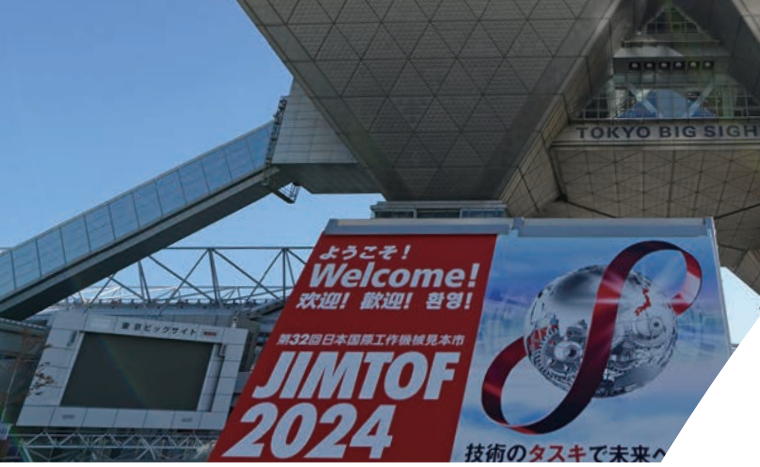
SHAPE it

OSG GLOBAL TOOLING MAGAZINE | SUMMER 2025

TRENDS:
ENVIRONMENTALLY FRIENDLY PRODUCTS

OSG promotes large-scale efforts to contribute to carbon neutrality starting with its cutting tools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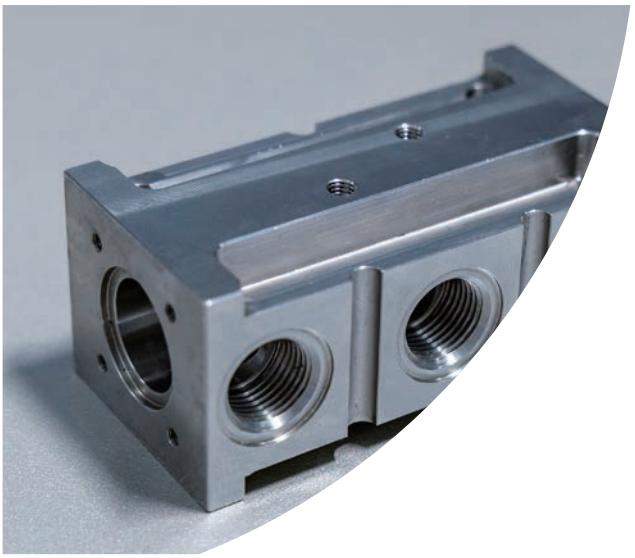

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Environmentally Friendly Products

OSG promotes large-scale efforts to contribute to carbon neutrality starting with its cutting tools

Arina Kobayashi
OSG Corporation

In recent years, awareness of environmentally friendly efforts toward the realization of a sustainable society has drastically increased. The Japanese government has set a goal of achieving carbon neutrality by 2050, and is promoting various initiatives such as energy conservation and the adaptation of low-carbon lifestyles. Resource conservation has become today's norm, and we are required to make environmentally conscious choices not only in the industrial sectors, but also in our daily lives. As a comprehensive cutting tool manufacturer that provides responsible products, OSG proposes tooling solutions from an environmentally friendly perspective, focusing on energy saving, waste reduction by minimizing tool usage, and improvement of the machining environment.

Environmental Impact of Cutting Tool Selection

Cutting tools and the environment may seem unrelated at first glance. However, when cutting materials such as metals, electricity is consumed, and carbon dioxide (CO_2) is emitted when electricity is generated. Consequently, by reducing power consumption, CO_2 emissions can also be reduced. In addition, the main raw materials of cemented carbide used as the base material of cutting tools are rare metals. There are concerns when mining rare metals, such as destruction of the earth's surface and environmental pollution due to chemicals generated when rare metals are smelted. By opting for high-performance cutting tools, processing efficiency and machine tool availability can be improved, which minimizes power consumption. Additionally, by extending tool life and reconditioning used tools, the amount of cemented carbide waste can be lessened, which are essential factors for contributing to carbon neutrality.

Selecting products manufactured with consideration for the environment contributes to reducing environmental impact. Using the following cutting examples, we will highlight some of OSG's latest environmentally friendly products.

A-XPF Highly Efficient and Multi-purpose Forming Tap

First, we will introduce machining improvements by using the A-XPF highly efficient and multi-purpose forming tap (figure 1). Table 1 summarizes common tapping trouble consultations received at OSG's customer service center. In all cases, the main cause of trouble is cutting chip related. As depicted in figure 2, forming taps form threads by plastic deformation of the work material. Therefore, no chips are generated during tapping. By leveraging the A-XPF, troubles caused by chips can be completely eliminated, which prolongs tool life. Reducing tool usage through longer tool life also leads to less waste. In addition, the A-XPF reduces tool change time due to chip troubles and machine stop time when removing accumulated chips, making it possible to shorten machining cycle time and reduce power consumption.

Product Details

Figure 1. A-XPF highly efficient and multi-purpose forming tap. The A-XPF is engineered with a special thread shape that improves cutting edge rigidity. In addition, by employing a high-performance VI coating exclusively designed for taps, high-load machining is made possible.

TOP 3 Tapping Troubles		
No.1	Breakage and chipping	**26%**
No.2	Dimensional error	**17%**
No.3	Galling	**14%**
	Others	**43%**

Table 1. Top 3 tapping troubles (source: OSG Technical Consultation Division).

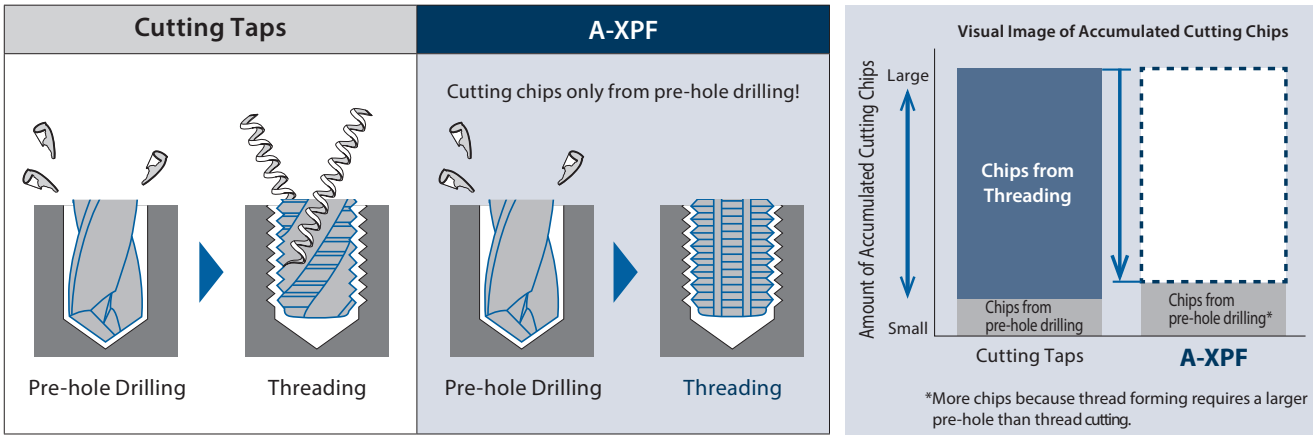
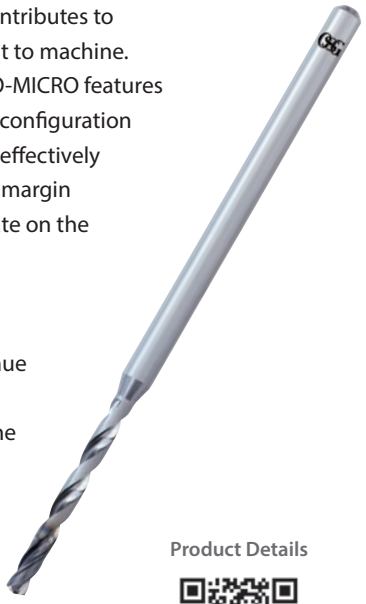


Figure 2. Chip evacuation visual image of cutting tap and A-XPF.

ADO-MICRO Small Diameter Coolant-through Carbide Drill

Next, we will introduce the ADO-MICRO (figure 3), a small diameter coolant-through carbide drill that contributes to waste reduction by stable and high efficiency drilling in deep-hole applications, which are highly difficult to machine. One of the keys for successful small diameter deep-hole drilling is trouble-free chip evacuation. The ADO-MICRO features a straight hollow shank design where coolant is injected in addition to the two spiral oil hole paths. This configuration increases coolant discharge from the tool tip. With a higher coolant flow rate, cutting chips can be more effectively evacuated, thereby enabling stable machining. Furthermore, the ADO-MICRO employs a unique double margin geometry to enable stable machining by smoothly discharging the micro sludges that tend to accumulate on the outer periphery of the cutting tool, which is a key cause of abrupt tool breakage.

