has employed a unique oil hole design for diameter sizes above 6mm to suppress heat generation and to facilitate smooth chip evacuation. With the addition of OSG's patented WXL coating, which has strong adhesion strength, high resistance against welding can be achieved. Utilizing OSG's latest cutting tool technology, the WDO-SUS series is capable of drilling stainless steel and titanium alloy with predictable and consistent tool life, making efficient machining of difficult-to-machine materials a reality. ✦

The EXOCARB® WDO-SUS series is capable of drilling stainless steel and titanium alloy with predictable and consistent tool life, making efficient machining of difficult-to-machine materials a reality.





# Less Idle Time, More Cost Efficiency

More than 20,000 holes drilled in the master class of stainless steel  
*Dieter Prinz, OSG Deutschland GmbH*

Lower cutting force, lower cutting temperature and lower feed rate achieved by switching to a new tool – these ideals sound great on paper. However, whether or not ideals can be achieved often is not based on cutting data alone, but also by the various components surrounding the actual cutting environment. That is why at Heinz Edelstahl in the German town of Salach, the production team gave little attention to any figures

achieved under laboratory conditions. What Heinz Edelstahl cares about is process reliability in difficult-to-machine materials such as stainless steel.

Heinz Edelstahl GmbH was founded in 1990 and has established itself as a supplier of small batches and custom pieces of stainless steel parts. In Salach, up to 1,200 tons of stainless steel are processed each year, 95 percent of which are machined by milling, turning, grinding and drilling.

The company also offers plasma cutting with three cutters. Together with efficient cutting optimizations by using state-of-the-art CAM software, very little waste is created. Customers today come from the medical and food industry, architecture and construction, as well as pipe manufacturing and the petrochemical sector.

Heinz Edelstahl was not particularly encountering any machining difficulties when OSG visited their production facility. However, they are always looking to further improve their operation and welcome new recommendations. In this specific report, a new recommendation was made on the drilling of sieve segments for a manufacturer of paper machines. This



Zeljko Kuzmann, head of production (left) and Peter Heinz, engineering and sales (right): "This drill has proven trustworthy enough that we are thinking about using it unsupervised overnight."

application required more than 10,000 through-holes in stainless steel 1.4462 at a diameter of 12 mm and a depth of 20 mm per hole.

This stainless steel X2CrNiMoN22-5-3 is hard to machine, and the processing of this steel belongs in the master class. This cryogenic stainless steel is highly weather resistant and is therefore mainly used in architecture and sometimes in the petrochemical industry. For drilling one of these sieve segments, the standard was three days and 2.5 drills. The up to then exceptional cutting conditions were achieved with a top shelf carbide drill. Now cutting parameters have been increased by 3.5, and tool life has been more than doubled. This was made possible by the EXOCARB® WDO-SUS carbide drill from OSG, engineered specifically for tough materials like stainless steels. The WDO-SUS series has adopted a tool geometry that emphasizes sharpness to reduce work hardening, thereby prolonging tool life for post-processing including reaming and tapping. Its new flute form encourages the creation of small cutting chips, which is essential for trouble-free chip evacuation. Furthermore, the WDO-SUS has employed a unique oil hole design for diameter sizes above 6mm to suppress heat generation and to facilitate smooth chip evacuation. With the addition of OSG's patented WXL coating, stronger adhesion strength and resistance against welding can be achieved.



Lower cutting force and less friction for reduced cutting temperature and a new chamfer design for lower feed rates and optimal chip formation are proven results achieved by OSG with the EXOCARB® WDO-SUS coolant-through carbide drill series.

By switching to the WDO-SUS, cutting force and friction as with that cutting temperature are reduced. In addition, because of the new chamfer design, less feed is needed. The performance of the WDO-SUS has far exceeded the expectation of Peter Heinz, head of sales and engineering at Heinz Edelstahl GmbH.

“We have been machining stainless steel for 25 years and have tested a lot. Based on our experience, the performance of a tool usually is maximized under ideal conditions like climate controlled environment and with the utilization of state-of-the-art machinery,” said Heinz.

“Our machines aren’t the latest models, radial deviation isn’t the best either. That’s why I was surprised by the WDO-SUS. It’s completely reliable, evacuates chips really well and tool life is also great.”

OSG had set up testing for cycle time and tool life. First, cutting parameters were set to the maximum to shorten cycle time. As a result, cycle time was reduced from three days to one and a half. The next step was unsupervised



Heinz Edelstahl is processing up to 1,200 tons of stainless steel per year, 95 percent of which are machined by milling, turning, grinding and drilling.

production. The result was a tool life of two sieve segments with one drill, but even after that, it didn’t need to be replaced and could be used further without problems. These results were able to build enough trust to start considering unsupervised manufacturing

*Less stress on machines and warehouse is nice, but for us that’s not really the point. With our lot sizes, there is not much need for maximized cutting speed. It’s more about reliability, with noticeably less machine idle time because of the reduction in tool replacement or breakage.*

overnight. It’s just that the optimizations OSG did with the WDO-SUS were meant to relieve the machine and to reduce power intake. But that’s not what it is about in Salach. There is no mass production, no permanent load. Process reliability is far more important. Higher speed and longer tool life are just an additional bonus according to Peter Heinz.

“Less stress on machines and warehouse is nice, but for us that’s not really the point. With our lot sizes, there is not much need for maximized cutting speed. It’s more about reliability, with noticeably less machine idle time because of the reduction in tool replacement or breakage.”

Cost efficiency itself is a big concern for small and mid-sized companies. OSG eliminates the need for a stockpile of tools because the WDO-SUS can

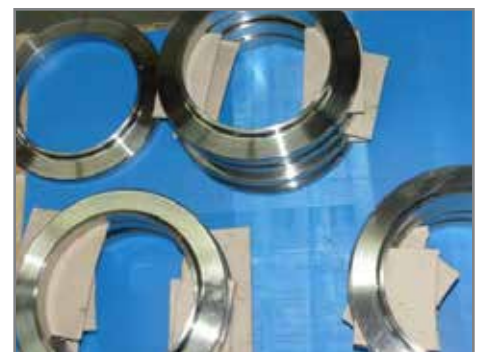
demonstrate its strength even in carbide and tool steel. With cheaper products, one has to stock multiple tools with the risk of causing damage to an important part. So Heinz Edelstahl seems to be on the right track. Besides the 1.4462, a variety of other stainless steels are also processed in Salach, and, according to Peter Heinz, these are no match in terms of problematic machining in comparison with the master class, the 1.4462. ✖



Instead of figures achieved under ideal conditions such as climate controlled environment and state-of-the-art machinery, practical use is what counts in Salach. The machines aren’t the latest models, radial deviation isn’t as good as with a new machine.



Heinz Edelstahl has established itself as a supplier of small batches and custom pieces of stainless steel parts.



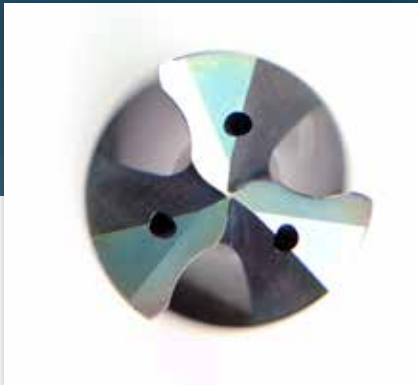
The EXOCARB® WDO-SUS carbide drill from OSG in use. Besides 1.4462, other stainless steels are also processed.



# The Real Potential of a Three-Flute Drill

EXOPRO® Mega Muscle drill demonstrates ultra efficiency even after regrind

Vis Huang, OSG Shanghai



The EXOPRO® Mega Muscle drill is designed specifically for drilling at feed rates 1.5 to 2 times faster than 2-flute drills. The Mega Muscle drill may also be used at lower RPMs, which decreases the amount of wear and prolongs tool life. This design also leads to higher hole accuracy with less work hardening, which gives secondary operations such as tapping even more tool life.

Because 3-flute drills have a smaller flute size (chip room) than 2-flute drills, they are rarely used in difficult-to-machine materials like steels. However, OSG's EXOPRO® Mega Muscle drill is designed with a special shaped flute (PAT.P) that breaks steel chips into small, manageable pieces for easy evacuation, thereby enabling ideal performance even in steels.

In the automotive manufacturing sector, components such as engine blocks, cylinder heads and crankshafts are commonly produced from materials like cast iron, alloy steel and aluminum. Due to the mass production nature of the business, reliability and cost efficiency are often the key determinants in the choice of tooling.

In this case study, a cylinder block made of HT250 (equivalent to gray cast iron) with a 180~220 hardness was being evaluated. The customer is a major automotive manufacturing company based in Zhengzhou, China, with an annual production capacity of 400,000 units. The material of the cylinder block

is brittle with low tensile strength but is easy to cast. The total lot had 380 blocks with each requiring 15 drilled holes. The part was being machined in a Makino horizontal machining center, with a BT50 drill holder using internal and external emulsion 8% coolant. The drills used in this part are reconditioned and reused to maximize cost efficiency. This manufacturer was originally using a 2-flute coolant-through carbide drill running at a cutting speed of 100 m / min, 4,680 min<sup>-1</sup> revolution, 0.15 mm / rev feed per revolution, a feed rate of 1,700 mm / min, and drilling at a hole depth of 14 mm (blind hole). The manufacturer was looking to further improve efficiency and had decided to

switch from 2-flute to 3-flute tooling.

Conventional 3-flute drills are most commonly used in the processing of materials with short cutting chips, such as cast iron and cast aluminum.

Because 3-flute drills have a smaller flute size (chip room) than 2-flute drills, they are used less in difficult-to-machine materials like steels. OSG's TRS "Mega Muscle" drill has been heavily advertised as a 3-flute series with ultra machining efficiency. The Mega Muscle drill is designed with a special shaped flute that breaks steel chips into small, manageable pieces for easy evacuation. This allows for increased feed rates up to 1.5 to 2 times faster than 2-flute drills. More importantly, rotational speed can be decreased, thus decreasing the amount of wear on the drill to prolong tool life. With its special negative cutting edge, the tendency of chipping at the corners on breakout of through-holes can be minimized. Its unique geometry further enhances hole accuracy with less work hardening, which gives secondary operations such as tapping even more tool life.

After putting one of the Mega Muscle drills (TRS-HO-5D dia. 6.8 mm) on the spindle for test, the manufacturer was able to witness this drill's real potential. Running at a cutting speed of 100 m/min, 4,680 min<sup>-1</sup> revolution, 0.25 mm / rev feed per revolution, a feed rate of 1,170 mm / min, the Mega

Muscle drill was able to machine a total of 5,600 holes (approximately 109 m of materials) before regrind, compared to 4,800 holes versus the previous 2-flute

drill. After tool reconditioning, the Mega Muscle drill was able to achieve 2,800 holes, while the previous 2-flute drill had machined 2,500 holes after reconditioning. The Mega Muscle drill had dominated the test trials due to its stable efficiency. The 120° equal spacing

margins of the 3-flute design allows for more predictable, vibration free hole processing, thereby increasing hole quality and tolerance. This stability is consistent throughout the 3-flute drill's tool life, whereas a 2-flute drill often has drastic changes of hole size and quality. With this 3-flute design, the Mega Muscle drill is capable of achieving hole

*“Less stress on machines and warehouse is nice, but for us that's not really the point. With our lot sizes, there is not much need for maximized cutting speed. It's more about reliability, with noticeably less machine idle time because of the reduction in tool replacement or breakage.”*



accuracy twice as precise as a 2-flute drill. From CGI engine blocks to forged steel crankshafts, the Mega Muscle drill can provide high efficiency drilling solutions for the manufacturing of automotive components and applications. ✖



A cylinder block made of HT250 (equivalent to gray cast iron) with a 180~220 hardness.



# Sealing the Deal with Reliability and Quality

EXOCARB® WDO drill eliminates short tool life and frequent breakage headaches

Vinicius Stychnicki, OSG Sulamericana

Efficiency is a key element to success in the world of manufacturing. Speed alone, however, often isn't sufficient especially in the machining of delicate and precision parts. In the manufacturing of sealing components, where safety is a major factor, reliability and quality cannot be compromised.

Founded in 1884, EagleBurgmann is a joint venture of the German Freudenberg Group and the Japanese EKK group and is among the internationally leading providers of industrial sealing technology. The company produces, sells and provides technical support in mechanical seals, magnetic couplings, accessories, expansion joints, gaskets and static joints, according to the needs of each client. EagleBurgmann's products are used in the oil & gas, refinery, chemical, energy, food processing, paper, water, marine, aerospace and mining industries. It has a workforce of approximately 6,000 employees worldwide and locations in 77 countries. This case study reports from EagleBurgmann's Campinas, Brazil location, which was founded in 1978 and is a subsidiary of the EagleBurgmann Group.

During a routine customer visit EagleBurgmann's staff was involved with a workpiece made of super duplex stainless steel with a 410 HB hardness. The part required drilling 6 holes per workpiece at a hole depth of 58 mm with soluble coolant on a Mazak vertical machining center. The drill used at the time was breaking inside the workpiece frequently and had poor tool life. Troubled by the unsatisfactory results, these concerns were expressed to OSG's sales and engineering team. After a careful evaluation of the application, OSG recommended its EXOCARB® WDO-10D coolant-through carbide drill (dia. 6 mm) to EagleBurgmann.

The WDO series is OSG's premium line of carbide coolant-fed high performance drills designed to machine a variety of steels up to 30X diameter without pecking. It features a unique point design to increase sharpness and decrease vibration, permitting stable low-torque drilling. With the addition of OSG's proprietary coating, tool life can be further prolonged with greater wear resistance.

After making the switch to the WDO-10D drill EagleBurgmann was able to accomplish a number of cost savings – tool life was increased by 150 percent; total tooling cost was reduced by 47 percent; the average cost per workpiece had dropped from R\$ 60,47 to R\$ 10,08. Moreover, the WDO drill had improved hole quality, while adding the extra benefit of being able to stably perform at greater drilling speeds. The headaches caused by broken tools within the workpiece have been eliminated, leaving only faster setup times and cost efficiencies. ✨

*After making the switch to the WDO-10D drill EagleBurgmann was able to accomplish a number of cost savings – tool life was increased by 150 percent; total tooling cost was reduced by 47 percent.*

The EXOCARB® WDO series is OSG's premium line of carbide coolant-fed high performance drills, designed to machine a variety of steels up to 30X diameter without pecking.