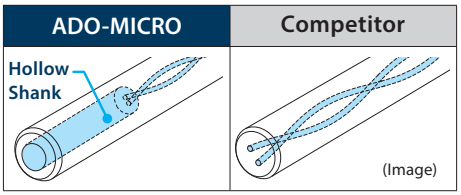


Product Details

Figure 4 depicts a cutting example in SUS304 using a diameter 0.7 mm ADO-MICRO-5D drill. While the competitor product exhibited chisel wear after machining 600 holes, the ADO-MICRO was able to continue drilling even after 1,800 holes. Additionally, due to the effect of the straight hollow shank design, the amount of coolant discharged per minute is approximately five times that of the competitor product. One piece of drill requires approximately 7 grams of cemented carbide. The competitor drill required three times the number of tools to complete 1,800 holes versus the ADO-MICRO, thus requiring 21 grams of cemented carbide. By using a third of the tooling, the ADO-MICRO is able to reduce cemented carbide waste by approximately 65 percent and contribute to waste reduction with long tool life.

Figure 3. ADO-MICRO small diameter coolant-through carbide drill. Good chip evacuation enables stable and highly efficient machining of small diameter deep holes. Stable machining of small diameter deep holes leads to longer tool life.

Tool	ADO-MICRO 5D ϕ0.7
Work Material	SUS304
Cutting Speed	30 m/min (13,640 min^{-1})
Feed	136 mm/min (0.01 mm/rev)
Depth of Hole	3.5 mm (Blind)
Coolant	Water-soluble (Internal)
Coolant Pressure	5 MPa
Machine	Vertical Machining Center (HSK-A63)



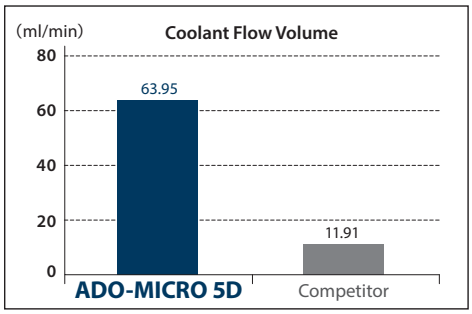


Figure 4. Cutting example in SUS304.

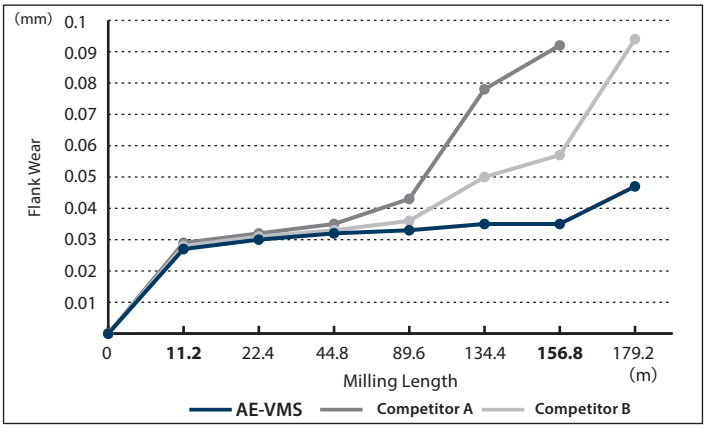
AE-VMS Anti-vibration Carbide End Mill

Next, we will introduce the AE-VMS anti-vibration carbide end mill (figure 5), which is certified by the Japan Cutting & Wear-resistant Tool Association (JTA) as an environmentally friendly product. The AE-VMS employs OSG's original DUARISE coating with excellent lubricity, wear resistance, and high temperature oxidation resistance, enabling stable durability regardless of coolant. Figure 6 depicts a cutting example with a 6 mm outer diameter AE-VMS end mill in SCM440 using air-blow. Compared to the competitor products, the AE-VMS is able to achieve minimal wear and stable machined surface roughness. Consistent durability and machining accuracy can be obtained even with air-blow, contributing to environmentally friendly processing.

Product Details

Figure 5. AE-VMS anti-vibration carbide end mill. As the new milling standard, the AE-VMS is engineered with a unique flute form and coated with OSG's original DUARISE coating, enabling good chip evacuation and excellent machined surface quality.

Tool	AE-VMS ϕ 6
Work Material	SCM440
Milling Method	Side Milling
Cutting Speed	140 m/min (7,500 min^{-1})
Feed	1,800 mm/min (0.06 mm/t)
Depth of Cut	ap = 9 mm ae = 1.2 mm
Coolant	Air-blow
Machine	Vertical Synchronized Machining Center (BT40)



Surface roughness after milling 11.2m

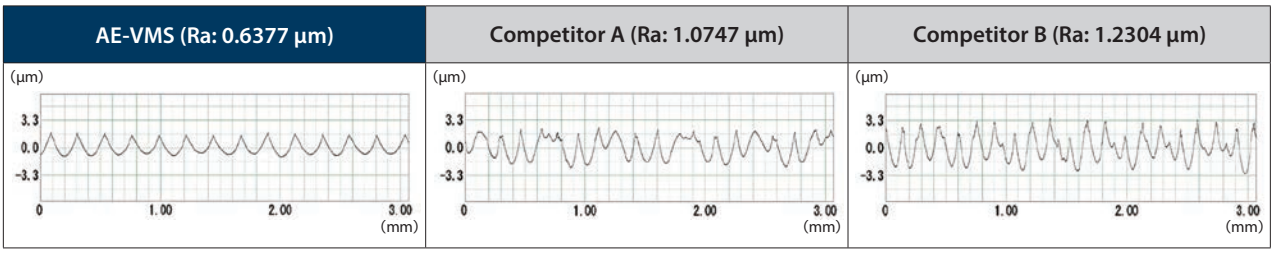


Figure 6. Cutting example in SCM440.

AT-2 Carbide Thread Mill with End-cutting Edge for High-hardness Steels

Finally, we will introduce the AT-2 carbide thread mill with end-cutting edge (figure 7), which reduces machining processes and the number of tools required by performing helical drilling and threading simultaneously.

Generally speaking, the machining of high-hardness steel is highly difficult and often presents a risk of sudden tool breakage. As the number of machining process increases, the number of tools required also increases, and the risk of tool breakage escalates with each process. The AT-2 thread mill consolidates two processes into one by performing the conventional pilot hole drilling and thread cutting at the same time. Figure 8 shows a cutting example in SKD11 (60 HRC) using a diameter 6.2 mm x 16 P1.25 AT-2 thread mill versus a M8 x 1.25 3P carbide hand tap. With the hand tap, the cutting edge chipped after machining 65 holes. The AT-2, on the other hand, was able to process up to 208 holes with a single tool. The number of tools required to machine approximately 200 holes is less than one third that of the carbide hand tap, which reduces the amount of cemented carbide used by approximately 30 percent. Furthermore, the AT-2 eliminates the need for a carbide drill for pilot holes, making it possible to further reduce the amount of waste.

Product Details

Figure 7. AT-2 carbide thread mill with end-cutting edge for high-hardness steels. By performing helical drilling and threading simultaneously, the consolidation of machining process in highly difficult high-hardness steel applications is made possible.

Tool	AT-2 ϕ6.2 x 16 P1.25	Carbide Hand Tap for High-hardness Steels M8 x 1.25 3P
Work Material	SKD11 (60 HRC)	
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	ϕ6.8 x 23.5 mm (Blind)
Internal Thread Size	M8 x 1.25	
Threading Length	16 mm (2D)	
Coolant	Air-blow	Non-water Soluble
Machine	Horizontal Machining Center (BT40)	Vertical Machining Center (BT40)

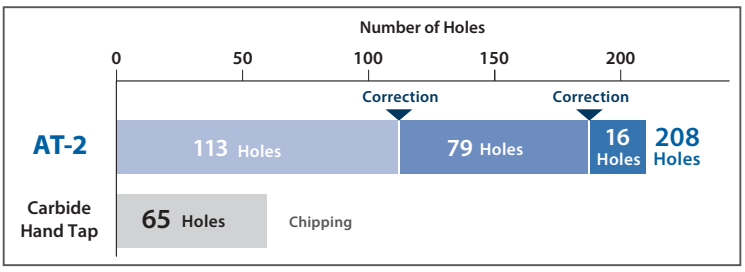


Figure 8. Cutting example in SKD11 (60 HRC).

OSG Environmentally Friendly Initiatives

In addition to supplying cutting tools, OSG is promoting tool reconditioning and carbide recycling throughout its network as environmentally friendly initiatives.

Tool Reconditioning

It is a general assumption that the cutting condition would be lowered after tool reconditioning. Production lines often would apply cutting conditions with consideration of the possibility of tool reconditioning in order to minimize changes in setup. Additionally, the pace of tool replacement may become sooner than needed due to the presumed inferior tool durability. At OSG, we make full use of the tool design know-how and coating technology that we have cultivated over many years as a comprehensive tool manufacturer, and are able to restore used tools equvalent to new condition. Since the performance and durability are identical as new products, cutting conditions can be improved and tool life can be extended.