The EXOCARB® WDO-10D in action drilling at a hole depth of 58 mm in super duplex stainless steel with a 410 HB hardness.



Sealing components manufactured by EagleBurgmann of Campinas, Brazil.





# The Definition of Productivity

Giving a new high tech machining center the quality tooling it deserves

Mike Cotton, OSG USA

After making the investment to purchase a brand new, state-of-the-art machining center, what's next? For owners in the manufacturing industry, one of the first major business hurdles after making the initial capital investment on machining centers is securing orders to generate revenue from these expensive pieces of equipment. Once an order is secured, proper selection of cutting tools can also play a major role in a manufacturer's profitability as it influences cycle time, down time for tool changes and also has an impact on the quality of the finished product.



Batches of parts are waiting to be machined at Ameridrives.

Ameridrives Power Transmission in Green Bay, Wisconsin, USA (formerly All Power Transmission) is a manufacturer of universal joints for industrial, marine, pumping, off highway and transportation applications.

With over 30 years of experience providing solutions for the needs of the mechanical power transmission coupling industry, Ameridrives designs, manufactures, services and repairs drive shafts from 1 to 40 inches in diameter, and up to 30 feet in length. In addition to universal joints, Ameridrives can also provide gear couplings, disc couplings and elastomeric couplings.

The WDO-5D is a part of OSG's EXOCARB® WDO carbide coolant-fed high performance drill series designed to excel in a variety of materials and applications.

The EXOPRO® OIL-S-XPF is a premium high performance form tap designed for materials up to 35 HRC.

Recently Ameridrives purchased a brand new DMG Mori NVX 5100 machine as a replacement and improvement over an older Tree machine. The new Mori NVX 5100 is a high-precision, high-speed vertical machining center with coolant circulation technology and heat-symmetrical structure for effective spindle heat dispersal. This investment will soon pay off with increased throughput with carbide cutters, drills and roll form taps on multiple types of components. With their new machine ready for a debut, Ameridrives was ready to get tooled up.

The first part of the process involved the machining of 8620 alloy steel with 30,000 drilled and tapped holes. Overall, the job included up to 120 different part numbers with a large amount of drilling focus. During the tool selection process Ameridrives was looking for both reliability in tool life as well as performance, and OSG had just the tools for the job. For this article we are focusing on the test results for the drilling and tapping using OSG's EXOCARB® WDO-5D drill (diameter 0.3488") and EXOPRO® OIL-S-XPF form tap (3/8-16)."

The WDO-5D is a part of OSG's EXOCARB® WDO carbide coolant-fed





Above: The EXOPRO® OIL-S-XPF form tap was put into Ameridrives' new DMG Mori NVX 5100 for a tool life test in 8620 alloy steel.



Ameridrives' recent contract requires the drilling of up to 30,000 holes per lot.

high performance drill series. It is designed to excel in a variety of steels up to 30X diameter without pecking. Unique point geometry creates sharp cutting action for reduced thrust forces, while OSG's proprietary WD1 coating provides drastically higher hardness and heat resistance, enabling higher drilling speeds and incredible tool life.

The XPF is a premium high performance form tap designed for materials up to 35 HRC. These form taps generate up to 50 percent less torque versus other forming

taps, making it feasible to tap materials up to 35 HRC and for sizes up to or exceeding 1" in diameter.

The WDO drill ran at 300 SFM (3250 RPM) 29 IPM (0.009 IPR) drilling 0.95" deep. After 200 holes, no wear was visible. The XPF form tap followed right after, running at 90 SFM (916 RPM), feed of 57.3 IPM (0.0625IPR) to a depth of 0.93". The XPF also did not display any visible wear after 200 holes. At the end of the trial, the tool life ended up to be 3,000 holes per WDO drill and 6,000 holes

per XPF tap. The WDO drills can also be reconditioned up to three times in this case to further enhance cost efficiency.

Maximum productivity can be defined by the lowest cost-per-hole with the shortest cycle time and highest quality possible. As demonstrated above, this can only be achieved with the best combination of equipment – both machines and tooling. ✪



# One Tap Does it All

High process reliability across a wide range of materials

Dieter Prinz, OSG Deutschland GmbH

Multipurpose isn't usually associated with high performance, especially with cutting tools. When it comes to taps, tool geometry and base substrate are commonly matched with the material to be processed. Even though Brinke & Breuer, a company active in tool making, mechanical engineering and fixture construction, works with a broad range of materials such as aluminium (soft to hardened), copper, brass, mild steel and tempered steel, the need to try new thread cutting tools never surfaced as a topic.

Brinke & Breuer GmbH started out in 1995 with metal works for construction. The focus has gradually shifted to traditional metal and mechanical engineering. In 2011, tool making for injection moulding was added to the portfolio. The manufacturing range was

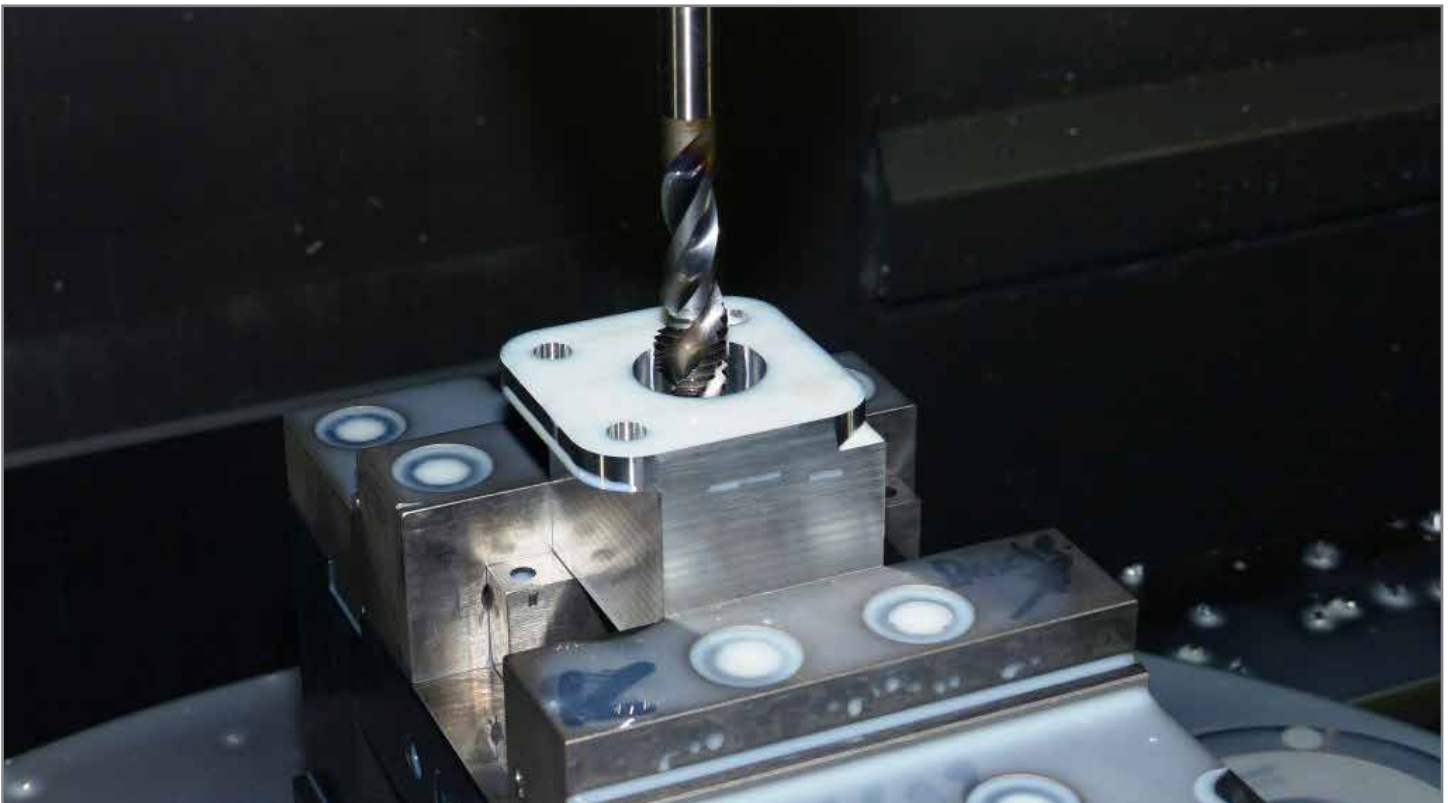
further broadened by acquiring two five-axis machining centers and waterjet cutters due to market requirements. Nowadays, customers are not limited to a specific industry, but stem from a variety of industry sectors, such as the automotive, supply industry and pump manufacturing among others. One of Brinke & Breuer's strengths is custom and small batch part manufacturing up to production of complete machines (e.g. for the installation of gas springs). The tools used at Brinke & Breuer until then were, apart from a few exceptions, yielding excellent results. Change came with a material often worked with in Staudt, where the company is located – electrolytic copper (E-Cu). According to the owner, Jens Brinke, it was this material that started the relationship with OSG.



Jens Brinke (left) and Michael Breuer (right): "Our goal was to find a single supplier for our tool. We found that just two manufacturers worldwide that meet our requirements - OSG is one of them."

"We were looking for a deep-hole drill, diameter 9 mm, 300 mm deep, for electrolytic copper," said Brinke. "Only OSG was able to deliver a solution to that problem. Starting with that, we made a full switch to OSG, threading tools as well."

To Brinke & Breuer, it was about not only the number of holes but also more importantly process reliability. They had given the EXOTAP® A-TAP® Spiral Flute Tap (A-SFT) a try because the tool had



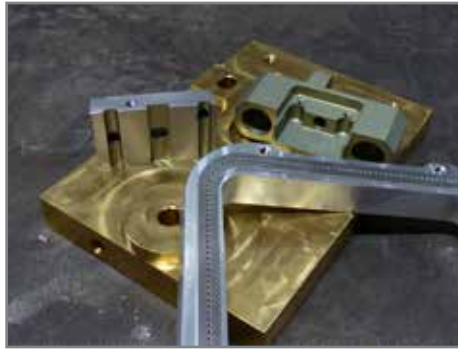
Universal use: The EXOTAP® A-Tap® is engineered for high process reliability. Its capability to run under ambitious cutting speeds adds to its economic efficiency.

promised high cutting speeds across a broad range of materials on top of long tool life.

OSG's A-SFT spiral flute tap is an all-purpose tap series designed to simplify tool management and to excel in a wide variety of materials and applications. The A-SFT has adopted a variable helix flute design, which encourages stable chip evacuation and reduces cutting forces. The helix angle changes from the chamfer, where chips are formed, to the flutes, where chips are evacuated. This unique geometry enables greater chip control that can help produce tightly compacted chips for easy ejection from the hole. To accommodate a wide range of cutting conditions, powdered metal HSS and OSG's patented V coating have been employed in this series to achieve excellent wear resistance.

Brinke's main concern was the advertised absolute process reliability regarding chip formation and evacuation across a variety of materials with high cutting speeds. Now the switch to the A-SFT is almost complete.

The emphasis Brinke & Breuer put on process reliability is due to thread cutting, usually the last step in the production of high value components. When producing one-of-a-kind or small batch components out of a broad variety of materials, tool life is not the most important factor. Considering the broad range of applications, it would be almost impossible to calculate. Neither is there a need to shave down cycle times. Looking at the range of materials and thread sizes from M2 to M16, warehousing becomes a serious concern. On each of the eight machines during each shift, a minimum of three to four different materials are processed. With this factor in mind, a huge variety in threading tools would have had a negative impact on set up times. Both partners of Brinke & Breuer, Jens Brinke and Michael Breuer, wanted a tap that was economical. And, according to them, it is economical if you can only cut 10 threads with a M2.5 tap into a 1.2379 tool steel with ease. So far no off-the-shelf tool was able to cut even a single thread into that material.



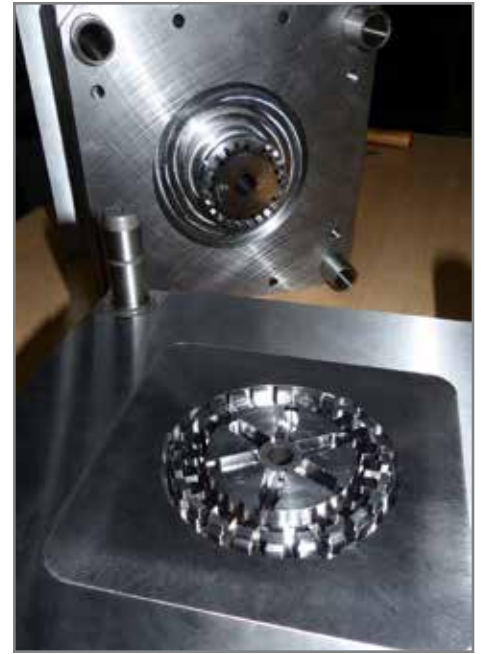
A material range as broad as it could be – from brass, copper, aluminium, to highly hardened and tempered steel. And just one tap is used for all of these materials.

### Better safe than ambitious cutting speeds

On top of ease of use and long tool life, ambitious cutting speeds are also promised by OSG.. Speeds up to 70 m/min in 42CrMo are advertised as and could be used at the Brinke & Breuer plant.

"The first problem with a lot of different threading tools is educating the employees – when and with which application to use what tool at what speed and which feed rate," commented Michael Breuer.

"We solved that problem by using the A-SFT, which doesn't require the cutting parameter to be set individually. But apart from one employee no one is yet brave enough to approach the ambitious cutting speeds. On the other hand we know, the slower the speed, the higher the risk of failure and breaking of the tap. We traced that back to galling of the cutting edges. Fortunately, unlike other



Excels in multiple materials for tool making: In Staudt, the EXOTAP® A-TAP® tap is used up to HRC 42.

taps the A-SFT is really razor-sharp."

Of course, to be able to reach those cutting speeds, state of the art machines with precise synchronization is a prerequisite. Nonetheless, the A-SFT seems to be paying off at Brinke & Breuer with materials such as soft copper, high-strength aluminium and steels up to 42 HRC. With the 2-shift system, tool wear and failure are reduced to less than one percent, and findings from quality assurance are also promising. Since December 2013, Brinke & Breuer's inspection department had compared tap performance since before the switch. Thread qualities are checked and necessary rework gets written down. According to their reports, the A-SFT outperforms the already satisfactory old tap in every aspect. ✖



With its variable lead flute the EXOTAP® A-TAP® is able to achieve optimized chip formation and evacuation.