Carbide Recycling

Carbide tools that can no longer be reground can be collected and recycled through the OSG Group's recycling program. Cemented carbide materials contain a large amount of rare metals. Carbide recycling reduces material consumption, contributes to environmental preservation, and serves as a positive initiative for our customers' corporate social responsibility (CRS) activity in the promotion of zero emissions.

Making a difference starting from cutting tools, OSG will continue to develop innovative products, propose efficient processing techniques, and provide optimium services to contribute to the earth's sustainability and carbon neutrality.

Scan for details

Gtag Low Carbon Product Series

Last November, OSG Corporation announced the launch of Gtag, a low carbon product series. As concerns for environmental sustainability continue to grow, efforts for reducing greenhouse gas (GHG) emissions in manufacturing operations, value chains and processes are becoming increasingly prominent. The Greenhouse Gas (GHG) Protocol is a widely accepted standard used for categorizing emissions into three different scopes: Scope 1, Scope 2, and Scope 3. Scope 1 emissions are GHGs released directly from a business. Scope 2 emissions are indirect GHGs released from the energy purchased by an organization. Scope 3 emissions are value chain emissions that are not owned or controlled by the reporting organization. This classification of emissions is used to monitor progress toward the reduction of GHGs globally.

OSG recognizes that the preservation of the global environment is a fundamental obligation and is actively proposing initiatives that can be implemented from cutting tools toward a sustainable society. OSG continuously innovates to provide products with longer tool life and higher machining efficiency that can lead to reductions in Scope 2 emissions for its customers. In addition, OSG has introduced Gtag, a low carbon product series that reduces CO_2 emissions by minimizing power consumption during manufacturing through the adoption of a new and unique manufacturing method, which corresponds to Scope 3 emissions for its customers.

The Gtag series is currently comprised of the GRT high-performance and low-carbon forming tap, the AD-2D Gtag low-carbon carbide drill, and the AE-VMS Gtag low-carbon anti-vibration short carbide end mill. By simply selecting the Gtag series, manufacturers can contribute to reducing GHG emissions throughout the supply chain.

Scan for details

Green Tap GRT

High-performance and low-carbon forming tap

Tetsuya Mizoguchi
OSG Corporation Applications Engineer
(Tap Development Division)

In November 2024, OSG Corporation introduced "Green Tap" at the Japan International Machine Tool Fair (JIMTOF) and released it on November 20 the same year. Green Tap (hereafter referred to as "GRT") is a revolutionary forming tap designed for high-performance machining with enhanced durability and efficiency. As a forming tap, which creates internal threads by plastic deformation of the material, GRT does not generate cutting chips. In other words, machining troubles caused by cutting chips can be completely eliminated. Furthermore, GRT is a low-carbon product that reduces CO_2 emissions by decreasing power consumption during manufacturing through the adoption of a new and original manufacturing method. By selecting high-performance and low-carbon products, tap users can contribute to the reduction of carbon footprint and the realization of a sustainable society. This article provides an in-depth introduction to the GRT high-performance and low-carbon forming tap, a game-changer for sustainable manufacturing.

Features of GRT

The innovative design and construction of GRT are at the heart of its advancements. Below are its main features.

1. Increased Web Diameter

Conventional taps have oil grooves for supplying coolant during machining as depicted in figure 1. In contrast, GRT eliminated oil grooves entirely in its tool geometry. By removing these oil grooves, the web diameter (cross-sectional area) has increased, making the tool more resistant to breakage. For example, in the case of M6 x 1, the core diameter is increased by 11 percent and the cross-sectional area is enlarged by 24 percent compared to the conventional product as illustrated in figure 2. This tool design significantly enhances tool rigidity.

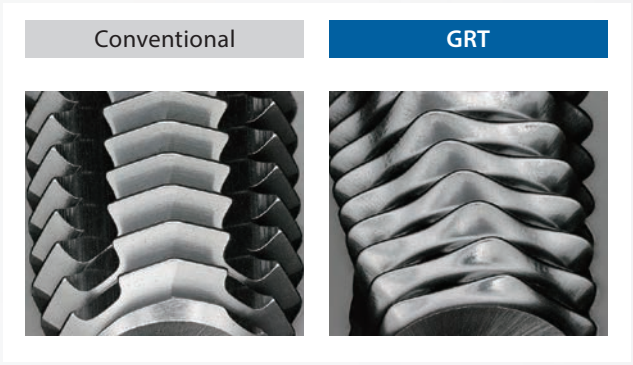


Figure 1. Comparison of tool geometry between a conventional forming tap (left) and GRT (right).

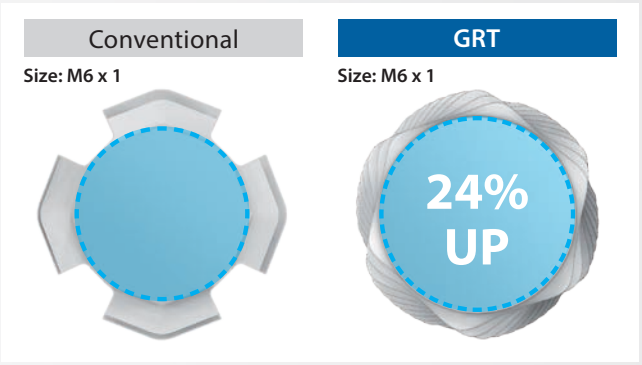


Figure 2. Comparison of web diameter size between a conventional forming tap (left) and GRT (right).

2. Enhanced Torsional Strength

Taps are subjected to large torsional moments during machining, and have a high risk of breakage. If a broken tap remains inside the workpiece, removal can be extremely difficult. To address this, GRT increases the web diameter, which significantly reduces stress concentration as depicted in figure 3. Finite element method (FEM) analysis shows that the maximum stress has decreased from 3,088 MPa in the conventional forming tap to 1,551 MPa in GRT. Additionally, the rounded edges ensure stable strength.

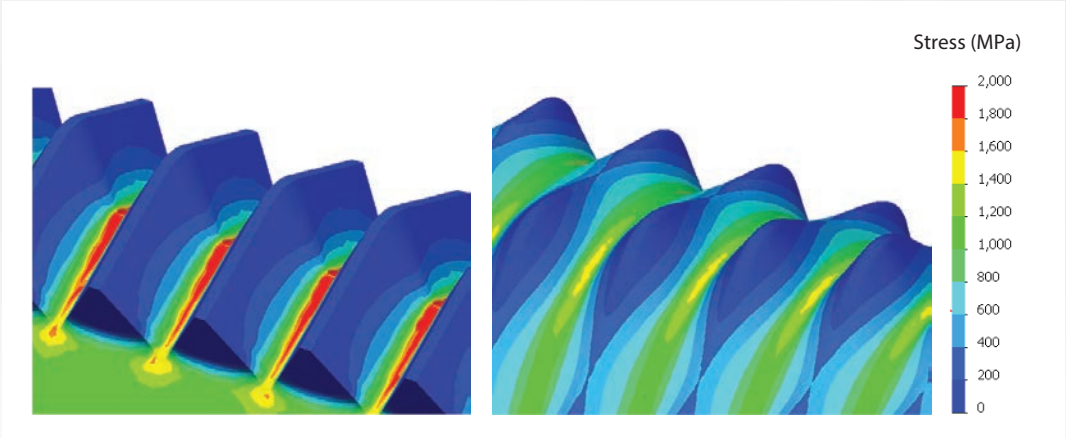


Figure 3. Comparison of von Mises stress distribution between a conventional forming tap (left) and GRT (right).

3. Lubrication and Cooling Performance

While eliminating oil grooves might seem to lower lubrication and cooling performance, GRT maintains and even improves them through the following three innovations:

3.1. Coolant Flow Design

GRT is designed to allow coolant to flow smoothly to the cutting edges as depicted in figure 4. Computational fluid dynamics analysis confirms that coolant reaches the cutting edges more effectively than in the conventional product, enhancing lubrication and cooling performance in heated areas.