## Not Settling for Less

**A-POT point tap eliminates burrs and doubles tool life**

*Fernando Arzaluz, OSG Royco*

Top: OSG's EXOTAP® A-TAP® Spiral Point Tap (A-POT) was used to improve cost efficiency in the production of crankshafts at MACIMEX. Bottom: OSG's A-POT point tap was able to eliminate burr problems to improve hole quality.

MACIMEX, founded in 1979, it is a subsidiary of Grupo Quimmco and one of the world's biggest independent crankshafts manufacturers. MACIMEX is dedicated to the machining of wrought and cast iron crankshafts from 2 to 8 cylinders for engines and compressors having weights from 1.9 kg (4lb) to 42 kg (92 lb.) and are used in a wide range of industries as automotive, industrial, agriculture, recreation and marine. According to MACIMEX the company manufactures over 1 million crankshafts for year and exports 50 percent of its production to customers worldwide.

MACIMEX's Tenango del Valle produces over 1,800 crankshafts for day. As a leader in its field, MACIMEX is constantly looking to improve production in terms of efficiency and quality. In perforation of improving the tapping on the crankshaft's flange side, which consists of a total of 8 holes, the company contacted OSG. The material of the crankshaft was forged steel alloy SAE 1438MV with a hardness of 38~40 HRC. MACIMEX was using a horizontal machining center with synchronized feed and rotation. The hole diameter was 9.5 mm with a hole depth of 500

mm (through-hole). The cutting speed was 17 m / min and internal-fed water-soluble coolant was used.

MACIMEX was facing poor performance by using a spiral point TiN coated M11x1.5 tap from a different tooling manufacturer, which averaged a tool life of 1,600 threads. The tool life judgment was GP out but MACIMEX also experienced problems with burrs. The cost per unit with the competitor tool was \$0.0475 (USD) with five tool changes per day.

After a physical visit and a close evaluation of the application, OSG proposed the EXOTAP® A-TAP® Spiral Point Tap (A-POT) M11x1.5 (special) from the A-TAP® series. OSG's A-TAP® is an all-purpose tap series designed to simplify tool management and to excel in a wide

variety of materials and applications. The series offers spiral flute (A-SFT) and spiral point (A-POT) in a wide range of sizes. To accommodate a variety of

cutting edge design that emphasizes sharpness. Not only does the A-TAP® series perform well in general steel, it also excels in difficult to machine

materials such as stainless steel and mild steel.

The sharp cutting edge, variable flute helix and high wear resistance helped to eliminate the burr problems, and the tool life was increased to 4,000 threads, more than doubled the durability. The cost per unit went from \$0.0475 (USD) to \$0.0166 (USD), which is a 65 percent savings, and only one tool change was required per day.

As demonstrated by this case study, the formula for successful mass production is not settling for less. ✖



MACIMEX's Tenango del Valle production facility.

cutting conditions, powdered metal HSS and OSG's patented V coating have been employed in this series to achieve excellent wear resistance. In addition, to enable high speed machining, the A-TAP® series also incorporates a unique



The A-POT is a part of OSG's A-TAP® series designed to simplify tool management and to excel in a wide variety of materials and applications. The series offers spiral flute (A-SFT) and spiral point (A-POT) in a wide range of sizes.



# The Answer to Zero Defects

EXOTAP® A-TAP® provides peace of mind with long tool life and quality finish

Raman Pandiyan, OSG Asia



Components used in the oil and gas industry are often very large in size. The demand for quality has also continued to increase to ensure security. Large components are a challenge to machine as scrapping a part due to the poor finish of a hole can be very costly.

At FMC Technologies Inc. in Singapore, zero defects are an absolute in its production of annulus block valves. FMC Technologies is a leading global provider of technology solutions for the oil and gas industry. FMC Technologies designs, manufactures and services technologically sophisticated systems and products such as subsea production and processing systems, surface wellhead systems, high pressure fluid control equipment, measurement solutions and marine loading systems. As of 2013, the company has approximately 19,000 employees and operates 24

production facilities in 14 countries.

FMC was machining batches of annulus block valves in AISI 4140/4130 with a thread size of 1"-8 UNC-2B, hole diameter of 22.2 mm, hole depth of approximately 70 mm (blind holes and depth varies depending upon components), threading depth of approximately 33 mm, and tapping paste was applied as a form of lubricant. In terms of equipment, the WFL Horizontal Boring Machine, Mazak Integrex and Mazak e-tower machining centers were used. Some of the components require over 48 hours to machine.

Due to the overall cost of the components, zero defects was a key concern with good tool life serving as a secondary requirement. In search of a tap capable of producing good quality thread finish without any gauge problems, FMC Technologies tested tools from three different tooling manufacturers.

The cutting parameter was kept at

80 RPM for all three tools. For this part, OSG recommended its popular EXOTAP® A-TAP® series spiral flute tap, the A-SFT. Achieving trouble-free chip evacuation with a spiral tap in blind holes is particularly challenging and is a main cause of headaches for many

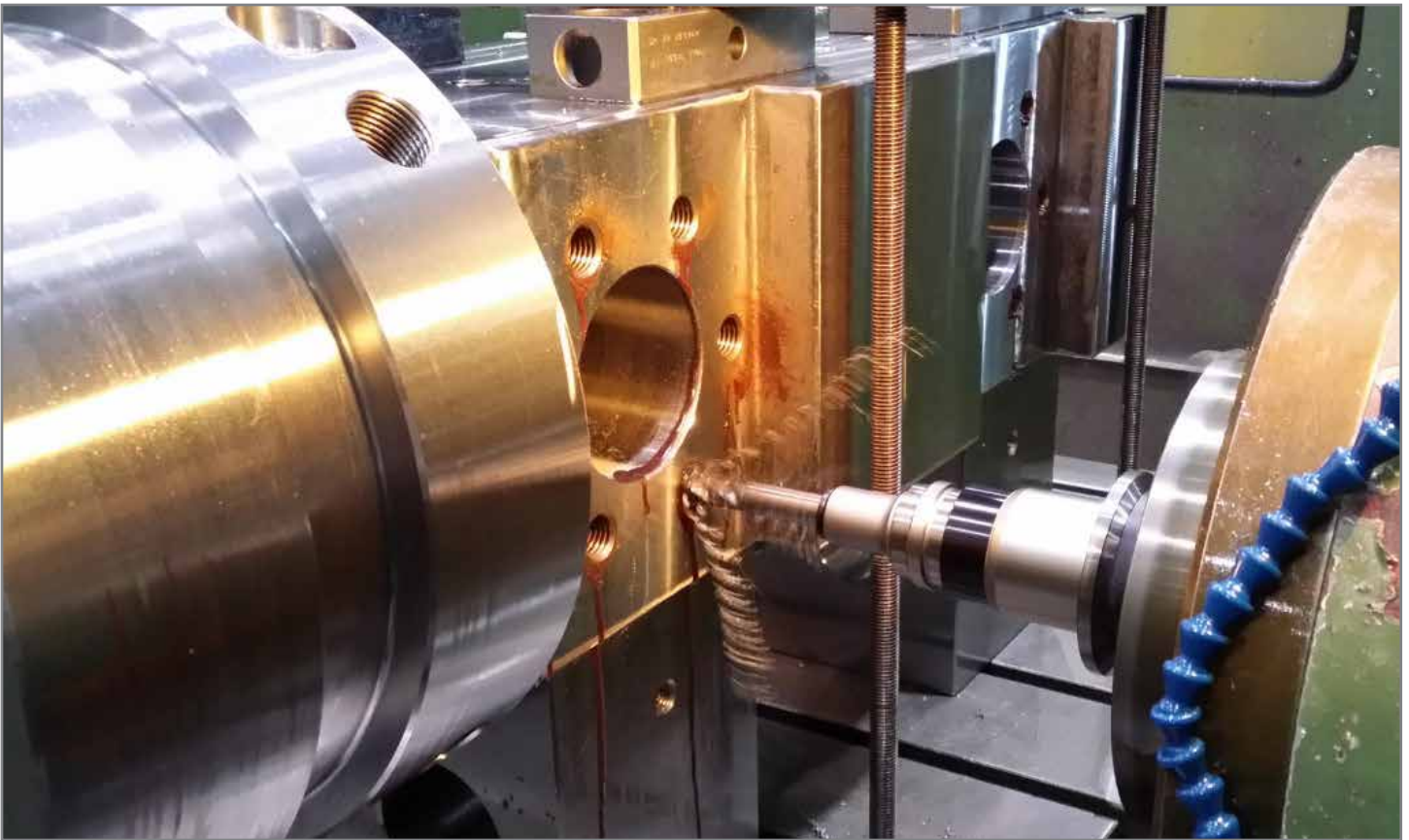
manufacturers. To resolve this problem and to improve the ejection of chips, OSG's A-TAP® SFT has adopted a variable helix flute design, which encourages stable chip evacuation and reduces cutting forces. The helix angle changes from the chamfer, where chips are formed, to the