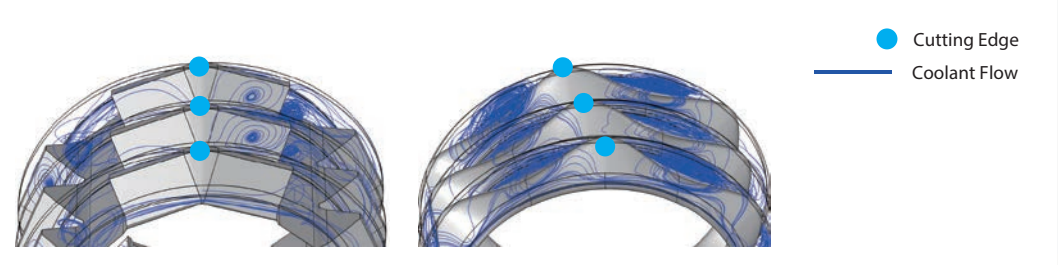
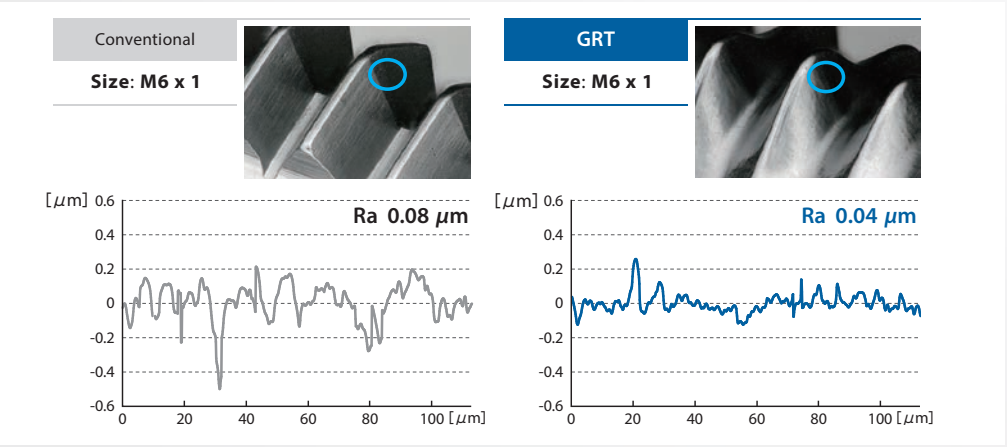


Figure 4. Comparison of coolant flow between a conventional forming tap (left) and GRT (right) by computational fluid dynamics analysis. Size: M6 x 1; cutting speed: 30 m/min.

3.2. Tap Surface Roughness

Due to improvements in the manufacturing method, the surface of GRT is smoother than that of the conventional product as illustrated in figure 5, which reduces frictional heat and extends tool life.



Tool	GRT M6 x 1 2P
Work Material	S45C
Drill Hole Size	ϕ5.52 x 20 mm (Through)
Tapping Length	12 mm
Cutting Speed	15 m/min (796 min^{-1})
Coolant	Water-soluble Chlorine-free (5%)
Machine	Vertical Machining Center (BT30)

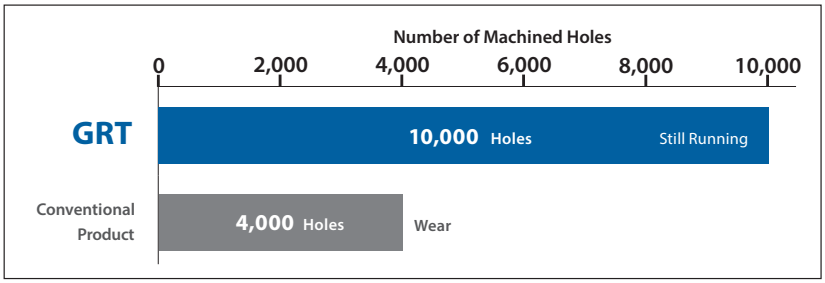


Figure 5. Comparison of surface roughness and machining performance between a conventional product and GRT.

3.3. Plastic Deformation Mechanism

Breaking away from the traditional fixed "60° thread angle" design, GRT employs a new plastic deformation mechanism with variable thread angles as depicted in figure 6. This enhances cutting edge strength while achieving a gap design that allows coolant to reach the cutting edge more easily.

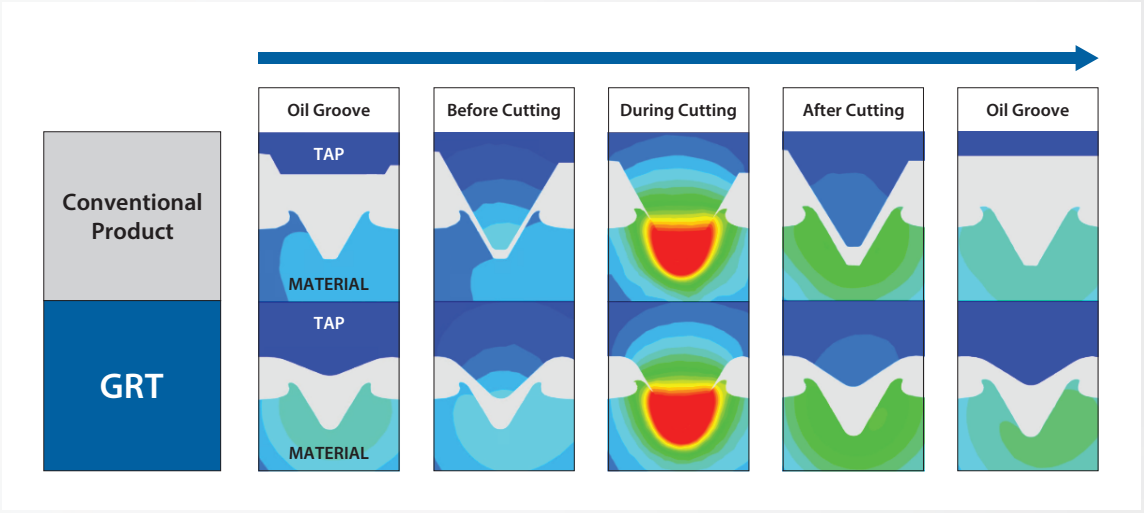


Figure 6. Comparison of plastic deformation mechanism between a conventional forming tap and GRT.

4. Reduced Machining Resistance

In an actual cutting test, GRT reduced torque by 10 percent and thrust force by 55 percent compared to the conventional product as depicted in figure 7. This not only reduces the risk of tool breakage, but also suppresses heat generation, contributing to extending tool life.

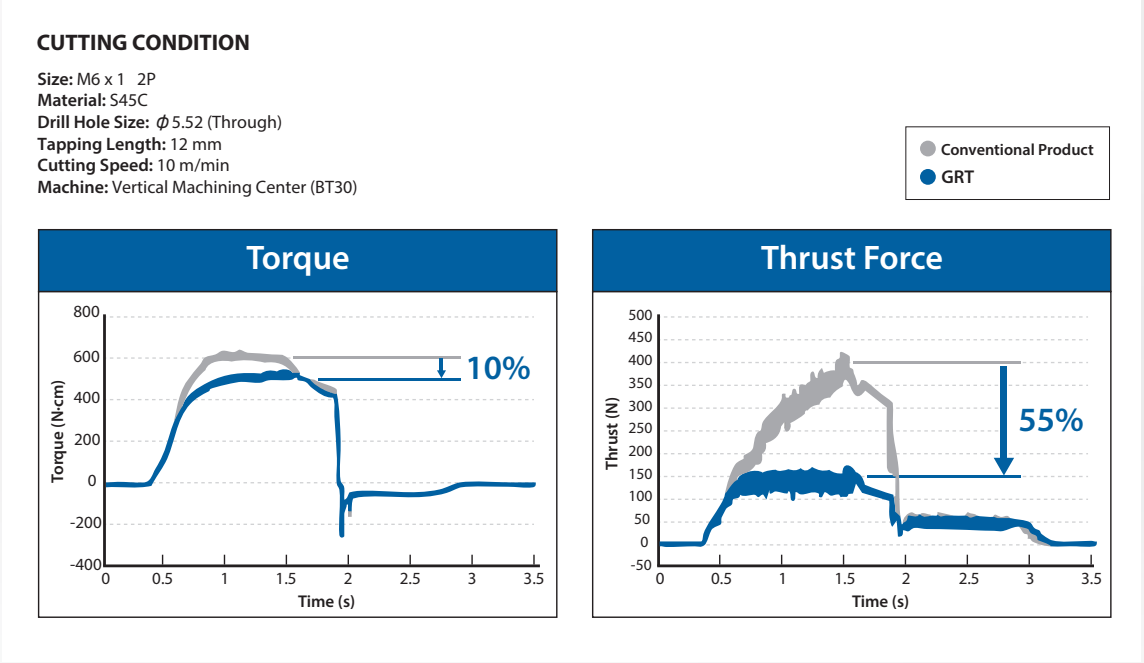


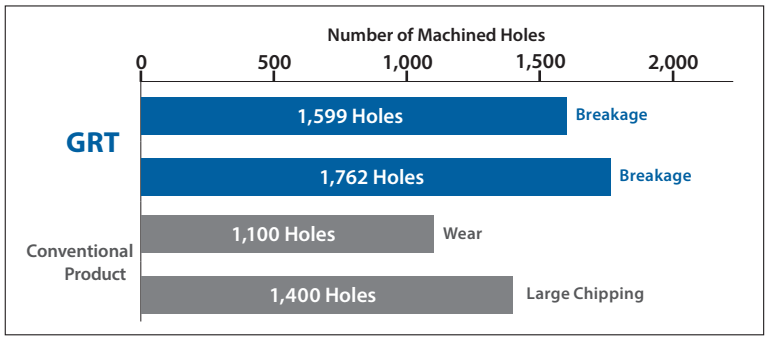
Figure 7. Comparison of torque and thrust force between a conventional forming tap and GRT.

Cutting Data

Cutting results of GRT have proven its high durability. When machining SUS304, the tool life of GRT was longer than that of the conventional product for both M1 x 0.25 and M6 x 1 sizes as illustrated in figure 8. GRT also demonstrated high durability in a variety of work materials, including steel and aluminum alloys. Since it can use the same pre-drill hole diameter as conventional taps, the GRT can be easily implemented on the shop floor without having to alter machining conditions.

• M1 x 0.25

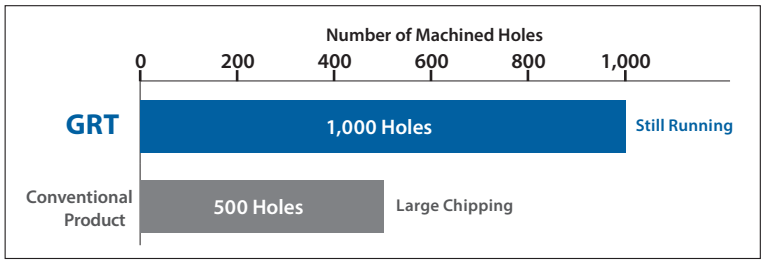
Tool	GRT M1 x 0.25 1P
Work Material	SUS304
Drill Hole Size	ϕ0.91 x 3.5 mm (Blind)
Tapping Length	2 mm
Cutting Speed	10 m/min (3,183 min^{-1})
Coolant	Water-soluble Chlorine-free (5%)
Machine	Vertical Machining Center (BT30)



GRT 1,700 Holes	Conventional Product 1,100 Holes
	

• M6 x 1

Tool	GRT M6 x 1 2P
Work Material	SUS304
Drill Hole Size	ϕ5.52 x 20 mm (Through)
Tapping Length	12 mm
Cutting Speed	7 m/min (371 min^{-1})
Coolant	Water-soluble Chlorine-free (5%)
Machine	Vertical Machining Center (BT30)



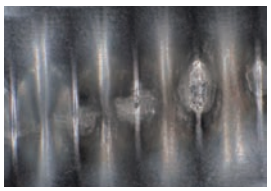
GRT 1,000 Holes	Conventional Product 500 Holes
	

Figure 8. Durability comparison between a conventional forming tap and GRT. GRT demonstrates stable machining even in difficult-to-machine stainless steel.

Environmental Considerations

While conventional environmentally friendly tools focused on reducing waste through longer tool life and higher efficiency, their effectiveness often depended on how the user uses them. In contrast, GRT reduces CO_2 emissions at the manufacturing stage. For instance, CO_2 emissions during the manufacturing of M6 x 1 size tap can be reduced by 35 percent compared to conventional products. By simply switching to GRT, tap users can easily and cost-effectively lower their CO_2 emissions.

GRT is a forming tap engineered with sustainability in mind. It is highly recommended for users facing challenges such as "frequent tap breakage," "short tool life," or "seeking efficient CO_2 emission reductions."

Scan for details

From left, OSG Italia Engineering Manager Andrea Severi, Simtech Production Manager Andrea Manzoni, and Uciemme Manager Osvaldo Centurelli pose for a photograph at Simtech's manufacturing facility in Lurano, Bergamo, Italy.

Extreme Processing Stability

ADO-SUS carbide drill demonstrates superior cutting performance at high feed rates to elevate productivity in hydraulic and pneumatic component production made of 316L stainless steel for the oil and gas industry

Andrea Severi
OSG Italia

Consistent cutting tool performance plays a crucial role in manufacturing. When processing efficiency and stability are maintained without compromising quality, significant cost savings can be achieved even in small batch production.

The elimination of cutting chip problems and the minimization of tool wear in stainless steel component production are some of the key objectives of Simtech S.r.l., a part manufacturer headquartered in Lurano, Bergamo, Italy. Established in 2003, Simtech today employs 22 staff in its 3,000-square-meter production plant. Simtech specializes in the production of parts made by mechanical turning and milling processes for the field of hydraulics and pneumatics. Simtech's manufacturing plant is equipped with numerous numerical control machining centers where the company can optimize work cycles of parts for small, medium and large batches in various materials, such as quenched and carbon steel, stainless steel, cast iron and aluminum. The production capacity of the Simtech plant is estimated to be around 20,000 parts annually, with a mix of distributors and pressure reducers divided into 10 types of products.

1. Simtech's 3,000-square-meter manufacturing plant is equipped with numerous numerical control machining centers where the company can optimize work cycles of parts for small, medium and large batches in various materials.

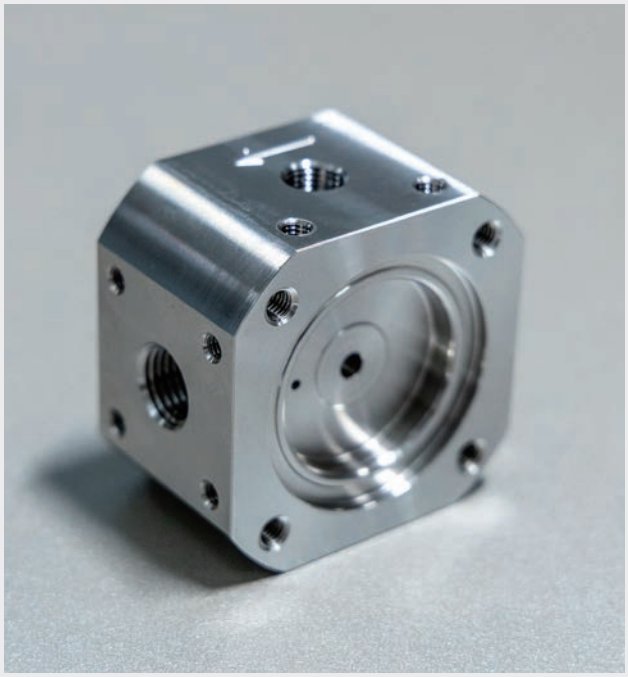
2. Headquartered in Lurano, Bergamo, Italy, Simtech S.r.l. specializes in the production of parts made by mechanical turning and milling processes for the field of hydraulics and pneumatics.

3. Pressure reducers are produced in batches of 500 pieces with an annual production volume of 2,000 pieces.

4. The pressure reducers are machined using a Haas VF-3 vertical machining center.

Since the company's founding more than 20 years ago, Simtech has followed strict internal procedures to maintain all phases of its process under control. In 2008, Simtech was certified by the Certiquality Certification Institute for the ISO:9001 standard. With its team of specialists and by leveraging the latest machinery and cutting-edge processing tools, Simtech today services leading Italian and foreign companies operating in various industries. The quality of service, competence, and professionalism combined with the collaborative relationship with partners as well as customers have been keys to Simtech's growth over the years.

As a company that is attentive to new technologies, Simtech is always actively seeking for process optimization. Recently, Simtech was looking to improve tool performance on the production of two components made of 316L stainless steel. The first part is a pressure reducer for regulating the pressure of oxygen and fluids. It is produced in batches of 500 pieces with an annual production volume of 2,000 pieces. Each pressure reducer requires the drilling of 20 blind holes in two sizes and six through holes in three sizes. The second part is a hydraulic distributor, a key component in hydraulic systems. It is produced in batches of 100 pieces with an annual production volume of 1,000 pieces. Each hydraulic distributor requires the drilling of 12 blind holes in two sizes and five through holes at a diameter of 13 mm. The parts are machined using a Haas VF-3 vertical machining center.



A pressure reducer made of 316L stainless steel used for regulating the pressure of oxygen and fluids. Each pressure reducer requires the drilling of 20 blind holes in two sizes and six through holes in three sizes.

Pressure Reducer

Hole Specification: Diameter 3.66 (Blind), Depth 10 mm
Number of Holes: 8
Tool: ADO-SUS-5D ϕ3.66 (EDP# 8667366)
Cutting Condition: Cutting Speed 80 m/min, Feed 0.11 mm/rev

Hole Specification: Diameter 4.65 (Blind), Depth 12 mm
Number of Holes: 12
Tool: ADO-SUS-3D ϕ4.65 (EDP# 8680465)
Cutting Condition: Cutting Speed 80 m/min, Feed 0.14 mm/rev

Hole Specification: Diameter 5.3 (Through), Depth 24 mm
Number of Holes: 2
Tool: ADO-SUS-5D ϕ5.3 (EDP# 8667530)
Cutting Condition: Cutting Speed 80 m/min, Feed 0.16 mm/rev

Hole Specification: Diameter 8.5 (Through), Depth 12 mm
Number of Holes: 2
Tool: ADO-SUS-3D ϕ8.5 (EDP# 8680850)
Cutting Condition: Cutting Speed 80 m/min, Feed 0.23 mm/rev

Hole Specification: Diameter 11.4 (Through), Depth 24 mm
Number of Holes: 2
Tool: ADO-SUS-3D ϕ11.4 (EDP# 8666140)
Cutting Condition: Cutting Speed 80 m/min, Feed 0.25 mm/rev

A hydraulic distributor made of 316L stainless steel, a key component in hydraulic systems. Each hydraulic distributor requires the drilling of 12 blind holes in two sizes and five through holes at a diameter of 13 mm.