*Due to the overall cost of the components, zero defects was a key concern with good tool life serving as a secondary requirement.*

flutes, where chips are evacuated. This unique geometry enables greater chip control that can help produce tightly compacted chips for easy ejection from the hole.

The first competitor tap finished 500 holes while the second competitor tap completed 350 holes. Under identical cutting conditions, OSG's A-SFT tapped 2,018 holes, more than four times the tool life versus the competitors with good thread finish and perfect gauge confirmation. With the use of the A-TAP®, the answer to zero defects cannot be any clearer. ✖





OSG's EXOTAP® A-TAP® Spiral Flute Tap in action tapping a hole in the annulus block valve.



An annulus block valve in a R16-3100 machine at FMC Technologies.



FMC's very own 1" 8UNC GO plug gauge was used to confirm the accuracy and finish of the thread surface. The thread tapped by the EXOTAP® A-TAP® Spiral Flute Tap appears in good quality.

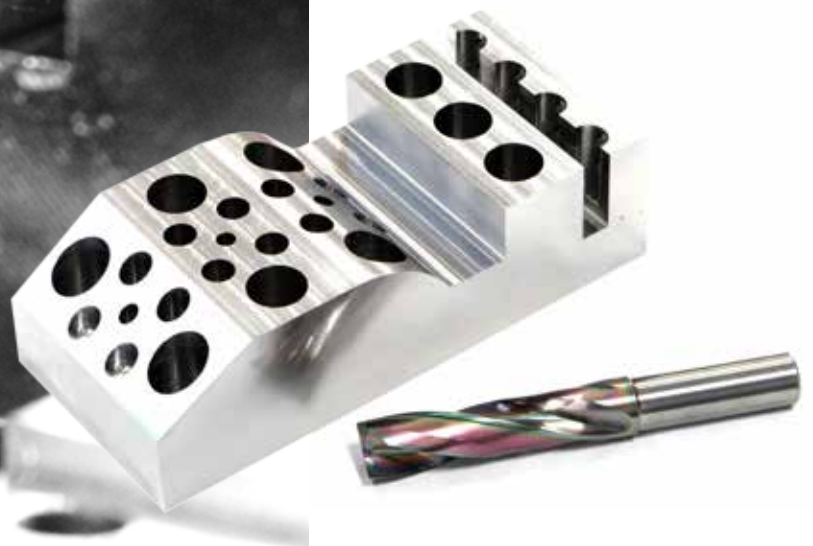
The EXOTAP® A-TAP® Spiral Flute Tap has adopted a variable helix flute design, which encourages stable chip evacuation and reduces cutting forces. The helix angle changes from the chamfer, where chips are formed, to the flutes, where chips are evacuated. This unique geometry enables greater chip control that can help produce tightly compacted chips for easy ejection from the hole.

## ADF Flat Drill Series

**Multi-purpose flat drill series for inclined surfaces and counterboring applications**

The ADF was developed with an “all-purpose” concept for superior versatility, reliability and quality for flat-bottom holes. Machining a flat hole traditionally required the use of an end mill and a drill. The ADF enables one-step drilling thereby simplifying machining time and tool management. The drill’s balanced point form improves precision and minimizes the shifting of the hole position. Its sharp cutting edge results in low cutting force to minimize burrs even in thin plates. With wide chip room geometry, trouble-free chip evacuation can be achieved. Furthermore, with the addition of OSG’s new proprietary EgiAs coating, tool life can be prolonged with excellent heat and wear resistance.

The ADF is engineered for a wide variety of drilling applications including inclined surfaces, curved surfaces, counterboring, eccentric holes, thin plates, etc. It is suitable for common materials such as carbon steel, alloy steel, hardened steel (up to 35 HRC) and cast iron. Standard types are available in diameters from 2 to 20 mm, and long types are available in diameters from 3 to 20 mm).





# AERO End Mill Series

High performance carbide end mills for aluminum alloys

The AERO end mill series is one of OSG's latest innovations for high efficiency milling of aluminum alloys. This series consists of five types of end mills designed for roughing and finishing.

The AERO end mill's high rigidity design enables efficient machining of large aluminum work pieces with high horsepower equipment of over 80 kW. Its optimal flute length and sharp cutting edge facilitate excellent chip evacuation even under aggressive speeds and feeds. Further, with OSG's diamond-like coating (DLC), this series is able to achieve long tool life with exceptional welding resistance and lubricity for trouble-free chip evacuation. Another notable benefit of the DLC coating is its ability to achieve superb surface finish under high-speed cutting conditions with a single pass.

OSG's AERO end mill series is available in various styles and flute lengths.



## Phoenix Indexable Drill

Comprehensive series engineered to excel in a wide range of drilling applications, including deep-hole

The Phoenix indexable drill series consists of four length sizes – 2D, 3D, 4D and 5D, designed for reliable and highly efficient drilling of large holes. The high precision finishing of this series' flute surface dramatically improves chip ejection to eliminate common deep-hole machining problems such as chip packing, elongation of chips and tool breakage. Its unique flute design features both high rigidity and superb chip evacuation. With an attached breaker to the cutter body, cutting chips can be broken into small pieces. Thanks to the above features, high feed machining can be achieved to maximize efficiency even under rigorous 5xD deep hole drilling.

This series includes three insert types to accommodate a wide range of work materials, from steels, stainless steels, cast irons and aluminum alloys to non-ferrous metals. All inserts incorporate an economical 4-corner design that can be applied to both the center and peripheral cutting edge and are applicable to every cutter body in the series to simplify tool management.

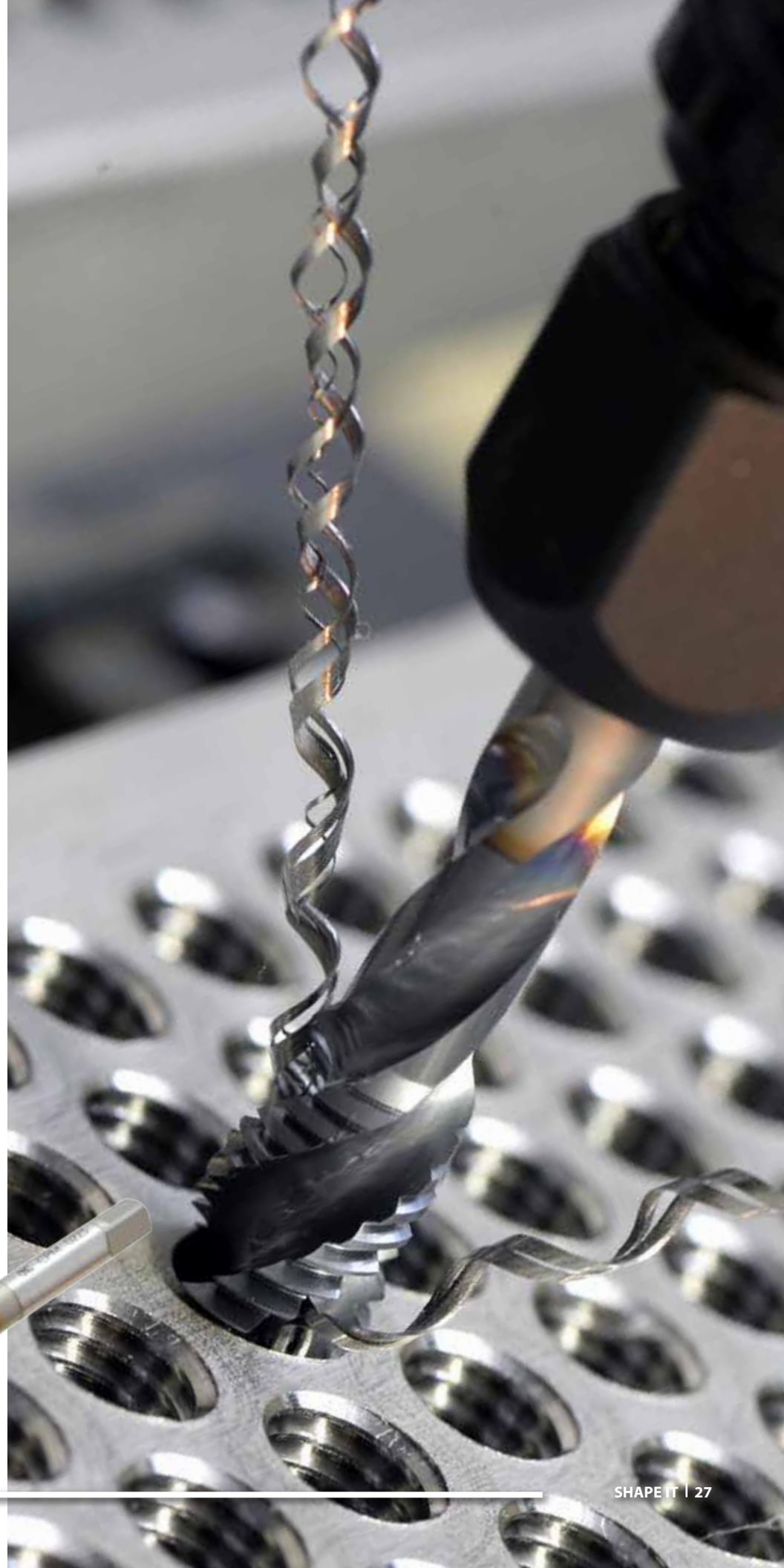
# A-TAP®

## All-purpose spiral flute and spiral point tap series

OSG's EXOTAP® A-TAP® is an all-purpose tap series designed to simplify tool management and to excel in a wide variety of materials and applications.

Achieving trouble-free chip evacuation with a spiral tap in blind holes is particularly challenging and is a main cause of headaches for many manufacturers. To resolve this problem and to improve the ejection of chips, OSG's A-Tap SFT has adopted a variable helix flute design, which encourages stable chip evacuation and reduces cutting forces. The helix angle changes from the chamfer, where chips are formed, to the flutes, where chips are evacuated. This unique geometry enables greater chip control that can help produce tightly compacted chips for easy ejection from the hole.

To accommodate a wide range of cutting conditions, powdered metal HSS and OSG's patented V coating have been employed in this series to achieve excellent wear resistance. In addition, to enable high speed machining, the A-Tap series incorporates a unique cutting edge design that emphasizes sharpness. Not only does the A-Tap series perform well in general steel, it also excels in difficult to machine materials such as stainless steel and mild steel.



# 2016 Exhibition Schedule

## Global Events

- |                  |   |                  |   |                       |  |
|------------------|---|------------------|---|-----------------------|--|
| <b>Feb 2-4</b>   | <b>Expo Manufactura</b><br>Monterrey (México)                       | <b>Apr 11-15</b> | <b>CCMT 2016</b><br>Shanghai (China)                            | <b>May 16-18</b>      | <b>MMTS</b><br>Montreal (Canada)   |
| <b>Feb 8-10</b>  | <b>AERODEF</b><br><b>Manufacturing 2016</b><br>Long Beach, CA (USA) | <b>Apr 13-17</b> | <b>SIMTOS 2016</b><br>Ilsan (Korea)                             | <b>Jun 1-3</b>        | <b>ILA</b><br>Berlin (Germany)   |
| <b>Feb 23-27</b> | <b>Metav</b><br>Düsseldorf (Germany)                                | <b>Apr 16-19</b> | <b>Industrial Supply Association 2016</b><br>Rosemont, IL (USA) | <b>Jun 15-16</b>      | <b>amerimold 2016</b><br>Novi, MI (USA)  |
| <b>Mar 30-31</b> | <b>Fastaner Turkey</b><br>Istanbul (Turkey)                         | <b>Apr 20-23</b> | <b>INTERMOLD 2016</b><br>Osaka (Japan)                          | <b>Jun 15-16</b>      | <b>Orthopaedic Manufacturing &amp; Technology Exposition and Conference 2016</b><br>Rosemont, IL (USA) |
| <b>Apr 4-8</b>   | <b>Industrie Paris 2016</b><br>Paris Villepinte (France)            | <b>May 10-13</b> | <b>Intertool</b><br>Wien (Austria)                              | <b>Jun 16-20</b>      | <b>ACMEE</b><br>Chennai (India)  |
| <b>Apr 11-13</b> | <b>Taiwan International Fastener Show</b><br>Kaohsiung (Taiwan)     | <b>May 10-13</b> | <b>Elmia Verktygsmaskiner 2016</b><br>Jönköping (Sweden)        | <b>Jun 22-25</b>      | <b>INTERMOLD 2016</b><br>Bangkok (Thailand)  |
|                  |   |                  |   | <b>Jun 22-26</b>      | <b>CIMES 2016</b><br>Beijing (China)   |
|                  |   |                  |   | <b>Jul 11-17</b>      | <b>Farnborough Air Show</b><br>Farnborough (UK)  |
|                  |   |                  |   | <b>Aug 31 - Sep 3</b> | <b>Taipei Int'l Mold &amp; Die Industry Fair</b><br>Taipei (Taiwan)                                    |
|                  |   |                  |   | <b>Sep 12-17</b>      | <b>IMTS 2016</b><br>Chicago, IL (USA)  |
|                  |   |                  |   | <b>Sep 13-17</b>      | <b>AMB</b><br>Stuttgart (Germany)  |
|                  |   |                  |   | <b>Oct 3-7</b>        | <b>MSV</b><br>Brno (Czech Republic)  |
|                  |   |                  |   | <b>Oct 25-27</b>      | <b>National Industrial Fastener &amp; Mill Supply Expo 2016</b><br>Las Vegas, NV (USA)                 |
|                  |   |                  |   | <b>Nov 16-19</b>      | <b>METALEX 2016</b><br>Bangkok (Thailand)  |
|                  |   |                  |   | <b>Nov 17-22</b>      | <b>JIMTOF 2016</b><br>Tokyo (Japan)  |
|                  |   |                  |   | <b>Nov 23-26</b>      | <b>TMTS 2016</b><br>Taichung (Taiwan)  |
|                  |   |                  |   | <b>Nov 30 - Dec 3</b> | <b>Machine Tool Indonesia 2016</b><br>Jakarta (Indonesia)  |