Hydraulic Distributor

Hole Specification: Diameter 4.65 (Blind), Depth 12 mm
Number of Holes: 8
Tool: ADO-SUS-3D ϕ4.65 (EDP# 8680465)
Cutting Condition: Cutting Speed 80 m/min, Feed 0.14 mm/rev

Hole Specification: Diameter 5.55 (Blind), Depth 12 mm
Number of Holes: 4
Tool: ADO-SUS-3D ϕ5.55 (EDP# 8680555)
Cutting Condition: Cutting Speed 80 m/min, Feed 0.14 mm/rev

Hole Specification: Diameter 13 (Through), Depth 27 mm
Number of Holes: 5
Tool: ADO-SUS-3D ϕ13 (EDP# 8681300)
Cutting Condition: Cutting Speed 80 m/min, Feed 0.25 mm/rev

To ensure night production in an unattended and automated fashion, the tool life of the drill has been set to 500 parts. At the end of the batch, drills that are still in good condition are removed from the automated work cycle and used for other processes. Simtech was originally using several competitor drills for these two applications. However, the competitor drills exhibited excessive wear of the cutting edge in the peripheral area, resulting in the generation of long cutting chips that caused downtime after only 100 to 150 parts.

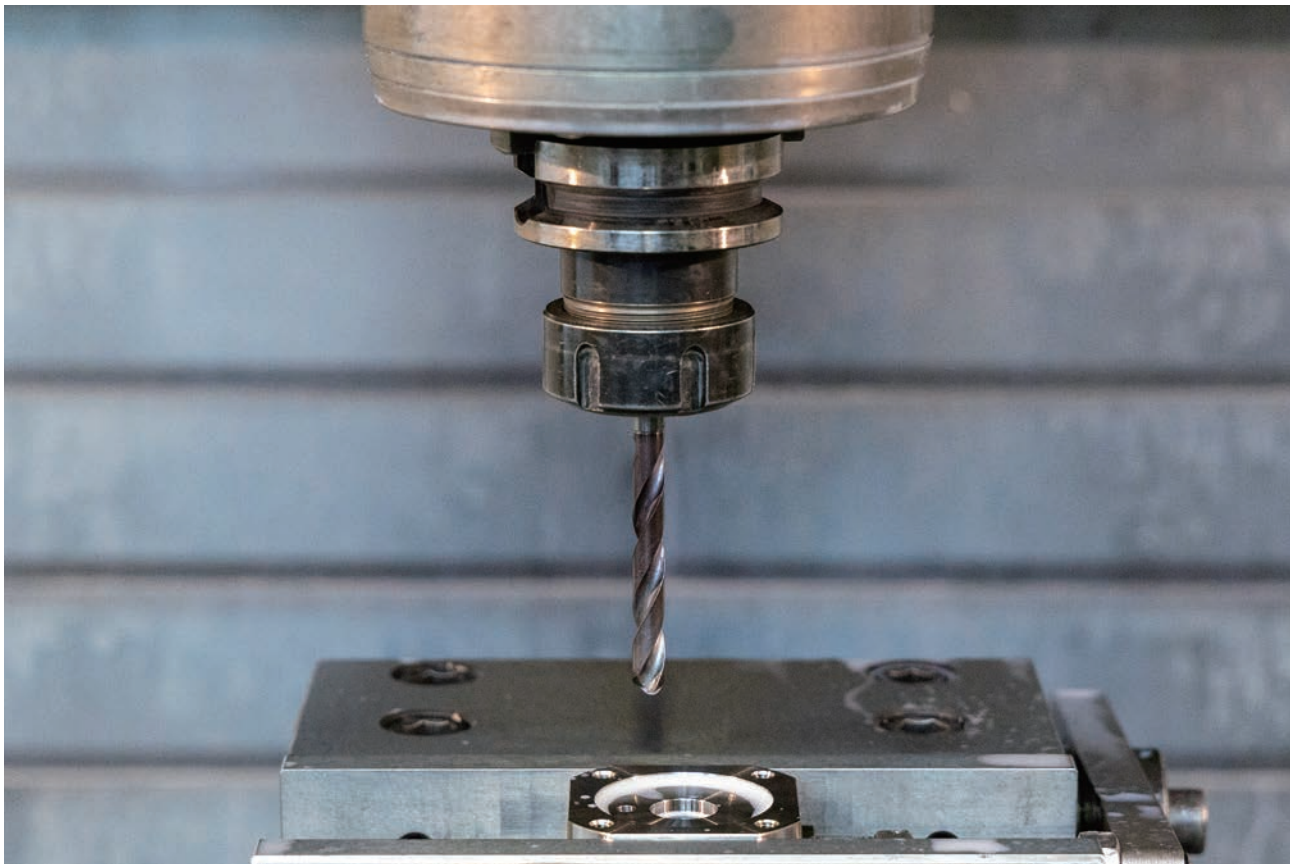
Seeking to optimize process stability, increase tool life and improve chip control that caused enormous downtime, Simtech Production Manager Andrea Manzoni contacted OSG through Uciemme in Caravaggio, Bergamo, a local distributor. Shortly after, Uciemme Manager Osvaldo Centurelli and OSG Italia Engineering Manager Andrea Severi visited Simtech's manufacturing facility to evaluate the application. After analyzing the cutting condition, Severi recommended OSG's ADO-SUS coolant-through carbide drill series.

ADO-SUS Carbide Drill

The ADO-SUS coolant-through carbide drill is one of OSG's latest innovations engineered to excel in stainless steel and titanium alloy applications. This drill 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 unique flute form encourages the creation of small cutting chips, which is essential for trouble-free chip evacuation. Furthermore, the ADO-SUS has employed a unique oil hole design "MEGA COOLER" for diameter sizes above 6 mm to suppress heat generation and to facilitate smooth chip evacuation. With the addition of OSG's WXL coating, which has strong adhesion strength, high resistance against welding can be achieved. Utilizing OSG's latest cutting tool technology, the ADO-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.

Unlike the competitor tools, the ADO-SUS drill is able to complete 500 parts without problems of instability and chip control, which is always short and fragmented. Thanks to the ADO-SUS carbide drill's special margin shape, sharp cutting edge, unique flute geometry and the patented WXL coating, friction and heat development are drastically reduced, thus significantly increasing tool life by more than three times versus the previous tooling choice. Considering the low coolant concentration of 6 percent (Quaker Houghton Hocut 3130), the increase in tool life has been truly remarkable, contributing to better management of tool purchases and a reduction in machining costs.

The ADO-SUS has proven to be the winning cutting tool of choice, with exceptional ability to produce short and compact cutting chips even in difficult-to-machine material such as stainless steel, guaranteeing extreme stability at high cutting parameters to elevate productivity.



The ADO-SUS coolant-through carbide drill is one of OSG's latest innovations engineered to excel in stainless steel and titanium alloy applications.

From left, Hassmann Machine Operator Luis Gustavo de Oliveira, OSG Sulamericana Sales Engineer Anderson Scalginsky and Hassmann Purchasing Agent Eduardo Schneider pose for a photograph at the Hassmann factory in Imigrante, Rio Grande do Sul, Brazil.

Quality that Outperforms

OSG rolling dies more than triple tool life in screw production

Yasmin Natacha Nunes da Silva
OSG Sulamericana

Founded in 1955, Metalúrgica Hassmann S.A. (Hassmann) is one of the largest fastener manufacturers in Brazil. Equipped with a capacity to produce more than 40,000 different types of screws, rivets, and special parts, Hassmann supplies high-performance products with dedication, efficiency, and excellence in quality to the automotive, agricultural, truck, construction machinery industries, among others. Hassmann is distinguished by its dynamism, production capacity, quality, inventories, and flexibility to meet the market's needs, always seeking full customer satisfaction. With quality and environmental management systems implemented and certified for decades, Hassmann has consolidated a high-quality standard, as well as a deep respect for the environment and the next generation. Hassmann currently has three facilities in Brazil - its main factory and headquarters, a distribution center, and a facility for surface treatment. Outside of Brazil, Hassmann opened a distribution center in 2019 in Tampa, Florida, United States to support its exports to more than 25 countries. Today the company employs more than 500 highly skilled workers.

Hassmann's headquarters is located in Imigrante, Rio Grande do Sul, Brazil, with an estimated factory and warehouse area of over 40,000-square-meter. During a visit to Hassmann's manufacturing plant in Imigrante, OSG Sulamericana proposed an application optimization on Hassmann's screw production. Although the company was not experiencing problems on its application, Hassmann was eager for potential improvement in tool life and cost benefit.