Left: A number of work pieces are displayed at OSG's booth during the 2014 JIMTOF in Tokyo.

Bottom: OSG Sales Application Engineer Yusuke Kubota introduces OSG's latest milling solutions to a visitor during JIMTOF 2014 at the Tokyo Big Sight in Koto Ward, Tokyo.



# Facility Expansions

Mexico: OSG Royco, S.A. de C.V. & Germany: OSG GmbH

OSG demonstrates its commitment to the manufacturing industry through the investment in a brand new Technology Center in Silao, Guanajuato, Mexico to support local tooling services and inventory. The facility will be completed by the start of 2016.

With a total of 135,780 square feet of space, the new state-of-the-art Silao Technology Center will house a sales office, warehouse, regrinding and coating facility, as well as areas for R&D and technical seminars to encourage communication among the local tooling community.

“The new Silao facility will focus on providing faster and higher quality services to the Bajio area,” said Salvador Rivera, General Manager at OSG Royco. “Engineering, sales and customer service will be closely integrated in this facility to provide our clients with a total solution for their individual tooling needs.”

OSG Royco has been serving the Mexican market since 1994 with six sales offices in Mexico City, Queretaro, Leon, Aguascalientes, Saltillo and Monterrey, and a manufacturing plant in Toluca.

In addition to OSG Royco in Mexico, OSG GmbH in Germany is also scheduled to complete a new Academy serving as OSG’s European campus dedicated to education, research &



OSG Royco’s new Technology Center will host technical seminars to encourage communication among the local tooling community.

development. The Academy will be constructed along side of OSG GmbH’s existing facility and will include an engineering office, machine centers for R&D, classroom and meeting spaces, as well as a dining area.

OSG Royco and OSG GmbH are part of OSG’s global network. OSG has established a stable and efficient product supply system for the manufacturing industry worldwide. OSG has a global network of 59 business offices in 29 countries, which provides our production sites with accurate feedback about user needs so that they can quickly design, develop, manufacture and deliver products that precisely meet those requirements. ✖

## shaping your dreams

*“Shaping your dreams” is OSG’s commitment to transforming each and every one of our customers’ ideas into reality.*

*With this mission in mind, it is our promise to deliver products and services with complete customer satisfaction.*



# OSG Around the World

Employee Interview with Reiko “Judy” Masuhara



OSG Corporation was founded in 1938, more than 77 years ago. Today OSG holds the No. 1 position in the Japanese cutting tool market as well as a top-ranking position globally, with a production, sales and technical network spanning 29 countries. Our commitment to innovation, services, total solutions and out-of-the-box thinking has contributed to our immense success today. However, without our employees, none of it would be possible. We truly believe that our employees are one of the greatest assets of the company. In this section, we will introduce our team members from around the world. Our very first interview features Ms. Judy Masuhara of Japan.



Left: Judy meets with a member of the engineering team to discuss product development.

Top Right: A group photo from OSG's 3rd Global Marketing Meeting, with members attending from 11 different countries.

Bottom Right: A photo from OSG's annual New Year celebration event at the company Guest House in Toyokawa, Aichi, Japan.

## Tell us about your work?

I am the marketing supervisor at OSG Corporation. My department oversees the production of product catalogs and e-commerce. We have recently established a new global department. Our goal is to improve customer communication worldwide through various marketing initiatives and to provide product information that is user friendly and easily accessible.

for screw and “G” for grinding. It is a family business, and this family culture continues to prevail even after 77 years of history. OSG Corporation in Japan takes great care of its employees – from providing standard healthcare benefits and numerous family events throughout the year, to aggressively encouraging career development through education reimbursement programs and opportunities to exchange with other overseas group companies.

and to make OSG a company that both customers and employees are proud of.

## What is unique about OSG Corporation in Japan?

From our company name, the “O” stands for Osawa, our founder, “S”

## What is your goal for the future?

My goal for the future is to continue to strengthen the OSG brand with the various marketing initiatives that we do

## How do you spend time on your day off?

On my day off, I spend every minute with my family. I have two sons, one in sixth grade and one in second grade. We also have a 3-year-old Pomeranian Poodle mix who is always full of energy. On a typical weekend, we either have a picnic at a nearby park or take a day trip to somewhere farther away from town. Once in a while, my husband goes to the ocean in Mie prefecture or Fukui prefecture and brings home fresh fish from the sea, which I prepare into dinner for the night. We make a good team! 🌟

## What is your favorite OSG tool?

The EXOCARB® WDO-SUS coolant-through carbide drill is my favorite OSG tool. It was released about two years ago for machining difficult materials such as stainless steels and titanium alloys. We have done a lot of testing on this drill, and I have received a great deal of positive feedback even from our overseas group. I am personally fascinated by its unique coolant hole shape and its capability to achieve trouble-free chip evacuation while maintaining efficiency. It is an innovative product that I am very proud of.



Left: Judy's sons holding a large sea bream that her husband caught.  
Top Right: Japanese red rockfish.  
Bottom Right: Dishes made from the sea bream.

## Reiko "Judy" Masuhara

**Company Location:** OSG Corporation

**Position:** Marketing Supervisor

**Joined OSG:** 1999

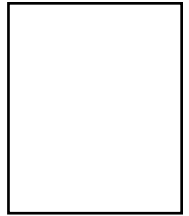
**Motto:** "Always carry a smile"

*My motto in life is to always carry a smile. Smiling is the best way to face every problem, and it is the prettiest thing that we can wear.*

Reiko "Judy" Masuhara



**OSG USA, INC**  
676 E. Fullerton Avenue  
Glendale Heights, IL 60139



## ADF Flat Drill Series

High performance carbide drills developed with an "all-purpose" concept and designed for superior versatility, reliability and quality flat-bottom holes.

Suitable for common materials such as carbon steel, alloy steel, hardened steel (up to 35 HRC) and cast iron.

Features OSG's brand new proprietary EgiAs coating for excellent heat and wear resistance.



*Watch it in action!*