The screw application under evaluation is made of 10B30 low carbon steel. Hassmann has been manufacturing these screws for approximately 50 years. The screws are mass produced by using a model IC-530 heavy-duty hydraulic thread rolling machine made by I-Cheng. A pair of M16 x 2 rolling dies are installed to form the threads on the material. In terms of production volume, around 1 million pieces of screws are produced annually.

Hassmann's headquarters is located in Imigrante, Rio Grande do Sul, Brazil. Photo courtesy of Hassmann.

1. Hassmann's screws are mass produced by using a heavy-duty hydraulic thread rolling machine. A pair of M16 x 2 rolling dies are installed to form the threads on the material.

2. For this specific type of screw, around 1 million pieces are produced annually at Hassmann.

For this application, Hassmann originally used a local competitor rolling dies made of M2 high speed steel with nitriding surface treatment. Upon a detail evaluation of the application, OSG Sulamericana Sales Engineer Anderson Scalginsky recommended OSG's M16 x 2 (170 x 80 x 54 NI) rolling die in the same size of M16 x 2 with nitriding surface treatment. Made of M2 high speed steel, the die width measures 80 mm and the external diameter measures 170 mm. Although OSG's rolling dies share identical specifications as the competitor, the level of quality control is unparalleled. The raw material for OSG Sulamericana's rolling dies comes from suppliers approved by the OSG headquarters, resulting in approximately 20 percent longer tool life versus local suppliers. Moreover, the thread profile of OSG rolling dies is regulated with high precision, leading to a more superior thread grinding finish. The radius run-out of OSG dies is also much more controlled compared to the competitor.

OSG has been manufacturing rolling dies since 1956, nearly 70 years ago. Today, the company offers a broad lineup of dies and thread rolling products including cylindrical dies, flat dies, trim dies, planetary dies and rack dies. OSG is one of the world's largest manufacturers of rolling dies, with more than 70,000 cold forming tools being produced annually through several production sites around the globe. Utilizing the same advanced technology the company uses for its world-renowned taps, OSG manufactures a variety of dies in accordance with their intended use with superb precision and tool life. OSG can manufacture dies based on any desired specifications and can provide tailored evaluation and solutions.

The competitor rolling dies were achieving an average tool life of 50,000 pieces. OSG's rolling dies, on the other hand, are able to achieve 180,000 pieces, which is 3.6 times longer in durability. OSG rolling dies, although around 25 percent more expensive, outperformed the competitor dies to improve cost per unit over 65 percent. Based on Hassmann's annual production volume of 1 million pieces, an estimated cost savings of R$126,500 BRL (approx. $22,149 USD) can be achieved. Moreover, by switching to OSG's rolling dies, machine downtime was significantly reduced, which is highly prominent as Hassmann only had a single thread rolling machine dedicated for this application. OSG rolling dies have a significantly higher level of manufacturing and application compared to the competitor in terms of repeatability. Not to mention the reconditioning program of OSG rolling dies, which delivers performance very close to brand-new OSG rolling dies.

As a progressive company, Hassmann continuously evaluates, develops and utilizes the most technological advanced software and equipment in its production. By providing superior and reliable products, OSG will strive to support Hassmann's production of high-performance fasteners to fulfill evolving market needs, assure product quality and customer satisfaction.

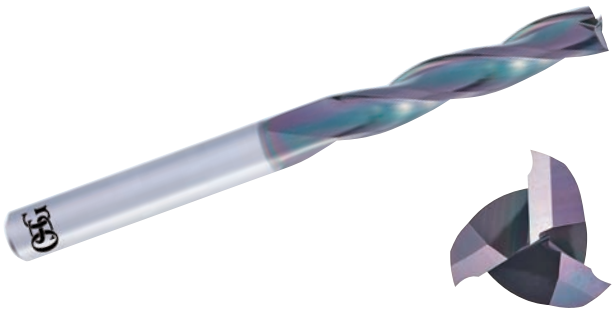
A pair of OSG cylindrical dies. Thread rolling cylindrical dies are used in set of two or set of three. They are ideal for a wide range of precision threaded parts.

SEP-EL

DLC Coated Carbide End Mill

The SEP-EL is OSG's latest milling innovation specialized for high-quality processing of super engineering plastics (SEPs) that are prone to wear. The first key feature of the SEP-EL is the application of OSG's original DLC-IGUSS coating, a thick-film type DLC coating. The DLC-IGUSS offers the perfect balance of lubricating effect, wear resistance, and cutting edge sharpness to enable high durability and long tool life.

A second key feature of the SEP-EL is its 3-flute specification, which reduces the load on the cutting edge compared to 2-flute configuration. The low helix geometry of the flute suppresses the generation of burrs, lifting or peeling of the workpiece when fixed with double-sided tape, resulting in stable processing.



A-OIL-XPF

Forming Tap

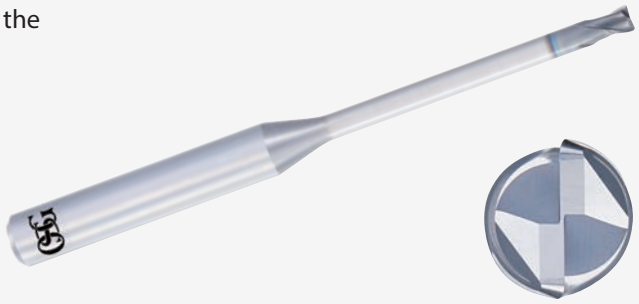
The A-XPF is one of OSG's latest high-efficiency and multi-purpose forming tap series. The A-XPF forms threads by plastic deformation of the work material and does not generate cutting chips. The A-XPF enables the reduction of tool change time caused by cutting chip troubles and machine downtime required for removing accumulated cutting chips. The A-XPF features a special chamfer specification for achieving low thrust. Its special thread configuration improves cutting edge rigidity, making it less prong to chipping. The A-XPF is made of powder metallurgy HSS (CPM) with high wear resistance. With the addition of OSG's VI coating, tool life can be further enhanced.

The newly added A-OIL-XPF with internal coolant holes is compatible with mist machining. Mist coolant cutting eliminates the need for oil disposal, which helps reduce waste. Furthermore, there is also less scattering of cutting oil, which leads to an improved work environment.

AE-CPR2-H

2-flute Long Neck Corner Radius Carbide End Mill

The AE-CPR2-H is a 2-flute long neck corner radius carbide end mill optimized for high precision finishing of high-hardness materials. Since the number of cutting edges cutting simultaneously is small, tool deflection is suppressed with low resistance, enabling high-quality processing. The corner radius is designed with a 3-dimensional negative geometry that combines both sharpness and cutting edge rigidity. Furthermore, with the addition of OSG's DUROREY coating optimized for high-hardness steel, high chipping resistance is achieved even in workpieces of over 60 HRC, enabling long tool life and high-precision machining.



AE-CPR4-H

4-flute Long Neck Corner Radius Carbide End Mill

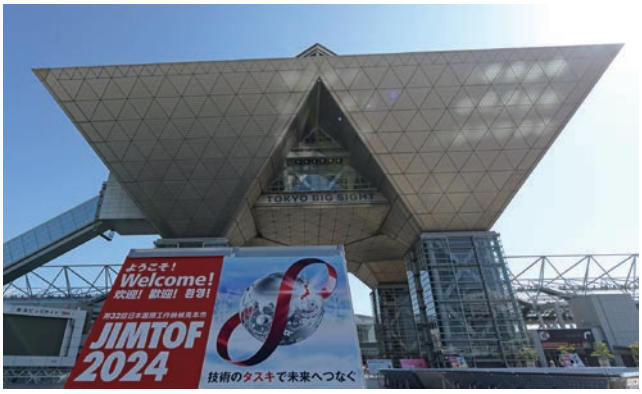
The AE-CPR4-H is engineered to achieve high-efficiency milling in high-hardness steels. Its unique gash specification with a spiral shape forming from the center to the corner radius improves chip evacuation and prevents chips from getting caught. Chattering is minimized by the AE-CPR4-H's unequal spacing teeth geometry, enabling highly efficient machining even in deep milling of L/D = 14. With the addition of OSG's DUROREY coating and smooth surface treatment, surface accuracy is further improved.

OSG Participates at JIMTOF 2024

OSG members pose for a group photograph at JIMTOF 2024 in Tokyo, Japan.

The OSG Group participated at the 32nd Japan International Machine Tool Fair (JIMTOF) from November 5 to 10, 2024 at the Tokyo Big Sight in Tokyo, Japan. JIMTOF is the largest industrial trade show in Japan and has been held every even-numbered year since 1962. According to official figures, nearly 130,000 visitors attended the 6-day event. On a total exhibition area of 118,540-square-meter, 1,268 exhibitors and a record number of 5,744 booths showcased cutting-edge technologies and products from across the manufacturing spectrum, ranging from machine tools to accessories and equipment of all kinds used in the metalworking industry.

In today's era where efforts to reduce CO_2 emissions in manufacturing processes are becoming increasingly prominent, OSG strives to contribute to the realization of a carbon-neutral society by providing innovations with added value that goes beyond performance and quality. At JIMTOF 2024, OSG announced the release of the highly anticipated high-performance and low-carbon forming tap Green Tap GRT. A new low-carbon product series Gtag was also introduced at the show. A seminar was held on Wednesday, November 6, at the Tokyo Big Sight Conference Building revolving the topics of decarbonization and the elimination of machining troubles to minimize energy as well as waste. New high-performance and environmentally friendly products were introduced by two of OSG's product development engineers. Furthermore, OSG's philosophy of being an environmentally friendly company is reflected in its booth design. More than 90 percent of the OSG booth is made up of reusable parts and recyclable materials.



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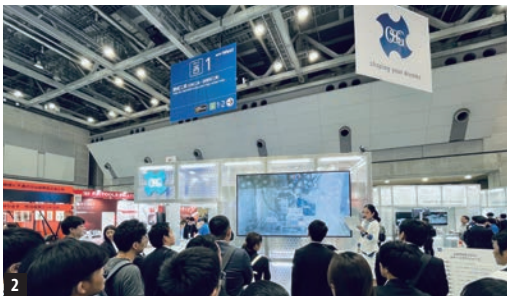
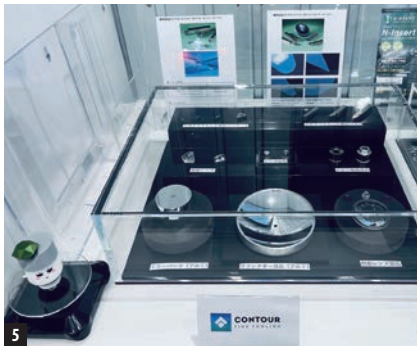




1. OSG's latest high-performance and low-carbon forming tap Green Tap GRT was exhibited at JIMTOF 2024 at the Tokyo Big Sight. Made by a new and original manufacturing method, Green Tap is designed for high-performance machining with enhanced durability and efficiency. It is engineered to reduce environmental impact while delivering optimal precision, making it a game-changer for sustainable manufacturing.

2. Visitors gathered around the OSG booth during a live machining demonstration.

3. Dressed in blue from left, Naoko Sakata and Masatoshi Kageyama, members of OSG Corporation's Global Planning division, demonstrate the operation of OSG's MONOlithbox digital tool management system.

4. OSG Corporation Sales Representative Sei Tanabe poses for a photograph at the A Brand product corner at the OSG booth during JIMTOF 2024.

5. Cutting tools and workpieces by Contour Fine Tooling (Contour), which is known for precision diamond cutting tools for various optical applications, were displayed at the OSG booth during JIMTOF 2024. Contour was acquired by the OSG Group in July 2024 to further expand OSG's presence in the field of micro precision machining and accelerate its global growth.

6. In promotion of OSG's MONOlithbox digital tool management system, visitors who experience operating the machine at the OSG booth were given with an original "OSG Ramen for People who Like Machining (Salt Flavor)," which OSG has collaborated with Ogasawara Seifun Corporation to create.

At the show, OSG offered a variety of programs that could only be experienced on site at JIMTOF. Live machining demonstrations were held four times per day at the OSG booth to allow participants to experience OSG tools' capabilities firsthand. In promotion of OSG's MONOlithbox digital tool management system, visitors who experience operating the machine at the OSG booth were given with an original "OSG Ramen for People who Like Machining (Salt Flavor)," which OSG has collaborated with Ogasawara Seifun Corporation to create.

OSG also exhibited its latest A Brand products (taps, drills, end mills, thread mills) in combination with workpieces related to micro-precision processing, die and mold, automotive, and more. In order to meet the diverse needs of today's manufacturing, OSG has introduced specialized tools optimized for materials such as super engineering plastics, high-hardness steels, non-ferrous metals, as well as brittle materials such as cemented carbide and ceramics. In 2024, OSG has significantly strengthened its diamond tool business and product offering through a number of M&A domestically and internationally. Diamond tooling designed for optical applications were exhibited at the show, demonstrating the OSG Group's expanded tooling portfolio for micro precision machining.

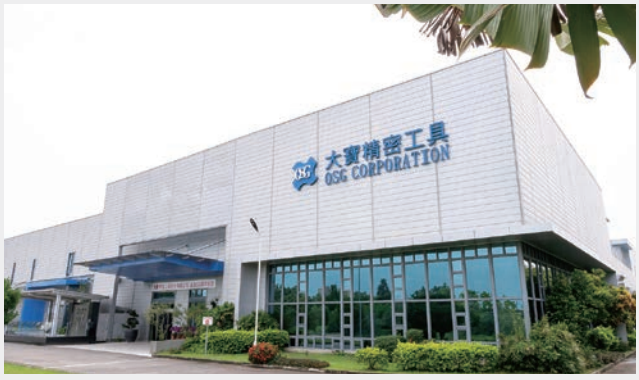
OSG Around the World

Employee Interview with
Hsiu-Mei Chen

Tell us about your background.
I graduated from Oda Fashion College in Japan, majoring in fashion design. While studying in Japan, I also became fluent in Japanese. After graduation, I returned to Taiwan and worked in the apparel and fashion industry for a total of four years and spent two years in the logistics sector. How I ended up working at OSG was serendipity. One day in 2004, while I was still working in Taipei, I received a phone call from my father. He told me that there was a company (Taiho Tool Mfg. Co., Ltd.) near my hometown in Kaohsiung that was recruiting for a Japanese-speaking personnel, and my family hoped for me to return for interview. I left my hometown at the age of 12 for school and did not return after entering the workforce. Taipei is located approximately four hours away from Kaohsiung by car. If I were to work closer home, I would be able to spend more time with my family. The idea was attractive enough that I decided to apply for the interview. Although the field of manufacturing is completely different from what I have studied, I was guided by many wonderful professionals who helped me navigate through this intriguing industry.

Profile
Location: Taiwan
Position: Sales Manager of International Trade Division at Taiho Tool Mfg. Co., Ltd.
Joined OSG Group: 2004
Motto: "Winners never quit and quitters never win."

About Taiho Tool Mfg. Co., Ltd.
Headquartered in Kaohsiung, Taiwan, Taiho Tool Mfg. Co., Ltd. was established in May 1969, and is the second overseas subsidiary of OSG Corporation after OSG USA in America. More than 55 years have passed, Taiho today employs over 370 staff and has transformed from a traditional SKS tap factory into a major high-quality cutting tool manufacturer with a total of eight production sites, stock centers and sales offices located throughout Taiwan and China. Taiho's key products include taps, nut taps, rolling dies, drills and gauges.



The Taiho company headquarters in Kaohsiung, Taiwan.

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1. Fifth from right on second row, Chen poses for a group photograph with Taiho and OSG Group employees at the company headquarters in Kaohsiung, Taiwan.

2. Two large rubber ducks are moored in the harbor in front of the Kaohsiung Pop Music Center. Kaohsiung is known as Taiwan's Harbor Capital because it has the largest port in the country and is where Taiho is located.

3. Chen poses for a photograph during the 20th anniversary celebration of Taiho's Ningbo office in China.

Tell us about your daily routine.

I am mainly responsible for product sales in overseas regions. My daily work includes back office management, business trips to China, client visits, coordination of exhibitions, Japanese translation of corporate communications, market research, etc.

What is most challenging about your work?

Crafting strategic plans to achieve annual objectives and improving customers' satisfaction and loyalty are some of the most challenging aspects of my work.

What is unique about Taiho?

What is most unique about Taiho is its geographical location and cultural environment.

What is your favorite Taiho product?

My favorite tool is Taiho's nut tap, which is used to thread nuts. Taiho is located in Gangshan, Kaohsiung, southern Taiwan, one of the most screw and nut intensive industrial districts in the world. Taiho is honored to be a part of the globally renowned fastener cluster area and will strive to contribute to society through the production of quality products.

4

4. **Through-hole Nuts**

Through-hole nuts processed by Taiho's nut taps. Taiho is located in Gangshan, Kaohsiung, southern Taiwan, one of the most screw and nut intensive industrial districts in the world.

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5. **Nut Taps**

A variety of nut taps manufactured by Taiho Tool Mfg. Co., Ltd., an OSG subsidiary in Taiwan. Taiho's nut taps are manufactured with OSG's original grinding machines with high quality thread grinding techniques that can strictly control thread limit. Taiho has been a major factor in establishing OSG's position as the world's number one nut tap manufacturer.

How do you spend time on your day off?

Because my work involves frequent business travel, I like to spend time with my family at home during time off.

shaping your dreams

For super engineering plastic applications

SEP-EL

DLC Coated Carbide End Mill

scan for details